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## TYPE AND TYPICAL.\*

BY HENRY H. LYMAN, MONTREAL.

These terms are used in such different senses by different authors that confusion is sometimes caused, and it is much to be desired that some authoritative body of naturalists should accurately define their proper use, and then that all other naturalists should accept the decision and conform to it even if it does not agree with their own individual opinions.

My thoughts have been recently turned in this direction by reading the Annual Presidential Address of Mr. Charles Owen Waterhouse, read before the Entomological Society of London on the 15th of January last.

In his address Mr. Waterhouse urges, and in my opinion rightly, that accuracy and stability of nomenclature are of more importance than the observance of the strict letter of the law of priority, but we differ in our views as to the use of the word type.

Mr. Waterhouse urges, as others have done, that there should be only one type specimen for each species, and that that type specimen should be the standard for all time, while I hold that a species should never be founded upon one specimen where that can be avoided.

We agree, however, in regarding the preservation of type specimens as of the greatest importance.

Mr. Waterhouse, pointing out the different ways in which different authors use the word type, especially mentioning that some regard all the specimens which they had before them when describing a new species as types, and distribute them as such, says: "Some thirty-five years ago I saw the danger arising from this loose way of using the word, and applied the word "type" to the actual specimen described when that could be determined, and called the other examples, mentioned by an author, 'co-types.' Some years afterwards my colleague, Mr. Oldfield Thomas, proposed (P. Z. S., 1893, p. 242) the terms para-type, topo-type and meta-type, and all these are useful in their way, but we are both agreed that the word type should be restricted to the actual specimen upon which the species is founded."

\*Read before the Montreal Branch of the Entomological Society of Ontario, Feb. 8th, 1908.

Another similar term, viz., homo-type, has also been proposed, but it may, perhaps, be objected to all these terms except co-type, the meaning of which might seem to be sufficiently obvious, that a glossary is necessary to explain them, and even the word co-type seems to be used in different ways, as Dr. J. B. Smith, in his "Explanation of terms used in Entomology," explains the word as follows :

"Co-types are all the specimens before the describer when a species is named, no single one being selected as the type ; the type in such case equals the sum of the co-types."

This is using the word in a different sense from that in which Mr. Waterhouse and others use it, but it is the sense in which Mr. Oldfield Thomas defined it, Proc. Zoo. Soc., 1893, he adding: "No species would have both type and co-types, but either the former or two or more of the latter."

Para-type is defined by Dr. Smith as "every specimen of the series from which the type was selected," and it is in that sense that Mr. Waterhouse and others use the term co-type.

Meta-type is defined by Dr. Smith as "a specimen named by the author after comparison with the type," but according to Mr. Oldfield Thomas, it must also be from the original locality, and so also be a topo-type.

Homo-type, on the other hand, is "a specimen named by another than the author after comparison with the type," and topo-type is "a specimen collected in the exact locality whence the original type was obtained."

It always appears to me that any unnecessary addition to the already vast number of technical terms is to be deprecated, as imposing an additional burden upon amateurs and beginners, and it would seem to be simpler to label a specimen "compared with type" than to label it "homo-type," and when a specimen is compared with a type by anyone other than the owner of the specimen, the name of the comparer should be put on the label, as the value of such comparison is directly in proportion to the ability of the one who makes it. My objection to having a single type, when additional specimens, which are undoubtedly of the same species, are available, is that in the former case a *specimen* is described instead of a *species*.

One good specimen of a coin is sufficient for description, but insects are not stamped from dies like coins, and all species vary more or less, and if an author has before him a fair representation of the range of variation of the species, his description can be made to much better cover the species than if drawn up from a single specimen. Of course, it is of the greatest importance that all danger of having more than one species in the series selected be avoided, but even should such an error be made, the plan which I have adopted would work automatically to establish the species intended. My plan is to number all the types. The best, and what I believe to be the most typical ♂, I name type No. 1, and the best and most typical ♀ type No. 2. The others are numbered consecutively, as far as possible, according to their closeness to type No. 1. Should, unfortunately, another species be discovered among the types, it must be given a new name, type No. 1 being the final standard for the species. Should type No. 1 be unfortunately destroyed, type No. 2 would then become the final standard.

When a species is very distinct and not very closely allied to any other species, types of any kind are of minor importance, as, for instance, in the case of such a species as *Vanessa Antiopa*, the preservation of the type would be of no consequence beyond the interest necessarily attaching to a specimen described by the great Linnæus.

When the type of a species has been lost or destroyed, a topo-type might be of great importance in re-establishing the species.

In the Proc. Acad. Nat. Sci. Phil., 1862, Mr. W. H. Edwards described a species under the name of *Lycæna Pembina*. The types were brought from the shores of Lake Winnipeg by R. W. Kennicott. Unfortunately, the types were afterwards lost, and Mr. Edwards could not afterwards certainly identify anything as the same. Strecker thought he had identified it with the species later described by Grote under the name *Glaucopsyche Couperi*, but he afterwards admitted his error, and in his catalogue designated it as unknown to him. Scudder thought, after a "prolonged study" of all the N. A. Blues, that it was the same as *Lycæna Lycea*, Edw., of which *L. Arapahoe*, Reak., is accounted a synonym, but that also proved erroneous. In such a case as that, topo-types would be exceedingly valuable, and should render it possible to clear up the mystery surrounding the name.

I now come to the consideration of the word Typical. This naturally means agreeing with the type, but what type? The author's type from which he described the species, or a specimen agreeing with the general average of the species in nature? Surely it should be used in the latter sense, which is the common every-day sense of the term. Some species have unfortunately been described from aberrant specimens, but it is surely absurd to call an aberrant specimen typical of the species?

In 1863 Grote described in the Proc. Ent. Soc. Phil., a species of Tiger moth under the name *Arctia Anna*, the hind wings and abdomen being entirely black. Three months later he described in the same volume what he considered to be another species, under the name *Arctia Persephone*, in which the hind wings were yellow, with black markings, both specimens having been received from the same collector. Later it was found that they were only varieties of the same species, and though *Anna* is very rare, that name is given to the species, while *Persephone*, the common form, which probably outnumbered the *Anna* form fifty to one, is classed as a variety. Surely that is unnatural and ridiculous?

What difference could it make to Mr. Grote's credit whether we write

Arctia Anna, Grote,	Arctia Persephone, Grote,
var. Persephone, Grote, or	var. Anna, Grote?

While the first represents a foolish worship of the Law of Priority, the second shows the true relationship in Nature. Even had they been described by different authors, I would follow the same practice, as it would make no difference to the authors, while it would make the nomenclature agree with nature.

#### NEW AND LITTLE KNOWN BEES.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

The genus *Nomia* doubtless originated in the Old World, where it is abundant and varied. In America it has few species, though one (*N. jenseni*, Friese) exists as far south as the Argentine. The genus may perhaps have reached America about the same time (and doubtless by the same route) as the Elephantidæ.

*Nomia ekuivensis*, sp. nov.

♂.—Length about 8½ mm., anterior wing 6; black, with a strongly clavate abdomen; pubescence dull white (not at all fulvous or yellow);

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head large and broad; front and vertex dull and rough; face covered with hair; mandibles dark; antennæ dark, flagellum with a ferruginous streak at base beneath; palpi dark; tongue rather short, dagger-shaped; mesothorax shining, with strong and mostly well separated punctures; scutellum prominent but not bigibbous, very shiny, with sparse punctures; area of metathorax plicate basally; tegulæ of ordinary size, rufopiceous; wings strongly infuscated in the apical field, iridescent, nervures and stigma piceous; second s. m. nearly square, but a little oblique, receiving the first r. n. at or very slightly beyond its middle; third s. m. large, scarcely shorter than first; legs black, slender, tarsi brown, the hind ones quite pallid; hind legs not modified; abdomen shining, finely punctured, hind margins of segments depressed and with thin hair-bands; most of fourth ventral segment depressed and covered with hair.

*Hab.*—Ekuiva Valley, W. Africa, 1907 (*Wellman*). *N. producta*, Smith, from Natal, and *N. andrei*, Vachal, from the French Congo, also have a claviform abdomen. The following table separates the males:

Clypeus greatly produced; first r. n. joining second t. c. . . . *producta*, Sm.\*  
 Clypeus normal. . . . . I.  
 1. Head and mesothorax sculptured alike . . . . . *andrei*, Vach.  
 Head and mesothorax sculptured quite differently . . . *ekuivensis*, Ckll.

*Nomia Welwitschi*, sp. nov.

♂, ♀.—Length about 10 mm., black, the head and thorax with dense, coarse pubescence, strongly ochreous on thorax above, otherwise pallid; wings strongly and broadly infuscated apically; hind margins of abdominal segments broadly whitish or reddish, with hair-bands.

♂.—Head broad; orbits converging below; face broad, very hairy; antennæ dark, ordinary, flagellum dull red beneath; vertex with rough, dense sculpture; mesothorax very densely rugosopunctate; scutellum normal, rugosopunctate and dull; metathorax with a subbasal ridge, above which is a narrow (almost linear) area, which is shining and somewhat plicatulate; tegulæ ordinary, piceous, pallid in front; wings reddish

\*Since writing the above, I have determined that *Nomia producta*, Smith (Tr. Ent. Soc. Lond., 1875), is not a *Nomia* at all, but a *Thrinchostoma*. For the venational characters, see Ckll., Trans. Amer. Ent. Soc., XXXI, p. 322. The name *producta* was earlier used for a different *Thrinchostoma*, so the *Nomia producta*, Sm., may be known as *Thrinchostoma nomieformis*, n. n.

subhyaline, the apical region with a dark cloud; nervures and stigma dark, stigma small; second s. m. broad, receiving first r. n. beyond the middle; legs red, the coxæ and trochanters black, and the femora black above; anterior tarsi fringed with long hair; middle femora short and rather swollen, very shiny; hind femora greatly incrassated, concave beneath, with a sharp tooth on inner side beyond the middle; hind tibiæ enlarged, subtriangular, with a broad, blunt, apical lamina, but no tooth on inner side; abdomen broad, with hair-bands on all the segments, apex rounded, bright ferruginous.

♀.—Legs black; abdominal bands golden-fulvous.

*Hab.*—Ekuiva Valley, W. Africa, 2 ♂'s, 1 ♀, 1907, one of the males at flowers of *Geigeria* (*Wellman*). The species is named after Welwitsch, the well-known African traveller, who collected bees in Angola many years ago. By the clouded wings and other characters this closely resembles *N. nubecula*, Smith, from Sierra Leone, but it differs from *nubecula* by the dark mandibles (only slightly ferruginous in the middle), the dark scape, the form of the scutellum, the dark tegulæ, etc. The face is broad, whereas in *N. nubecula* (of Ckll., Trans. Am. Ent. Soc., XXXI, p. 322) it is narrow. In the form of the hind legs *N. Welwitschi* resembles *N. patellifera*, Westw., except that the tibial process is shorter and blunter.

*Nomia Wellmani*, sp. nov.

♀.—Length 10 mm. or a little less, robust, black, the apex of the abdomen covered with shining orange-ferruginous hair, and the hind margins of the third to fifth segments with broad hair-bands of the same colour, that on the fifth dense, those on the other two paler and thinner, very thin on middle of third; a little of the same hair at sides of second segment; all this giving an appearance just like that of the Australian *N. australica*, Smith, as seen from a little distance.

Head and thorax very densely rugosopunctate; face very broad, rather thinly covered with coarse whitish hair; antennæ black, flagellum more or less red beneath; mandibles black, with long golden hairs beneath; tongue rather long, linear; labial palpi elongated, with the first joint longer than the other three united; maxillary palpi slender; thorax with coarse, dull white hair; tegulæ ordinary, shining piceous, whitish in front;

scutellum and postscutellum ordinary; metathorax with a transverse subbasal ridge, very prominent, enclosing a band-like shining area which is more or less plicate; legs black, the tarsi (especially the hind tarsi) broad; anterior basitarsi, and apex of their tibiae, with orange hair; apex of hind basitarsus fringed with bright orange hair; base of hind basitarsus above ferruginous; abdomen broad, densely punctured; wings dusky, the apical margin broadly darker; stigma ferruginous, nervures rather pale brown: marginal cell very obtuse at apex; second s. m. very broad, receiving first r. n. beyond its middle.

*Hab.*—Hinterland of Benguella, W. Africa, Jan. 3, 1908, taken with many other bees at a patch of flowering Compositae, *Othonna* and *Geigeria* spp. (*Wellman*). This species is not truly congeneric with such forms as *N. ekuivensis*, but I should prefer to examine a larger series of the African species commonly assigned to *Nomia* before proposing any segregated genera.

*Nomia Bakeri*, Ckll., 1898.

This species was described from the male only. A female was taken by Mr. S. A. Rohwer at Boulder, Colorado, Sept. 16, 1907. It agrees with the male, except in the usual sexual characters; the tibiae and tarsi are entirely clear ferruginous, with yellowish-white hair. The sixth abdominal segment is clothed in the middle with appressed bright orange-ferruginous hair. The wings are very yellow, with the apical margin broadly infuscated.

*Calliopsis coloradensis*, Cresson, 1878.

♂.—Length, 8 mm.; black, with abundant white pubescence; face, knees, tibiae and tarsi lemon-yellow, the small apical joints of the tarsi ferruginous. The abdomen is broad and flattish, like that of a female; the hind margins of the segments are rather broadly hyaline, with thin white hair-bands. Head broad; eyes green; labrum yellow, prominent, concave, with a central dark spot; mandibles yellow except apically; supraclypeal and dog-ear marks present; lateral face-marks large, extending above level of supraclypeal mark, ending in an acute angle on the orbital margin: scape yellow in front; flagellum ferruginous beneath; prothorax yellow above; tubercles dark; wings clear, nervures and stigma ferruginous; anterior femora with the apical half in front yellow;

anterior and middle tibiae with a black spot behind, but *hind tibiae wholly yellow*. Closely related to *C. andreniformis*, Smith, but much larger, with a much broader face, and the femora mainly black. It is also very much larger and broader-faced than *C. rhodophilus*, Ckll.

Boulder, Colorado, at flowers of *Grindelia perennis*, Nelson, August (*S. A. Rohwer*).

Cresson's description of the male of this species is very short, but I think there is no doubt about the identity of our insect. There is in this group a curious sexual difference in the first abdominal segment, which is much more closely and minutely punctured in the males than in the females.

*C. chlorops*, Ckll., was based on a male of this group, easily distinguished from *coloradensis* by the colour of the legs and the smaller size. *C. coloratipes* (Ckll.) is very like *chlorops*, but the eyes in both sexes have a sort of purple colour, instead of the characteristic green of *chlorops* and *coloradensis*. The species common at Phoenix, Arizona, at flowers of Compositæ (*Heterotheca*, etc.) hitherto regarded as *coloratipes*, has green eyes, and must be associated with *chlorops*, though, perhaps, racially separable. A male from Florissant, Colorado, at first referred to *coloradensis*, proves to be *chlorops*. Two females from Soledad Canon, Organ Mts., New Mexico, (*C. H. T. Townsend*), belong to *chlorops*, resembling the Arizona form. The females of *coloratipes*, and also those of the Arizona form of *chlorops* (in each case taken in copula with the males), have the light dog-ear marks on the face, which are wanting in *coloradensis* ♀. The more northern and typical *chlorops*, however, seems to have a female without these marks; and at present I do not know how to separate this from *coloradensis*. There is just a possibility, perhaps, that *coloradensis* was founded on females of *chlorops* and males of the Boulder species described above.

A female which I collected at Rinconada, New Mexico, at a tall species of *Chrysothamnus*, Sept. 26, represents an intrusion of the southern type into northern New Mexico, up the Rio Grande Valley. It has the dog-ear marks very well developed; and the lateral marks are peculiar, being broad and obliquely truncate above, with a linear upward extension quite distinct from the truncation. This may represent a distinct local race.



## FURTHER NOTES ON ALBERTA LEPIDOPTERA.

BY F. H. WOLLEY DOD, MILLARVILLE, ALBERTA.

(The numbers refer to my list previously published in this magazine.)

1. *Danaïs archippus*, Fabr.—Both Mr. Willing and Mr. Gregson inform me that there can be no doubt that the species breeds here. It is not likely, however, that it survives the winter in any stage.

[3a. *Argynnis leto*, Behr.—I have had a few specimens sent me as this species from Utah and Idaho. The males differ from eastern *cybele* mainly in being less heavily marked with black, especially in the outer row of round spots in the interspaces, with a distinct tendency towards the gradual obliteration of all markings near the apex, and in having smaller metallic spots beneath. My only female of these is pale straw instead of pale red as in typical *cybele*, and both sexes agree well with Holland's figures. Some Calgary specimens taken since my last list was published closely approximate these, though I cannot see that they are superficially separable from the local *cybele*, as they appear to grade through. My only local female of either, taken in cop. with one of the most intermediate males, is considerably paler in colour than eastern females, but except in being much smaller, otherwise approximate them rather than my Idaho specimens. In short, what I have listed as *cybele* seems strictly referable to neither so-called species.]

4. *A. cypris*, Edw.—The species is, without much doubt, identical with *cypris* ♂ sent me from Denver, Colo., which, however, is somewhat richer in colour. The resemblance of the local form to the paler forms of *lais* is very close, and confusion is easy without a good knowledge of both. Though nearly all Calgary specimens that I have seen are a little larger, a series I took last summer on the Gleichen prairie, as well as some submitted to me by Mr. Crocker from Redvers, Sask., are decidedly smaller than Calgary *lais*. The apices are more acute, and outer margin very slightly concave instead of straight or slightly convex as in *lais*. The veins of primaries are much less prominently black marked. Another difference is in the greater length and thickness in *cypris* of the tuft of hairs on the subcostal vein of secondaries. Also, this tuft, as well as the rest of the hairs near the inner margin, show, in certain lights, a very distinct violaceous reflection, quite characteristic of the species, and not seen in *lais*. These remarks apply to the male. I have only one undoubted female, taken in cop. Other females scarcely differ, but

apparently the species is harder to separate from *lais* in this sex than in the male.

6. *A. electra*, Edw.—The separation of local material into two species as *atlantis* and *electra* is quite out of the question. *Atlantis* is strictly eastern, and as distinguished from the rest of the group is larger, has heavier black markings, including a wider outer border, and a narrower buff band beneath. Of *electra* from Colorado, its described district, I have only one pair, but cannot see any difference whatsoever from the species so widely distributed throughout the Rockies and Selkirks of British North America, including the prairie-bounding hills in the west-central portion of Alberta. The darker forms found in that region, though a bit smaller, approximate the eastern species so very closely as to make separation more than difficult. The lighter end of the series is the *lais* common on the Albertan prairies, whence this form was described. My series at present consists of sixty males and about thirty females, and I have from time to time closely examined a very much greater number. These include two males from Windermere, four from Kaslo, one from Osoyoos, four males and five females from the Rockies, along the line of the C. P. R., and the rest from various localities from the foothills to the plains, though I have none from east of Calgary, having seldom collected there during its season. My efforts to procure more mountain material have been unsuccessful. The typical prairie form is much less heavily black-marked, has lighter and more restricted brownish basal area, and less rusty-red on secondaries beneath, with a rather wider buff border. I have tried for years, but have utterly failed to draw any distinct line between the two forms, and waver between two opinions. Those are, that either *lais* is a prairie form of *electra*, merging gradually into it as it reaches the mountains, or that they are really two species, of which the extreme varieties overlap, and of which *lais* does not quite reach the mountains, though *electra* just reaches to the edge of the plains. *Lais*, however, is entered in the B. C. list, on the authority of Dr. Holland, who states that it is found in "Alberta and Assiniboia, and in British Columbia among the foothills and the lower slopes of the mountain ranges." There is sometimes a slight tendency for the prairie form to lose the silver from the marginal spots near the anal angle of secondaries, and in one specimen, taken on June 10th, an abnormally early date, the marginal row have scarcely any trace of silver whatever.

7. *A. monticola*, Behr.?—My previous record of this species was based on a single Banff male, and so far I have seen no more from Alberta. I cannot find by what authority I listed it under the name, but Dr. Skinner refers to the record in Supplement No. 1 of his Catalogue. I have a similar male from Kaslo, received as *rhodope*, but differing from Vancouver and Island specimens under that name in being slightly smaller, paler in both ground colour and shading above, and in having paler secondaries beneath, without trace of silver on any of the spots, and the marginal row slightly larger. It agrees in these details with Holland's figure (under side) and description of *monticola*, except in having more of a rusty-red and less of a purplish shading on secondaries. I recently submitted both these forms to Dr. Skinner. The coast specimens he named *rhodope*. The Banff and Kaslo specimens he says exactly fit no described form, but "are related to *serene* and *monticola*, var. *purpurascens*." Under *rhodope*, in the Kootenai list, Dr. Dyar mentions that Mr. Cockle had the species standing as *monticola*.

8. *A. halcyone*, Edw., vel. *platina*, Skinner?—I listed the species as *halcyone* on the authority of Dr. Skinner, who had specimens from me some years ago, and who entered the record in Supp. No. 1 of his Catalogue. Of Calgary material, I have now under examination twelve males and three females, and have at times distributed a few of both sexes. Some of the females, which I had been unable to compare when writing my former notes, to my mind fit Edwards's figure of ♀ to a nicety, but both sexes show considerable variation. I have males almost the exact counterpart of mine from Colorado, 8-10,000 ft., labelled "Gore's Range," "Williams River Range," and "Pinnacle," and Dr. Skinner bears me out in associating these specimens, and now says: "They are near *platina*, and undescribed." Calgary females, however, are less like my females from the same locality. Of what Dr. Skinner tells me is true *platina*, I have a ♂ from Beaver Canon, Idaho (one of the type localities), another from Stockton, Utah, and a ♀ from Soldier Canon, Toocle Co., Utah. This series differs from the Colorado mountain series, and, in the main, from the Calgary males, in being slightly paler in all the details of colour and shading, but more distinctly in having rather larger silver spots and a wider buff band. An occasional Calgary male, however, is by no means sharply distinct. Of the only Calgary female Dr. Skinner has seen from me, he says: "Near *halcyone*, but markings darker and heavier." I have two males, from Oslar and Glenwood Springs, Colo., which Dr. Skinner

has named *halcyone*, and these differ most obviously from the local specimens in being paler in both colour and basal shading above, and lighter in markings. As to my former references to *coronis*, Behr., under this heading, Dr. Skinner tells me that the types of that species came from Mare's Island, San Francisco, now built over or otherwise spoilt entomologically. Also that Mr. Edwards's identification of the species was erroneous, and that the types having now been destroyed in the San Francisco fire, the exact identity of the species is doubtful. I took a pair in cop. at Brisco, B. C., on the Upper Columbia, about thirty-five miles below Windermere, on July 15th of last year, which are probably the same as the Calgary species. The male, however, is washed with green beneath rather than brown, and I at first mistook it for *Meadii* or *Nevadensis*, but it agrees best with the *platina-halcyone* series in other respects. It reflects brown in certain lights, which Calgary *Meadii* do not, and nearly all of the local series show a green iridescence as well as the brown, suggesting that the colour is prismatic rather than pigmentary. Another ♀, taken at the same place and time, is also greener than any Calgary specimens. The variation leads me to suspect that this species may, in some localities, sometimes be confused with *Nevadensis* or *Meadii*.

9. *A. Nevadensis*, Edw., var. *Meadii*, Edw.—In my list I recorded this species as *Nevadensis* merely, but have now decided that *Meadii* fits it better. I have compared it with four male and five female *Edwardsii* from various Colorado localities, three male *Nevadensis* from Nevada, Nevada Co., Calif., and Yellowstone Park, Wyo., and with four male and three female *Meadii*, one pair from Stockton, Utah, and the rest from Colorado. My *Edwardsii* are quite the largest of the group, and compared with the local form are rather darker, though having less of the dark basal shading above, the veins with less black, and in the females a heavier black border. Beneath there is more and richer red on primaries, and the very much darker green on secondaries (Holland says "olive-brown") encroaches much more on the buff submarginal band, so as to sometimes almost obliterate it, and the marginal silver spots differ in shape. In the Calgary species they are almost triangular, pyramidal, with the vertices generally rather sharply angled, almost dentate. In my *Edwardsii* they are more nearly rounded, with the vertices blunt. A single specimen from the Red Deer River, though pretty obviously conspecific with the rest of my series, bears some resemblance to *Edwardsii* in the shape of the spots and partial obliteration of the band.

But I have found nothing amongst north-western material examined that I can treat as distinct under the name *Edwardsii*, by which the form generally passes, and as which it was probably recorded from Alberta by Geddes. *Nevadensis* is smaller, though about right in colour, and is more lightly shaded basally, with the veins less black, and the green paler. Colorado *Meadii*, as to basal shading and black, is even a little too dark. The shape of the silver spots agrees with the local form, though the green encroaches more on the buff band, differing in this respect from *Nevadensis*. The Calgary species, however, differs rather markedly from either *Nevadensis* or true *Meadii* in the tint of the green, this being, especially in the female, almost a peacock blue. An exception must be made with the Stockton, Utah, pair, which approximate the local form so much more nearly than any of the rest, that I have at times rather doubted the genuineness of the labels.

17. *A. Alberta*, Edw.—Mrs. Nicholl and I met with the species in fine condition on several mountains near Laggan, far above the timber line, from July 19th onwards, in 1904. The lower spurs and shoulders of Mts. Fairview and Piran are easily accessible to an energetic amateur hill-climber (I may remark that the "hills" are a bit steep!), and good hunting grounds for this species. The ridge leading from Fairview to the Castle Crags holds the species, and is partly smooth, even ground, but dangerously precipitous on the Lake Louise side. It is best reached via the trail right up to Saddle-Back, and thence over nearly the summit of Fairview. A long low spur of Mt. Piran, on the side next Mts. White and Victoria, is also an excellent hunting ground, easy to run on, and not a bit dangerous. The insect is far easier to capture than *astarte*, and, unlike that species, the sexes were taken in about equal numbers. It usually flies close to the ground, frequently settles, and when approached does not rise quickly nor high. Mrs. Nicholl subsequently found it widely distributed between Laggan and Field. Bean records the capture of a pair on a mountain near Hector, B. C. (Edwards Butt. N. Am., Vol. III), and Mrs. Nicholl captured specimens on a mountain rising from the lower end of Wapta Lake at Hector, near Lake O'Hara, and at the very head of the Yoho Valley, the latter at about 8,000 feet. She also met with it in abundance during the latter part of July of last year (1907), on a trip from Laggan to the head waters of the Athabasca. She writes: "*Alberta* fairly swarmed in places. I got twenty-five in one day on the

slopes of Wilcox Peak. I think it prefers slate mountains, and likes steep shaly slopes. It was very common on Wilcox Pass." Her record of the species for that year is of particular interest, as Mr. Bean never met with it at Laggan except in even digitated years, and believed it to be a biennial species.

18. *A. astarte*, Doubl.-Hew.—We found this on the same dates in similar situations to the last, but even more widely distributed, and the males go higher up. The extreme summits of Mts. Fairview (8,875 ft.) and Piran (8,610 ft.) both held the species in some numbers. I saw a few on Saddle Peak (7,900 feet) just east of Fairview, as late as 5 o'clock in the afternoon. A few were to be seen considerably below the peaks, but the tip-top is the favourite playground of the males. Its flight is unmistakable. Two or three would often meet in playful gyrations, and ascend in a few seconds to a height of fifty or a hundred feet above the very highest peak, then separate as suddenly and descend in different directions, to continue their rapid, dodgy flight amongst the sometimes almost scorchingly hot rocks. I was using a short-handled, wide-mouthed net, whilst Mrs. Nicholl had a rather narrow-mouthed one, but with a longer handle. This fact, added to superior dexterity in handling it, enabled her to capture at least three to my one. All three of these peaks are composed of a huge pile of loose sharp-edged rocks and stones, varying in size from a haystack to a match-box, so the nature of the ground makes quick-stepping impossible, if not foolhardy. Some of the lower spurs where *Alberta* should be sought, and *Chionobas Beanii* is more easily captured, are more or less evenly covered with fine close-lying shale, on which even running is safe. The females were much more rarely met with, and down nearer the timber line. During that summer Mrs. Nicholl also saw *astarte* on Mt. Assiniboine, south of Banff, and at Glacier Crest, in the Selkirks. A pair of her British Columbian captures are in my collection, a ♂ labelled "500 ft. above Lake O'Hara = about 7,000 ft., July 28th," and a ♀ from "Pass to Yoho Valley, timber line, Aug. 23rd," the latter in fair condition only. Mrs. Nicholl wrote to me from Emerald Lake on 22nd, and left for the Yoho the following day, so the B. C. origin of this specimen is beyond dispute. She reports that she met with the species that summer everywhere she went in the Rockies, and says that females were not hard to stalk when sitting on a flower. She tells me that during her trip far to the north of Laggan last year (1907) her packer, Jim Simpson, caught eleven specimens on the spurs of Mt. Athabasca and

northwards, very fresh, in the last week of July. Mrs. Chas. Schæffer also records it from Mt. Athabasca, and from Mt. Temple, near Laggan, "above the saddle."

19. *Melitæa anicia*, Doubl.-Hew., var. *Beanii*, Skinner. — Not uncommon on Mt. Piran, from about 7,000 to 8,000 feet. It seems to merge into *anicia* lower down. Mrs. Nicholl met with var. *Beanii* during her trip far north of Laggan last summer.

21. *Phyciodes ismeria*, Bd.-Lec. — A worn ♀ at Gleichen station, June 29th, 1905.

22. *P. tharos*, Dru. — A form I have taken at the Red Deer River locality during early July, and which has puzzled me considerably, differs from the more usual form, which flies, equally fresh, at the same time and place, in being conspicuously marbled beneath. I considered it distinct, but Dr. Skinner says that specimens I sent him agree with some of Edwards's figures of var. *marcia*. A species sent me as *camillus* from Hall Valley, Colo., closely resembles this form beneath, but is nearer to *pratensis* above.

24. *Grapt'a satyrus*, Edw. — Not common. I have only five local specimens under this name in my collection. Two of them are much variegated and contrasting beneath, with the band on secondaries defined outwardly by a rather heavy black line, and a heavy G mark. A specimen from Kaslo is like this. The other three are much more uniform and darker beneath, with the band edged by a finer line, and the G also finer. One of them was bred from a larva which fed on nettle. Three specimens from Wellington, B. C., are like this. The under sides figured by Dr. Holland of both *marcyas* and *satyrus* are like the first form, and I believe I have two species.

25. *G. faunus*, Edw. — I have only one Calgary specimen, like Dr. Holland's figures, and agreeing with specimens sent me as this from Montana and B. C.

26. *G. zephyrus*, Edw. — Two local specimens agree well with Holland's figures, but are darker. One of them Dr. Fletcher has named *zephyrus*, and they are probably the same as a Colorado specimen sent me as such by Dr. Barnes. I have others of the same species from Wellington, Vancouver and Colorado.

31. *Pyrameis atalanta*, Lin. — I have occasionally bred it from larvae found on nettle, but have never seen the imago at all common. I have observed it on the wing, presumably after hibernation, as early as May 15th.

33. *Limenitis arthemis*, Dru.—Fairly common on the Red Deer River bottoms wherever there are willows.

34. *Cænonympha typhon*, Rett., var. *laidon*, Bork.—This, according to Dr. Skinner's Revision of the genus, is the correct name for the species, *inornata* being placed as a synonym. My tentative reference to *ochracea* proves erroneous. I have at present thirty-six males and fifteen females in my series, and have examined a large number more without being able to make two species. Many of the males that I have from the prairie round Gleichen are somewhat heavily suffused with fuscous, both above and beneath, and yet I have a paler male from there than any in my south-west of Calgary series. One of the Gleichen specimens lacks all trace of the pale bands beneath. Only one very small male (24 mm.) lacks ocelli. Nearly all others have ocellus on primaries above, usually very faint, rarely black pupilled. The corresponding black, pale-ringed ocellus beneath is usually pale pupilled, rarely obsolete. The secondaries beneath are often without ocelli, or there may be one or two small ones, and rarely traces of even four or five. None have the sub-basal ochreous patches which seem to be characteristic of *ochracea*. The females are paler than the males.

35. *Erebia discoidalis*, Kirby, has been seen as early as April 18th, 1902.

36. *E. disa*, Thunb., var. *mancinus*, Doubl.-Hew.—After a long hunt for it, with sundry chases after *epipsodea*, Mrs. Nicholl and I caught six fine specimens of this butterfly in a lightly fir-timbered swamp near the foot of the north end of Sulphur Mountain, Banff, scarcely ten minutes' walk from the Sanitarium, on July 1st last. We saw more than double that number, but they escaped by disappearing into thicker timber. It appeared to be very local, and not at all common. I think Mrs. Nicholl took a female. She subsequently met with it far north of Laggan. She writes: "I got none on the Piperstone Creek, which I think is too dry for the species. But on the Saskatchewan, in one place, I saw several, and caught two, both in bad order." That would be about the end of July.

38. *Satyrus alope*, Fab., var. *nephele*, Kirby. Most of the specimens fit Holland's figures of *olympus* better than any of the other forms. Specimens from Chicago received under this name match them pretty closely, but are slightly darker beneath, and have more ocelli on secondaries.

(To be continued.)



LIST OF HEMIPTERA TAKEN BY W. J. PALMER, ABOUT  
QUINZE LAKE, P. QUE., IN 1907.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

(Continued from page 116.)

## TETTIGONIIDÆ.

*Oncometopia costalis*, Fabr.—Apparently common.*Tettigonia gothica*, Sign.—Taken at Temagami.*Dicrocephala coccinea*, Forst.—A most beautiful species, which seems to have been abundant at all places where Mr. Palmer collected.*Dræculacephala mollipes*, Say.—Taken at Quinze Lake only.*Dræculacephala novæboracensis*, Fitch.—Quinze Lake. Apparently common.*Gypona Quebecensis*, Prov.—Common at all stations.

## JASSIDÆ.

*Platymetopius acutus*, Say.—Taken in numbers at Temiskamingue.*Platymetopius latus*, Baker.—With the last, and at Bear Island in Lake Temagami and about Quinze Lake. This species, which I have taken in New York, Ohio, Colorado and Utah, has been a difficult form to place. The larger and paler specimens from Utah have been determined for me as Baker's *latus*, and in all essential characters they seem to agree fairly well with the description of that species. From these paler forms they run by almost insensible gradations in form and colour toward the smaller and darker *acutus*. In all, however, the vertex is longer, the oblique veins of the costa are more regularly placed, and the face is either entirely pale or but slightly infuscated exteriorly, with the basal angular pale line never entirely obsolete. I believe these should be separated from *acutus*, but whether they are the true *latus* of Baker is perhaps questionable. This species, *acutus*, Say, and *frontalis*, Van D., are common and widely distributed. The closely-allied *cuprescens*, Osborn, I have taken at Phœnicia, Colden and Gowanda, N. Y., always on springy spots among the hills.*Platymetopius obscurus*, Osborn.—Barrier Lake. Two examples. This is an interesting addition to the Canadian fauna. It was described by Prof. Osborn from material taken in New York, Pennsylvania and Ohio. It has the infuscated face found in *fuscifrons*, but most closely resembles *acutus*, than which it is smaller, stouter and has a shorter vertex. Of this cosmopolitan genus fifteen species have thus far been recorded from

America, north of Mexico. Provancher's *Platymetopius acutus* is the species here identified as *latus*, while his *magdalensis* is the *acutus* of Say. *Platymetopius ornatus*, Baker, has been placed in genus *Dicyphonia* by Dr. Ball.

*Deltocephalus Sayi*, Fitch.—Apparently common.

*Deltocephalus abdominalis*, Fabr.—Five examples were taken at Temiskamingue, Quinze Lake and Barrier River. This species may be roughly distinguished from the green examples of *debilis* by their having the base of the front abruptly black.

*Deltocephalus affinis*, Baker.—Temiskamingue and Barrier Lake. In compliance with the now generally accepted synonymy of this species, I have applied this name to the species formerly determined by me as *Melscheimeri*, Fh.

*Deltocephalus Melscheimeri*, Fitch.—Nigger Point, Quinze Lake. One example. This is a smaller and more slender species than the preceding, and much less abundant.

*Deltocephalus inimicus*, Say.—Common at all places where Mr. Palmer collected.

*Athysanus instabilis*, Van D.—Temiskamingue and Quinze Lake. Three examples. These specimens are typical *instabilis*, which Osborn and Ball identify with the European *striatulus*, Fall., in which they are very likely correct, but as my material does not agree with any descriptions of that species accessible to me, I prefer for the present to place it under a name of which I am certain, leaving it to future study to settle the synonymy.

*Athysanus*, sp.—Two examples, representing both sexes, were taken with the preceding. This is a smaller and more slender species, which may be best distinguished by the pale gray elytra with the areoles but obscurely bordered with darker, by the conspicuously white or pale yellow margins to the black abdomen, by its having the pygofer of the female whitish, with their base and the oviduct black, and by the mostly pale legs. This is the species listed as *striatulus* in my list of the Hemiptera taken by Mr. Palmer at Lake Temagami.

*Phlepsius apertus*, Van D.—Three examples from about Quinze Lake. An interesting species that finds its home in the far north.

*Phlepsius fulvidorsum*, Fitch.—Two specimens taken with the last.

*Scaphoideus immistus*, Say.—Taken at White Rapids and about Quinze Lake.

*Thamnotettix eburata*, Van D.—Temagami. One example. In 1906 Mr. Palmer took a good series at the same locality.

*Thamnotettix*, sp.—Nigger Point, Quinze Lake. Two examples.

*Thamnotettix inornata*, Van D.—Temiskamingue and Quinze Lake.

*Thamnotettix flavovirens*, Gill. and Baker.—Temiskamingue P. O. and Barrier Lake. Five examples. This pretty little green species was described from Colorado, and I have in my collection a specimen from Vancouver Island. So far as I know this is its first recorded occurrence in the east.

*Chlorotettix unicolor*, Fitch.—Taken at all stations where Mr. Palmer collected, and apparently common.

*Balclutha*, sp.—Temiskamingue. One example. I have taken this species at Hamburg, N. Y.

*Cicadula punctifrons*, Fall.—Nigger Point, Quinze Lake. One example.

*Cicadula variata*, Fall.—One specimen from Temiskamingue.

*Cicadula arcuata*, G. & B.—Three examples taken at Temiskamingue and Quinze Lake. Last year I listed this as *Cicadula lepida*, Van D.

*Cicadula 6-notata*, Fall.—Barrier River. Two specimens.

*Cicadula lineatifrons*, Stal.—Three examples of what I believe to be this species were taken at Barrier River and Quinze Lake. These are larger than *6-notata*, with the vertex more produced. All of them have two black points on the vertex near the hind margin, very faint in one individual; and in two the basal angles of the scutellum are black, otherwise they agree closely with Stal's description. There is a transverse line on the vertex anteriorly and another on the edge of the head, both interrupted in the middle, and the commissural nervure is fuscous, broadly interrupted with white.

#### TYPHLOCYBIDÆ.

*Empoasca obtusa*, Walsh.—Barrier River. One example.

*Empoasca unicolor*, Gill.—Taken in numbers at all places where collecting was done. This is one of our most abundant and generally distributed species in the Northern States and Canada.

*Empoasca splendida*, Gill.—Two examples that certainly belong here were taken at Temiskamingue P. O. by Mr. Palmer.

*Empoasca atrolabes*, Gill.—Numbers of this species were taken with the preceding and at Barrier River. This species and *splendida* seem to

run together by insensible gradations, not only in colour, but in the form of the last ventral segment of the female, and it would not be surprising if eventually they would have to be united, as suggested by their describer.

*Typhlocyba bifasciata*, Gill and Bak.—Temiskamingue and Barrier Lake.

PSYLLIDÆ.

*Psylla carpini*, Fitch.—Not uncommon at various localities.

*Psylla*, sp.—Three examples of a smaller species were taken at Temiskamingue.

SOME COLEOPTERA AFFECTING THE HONEY LOCUST.

BY C. O. HOUGHTON, NEWARK, DEL., ENTOMOLOGIST, AGRICULTURAL EXPERIMENT STATION.

On a farm near Newcastle, Delaware, there is quite a strip of honey locust (*Gleditschia triacanthos*, Linn.), hedge, which I have visited two or three times during the past two years. This hedge appears to have been injured by fire at some time, and certain sections of it are now entirely dead. Other sections are very thrifty, while between the dead and living sections may be found parts that are partly dead and partly alive.

My first visit to the hedge was on June 12th, 1906, and my attention was drawn to it owing to the large number of specimens of *Agrilus fallax*, Say, which I found upon it. Whether or not they were feeding upon the leaves I did not determine, but it seems probable that they were. At any rate, they were present in large numbers, and several were seen pairing. About fifty specimens were taken in a short time—the first of this species that I had ever seen.

Owing to the presence of such large numbers of this species on the hedge that day, I thought it probable that these beetles were breeding in its dead or dying wood, and I resolved to return to the place the next spring to collect some of this and attempt to breed *A. fallax* therefrom.

A few branches which were broken off at that time and brought home were found to contain Buprestid larvæ. One of these which I examined measured 5 mm. in length by 1.75 mm. in breadth, at the greatest width; another 6.5 mm. by 1.75 mm. The brief notes which I made on the larvæ at that time are as follows: "White; mandibles brown, tipped with black."

May, 1908

To illustrate the biting power of these small larvæ, one which I allowed to seize the point of a dissecting needle held itself suspended therefrom, at an angle of about 45 degrees, for a period of nearly two minutes.

No attempt was made to rear these larvæ, but on June 10, 1907, I again visited the hedge and collected a suit-case full of the wood. This was principally dead, but I made it a point not to get that which was too old and brittle, as some of it which I examined on the ground did not appear to contain any wood-boring larvæ—nor did I find any in the living wood which I secured.

This material was brought home and examined, and it was found that there were apparently several kinds of living larvæ therein. It was, therefore, cut up into suitable lengths and placed in air-tight glass jars, or glass cylinders with cotton batting at top and bottom, and set away in my laboratory. The first beetle bred from these dead branches appeared June 11, and proved to be *Neoclytus erythrocephalus*, Fab. Other specimens of this species emerged later.

On June 20 a specimen of *Clerus quadriguttatus*, Oliv., was found alive in one of the jars, and several other specimens of this species appeared later. It is probable that their larvæ were feeding upon the larvæ of some of the wood-borers in the *Gleditschia*, as most of the Clerid larvæ appear to be carnivorous. On June 24 three specimens of *Liopus fascicularis*, Harr., all alive, were found in one of the jars; also a specimen of *Melanophthalma distinguenda*, Com., and one of *Liopus variegatus*, Hald. Another specimen of the latter species had emerged a few days earlier, but escaped.

A specimen of *Tropideres rectus*, Lec., emerged June 29 or 30. The pupal cell of this specimen had been opened when the branches were cut up. At this time it contained a larva. The pupa was observed several days before the adult emerged, but the exact length of time of the pupa stage was not determined.

On July 1 a specimen of *Ecyrus dasycerus*, Say, emerged, also one of *Phyton pallidum*, Say. Like *Clerus quadriguttatus*, this Clerid was (as a larva) doubtless feeding upon the larvæ of the wood-borers.

No specimens of *Agrilus fallax*, the species which I most expected to secure from the *Gleditschia*, emerged. However, when cutting up the branches from the jars, a living Buprestid larva similar to if not identical with the larvæ found in 1906, was found, which I thought was probably a

larva of that species. At that time it measured probably about 6 mm. in length, and I thought that possibly it might soon pupate. This it failed to do, however, but continued to work in the piece of branch all summer. Wishing to determine whether this larvæ was still alive at the end of the year I followed up its burrow on Dec. 30, 1907, and soon located it. It was apparently thriving, although it had been in the dry branch in a hot laboratory all summer, and had increased somewhat in size. I have made no search for it since, but have hopes that eventually I may find a specimen at *A. fallax* in the cylinder.

This species has been recorded as affecting the locust (*Robinia pseudacacia*), but I have seen no reference to its occurrence in *Gleditschia*. Chittenden states that the habits of *A. fallax* are similar to those of *A. egenus*, and of the latter species he says: "Infests locust (*Robinia pseudacacia*), mining under the bark and twigs of the smaller branches, the beetles eating the leaves." In further notes on *A. fallax* he says: "In the National collection is a series from Central Missouri, labelled by Dr. Luggen on locust, and another series from Iowa similarly labelled by the late Dr. C. V. Riley. Among Divisional notes is one of the occurrence of what is stated to be this species under the bark of cottonwood, in July.<sup>1</sup>

Hopkins<sup>2</sup> states that this species "infests bark and wood of dying branches on living and dying Hackberry," and that adults were taken May 2 in Wood Co., W. Va.

Packard,<sup>3</sup> in his "Forest Insects," does not mention any species of wood-boring beetles as affecting the honey locust, but gives a list of several species of insects that feed upon its leaves. With but three exceptions, these are all Lepidoptera, the exceptions being *Lytta (Epicauta) cinerea*, Forst., *Eburia 4-geminata*, Say, and *Spermophagus robinia*, Sch. (The last in seeds.)

I have found the following beetles, which were presumably feeding to some extent upon the leaves, upon this plant: *Anomoea laticlavata*, Forst.; *Nodonota puncticollis*, Say; *Macrobasis unicolor*, Kirby. Other species that I have taken thereon, but whose presence was probably merely accidental, are the following: *Photuris Pennsylvanicus*, De Geer; *Chauliognathus marginatus*, Fabr.; *Statira gagatina*, Melsh.; *Mordelistaena pustulata*, Melsh.

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1. Bul. No. 22, n. s. Div. of Ent., U. S. Dept. Agric., p. 67.
  2. Bul. No. 32, W. Va. Agric. Expt. Sta., p. 184.
  3. Fifth Report of the Entomological Commission, pp. 652-654.

## TWO CANADIAN SPECIES OF PSEUDOSCORPIONS.

BY EDV. ELLINGSEN, KRAGERØ, NORWAY.

I received last year (1907) from Dr. J. Fletcher, Ottawa, some Canadian Pseudoscorpions for determination. The collection comprised two forms, and these two species are, to my knowledge, the first Pseudoscorpions recorded from the Dominion of Canada. This is naturally founded on the fact that these small, interesting animals have not been collected by the entomologists. In the adjoining parts of the United States, as in the States on the whole, there are many species, and even as far north as Alaska a species has been taken. This should be of interest if Canadian entomologists would draw their attention to these animals, and they would certainly make many a fine capture.

The Pseudoscorpions have much in common with the scorpions, especially as regards the palpi, but they are animals of small size—the giants among them are about 8 mm. long,—and they quite lack the tail which is so characteristic of the true scorpions. The Pseudoscorpions are to be found under bark of decayed trees, under stones and logs, among mosses, etc; some also live in buildings. Some species, especially *Chelifer cancroides*, L., are true cosmopolites, as they are easily transported from place to place in goods and the like; they are distributed throughout all parts of the earth, very few in the polar tracts and in the colder temperate regions, but in the warmer temperate tracts and in the tropical parts of the earth they are abundant. The group of Pseudoscorpions is a small group, comprising about 400 species so far described, but some of these will certainly, on further examination, fall into the synonymy of the other species, or will be only *nomina nuda*.

The two species mentioned above are the following :

*Chelifer cancroides*, L.

Canada : Ottawa, 8 specimens, ♂ and ♀, taken in buildings (J. Fletcher). British Columbia : Kaslo, 2 ♂'s (J. W. Cockle).

*Ideobisium obscurum*, Banks.

British Columbia : Victoria, 1 specimen (A. W. Hanham).

The species is largely distributed in the western parts of the United States, the States of Washington, Montana and California.

A SYNONYMIC NOTE ON CERTAIN BELOSTOMIDÆ  
(HEMIPTERA).

BY G. W. KIRKALDY, HONOLULU, H. ISLANDS.

This brief note is in response to my friend Mr. Bueno's mention of further synonymy, in his recent valuable paper (CAN. ENT., Vol. XXXIX, pp. 333-341).

It is now generally accepted, by workers at aquatic hemiptera, that the generic name *Belostoma* must be conferred upon the species formerly known as "Zaitha," the single species arranged under the former, at its inception, being a "Zaitha." This requires no further comment, but some consideration is necessary to select the correct name for the now nameless genus, "*Belostoma*," olim.

Stal, in 1865 (Hem. Afr., III, 179), separated, from "*Belostoma*," those forms with strongly-widened lateral margins to the pronotum (*collosicum*, etc.), under the name *Amorgius*, and unaware of previous names, I adopted this, in my recent list of Pagiopod genera, for the old "*Belostoma*," accepting *Montandonista* (1901) as a subgenus for the narrow-margined forms. There is no doubt, however, that *Lethocerus* (Mayr, 1852, Verh. Zool. bot. Ges. Wien, V, 17) is the same as *Montandonista*, and that *Lethocerus cordofanus* (l. c.) must take precedence of *Amorgiur* (*Montandonista*) *niloticus*.

*Lethocerus*, however, was founded on a nymph, and was therefore rejected by Mayr himself in 1863 and 1871, as well as by Stal, Montandon and Champion. But, according to the general rules of nomenclature, genera and species founded on immature stages are valid, though as a rule they are not advisable. Therefore, *Lethocerus* must be reinstated.

The following synonymy will summarize the above:

1. *Belostoma* Latreille, 1807 (type *testaceopallidum*), = *Zaitha*, Am. and Serv., 1843.

2.\* *Lethocerus*, Mayr, 1852 (type *cordofanus*), = *Belostoma*, auctt., = *Montandonista*, Kirkaldy, 1901, subgen. *Amorgius*, Stal, 1865.

The species *Belostoma nilotica* (Stal, 1854) should therefore be known as *Lethocerus cordofanus*.

The above is a good instance of the folly of refraining from adjustments of synonymy when their necessity is discovered. Mayr knew in 1871 that the proper name of "Zaitha" was *Belostoma*, and that that of "Belostoma" was *Lethocerus*. Those changes were infinitely easier to make 37 years ago than now, and correspondingly (or more so) easier now than 37 years hence.

\*Incorrectly included by me formerly in *Hydrocyrius*, i.e., *Diplonychus*.

May, 1908



## NOTES ON HETEROPTERA.

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

Near my house in White Plains, N. Y., is a sunken meadow, on one side of which runs a brooklet, and on the other the Bronx Aqueduct, which carries water to New York city. The Tarrytown road bounds it at one end, and the other merges gradually into a marsh which is cut by another brook. In this meadow grows a profusion of plants, each in its season, and here insects abound in all forms. I have taken in it many interesting Heteroptera. Along the edges, at the Aqueduct, *Eurygaster alternatus* occurs. Further on, in the plants growing out of the wetter and lower portion of the meadow, in July and August I found many nymphs; some I could recognize, but two were misidentified. One was a peculiar spiny one, with an enlarged antennal joint. I guessed it to be *Chariesterus antennator*. To make sure, I took several full-grown nymphs home, together with one of *Archimerus calcarator*. The food problem, of course, presented itself, but the solution was found in the remains of my vegetable garden, and a bush bean pulled up by the roots and put in water in a breeding cage gave the nymphs food and shelter. They thrived on the bean, and my queer capture turned out to be nothing but *Acanthocerus galeator*. This very interesting nymphal form appears to be unrecorded, and Dr. Horvath, who was in White Plains at the time, suggested that it be described.

In colour it is a checkered grey and black, quite on the dark. This nymph is very spiny. The antennæ have the first joint studded with short spines, which in the second joint become smaller and are interspersed with hairs. This joint is dark at the base and apex only, the greater portion of the middle being light in colour. The third joint is expanded into a leaf-like form, with the narrowed end at the base of the joint and the broader at the apex. This, as well as the fourth joint, is black and hairy. The latter is fusiform. The first joint is subequal to the second, and the third to the fourth, each of the latter being about two-thirds the length of either of the former. The femora are all armed with stout spines, which are practically obsolete on the tibiæ. There are six long, toothed spines on the head, arranged in pairs, and one at each anterior angle of the pronotum, the lateral edges of which are also spiny, and the disk is studded with coarse black punctures. The wing-pads are also spined on the outer edge and coarsely punctured. Each of the abdominal segments has at the connexival edge two stout spines, one near the

anterior angle of the segment and the other near the posterior, the latter being longer and stouter than the former. All these spines have smaller spines on them, and they increase in size caudad. There is also a series of paired spines down the middle of the abdomen, similar to the others. The dorsal stink-orifices are two in number, the anterior being between the third and fourth segments, on the suture, and the posterior similarly placed between the fourth and fifth. These orifices are quite large and noticeable, and are apparently single. The length of the nymph in the last instar, from which this description is taken, is something over 11 mm. It has the general aspect of a Coreid bug, so it can be easily recognized if taken.

While the preceding is an accurate description, it is by no means minute, although quite sufficient for recognition. The younger nymphs are very similar, except that the antennæ are comparatively much longer and slimmer, being, in fact, nearly as long as in the last nymphal instar, and the spines are also longer.

In different parts of the meadow, in the higher parts, the highly-interesting Tingid, *Melanorhopala clavata*, Stal, was taken in both the brachypterous and the very rare macropterous forms. Here also was taken *Protenor Belfragei* in great abundance, both adults and nymphs; *Harmostes reflexulus* was far from uncommon; the various species of *Euschistus* were abundant, together with *Peribalus limbolarius*, *Trichopepla semivittata*, *Podisus maculiventris*, several species of *Reduviolus*, *Alydus eurinus* and *pilosulus*, *Corimelæna atra*, *Coenus delius*; and on Alders surrounding a mud-hole *Corythuca gossypii* was very common, but darker in colour than is usual. This mud-hole, when dry, proved to be the haunt of *Hebrus concinnus*, whose white-spotted wings betrayed it as it walked about on the drying black mud.

On a hillside there is a dry meadow where timothy had been grown for hay. Here late in August *Nezara hiliaris* was found abundantly along the edges. The first specimens I beat from the bushes near a gate, but other bushes along the fences gave no result. A clump of Golden-rod under some bushes was swept, and there was *Nezara*, both adults and nymphs. This was the case all along the field; one or two specimens were beaten at odd times from the trees and bushes, but the majority, as well as the nymphs, were all taken on the Golden-rod, under and near them. The nymph is light green and yellow, with the head,

prothorax, wing-pads, connexivum, antennæ, tibiæ and dorsal stink-orifices more or less black. The scutellum is green, with two black round spots at the base. This is, of course, a very rough description, but having nothing but dry specimens, it is as good as can be given under the circumstances.

One day in August I noticed climbing up the trunk of a large Maple on the roadside the nymph of a *Brochymena*. This was also taken home and put in the life-cage on the bean on which it fed and thrived. It finally moulted, giving a somewhat small but perfect *B. arborea*. This, in the nymph as well as the adult, had the curious habit of concealing its antennæ when at rest. They were bent under the body, and rested close to it between the coxæ, lying quite straight and parallel to the rostrum.

Near the Bronx River, in some underbrush, was swept a winged specimen of *Reduviolus subcoleoptratus*. This form is very rare, and only some six or eight have been recorded by different authors.

For some reason, winged forms of Water-striders of all genera seem to have been extraordinarily abundant in the summer of 1906, at least in this locality. *Trepobates pictus*, which even in the tropics occurs mostly wingless, gave one winged specimen. The macropterous form of *Microvelia americana* also was very common, and *M. pulchella* in one locality gave nothing but winged specimens. *Mesovelia Mulsanti* also yielded more than the usual proportion of winged individuals, and the three *Rheumatobates Rileyi* secured were in the same condition.

In the summer of 1906 my poor health compelled me to indulge in a long vacation, with bucolic joys to make time pass. I went to a little village named Fly Creek, which my friends suggested was a most appropriate abiding place for one of my "buggy" tendencies. Toward the end of August all the population of the place goes hop-picking, and my farmer-host insisted that I should lend my aid to the person he was going to work for, which I did. The hop-vines were covered with Aphids, and running over the leaves and stems in vast numbers was a black-and-white Anthocorid bug, which I have not been able thus far to determine. Its chief claim to distinction is its eagerness to insert its beak into anyone. The workers on the hop-vines kept handkerchiefs stuffed around their necks to prevent the bug from crawling under their clothes, but at the close of the day they could always exhibit a necklace of bites, shown by the red and inflamed spots where the bugs had succeeded in their purpose; at times their hands also were attacked.

## NEW SPECIES OF ACORDULECERINÆ (HYMENOPTERA).

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

*Acordulecera media*, n. sp.—♀. Front impressed about the median ocellus, producing a more or less distinct pentagonal area; antennal fovea triangular and distinct; head black, the antennæ fuscous; the clypeus, the labrum, the mandibles, the thorax, except a spot on each lobe and the apex of the scutellum, the legs, and the abdomen, luteous; the wings hyaline, the veins, the costa and the stigma luteous; the pronotum entirely white or luteous. Length, 5 mm.

Habitat.—Algonquin, Ill. (Nason).

*Acordulecera minima*, n. sp.—♀. Front with short, fine pubescence, so that the head appears glossy black; pubescence of the antennæ black, antennæ black; head black, with the labrum, the clypeus, and the mandibles white; the thorax, except a spot on each lobe of the mesonotum and the scutellum, the legs and the abdomen, luteous; the antennæ with the third segment as long as the fourth and fifth together; the front not impressed above the median ocellus; the antennal fovea wanting; the saw-guides exerted and broadly, roundly truncated at apex. Length, 4 mm.

Habitat.—Edge Hill, Pennsylvania (G. M. Green); Ithaca, N. Y.

*Acordulecera maxima*, n. sp.—♀. Front with a long pubescence, which conceals the glossy black colour of the head, and gives it a hoary appearance; antennæ black, with white hairs; head black, with the labrum, and mandibles white; the prothorax luteous; the mesonotum and scutellum black; the pleura and pectus piceous, and the legs and abdomen luteous; the third segment of the antennæ about as long as the fourth and fifth together; the wings hyaline; the front not impressed about the median ocellus; the antennal fovea wanting; the saw-guides retracted. Length, 5 mm.

Habitat.—Ithaca, N. Y.

*Acordulecera maura*, n. sp.—♀. Body black, with the clypeus, the labrum, the mandibles, the prothorax, the legs, the venter of the abdomen, and the four basal tergal segments at middle and at sides, yellow or luteous; head hoary with pubescence; the wings more or less infuscated; the saw-guides exerted, convex above and below, and broadly rounded at apex. Length, 5 mm.

Habitat.—North Mt., Penn.; Ames, Iowa (E. D. Ball); Ithaca, N. Y.

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*Acordulecera mellina*, n. sp.—♀. Front with a median furrow, antennal fovea wanting; body black, with the clypeus, the labrum, the mandibles, the antennæ, the tegulæ, the legs, the basal half of the venter, and a large triangular spot on the middle of the dorsum at base, the apex of the triangle turned toward the apex of the abdomen, white or luteous; head covered with very fine white pubescence, appearing bare when viewed from before; notum and pleura covered with a fine pubescence; saw-guides with the two sides parallel and obliquely truncated to a point at apex above. Length, 5 mm.

Habitat.—Mt. Washington, N. H. (Mrs. A. T. Slosson).

*Acordulecera mixta*, n. sp.—♀. Front with the median furrow wanting; antennal fovea indicated by a minute pit; body black, with the antennæ, the clypeus, the labrum, the mandibles, the collar narrowly, the tegulæ, the legs, and the basal half of the abdomen, greenish-white or luteous; the head and the antennæ covered with long black pubescence; pubescence of the notum short, sparse and white; saw-guides broadly convexly rounded at apex. Length, 4.5 mm.

Habitat.—Columbia, Mo. (C. R. Crosby); Ames, Iowa (E. D. Ball); Delaware Co., Penn. (Cresson); Ashbourne, Penn. (Viereck); Salineville, Ohio; Ithaca, N. Y.

*Acordulecera munda*, n. sp.—♀. Body black, with the clypeus, the labrum, the mandibles, the pronotum and the dorsum of the abdomen more or less, piceous; the tegulæ, the hind margin of the pronotum, the legs, and the venter of the abdomen, luteous; the head and thorax fairly densely covered with long pubescence; the third segment of the antennæ about as long as the fourth and fifth together; the saw-guides broadly rounded at apex, with a distinct scopa. Length, 5 mm.

Habitat.—Ithaca, N. Y.

*Acordulecera minuta*, n. sp.—♀. Antennæ with the third, fourth and fifth segments subequal; body black, with the clypeus, the labrum, the mandibles, the tegulæ, the legs, and the disk of the abdomen at base, luteous; the head and thorax covered with fine, white pubescence, the cell  $R_4$  about as broad as long, the transverse part of the vein  $M_2$  received near its middle; wings infuscated; saw-guides broad and broadly rounded at apex. Length, 3 mm.

Habitat.—Ames, Iowa (E. D. Ball).

*Acordulecera maculata*, n. sp.—♀. Antennæ with the third segment considerably longer than the fourth; body black, with the clypeus and labrum more or less white; the legs, except more or less of the tarsi and

the basal half of the tergum of the abdomen, more or less white; the head and thorax covered with fine white pubescence; the wings infuscated on the basal half; the front wings with the cell  $R_4$  about as broad as long; the head dilated behind the eyes; the saw-guides very broad and squarely truncated at apex. Length, 4 mm.

Habitat.—Ithaca, N. Y.

*Acordulecera marina*, n. sp.—♂. Antennæ with the third segment considerable longer than the fourth; body black, with the labrum, the mandibles, the legs, and the bases of the wings, white; the head and thorax covered with short, white pubescence; the head not dilated behind the eyes; the wings wholly hyaline; the front wings with the cell R much longer than wide, and receiving the transverse part of the vein M near the middle of the cell. Length, 4 mm.

Habitat.—Salineville, Ohio.

#### ENNOMOS MAGNARIUS, GUENEE.

Every winter the curious egg deposits of the Notch-wing, *Ennomos magnarius*, Gn., are sent in by fruit-growers to know what they are. These eggs are very characteristic, and are like those of many other geometrid moths, somewhat quadrate or rounded oblong in shape. They are steely-gray in colour, and white at one end; about 1 mm. in length by half mm. wide, and flattened above. These eggs are laid in straight or curved lines, the eggs touching at the sides, and as a rule about 20 in a row. A female which had freshly emerged from the cocoon was found in copulation and put in a box with her mate undisturbed. During the following two days she laid 632 eggs. Although kept in the box for another three or four days, no more eggs were laid.

J. FLETCHER, Ottawa.

#### ERRATA.

Page 100, lines 19 and 20, should read: "*Aplodes rubrifrontaria*, Pack., var. *Darwiniata*, equals *A. Darwiniata*, Dyar, a good species."

Lines 21 and 22 should read: "*Deilinia erythemaria*, Guenée, var. *pacificaria*, Pack., should be *D. pacificaria*, Pack., a good species."

Lines 29 and 30 should read: "*Selidosema humarium*, Guenée, var. *emasculatum*, Dyar, equals *Cleora emasculatum*, Dyar, a good species."

Lines 31 and 32 should read: "*Melanolophia canadaria*, Guenée, var. *subgenericata*, Dyar, equals *Mel. limitata*, Walker."

## THE GEOMETRID GENUS RACHEOSPILA.

BY HARRISON G. DYAR, WASHINGTON, D. C.

Our species of this genus are badly arranged in our list. The synonymy is due to Hulst's observations on the collections of the British Museum and other foreign collections, published by him in *Entomological News*, VI, 71, 1895. His examination must have been very hasty, for he has obviously confused several good species under the synonymy of *lixaria*. According to his arrangement (see Bull. 52, U. S. N. M., p. 300) we have five species: *lixaria*, Guenée, with five synonyms; *jaspidiaria*, Hulst; *Hollandaria*, Hulst; *viridipurpurea*, Hulst, and *saltusaria*, Hulst. Of *lixaria*, Guenée, only *rubrolineata*, Packard, appears to be a true synonym; *inclusaria*, Walker, represents a distinct form with larger dark discal dots and strongly-developed red line in the fringe, to which *extremaria*, Walker, may be cited as a synonym if we desire to retain the name, proposed as it was for specimens without locality; *congruata*, Walker, is evidently a synonym of *sitellaria*, Guenée (Spec. Gen., IX, 374, 1857), a species quite distinct from *lixaria*, to which also belongs *Synchlora Hulstiana*, Dyar, described as a variety of *S. Louisa*, Hulst; finally, *cupidenaria*, Grote, is a good species, afterward redescribed as *Synchlora Louisa* by Hulst. The three following species, *jaspidiaria*, *Hollandaria* and *viridipurpurea* are all varieties of one species, which is the same as *Geometra centrifugaria*, Herrich-Schäffer, and *protractaria*, Herrich-Schäffer (Corr.-Blatt. Zool.-Min. Verein Regensburg, 1870, 182), a Cuban species. The last species, *saltusaria*, Hulst, is the same as *Eucrostis niveociliaria*, Herrich-Schäffer, also from Cuba.

Our green Geometridæ are more widely distributed in regard to their specific forms than many other groups, and all our Southern Florida species come from Cuba. I would arrange our species of *Racheospila* as follows:

- |   |  |
|---|--|
| 1. <i>lixaria</i> , Guenée.<br><i>rubrolineata</i> , Packard.   | 4. <i>cupidenaria</i> , Grote.<br><i>Louisa</i> , Hulst.   |
| 2. <i>inclusaria</i> , Walker.<br><i>extremaria</i> , Walker (?)  | 5. <i>centrifugaria</i> , Herr.-Sch.<br><i>protractaria</i> , Herr.-Sch.<br><i>Hollandaria</i> , Hulst.<br><i>jaspidiaria</i> , Hulst.<br><i>viridipurpurea</i> , Hulst. |
| 3. <i>sitellaria</i> , Guenée.<br><i>congruata</i> , Walker.<br><i>indeclararia</i> , Walker.<br><i>Hulstiana</i> , Dyar. | 6. <i>niveociliaria</i> , Herr.-Sch.<br><i>saltusaria</i> , Hulst.   |

## BOOK NOTICES.

ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA. Published quarterly by the Society. Herbert Osborn, Managing Editor, Columbus, Ohio, March, 1908.

The five hundred members of this new international Society must, we feel sure, be pleased with the initial number of their Annals; it is so beautifully printed, so respectable in form, and so excellent in its contents, that we must all be proud of it, and should be willing to do all in our power to maintain its high character, and give it all needful support. The number contains the Constitution of the Society, a list of the Officers, Fellows and Members, and an account of the proceedings at the three meetings thus far held in the great cities of New York, Boston and Chicago. The remainder of the issue includes a most interesting paper on the Polymorphism of Ants, by Prof. W. M. Wheeler, and a discussion of the Habits of Insects as a factor in Classification, by Prof. Herbert Osborn. The chief feature of the number is, however, the charming photograph of our dear old friend, Dr. Samuel H. Scudder, which we are delighted to have, and which must be equally welcome to every one of the members of the Society.

The subscription price of the Annals is one dollar per annum to members, in addition to their yearly dues, and \$3 00, with the extra postage needed, to outsiders.

JOURNAL OF ECONOMIC ENTOMOLOGY: Official organ of the Association of Economic Entomologists. Concord, N. H., Vol. I, No. 2, April, 1908.

This second number of the Journal contains nearly all of the remainder of the papers read at the annual meeting in Chicago; the four numbers to follow will, therefore, furnish a large amount of material which could hardly have reached the public but for this new enterprise. The numerous papers now presented are full of useful and varied information, and are of much interest to all workers in the field of entomology. As time goes on this Journal will become a veritable storehouse of practical information for biological students, as well as those who are engaged in the cultivation of food products, cotton and other raw materials, or who are interested in the manifold relations of insects to the health and comfort of animals and man. It occupies a field of its own, and does not trench upon the domain of any existing periodical; it deserves to have a wide circulation and an ample subscription list.

Mailed May 8th, 1908.