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

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

Once more I am indebted to Mr. W. J. Palmer, of Buffalo, for a very interesting series of Hemiptera, taken by him in August, 1907, on a vacation trip from Lake Temagami, Ont., to Quinze Lake, P. Q., and along the Ottawa River and its lakes to Barrier Lake. This collection is much more extensive than that made by him in 1906, notes on which were published by me in the CANADIAN ENTOMOLOGIST for December, 1906. Among the 116 species taken in 1907, were several of unusual interest, such as *Corythuca incurva*, Uhler; *Neoborus Palmeri*, Reuter; *N. commissuralis*, Reuter; *Ceresa Palmeri*, Van Duzee; *Aphrophora Signoreti*, Fitch; *Platymetopius obscurus*, Osborn; *Thamnotettix flavovirens*, G. & B., and *Cicadula lineatifrons*, Stal.

Of the three new forms taken by Mr. Palmer on this trip, the descriptions of two Capsids: *Neoborus Palmeri* and *commissuralis* are by Dr. O. M. Reuter, of Abo, Finland, and will also appear (in Latin) in a paper about to be published, entitled, "Bemerkungen über nord amerikanis-chen Capsiden" in *Ofversigt af Finska Vetens. K. Soc. Forhandl.*, 1908.

### PENTATOMIDÆ.

*Homœmus æneifrons*, Say.—This boreal species was taken in abundance at all stations. I have found it common in the Adirondacks, but it is rarely taken in the level country about Buffalo.

*Eurygaster alternatus*, Say.—Nigger Point, Quinze Lake, Lake Temagami, and elsewhere. A common and widely-distributed form.

*Euschistus tristigmus*, Say.—Several specimens of the northern form, with obtuse humeri, were captured on Bear Island, Lake Temagami.

*Cosmopepla carnifex*, Fabr.—Taken along Barrier River, and at other points in the Ottawa River water-shed.

*Clinocoris lateralis*, Say.—Nigger Point, Quinze Lake and Barrier River, several examples. Formerly placed in genus *Acanthosoma*.

*Podisus modestus*, Dallas. Taken at Klauck's, and at Temiskamingue P. O., both in the Ottawa district.

## COREIDÆ.

*Protenor Belfragei*, Hagl.—Taken at Temiskamingue P. O. It has been redescribed as *Tetrahinus Quebecensis* by Provancher.

*Megalotomus 5-spinosus*, Say.—Bear Island, Lake Temagami. Two examples.

*Alydus eurinus*, Say.—Taken with the preceding, and at Temiskamingue Post Office.

*Alydus conspersus*, Montd.—Taken with the foregoing. It may best be distinguished by the dotted membrane.

*Corizus crassicornis*, Linn.—Taken at all stations along the Ottawa River, and at Temagami. This is the species I have heretofore determined, I believe correctly, as *novaboracensis*, Sign. I am indebted to Dr. Horvath for its identification with the common European species.

## LYGAEIDÆ.

*Ortholomus longiceps*, Stål. Taken at Bear Island, Lake Temagami. I now use this name for our northern form, which was included by Dr. Uhler in his description of *Nysius providus*, and which, it seems to me, includes both this species and *Jamaicensis*, Dallas. Genus *Ortholomus* may be distinguished from *Nysius* by the rectilinear costal margin of the elytra.

*Nysius thymi*, Wolf.—Nigger Point, Quinze Lake. On the occasion of his recent visit to Buffalo, Dr. Horvath set aside in my collection as *thymi* the *Nysius* taken by me at Lake Placid, N. Y., and listed as *angustatus* in my "List of the Hemiptera taken in the Adirondacks." The present specimen taken by Mr. Palmer is a little larger and paler, and may be the true *angustatus* if that species really be distinct from *thymi*, which I doubt.

*Ischnorhynchus resedæ*, Panz.—Temagami, one example.

*Cymus clavicularis*, Hahn.—Lake Temiskamingue, two examples.

*Ligyrocoris diffusus*, Uhler.—Taken at all stations, and apparently as abundant as in Western New York. This is the species formerly listed as *sylvestris*, Linn. The latter, if a *Ligyrocoris* at all, is *contractus*, Say, and not *diffusus*.

*Ligyrocoris contractus*, Say.—Like the last, this species was taken at all stations where Mr. Palmer collected. It is rare about Buffalo, but becomes abundant further north.

## TINGIDÆ.

*Corythuca incurva*, Uhler.—Temagami Lake, Temiskamingue, and Barrier River. I have carefully compared these specimens with an example determined by Dr. Uhler, and find them certainly identical. They seem to be sufficiently distinct from the smaller specimens of *juglandis* taken in Western New York and elsewhere.

## REDUVIIDÆ.

*Sinea diadema*, Fabr.—One example taken at Klauck's. Mr. Palmer reports this as the only specimen seen by him.

*Reduviolus ferus*, Linn.—Temiskamingue and Nigger Point, Quinze Lake. This is an imported species that follows cultivation into every portion of North America. Here it seems to have followed up the Ottawa River almost in advance of civilization.

*Reduviolus vicarius*, Reut.—Taken in numbers along Quinze Lake. This is the species so determined in my list of Lake Placid Hemiptera, and list of the Hemiptera taken by Mr. Palmer at Lake Temagami. I sent specimens to Dr. Reuter, and he writes me that it is not the true *vicarius*, but a species very near *limbatus*, Dahlb. The latter species was, however, described as very close to *limbatus*; so, if the present species be not *vicarius*, it must be very near it. It seems to be boreal in distribution. I now follow the European entomologists in using the name *Reduviolus* for this genus in place of *Coriscus*, Schrank.

*Reduviolus propinquus*, Reut.—Quinze Lake, one example.

## CAPSIDÆ.

*Miris dolobratus*, Linn.—Taken at Temiskamingue only. This species is now placed in genus *Miris*, of which it is the type. Formerly listed as a *Leptopterna*.

*Stenodema trispinosa*, Reut.—White Rapids, Barrier River and Temiskamingue. This is the North American form, formerly determined as *Brachytropis calcarator*, Fall. Dr. Reuter now considers our American form as a distinct species, and has so published it. *Brachytropis* is placed as a synonym of *Stenodema*, formerly called *Miris*.

*Stenodema affinis*, Reut.—Apparently common everywhere Mr. Palmer collected. Mr. Kirkaldy gives the name *instabilis*, Uhler, priority, quoting Dr. Uhler's reference to Proc. Bost. Soc. Nat. Hist., 1871, p. 104, but as a matter of fact the species was not included in that paper. Its first publication was in the Bul. U. S. Geol. & Geog. Surv., vol. II, No. 5, p. 316, 1876, and, consequently, was subsequent to Reuter's *affinis*, which appeared in 1875.

*Trigonotylus ruficornis*, Fall.—Two examples from Nigger Point, Quinze Lake.

*Collaria Meilleuri*, Prov.—Barrier River and Temiskamingue.

*Resthenia insignis*, Say.—At Barrier River Mr. Palmer took two examples of this species that were entirely black, except a touch of rufous on the collar and lateral submargins of the pronotum. I have taken it at Hamburg and Gowanda, N. Y., and have seen others from Idaho and Winnipeg. It seems to be northern in distribution.

*Monolocoris filicis*, Linn.—Temagami and Quinze Lake.

*Neoborus amoenus*, Uhl.; var. *Palmeri*, n. var., Reuter.—Pale livid, eyes castaneous, clypeus piceous toward its apex; vitta below the base of the antennæ ferruginous, two vittæ on either side of the pronotum nigropiceous, the exterior submarginal, not attaining the base, interior extending from the exterior angle of the collum to the base of the pronotum; corium with a slender vitta along the apical one-half of the cubital vein and a line within the basal margin of the membrane nigro-piceous; apex of the second joint of the antennæ and the two ultimate joints black, third pale at base. Female.—Klauck's, one example. A very pretty and distinct species.

*Neoborus* (*Xenoborus*, n. subg.) *commissuralis*, n. sp., Reuter.—Ob-long. Differs from *N. amoenus*, Uhl. (*saxeus*, Uhl., not of Dist.), in having the rostrum somewhat shorter, the costal margin of the hemelytra less rounded, and especially in having the sides of the pronotum not at all calloused; pale yellowish-white, smooth and polished, antennæ, eyes, claval commissure slenderly, and the extreme apex of the rostrum and the tarsi black; head about two-fifths narrower than the base of the pronotum, viewed from before a little shorter than its basal width with the eyes; viewed from the side the cheeks in both sexes as high as the eyes; vertex slenderly margined; in the male about three-fourths, in the female two to two and a-half times broader than the eyes; rostrum attaining the apex of the mesosternum; antennæ slender, first joint in the male as long as the head viewed from before; in the female a little shorter, second joint in the female twice longer than the first and a little longer than the basal width of the pronotum; in the male distinctly longer; pronotum about one-fifth shorter than its basal width, sides nearly straight, callosities moderately elevated, concolorous, in the middle somewhat indistinct, disk on either side quite densely and strongly rugose-punctate; hemelytra long surpassing the abdomen, obsoletely punctate, membrane whitish-hyaline,

veins pale, brachial vein towards its apex and a longitudinal vitta within the apex of the areole fuscous. Male and female. Length 7, width 2 mm. Klauck's four specimens taken with the preceding. This is the species found at Island Lake last year by Mr. Palmer, and listed by me as *Neoborus*, sp. I took it at Lake Placid, and have seen others from Montreal taken by Mr. Beaulieu.

*Poecilocapsus lineatus*, Fabr.—Apparently common at all places along the Ottawa River.

*Camptobrochis grandis*, Uhler.—Temagami, Temiskamingue and Nigger Point on Quinze Lake.

*Lygus pratensis*, Linn.—Abundant everywhere, with its variety *flavonotatus*, Prov.

*Lygus invitus*, Say.—Klauck's, on Quinze Lake.

*Lygus monachus*, Uhler.—One example from Barrier River.

*Lygus pabulinus*, Linn.—White Rapids, one example.

*Adelphocoris rapidus*, Say.—Apparently abundant at all stations. Dr. Reuter has separated this species and its allies from *Calocoris*.

*Neurocolpus nubilus*, Say.—Temagami, one example.

*Compsocerochoris annulicornis*, Reut.—Barrier River.

*Phytocoris pallidicornis*, Reut.—Taken in numbers at all stations.

*Phytocoris eximus*, Reut.—Bear Island, Lake Temagami.

*Lopidea marginata*, Uhler.—This species seems to have been common, as Mr. Palmer brought home numbers from Temagami, Barrier River and White Rapids.

*Stiphrosoma stygica*, Say.—Temagami, Barrier River and Temiskamingue. These agree with material from the mountains of Colorado in being a little smaller than those taken about Buffalo.

*Dicyphus agilis*, Uhler.—Temiskamingue and Nigger Point, Quinze Lake.

*Hyaliodes vitripennis*, Say.—Mr. Palmer brought home from Barrier River one example of the dark form that, about Buffalo, is found on oak.

*Cyrtorrhinus marginatus*, Uhler.—Taken at Barrier River.

*Orthotylus*, sp.—Quinze Lake, one example.

*Oncotylus chlorionis*, Say.—Temiskamingue, one example.

*Plagiognathus obscurus*, Uhler.—Abundant at all stations.

*Plagiognathus* sp.—One example of a small species, with a vittate scutellum, was taken at Temiskamingue.

#### GERRIDÆ.

*Gerris remigis*, Say.—One brachypterous example was taken at Quinze Lake.

## HOMOPTERA.

## FULGORIDÆ.

*Cixius stigmatus*, Say.—Taken in numbers at Nigger Point, Quinze Lake, Temiskamingue, and about Lake Temagami.

*Liburnia pellucida*, Fabr.—One macropterous male taken at Quinze Lake.

*Liburnia* sp.—Three brachypterous females from Quinze Lake.

## MEMBRACIDÆ.

*Ceresa basalis*, Walker.—This species was taken in large numbers, and shows a wide range in colour variation. The pale females are almost entirely green or fulvous when dry, while the darker males are deep piceous black marked, with pale only on the anterior margins of the head, base of the elytra, tibiæ and tarsi. The pale colour first shows on the summit of the metapodium, and the last black colouring to disappear is the line below the suprahumeral horns and the banding on the femora. *Ceresa turbida*, Goding, is certainly a synonym of this, his material being of the paler form found in the Northern States. I have received this same species from the Saskatchewan, and from the Selkirk Mountains in British Columbia.

*Ceresa Palmeri*, n. sp.—Closely allied to *borealis* and *constans*. Smaller, more slender, and less strongly coloured than *constans*. Clypeus broad, with the tylus strongly produced. Front of the pronotum rather low, vertical, convex before, with a prominent median carina; sides rectilinear, abruptly curved outward above to the horizontal acute subterete and black-tipped horns. These suprahumeral horns are strongly recurved, their posterior and inferior surfaces are concave and marked with a brown line above and below, on either side of the latter of which is a pale carina; triangular superior surface between the horns concave, a little convex along the median carina; posteriorly the pronotum is but feebly elevated, the apex is very slender, exceeds the abdomen, and is tipped with black. Colour pale fulvous, fading to pale greenish-yellow on the head and beneath; the horns and posterior carina ferruginous brown shading to piceous posteriorly; sides mottled with pale; elytra long, subhyaline, a little smoky along the apical margin. Tip of the rostrum, tarsal claws and tibial spines black.

Last ventral segment of the female rather long, angularly cleft nearly one-half of its length; the sides of this sinus convexly arcuated as far as the rounded outer angles. Plates of the male long and rather slender,

scarcely shorter than the pygofers. Ultimate ventral segment very short. Length to the tip of the elytra 7 mm.

Described from five males and one female; five of these were taken about Lake Temagami, the other was taken by Mr. Palmer on Fox Island, Red Cedar Lake, in 1906, and was listed by me as a small male of *brevicornis*. This additional material enables me to correct that determination. Mr. Palmer has spent several of his summer outings collecting Hemiptera in his characteristically energetic way, and has brought home some very interesting material, and it affords me pleasure to recognize the scientific value of his work by naming this species after him.

*Telamona coryli*, Fitch.—One female taken at Nigger Point, Quinze Lake, is of the dark type described by Dr. Fitch as *Telamona tristis*.

*Enchenopa binotata*, Say.—Quinze Lake, one example.

*Campyleuchia curvata*, Fabr.—Taken in numbers at all places where Mr. Palmer collected.

## CERCOPIDÆ.

*Lepyronia 4-angularis*, Say.—Apparently abundant. The males are very clearly marked.

*Aphrophora 4-notata*, Say.—Another common form.

*Aphrophora parallela*, Say.—Several specimens taken by Mr. Palmer average a little smaller than those taken about Buffalo.

*Aphrophora Signoreti*, Fitch.—One example taken near Quinze Lake. In form of vertex and front, this species is intermediate between *parallela* and *saratogensis*. It can finally be determined by the form of the plates of the male, which are well characterized by Dr. Ball in his paper on this family. This has proved to be a rare species, so far as my experience goes. I have one female taken by Prof. Houghton, in the Adirondacks, and a male taken by Dr. Brodie, at Toronto, Ont. The present specimen is, I think, the fourth I have seen.

*Philaronia bilineata*, Say.—Taken at Temiskamingue and Quinze Lake.

*Clastoptera obtusa*, Say.—Common everywhere Mr. Palmer worked.

*Clastoptera proteus*, Fitch., var. *nigra*, Ball.—Taken at nearly all stations, and apparently common. In the female there is a fulvous spot on the costa which is wanting in the male.

## BYTHOSCOPIDÆ.

*Bythoscopus sobrius*, Walker.—A rare species, of which Mr. Palmer took one example at Temiskamingue P. O.

*Bythoscopus cognatus*, VanD.—Taken at Lake Temagami and along Quinze Lake and Barrier River.

*Pediopsis viridis*, Fitch.—White Rapids and Barrier River. No males were taken.

*Pediopsis basalis*, VanD.—One female taken at Temiskamingue P. O. This belongs to the dark form, with banded elytra, of which I have taken examples at Lancaster and Hamburg, N. Y. This individual differs, however, in having a black propleural point not found in the specimens from Western New York. These banded forms seem to connect *basalis* with *bifasciata*, and they may prove to be a distinct species.

*Pediopsis bifasciata*, VanD.—One very pale specimen that I place here with some doubt, was taken at Klauck's, on Quinze Lake.

*Idiocerus pallidus*, Fitch.—Taken throughout the Ottawa River district.

*Idiocerus suturalis*, Fitch.—Taken commonly. The males were deeply coloured, and were more abundant than the females. The variety *lunaris*, Ball, was not taken on this trip.

*Idiocerus alternatus*, Fitch.—A good series from Nigger Point, Quinze Lake. I have placed under this name the common species found throughout the northern United States and Canada, and west to California. It may be distinguished from our other alternate-veined species by its having the apex of the head brown and polished, with the two round dots on the vertex distinct, and not confounded with the transverse black band. The commissural margin has a white spot in most specimens.

*Idiocerus* sp.—This species, of which Mr. Palmer took one example at Temagami, has a broad, irregular, black band across the apex of the head, in which the round dots are scarcely distinguished. This band is bisected by a pale median line, and below it are a pair of transverse spots on the base of the front. The elytral nervures are scarcely alternated. This species I have also taken at Ridgeway, Ont., near Buffalo.

*Idiocerus lachrymalis*, Fitch.—Barrier River, two examples. This is our largest *Idiocerus*. It has the same black band on the vertex that we find in the preceding species, but it is not bisected by a pale median line.

*Agallia novella*, Say.—Specimens of this species were brought from all stations along Quinze Lake and Barrier River. These are all of the pale form, in some of which the black pronotal spots are entirely wanting.

*Agallia sanguinolenta*, Prov.—Temiskamingue, P. O. One example.

(To be continued.)



## NOTES ON CORIXIDÆ NO. 1 [HEM.].

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

Species of the Corixidæ cannot be mistaken for those of any other family of Hemiptera. The remarkable structure of the mouth-parts (which caused Börner to elevate the family into a separate suborder, Sandalicerhyncha), and, in the males, the possession of two sets (apparently) of stridulating organs, abundantly separate them from any other family. Although not so specially adapted, to our eyes, for such a life, the Corixidæ have gained a more complete mastery over the problems of aquatic existence than their relatives, the Notonectidæ and Naucoridæ, if we may judge by the much greater number of their species.

The structure of the Corixidæ is extremely interesting, and there are probably no other insects whose males can boast of at least four separate secondary sexual characters (of these, two are of great specific importance). Their stridulation and general biology have recently been briefly summarized by myself.\*

The genera of Corixidæ may be tabulated as follows :

1. Scutellum covered by pronotum only at the anterior margin . . . . . (2).
- 1a. Scutellum covered (except sometimes at posterior angle) by pronotum . . . . . (4).
2. Metapleura simple. Minute species, never over 5 mill. long . . . . . (3).
- 2a. Metapleura deeply impressed behind, forming so-called "parapleura"; species over 6 mill. long . . . . . 3, *Diaprepocoris*, Kirkaldy.
3. Pronotum truncate, or (generally) convex behind . . . . . 1, *Micronecta*, Kirkaldy.
- 3a. Pronotum roundly emarginate behind . . . . . 2, *Tenagobia*, Bergroth.
4. Males . . . . . (5).
- 4a. Females . . . . . (10).
5. Strigil absent . . . . . (6).
- 5a. Strigil present . . . . . (7).
6. No stridular area; hind tarsi not marked with black . . . 4, *Cymatia*, Flor.
- 6a. Stridular area present; hind tarsi usually marked conspicuously with black (the segment itself, not the fringe of hairs only) . . . . . 5, *Callicorixa*, White.

\*"The stridulating organs of Water-bugs, especially of Corixidæ," 1901, J. Quekett Micr. Club (2), viii, 33-46, Pls. 3-4 (often cited as "Quebec!"), and "A Guide to the Study of British Water-bugs," 1905, ENTOMOLOGIST, XXXVIII, 231-6, etc.

7. Paler stridulator composed of pegs ranging from bristles to short "peg-tops," the transition gradual . . . . 6, *Glenocorixa*, Thomson.
- 7a. Paler stridulator never with bristles, although the "pegs" may be elongate (not to be confused with the lower fringe of bristles . . (8).
8. Asymmetry on right side . . . . . (9).
- 8a. Asymmetry on left side. Pronotum and tegmina smooth, shining . . . . . 9, *Corixa*, Geoffroy.
9. Tegmina with short, black hairs (immaculate, nonlineate) . . . . . 8, *Agraptocorixa*, Kirkaldy.
- 9a. Tegmina without short black hairs . . . . . 7, *Arctocorixa*, Wall.
- A. Pronotum transversely lineate, generally rostrate; tegmina more or less rostrate . . . . . (B).
- AA. Pronotum immaculate, smooth; tegmina smooth, polished . . . . . subg. 3, *Hesperocorixa*, nov.
- B. Tegminal hairs normal, tibiae ( $\delta$ ) rarely produced triangularly . . . . . subg. 1, *Arctocorixa*, s. str.
- BB. Tegminal hairs of two sorts, tibiae ( $\delta$ ) triangularly produced (type *pygmæa*, Fieber) . . . . . subg. 2, *Trichocorixa*, nov.
10. Face flattened . . . . . (11).
- 10a. Face convex . . . . . (14).
11. Pronotum immaculate; face smooth . . . . . 4, *Cymatia*.
- 11a. Pronotum with impressed transverse lines; face hairy . . . . . 6, *Glenocorixa*.
12. Pronotum immaculate . . . . . (13).
- 12a. Pronotum lineate . . . . . (14).
13. Tegmina with short black hairs . . . . . 8, *Agraptocorixa*.
- 13a. Tegmina not with short black hairs . . . . . (subg.) *Hesperocorixa*.
14. Pronotum and tegmina smooth, shining . . . . . 9, *Corixa*.
- 14a. Pronotum and tegmina more or less rostrate . . . . . (15).
15. A conspicuous black spot usually on hind tarsi . . . . . 5, *Callicorixa*.
- 15a. Hind tarsi pale, fringing hairs dark in some species . . 7, *Arctocorixa*.
- A. Tegminal hairs normal . . . . . *Arctocorixa*, s. str.
- AA. Tegminal hairs of two sorts . . . . . (subg.) *Trichocorixa*.

I do not know the Brazilian *Heterocorixa*, White, of which the types are apparently lost.

#### ARCTOCORISA, Wallengren.

This genus was originally founded for certain species with a percurrent pronotal keel (*Carinata*, etc.), which, however, are scarcely even subgenerically separable from *Linnei*, *fossarum*, etc., so that it has been

necessary to extend the limits of *Arctocorisa* to include *Basileocorixa*, Kirk. The type of *Corixa*, Geoffroy, is *striata*, Geoffr., (= *Geoffroyi*, Leach); the genus has not yet been found in America, whereas *Arctocorisa* has already been numerously reported.

1. *A. hydatotrepes*, n. sp.—Differs from any of the species of *Arctocorisa* known to me, by the complete anastomosis of the dark lines on the clavus, corium and membrane, the margins of these areas being more or less broadly pale.

Head and legs yellowish-testaceous, head dorsally more or less soiled. Pronotum testaceous, with five grayish-brown lines. Tegmina blackish-brown, embolium and all the margins pale, the lateral margin being broken by the dark colour only at the extralateral margin of membrane. Sterna very pale castaneous. Meso- and metanotum and abdomen blackish, or at least dark fuscous, margins of the latter pale. Fringe of hind tibiae fuscous. Head between eyes very narrow, less than a third of the width of the pronotum. Pronotum transverse, short, feebly rostrate, a tubercle at the apical margin in the middle. Middle tibiae one-third longer than the tarsi, and one-seventh longer than the subequal claws. Tegmina obsolescently rostrate.

♂.—Face flat medianly, scarcely excavated. Strigil suboval, transversely placed, with five rows. Pala subcultrate, dorsally arched, with 18 or more pegs, which lengthen as they approach the apex, and keep parallel and close to the dorsal margin soon after they leave the base.

♀.—Pala elongate cultrate.

Length, 6 mill. Hab.: Raleigh, North Carolina (Brimley).

2. *A. macroceps*, n. sp.—Yellowish-testaceous. Eyes grayish-brown. Pronotum brown, with three comparatively broad brown-testaceous lines, second and third partly confused. Tegmina brown; clavus with basal lines broad and subentire, the others much broken up; corial lines much abbreviated and contortuplicated, obscurely triseriate. Fringe on hind tibiae fuscous. Head large, rounded in front, one-third longer than wide between the eyes. Pronotum  $2\frac{1}{2}$  times as wide as the head between the eyes, and more than 4 times as wide as its own middle length. Pronotum and clavus rostrate, corium more feebly. Middle tibiae nearly one-half longer than the tarsi, which are subequal to the subequal claws.

♀.—Pala cultrate, arched near the base.

Length,  $3\frac{1}{3}$  mill. Hab.: Raleigh, N. C. (Brimley).

Subgenus *HESPEROCORIXA*, nov. subgen.

This has the characters of *Arctocorixa*, Wallengr. (*sens. lat.*), but differs by the non-rostrate pronotum and tegmina and the non-lineate pronotum. From *Agraptocorixa*, Kirk., it differs by the total absence of black hairs, the surface being polished. From *Corixa*, Geoffr., it differs by the ♂ asymmetry being on the other side, and by the absence of lineations. It may prove a good genus.

3. *H. Brimleyi*, sp. nov.—Head, fore legs, middle femora and claws, hind coxæ, etc., pale yellow. Eyes gray-brown. Pronotum and tegmina pale ferruginous, sometimes suffused with sanguineous, base of clavus and a large spot near apex of corium blackish-brown. Sterna, meso- and metanotum and abdomen black or blackish, pleurites and apical segment of abdomen yellowish, partly suffused with red. Middle tibiæ and hind femora and tibiæ sanguineous, the fringe on the latter golden-brown.

Pronotum short, very transverse, polished, very faintly rostrate, if at all, obsolescently keeled percurrently. Tegmina smooth and polished, obsolescently punctured, non-lineate, membrane angularly rounded at the apex. Middle tibiæ one-eighth longer than the tarsi, which are equal to the mutually equal long claws.

♂.—Face slightly flattened in the middle, scarcely excavated. Pala cultrate, with a closely-set row of about 28 pegs. Strigil rather large, oblong, oval, with five subeven rows.

♀.—Pala elongate cultrate.

Length, 9 mill. Hab.: Raleigh, N. C. (Brimley).

This is very distinct from any other American species known to me.

## EARLY STAGES OF NORTH AMERICAN MOTHS.

BY HENRY ENGEL, PITTSBURG, PA.

*Eutolyte bombyciformis*, Smith.

Ova.—Rose-pink, round, base flat, top depressed, 36 vertical ridges terminating in a raised circle at the crest. Ridges serrate, tipped whitish. Micropyle slightly raised and white.

Diameter, 0.80 mm. Height, 0.50 mm.

Eggs deposited April 30—May 2nd. Larvæ hatched May 13-14th.

First Stage.—Length, 2.50 mm. Head bilobed, a little wider than body, glossy black, covered with short hair. Mouth-parts black. Thoracic shield brown, trapezoid in outline. Body pale green, shaded with brown dorsally on thoracic segments. Thoracic legs pale green, claws black. Abdominal legs green, with two brown patches outwardly, the smaller one just above claws. Tubercles small, black, with short black setæ.

April, 1908

First moult May 18th.

Second Stage.—Length at rest, 4 mm; extended, 5 mm. Head and mouth-parts yellowish-green. Ocelli glossy black. Body light green, a faint whitish subdorsal line. Legs concolorous, claws black. Tubercles not contrasting. Setæ gray.

Second moult May 18th.

Third Stage.—Length, 7 mm. Head yellowish-green. Ocelli black. Body and legs light green. A gray dorsal line interrupted in the intersections. Subdorsal line more conspicuous than in stage 2, broken into spots on each segment. Tubercles light gray. Setæ on i and ii blackish, the lower ones gray.

Third moult May 31st.

Fourth Stage.—Length, 13 mm. Head pale green, 2 mm. wide. Ocelli black. Body green dorsally, lighter green below subdorsal line. Dorsal, subdorsal and stigmatal line yellowish-green. Legs pale green. Tubercles oval, prominent, pale yellow, with brown centre. Setæ dark gray.

Fourth moult June 8th.

Fifth Stage.—Length, 23 mm. Head 3 mm. wide, bluish-green. Mouth-parts brown. Ocelli black. Body yellowish green above, bluish-green below stigmatal line. Legs pale green, claws a shade lighter. Dorsal and subdorsal lines pale yellow, the former interrupted in the intersections and on the somites. The subdorsal line narrow and broken into irregular spots, the stigmatal line prominent, brighter yellow and continuous from second to anal segment. Tubercles prominent, pale yellow, with brown centre, iv of equal distance from and in line with spiracle except on segment 6, where it is slightly above, and in 7, where it is further removed and lower.

Larvæ matured June 17th. Length, 38–40 mm.

Pupa.—Light brown, darker over the eyes and on anal segment. Wing-cases ornamented with dentate striations. The segmental rings have numerous small round dents anteriorly, smooth posteriorly. Cremaster armed with four short spines. Two crescent-shaped dark brown raised ridges in subdorsal area on anal segment.

Pupation occurs in cells from 3–4 inches below surface.

Food plant.—*Carya alba*, Nutt., Shellbark Hickory.

I was fortunate in finding 12 females of this species during two afternoons in a beautiful hard timber woods near New Brighton, Pa., last April. They emerge about noon, and may be found on the trunk of the

Hickories. One specimen was taken at rest on an Oak. It showed signs of flight, and fertile ova were obtained. The moths have been taken from April 18—May 3rd.

*Nacophora quernaria*, Smith and Abbott.

Eggs deposited June 1st.

Ova. — Yellowish-green, with metallic reflections. Acorn-shape inverted, base ovably rounded, top broad, slightly convex. A circle of white, irregular, raised spots at the periphery, ranging from 18—21 in number.

Diameter, 0.55 mm. Height, 0.80 mm.

Larvæ hatched June 16—17th.

First Stage.—Length, 2.60 mm. Head 0.45 mm. wide, rounded, slightly bilobed, dull brown, shading darker to the mouth-parts. Fine irregular reticulations and a few gray hairs. Ocelli dark brown. Body velvety dark brown. Thoracic shield gray. Tubercles along dorsum small, blackish, with short gray setæ. An apparently white line along the side consisting of the prominent cream-coloured tubercles and intermediate speckles of white. Tubercles i, ii, iii on segment 2, and i, ii on segment 11 are in line laterally. Ventrally the tubercles are small, with short gray setæ. Legs gray, mottled with brown.

First moult June 21st.

Second Stage.—Length, 6 mm. Head 0.80 mm. wide, angular, notched in centre of the crown, depressed in front, dark brown, with numerous irregular light brown speckles. Ocelli glossy black. Body brown. On segment 5 two eminences or lumps have developed bearing tubercle ii. Tubercles along dorsum blackish, larger on segments 2, 5 and 11, on sides gray, centered with brown. The sides have whitish striations. Legs as in stage 1.

Second moult June 25th.

Third Stage.—Length, 10 mm. Head 1.40 mm. wide, thicker than body, square, deeply notched in centre, depressed in front, brown, with lighter mottlings. Body dark brown, with grayish mottlings, reddish on segment 5 and ash-gray on anal segment. Humps on segment 5 more developed. Body is sparsely covered with short gray hairs. Tubercles and legs as in stage 2.

Third moult July 1st.

Fourth Stage.—Length, 16 mm. Head 2 mm., shape as in stage 3. Brown, with a distinct dark brown dash from each angle converged to clypeus. Thoracic segments swollen and light brown. Body mottled

brown and gray, with short gray hair. Anal segment and legs pale ash-gray. Tubercles as before except segment 6, which is swollen ventrally, with tubercles more prominent.

Fourth moult July 7th.

Fifth Stage.—Length, 22 mm. Head 2.60 mm. wide, the deeply-notched crown more pronounced. Body mottled brown and gray, with triangular light gray patches dorsally on segments 6–10. A faint gray line above spiracles. Tubercles reddish-brown and prominent on segments 2, 3, 5 and 10–11. On 4, 5, 9 and anal segment they are small, scarcely darker than ground. On under side of segment 6 reddish-brown.

Fifth moult July 14th.

Sixth Stage.—Length, 33 mm. Head 4 mm. wide, very angular, deeply notched, rather deep and rounded posteriorly, variable grayish to dark brown, with numerous fine blackish warts. Ocelli and mandibles dark brown. Thoracic legs light brown. Body variable gray to dark brown. Thoracic shield lighter. Entire body covered with light gray warts, giving a crenulate appearance. A blackish triangular patch on under side of segments 2 and 3. Tubercles on segment 6 beneath and on 2, 5 and 11 above large and prominent, reddish on 5 and 6, gray to light brown on the other segments. Humps on 5 prominent. A broad broken yellowish shade on under side of segments 4–8. Lilac on 9–12. Anal plate and legs ash-gray, rough. Spiracles black-ringed. At rest the thoracic segments are drawn in, and segment 2, with its prominent row of tubercles, forms a striking hump.

Larvæ matured July 25th. Length, 45–48 mm.

Pupa.—Head, thorax and wing-cases blackish-brown, segments a shade lighter, brown on the somites and blackish-satin in the intersections. The surface is very rough. Six raised humps appear on the head, four situated between base of the antennæ and two slightly above. Anal segment is smooth, glossy black above. Cremaster with a strong spine dividing into two outwardly curved hooks. Three smaller curved spines on each side.

The larvæ formed a silk cocoon within and under moss in the breeding cage.

Food-plant.—*Quercus*. Oak.

One male emerged on September 2nd. Normal dark form, with nearly straight extradiscal lines in secondaries. The balance of the pupæ are laying over until spring.

*N. quernaria* has interested me greatly, and I have tried different times to secure ova. In almost every instance when a female was obtained, we had unfavourable weather, and although I carried the female to extensive forests, I failed to secure fertile eggs. My efforts at New Brighton, Pa., again proved futile with a female secured about middle of May. On May 31st a belated female was found and secured to a branch of a bush leaning against an Oak. The following morning several clusters of eggs were found deposited on the bark of the tree, and these fortunately proved fertile.

I have invariably found newly-emerged specimens on or near Oak, and this led me to offer it as the food. Wild Cherry also was provided as an experiment, and the larvæ fed on it, but seemed to prefer Oak, which was used exclusively thereafter.

In my opinion there is considerable uncertainty about the specific standing of *Macophora cupidaria*, Grote. Several specimens, all males, have been determined for local collectors as *cupidaria*. These are all males of *quernaria*, which is an extremely variable species in coloration as well as structure of the extradiscal line in secondaries. The late Dr. Packard had one female of *quernaria*, and besides the copy of Grote's figure a poor male, which he presumed to be *cupidaria*, when treating these species in his Monograph. On page 412 he speaks of *cupidaria* possibly being the male of *quernaria*, which I think is correct. The figure of *cupidaria* in the Monograph Plate XI, fig. 5, is poor, as the left and right sides do not correspond at all. I have seen about 40 specimens in the local collections, and will briefly state the differences of the sexes of *quernaria*: Male: Coloration mostly dark; in rare exceptions specimens occur where the costal area, collar and front of thorax are white, corresponding in this respect to the figure of *cupidaria*, cited above. The extradiscal line in secondaries is usually straight, in some specimens more or less angulated in the median area. Female: very variable, coloration usually light, corresponding with the figure of *quernaria*, Plate XI, fig. 6, in Packard's Monograph. Some specimens were noted which have the thorax brown and scarcely any white maculation on the wings. The line in secondaries is strongly angulated in the majority, in some specimens intermediate between these and the normally straight line of the male. The transverse lines of the primaries do not vary much. In the dark specimens of both sexes these lines are marked at the costa by irregular patches.



## NEW SPECIES OF DOLERINÆ.

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

The writer has in preparation some synoptic tables of the eastern species of Saw-flies. In this synoptic paper, it is not desirable to present the descriptions of new species. This paper and some others to follow later will include the descriptions of such new species as are to be included there.

*Dolerus parasericeus*, n. sp.—♀. Surface of the scutellar appendage entirely smooth; pectus with three longitudinal rows of large punctures; antennal furrows with their outer edges continued by an elevated area to the eye; head rounded off between the vertex and the occiput; the postocular area with fewer, smaller punctures than the sides of the vertex; the scutellum and the inflexed portion of the lateral lobes of the mesonotum with the punctuation similar in size and approximately similar in number to the dorsal surface of the lateral lobes; body dull black; wings infuscated, especially around the margins. Length, 10 mm.

Habitat: Ithaca, N. Y.

*Dolerus neosericeus*, n. sp.—♀. This species differs from the preceding in having the scutellum and inflexed portion of the mesonotum with the punctuation larger and distinctly more numerous than on the dorsal surface of the mesonotum; antennal furrows behind the ocelli distinct and sharply cut; upper orbits with an impunctate area; median lobe of the mesonotum distinctly, more densely punctured than the lateral lobes; body dull black; wings fuliginous. Length, 12 mm.

Habitat: Ithaca, N. Y., and Mt. Katahdin, Maine (J. O. Martin).

*Dolerus polysericeus*, n. sp.—♀. Pectus with three longitudinal rows of large punctures; antennal furrows not traceable below the lateral ocelli; scutellum with fewer punctures than the lateral lobes of the mesonotum, and its punctures twice their size; postocular area more finely punctured than the posterior orbits; head with a carina between the occiput and the posterior orbits; body dull black; wings infuscated. Length, 11 mm.

Habitat: Ithaca, N. Y.

*Dolerus colosericeus*, n. sp.—♀. Surface of the scutellar appendage smooth; pectus with three longitudinal rows of large punctures; antennal furrows not traceable below the lateral ocelli; scutellum and lateral lobes of the mesonotum uniformly punctured as to size and number; vertex

with a fine impunctate ridge extending from the hind end of the antennal furrow to the hind margin of the eyes; an impunctate spot on the edge of the head between the vertex and the occiput; body uniformly black; wings fuliginous. Length, 14 mm.

Habitat: St. Anthony Park, Minn. (R. H. Pettit).

*Dolerus monosericeus*, n. sp.—♂ ♀. Surface of the scutellar appendage smooth; pectus with three rows of large punctures; antennal furrows obsolete below the lateral ocelli; scutellum and lateral lobes uniformly punctured; vertex uniformly convex between the antennal furrows and the eyes; the vertex uniformly punctured; median lobe of the mesonotum uniformly, finely, densely punctured; body black; wings fuliginous. Length, 10 mm.

Habitat: West Springfield, Mass. (J. O. Martin).

*Dolerus apriloides*, n. sp.—♀. Surface of the scutellar appendage smooth; pectus with the punctures all uniform in size; antennal furrows broad and distinct to near the middle of the eyes; the postocular area with many fine punctures; the posterior orbits with adjacent, large punctures, surface subrugose; impunctate area on the lateral surface of the lateral lobes of the mesonotum not extending to the median lobes; body black, with abdominal segments one to five rufous; wings infuscated on apical half. Length, 12 mm.

Habitat: Ithaca, N. Y.

*Dolerus neoprilis*, n. sp.—♀. Surface of the scutellar appendage smooth; median lobe of the mesonotum with larger, coarser punctures at sides than at middle; pectus uniformly punctured; antennal furrows indefinite, not continued below the lateral ocelli; impunctate area on the sides of the lateral lobes extending to the margin of the median lobe of the mesonotum; the postocular area and the posterior orbits finely punctured, the postocular area the more densely; body black, with abdominal segments one to five rufous; wings hyaline, smoky toward the apex. Length, 11 mm.

Habitat: Nebraska (F. Rauterberger).

*Dolerus minusculus*, n. sp.—♀. Surface of the scutellar appendage smooth; mesonotum not with a band of larger punctures on each side of the median lobe; head with a distinct carina along the posterior margin between the occiput and the vertex; mesonotum with the median lobe

densely punctured, the lateral lobes almost smooth; body black, with the collar, tegulae, the legs beyond the middle of the coxae, and abdominal segments one to five, rufous; the wings slightly infuscated. Length, 8 mm.

Habitat: Ithaca, N. Y.

*Dolerus luctatus*, n. sp.—♀. Surface of the scutellar appendage smooth; mesonotum not with a band of large punctures on each side of the median lobe; head with a distinct carina along the posterior margin between the occiput and the vertex; mesonotum with the median lobe not more densely punctured than the lateral lobes; body black, with the pronotum in front irregularly, abdominal segments one to four, abdominal segment five at base, apical half of the front coxae, the front femora and tibiae, the middle and hind femora, except a black spot above at apex, and the knees in part, rufous; tegulae white; wings hyaline. Length, 8 mm.

Habitat: Ithaca, N. Y.

*Dolerus neocollaris*, n. sp.—♂ ♀. Surface of the scutellar appendage smooth; mesonotum with the median lobe uniformly punctured; head not with a carina along the posterior margin above; antennal fovea linear, definite, three times as long as broad; a transverse furrow extending across the head between the eyes and behind the ocelli; head uniformly punctured; body black, with the pronotum entirely, the median lobe of the mesonotum, and the upper half of the mesepimera, rufous; wings slightly infuscated. Length, 10 mm.

Habitat: Fulton, N. Y. (C. R. Crosby); Ithaca, N. Y.

*Dolerus icterus*, n. sp.—♀. Surface of the scutellar appendage smooth; mesonotum with the median lobe uniformly punctured; head not with a carina along the posterior margin above; antennal fovea punctiform, shallow, hardly if at all longer than broad; the transverse furrow between the eyes and behind the ocelli wanting; body rufous, with the head, the antennae, the lateral lobes of the mesonotum, the scutellum at middle, the pectus, the saw-guides, the stigma on its outer half, and the legs, except the knees of the front pair, black; wings infuscated at middle. Length, 9 mm.

Habitat: Saranac Inn, N. Y. (J. G. Needham).

*Dolerus refugus*, n. sp.—♀. Surface of the scutellar appendage uniformly, finely punctured; scutellum twice as densely punctured as

the surface of the median lobe of the mesonotum; the postocular area and the posterior orbits uniformly, closely punctured; body black, with the pronotum, the median lobe of the mesonotum, and the upper half of the mesopleura, rufous; wings subhyaline, clouded at apex. Length, 12 mm.

Habitat: Ithaca, N. Y. (J. H. Comstock); Lake Forest, Ill. (J. G. Needham).

*Dolerus inspectus*, n. sp.—♂. Surface of the scutellar appendage longitudinally striate at middle and punctured at sides; scutellum and lateral lobes of the mesonotum uniformly punctured; the postocular area more finely and densely punctured than the posterior orbits; the median lobe of the mesonotum and the scutellum finely, densely punctured, the lateral lobes smooth, with distinct punctures; body black, with the abdominal segments one to five rufous; wings yellowish, veins black. Length, 9 mm.

Habitat: Ithaca, N. Y., and Chicopee, Mass. (J. O. Martin).

*Dolerus cohesus*, n. sp.—♀. Surface of the scutellar appendage smooth at apex and striate at base; median lobe of the mesonotum uniformly punctured; antennal furrow extending from the occiput to the clypeus; vertex and postocular area differently punctured; lateral lobes of the mesonotum not so densely punctured as the median lobe or the scutellum; body black, with abdominal segments one to four, and the tibiae, at least on their basal half, rufous. Length, 7 mm.

Habitat: Otto, N. Y. (J. H. Comstock), and West Springfield, Mass. (J. O. Martin).

*Dolerus conjugatus*, n. sp.—♀. Surface of the scutellar appendage longitudinally striate; head viewed from above with a deep transverse furrow, rounded at bottom, extending from the lateral ocelli to beyond the hind angles of the eyes; head with the postocular area more densely punctured than the sides of the vertex; body black, with the knees and the abdominal segments one to five, rufous; the wings hyaline, the veins black, the stigma paler below. Length, 8 mm.

Habitat: Otto, N. Y. (J. H. Comstock); Wellesley, Mass. (A. P. Morse); Fulton, N. Y. (C. R. Crosby).

*Dolerus dysporus*, n. sp.—♀. Surface of the scutellar appendage longitudinally striate; head viewed from above with a deep transverse furrow, rounded at bottom, extending from the lateral ocelli to beyond the

hind angles of the eyes; head with the postocular area and the sides of the vertex uniformly, finely punctured; body black, with the abdominal segments one to five and the basal half of the sixth, rufous; the wings hyaline, the veins and stigma black. Length, 10 mm.

Habitat: Ithaca, N. Y., and Chicopee, Mass. (J. O. Martin).

*Dolerus plesius*, n. sp.—♀. Surface of the scutellar appendage longitudinally striate; head viewed from above with a deep transverse furrow, rounded at bottom, extending from the lateral ocelli to beyond the hind angles of the eyes; head with a fine ridge extending from the edge of the eye obliquely toward the occiput; mesonotum with the impunctate area on the sides of the lateral lobes not extending to the margin of the median lobe; the median lobe of the mesonotum more densely punctured than the lateral lobes; body black, with the prothorax, tegulæ, and abdominal segments four to five, rufous; wings very slightly infuscated, veins and stigma black. Length, 8 mm.

Habitat: Lake Forest, Ill. (J. G. Needham).

*Dolerus agcistus*, n. sp.—♀. Surface of the scutellar appendage longitudinally striate; head viewed from above with a deep transverse furrow, rounded at bottom, extending from the lateral ocelli to beyond the hind angles of the eyes; head without a fine ridge extending from the eye toward the occiput; mesonotum with the impunctate area on the sides of the lateral lobes extending broadly to the margin of the median lobe; mesonotum finely, densely punctured; body black, with the prothorax, tegulæ, median lobe of the mesonotum, upper half of the mesopleuræ, the metapleuræ, and the abdomen, except the saw-guides, rufous; wings infuscated, veins black. Length, 9 mm.

Habitat: Lake Forest, Ill. (J. G. Needham), and Durham, N. H. (W. & F.).

*Dolerus stugnus*, n. sp.—♀. Surface of the scutellar appendage transversely striate; mesonotum with the impunctate area on the sides of the lateral lobes almost entirely wanting, at least, always separated from the median lobe by a narrow punctate area; head when viewed from above with a transverse furrow extending across behind the eyes, interrupted by an oblique ridge extending from the postocular area to the upper posterior corner of the eyes; lateral lobes of the mesonotum not so densely punctured on the disk as at the sides; body black, with the prothorax for the most part, a spot on each side of the median lobe of the mesonotum, the

tegulae, the knees, and the abdominal segments one to five, rufous; wings yellowish hyaline, paler at base. Length, 10 mm.

Habitat: Ithaca, N. Y.

*Dolerus acritus*, n. sp.—♀. Surface of the scutellar appendage transversely striate; mesonotum with the impunctate area on the sides of the lateral lobes almost entirely wanting, at least, always separated from the median lobe by a narrow punctate area; head when viewed from above with a transverse furrow extending behind the eyes and ocelli, and without a carina behind the eyes between the occiput and the posterior orbits; vertex adjacent to the postocular area with a small impunctate area; the postocular area as densely punctured as the front; median lobe of the mesonotum not so densely punctured as the lateral lobes; body black, with the prothorax, tegulae, median lobe of the mesonotum, except at middle, and the abdominal segments one to five, rufous; wings hyaline, veins black, stigma rufous below. Length, 7 mm.

Habitat: McLean and Ithaca, N. Y.

*Dolerus arvensis*, Say.—This species, as has been pointed out before, is the female of *Dolerus unicolor*, Beauv.

#### THE CHRYSALIS OF EUCHLOE LANCEOLATA, BOISD.

BY KARL R. COOLIDGE, PALO ALTO, CALIFORNIA.

The preparatory stages of but two of our species of *Euchloe* have been entirely worked out. *Genutia*, Fab., is well known, and Prof. Shull (Ent. News, March, 1907) has given us the life-history of *olympia*, Edw. The later stages of *ausonides* have also been briefly described, and Mr. E. J. Newcomer and myself have succeeded in working out its entire history, as well as that of *sara* partially. The only reference to *lanceolata* is by Mead,\* in which he describes the mature larva, and makes a mention of the pupa. Later, Beutenmüller,† in his Revision of the genus, and Holland (Butterfly Book, p. 285) have compiled short descriptions of the larva, which appears to be similar to congeneric species, and with the usual glandular hairs, lateral and longitudinal markings, feeding on the flowers and buds, and later, the seed-pods of its food-plant. Mead's reference to the pupa is so meagre that I give it *verbatim*: "The chrysalis is somewhat larger than that of *A. hyantis*, and the long palpi-case is bent

\*Psyche, II, p. 179, 1878.

†Bull. Am. Mus. Nat. Hist., 10, 236, 1898.

April, 1908

backwards into a sickle shape, giving the pupa a remarkable appearance." Mr. F. X. Williams has kindly given me a pupa, with a description of the larva, of a species of *Euchloe*, and as the latter agrees so well with Mead's, and the pupa differs so radically from that of *sara* and *ausonides* (both of which are known to me), I have no hesitation in referring the species to *lanceolata*. The curvature of the anterior portion of the chrysalis is especially distinctive, and for this reason it can hardly be confused with either of the other species found in the same region. Mead says of this: "In many particulars the pupa is not unlike that of *Terias nicippe*, and I believe that this species is the nearest to *Terias* of all our *Anthocharis*." Besides the specimen given me, Mr. Williams has three or four others, taken towards the middle of July in Shasta county, California, at an elevation of about 2,000 feet. Careful breeding will probably eliminate a number of our so-called species and varieties. *Stella*, *thoosa*, *julia* and *flora* are probably synonyms of *Reakirtii*, Edw., and *mollis*, Wright, is the same as *sara*, Boisd. *Lanceolata* is a very distinct species.

Chrysalis.‡—Navicular, cylindrical, slender, the palpi-case much curved, more so than in any species known to me, giving the pupa a semi-lunar appearance; thickest in the middle and tapering gradually therefrom to the extremities; anterior end sharper than posterior, colour at first green, changing to a very light wood-brown, very faintly streaked, and with a few scattered black points; tip of palpi-case somewhat blackish; a narrow median ventral line somewhat darker than the ground colour; lateral ridges concolorous; incisures of segments whitish. Length, 19 mm.; width, about 5 mm.

*Lanceolata* is one of the first species to appear in the mountains, where it ranges. Like others of the genus, it varies considerably, especially in the density of the apical coloration and the size and form of the discal bar. Northern specimens differ from southern in having the auroral spot lighter, both above and below. *Lanceolata* ranges from Mexico to Alaska, and is essentially a mountain flyer. The food-plants are various species of Cruciferæ, particularly *Arabis perfoliata*, *Turritis glabra* and *Erysimum officinale*.

‡The pupæ of *Euchloe* seem to be very variable as to colour, and also the degree of curvature of the anterior portion. Mr. Williams tells me, however, that his pupæ are quite uniform. In *E. ausonides* the chrysalis varies greatly in the colour of the longitudinal stripes, and the tip of the palpi-case may be recurved to a noticeable extent in some specimens, while in others the curve is only moderate.

## SOME WINTER INSECTS.

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

Some five or six years ago, on Lincoln's birthday (February 12), my friend, Mr. W. T. Davis, took me collecting in Staten Island, and the CANADIAN ENTOMOLOGIST published my little sketch of the day. Every year since I have endeavoured to repeat my pleasant experience of that occasion, but never have met with success. Again I tried this year, and in spite of the two weeks of excessive cold that preceded the holiday, there were one or two things of interest to note:—

The day was bright, with a temperature at freezing or perhaps lower, and snow was quite deep on the ground. It was a day for walking, and I found myself wishing for snowshoes to go over the frozen crust. My collecting grounds are all about ten minutes' walk from my house in White Plains. First I went to a swamp, mostly under water and now covered with ice, but found nothing. Walking along the aqueduct, I kept on the look-out for likely-looking trees, but found none that gave results. Finally the Bronx River was reached, and in a field through which it runs, many specimens of the little Perlid, *Capnia nedyaloides*, were found crawling actively about on the snow. Some had wandered out of the sunshine and were quite torpid, but others were very agile and endeavoured to hide under the snow crystals to avoid capture. Here also were taken a couple of undetermined gnats which were crawling over the snow. On my way home I came across two sycamores, and under the flakes of loose bark took a dozen or so *Corythuca ciliata*. In the afternoon, during a walk, I noticed a dead and peeling sapling from which on one or two other occasions I had removed a part of the bark with satisfactory results. Again I tried it, and to my satisfaction found in a part of the unbarked portion of the branches a nice series of the Aradid, *Aneurus Fiskei*, Heid. I found not only the adult, but also the ova and nymphs in several stages.

This was indeed a very different day from the other, but on the whole it was not very disappointing, considering the desultory nature of my collecting. The capture of *Aneurus Fiskei* alone was sufficient to make it noteworthy.

The Thirty-eighth Annual Report of the Entomological Society of Ontario, 1907, has recently been issued and distributed by the Department of Agriculture at Toronto to all our subscribers who have paid up their dues for the current year. Among the important papers may be mentioned Mr. Jarvis's List of the Scale Insects of Ontario, and Dr. Fletcher's Entomological Record for 1907.



## THE SPECIES OF TORNOS, MORR.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

In 1887 Dr. Hulst described (Ent. Amer., Vol. II, pp. 192 and 210) five species under this genus, viz: *candidarius*; *robiginosus*, Mor., var. *cinctarius*; *robiginosus*, Mor., var. *abjectarius*; *dissociarius*, and *incopriarius*. The first named is a Noctuid; the second is a valid species; the third has recently been placed as a synonym of *scolopacinarina*, Guen., in an article by Mr. J. A. Grossbeck (Trans. Am. Ent. Soc., Vol. 32, p. 342), where it most assuredly belongs; the fourth was made the type of *Holochroa*, Hulst (Dyar, 3,821); and the fifth was in some strange manner incorporated with *Glaucina* (Dyar, 3,820). In describing var. *cinctarius*, Dr. Hulst gives no alar expanse, no sex, nor locality. Three examples of it have long been known to me, one in the Hulst coll. at N. B., the type, so labelled, from Florida; one in the Bklyn. Inst., through the Graef. coll., from Georgia; and one taken by me at Orlando, Florida, iv, 3, 1899; all females. At that time I was confident the species was entirely distinct, and this view has since been expressed by Dr. Dyar (Proc. Ent. Soc. of Wash., Vol. 6, p. 225), but I have waited several years to make certain of it, by an examination of the male sex. Recently, through the kindness of Mrs. A. T. Slosson, I was permitted to examine her Geometrid captures in Florida, and among them were two females and one male of this species. It is easily separated from *scolopacinarina*, which is also taken there, by its large size, stouter form, broad wings, in colour a deep mahogany-red when fresh, fading into a deep reddish-brown. With the black cross lines of both wings sharply defined except the intradiscal on fore wings, which after touching discal dot fades out toward inner margin. The discal dots on fore wings are two to three times larger, and the plumes with which they are ornamented much longer, so that they wave about with the slightest movement. The ♂ antennæ are heavier. The extradiscal line is outwardly edged with a fine border of white scales. In my specimen the basal and extradiscal curved lines on hind wings are both sharply defined, and the large oval discal spot, not ornamented with plumes as on fore wings, is pupilled with a few white scales. Expanse, 30 mm.

Type: ♂ in the coll. of Mrs. A. T. Slosson.

The above comparative description, amplifying that of Dr. Hulst, applies to both sexes.

The type of (*Glaucina*) *incopriarius*, Hulst, passed, with the Neumogen coll., to the Brooklyn Inst. It is nearly related to *Deilinea*,

but far removed from *Glaucina*. *Incopriarius* is represented in the Hulst coll. at N. B. by a species which Dr. Dyar has forestalled me in describing under the name of *errovaria* (Jour. N. Y. Ent. Soc., Vol. 15, p. 106). The type of *incopriarius* is identical with, so far as I can discern, the mutilated, badly-worn type in the Hulst coll. at N. B., representing *Aethytera lineata*, Hulst. Mr. Grossbeck refers to this species (loc. cit., page 341) as being represented by a false type, but this was a "slip of the pen." Perhaps Dr. Barnes, from whom Hulst's specimens came, may have better ones, upon which a definite opinion might be based. Incidentally, I would call attention to the persistent misspelling of Morrison's name, *robiginosus*, by all writers, from Packard, in 1876, to the present time. The species of *Tornos*, Mor., should stand :

- scolopacinaria, Guen.
- = robiginosus, Mor.
- = abjectarius, Hulst.
- cinctarius, Hulst.

#### BOOK NOTICES.

FAUNA HAWAIIENSIS, or the Zoology of the Sandwich (Hawaiian) Isles, Volume I, Part V, Microlepidoptera. By the Right Hon. Lord Walsingham : The University Press, Cambridge, 1907. (Price eighty shillings.)

This long-promised part of the *Fauna Hawaiiensis*, dealing with the *Microlepidoptera* of the islands, by Lord Walsingham, is now before the writer in a highly-prized complimentary copy.

Together with Edw. Meyrick's *Macrolepidoptera* (1899), it forms a monumental work on the Lepidopterous fauna of the Sandwich Isles, well worthy of the learned authors. The two volumes afford a comprehensive and authoritative key to the knowledge of this fauna, and they will ever remain indispensable classics, even though further collecting will undoubtedly add considerably to the number of species known from the islands, especially among the Micros.\*

\*A material increase may particularly be expected in the more minute Tineidae, which are scantily represented in the present work; thus, only two species of *Gracilaria* are described, and the genus *Lithocolletis* is totally absent. In U. S. National Museum is a series of *Lithocolletis* (near *Bethuniella*, Chambers), bred in Hawaii from *Lantana*, supposed to have been introduced from Mexico.

The present volume, which contains 300 quarto pages and 16 coloured plates, covers the *Pterophorina*, *Orneodina* and *Tineina*, and deals with 441 species, of which all but 35 are described for the first time.

These 441 species are distributed among only 62 genera,† confirming the theory, advanced by Meyrick, that the peculiar topographical conditions of the islands, with their numerous separate valleys, are highly favourable to specific differentiation, while the very limited area and the consequent uniform climatic conditions have not tended to increase correspondingly the originally limited number of genera.

The great majority (420) of these species and 26 of the genera are endemic to the islands. These endemic species on the whole indicate Australian rather than Asiatic or American origin of the fauna, though the total absence of *Oecophoridae* (a single introduced species excepted) is remarkable, that being the most abundantly-represented family in the Australian region.

The remaining 21 apodemic species are mostly of wide distribution, including the cabbage moth, *Plutella maculipennis*; the tobacco and potato moth, *Phthorimæa operculella*, and the sweet potato and *Ipomea*, Miner, *Bedellia somnulentella*, besides more or less domestic species of *Endrosis*, *Monopis*, *Tinea* and *Setomorpha*.

The synonymy of one of these, *Setomorpha rutella*, Feller [evidently but lately realized by Lord Walsingham, as it is only stated in the table of distribution (page 754), and there in correction of that shown under the genus in the body of the work (page 726)], is of decided interest, and will necessitate the change of the name, hitherto used for the American specimens. Lord Walsingham recognizes as but one cosmopolitan species the original type of the genus, *rutella*, Feller, from Africa; *dryas*, Butler, from Hawaii; *operosella*, Feller, with its synonyms as determined by the writer, from America; *corticinella*, Snellen, from Celebes; and *discipunctella*, Rebel, from the Canary Islands. I have long suspected this to be the case, and heartily approve of the synonymy. A series of moths clearly determinable as *corticinella*, Snellen, was bred by the writer in 1906 from a collection of pinned Philippine insects, which was received from Manila, and which was totally destroyed by the larvæ of the *Setomorpha*. This series, including both sexes, can not be distinguished from typical specimens of *operosella*, Feller, from Texas.

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†This number must, however, be somewhat enlarged, as explained in the following.

All the genera and species are described in the careful manner characteristic of the author, and the recognition of the species is further greatly facilitated by the very excellent colored plates, representing every species. It was a joy to the writer to be able to name, without any difficulty, a dozen species from the National Museum's Hawaiian collection in as many minutes.

With all this acknowledged, it seems hypercritical to require more; yet another plate, giving delineations of the venation of all the genera, would have been a valuable addition. Not that the genera may not be recognized from the very perfect descriptions, but in any eventual rearrangement of the genera, or in comparative studies with others of other faunas, where minute details, at present not reckoned with, may have to be relied on, such a plate of careful figures of the venations would have been exceedingly valuable to the student who has not access to a good Hawaiian collection.

One striking example of this need of structural figures is the genus *Aristotelia*, of which one is surprised to find, that Lord Walsingham has retained the same abstract idea as in his West Indian paper of 10 years ago (Proc. Zool. Soc., London, 1897, page 63), notwithstanding subsequent revisional work in that group. With this originally monotypical genus, which has been limited by Meyrick and the writer to the species agreeing in venation with the type, *decurtella*, Hubner, Lord Walsingham continues to associate quite different forms. While this may not be of much importance in the case of such closely-related genera as *Chrysopora*, Clemens (*Nomia*, Clemens; *Mannodia*, Heinemann), it is decidedly mischievous with a genus like *Evagora*, Clemens, which belongs to a very different group. In this genus, *Aristotelia* (Walsingham), figures of the venation, or at least a statement of it under each species, would have greatly facilitated a revision, which must in time take place, as even the coloured figures plainly show that the included species can not be congeneric.

Lord Walsingham's arrangement of the genera in families presents some interesting new departures.

The hitherto generally accepted family, *Xyloryctidae*, is absorbed without even a group name among the *Gelechiidae*, probably through sound reasoning, but without any presented argumentation. To the writer it would seem expedient to retain this admittedly natural group, at least as a sub-family, with the position of vein 2 in the fore wing as the distinguishing character.

The hitherto universally-accepted family, *Elachistidae*, Lord Walsingham finds inseparable from the *Hyponomeutidae*, through the knowledge of intergrading Hawaiian forms. While agreeing that any divisions which cannot be well defined should be avoided as inexpedient, though not necessarily unnatural, the writer is not quite prepared for this radical move, and ventures to suggest that the final solution of this question has not been reached, and may be found, rather, in other limits being drawn, than in no limits between the two families.

In the *Hyponomeutidae*, Lord Walsingham further places *Blastobasis* and *Endrosis*, though he has himself, within the last year, elucidated the family *Blastobasidae* by a generic table, in which he included both these genera (Proc. U. S. Nat. Mus., XXXIII, page 200, 1907).

No reasons are advanced for this change of view, and it can only be explained on the supposition that this part of the work had been written some years ago, and has not been brought up to the author's present conception. The *Blastobasidae*, in the absence of proof to the contrary, should be retained as a natural and easily-defined family, characterized mainly by the peculiar venation of the forewing.

The genus *Endrosis*, however, does not, in the writer's opinion, belong to this family,\* but to the *Cecophoridae*, near *Borkhausenia*.

After these radical reductions in the number of families, Lord Walsingham, on the other hand, promotes to family rank the *Carposinidae*, as suggested by the writer (Journ. N. Y. Ent. Soc., XV, p. 35, 1907), in which he presumably will include the *Phaloniinae* as a sub-family. With equal propriety he retains the *Olethreutinae* and the *Tortricinae* under one family heading, *Tortricidae*.

He adheres to the idea, which he originated, of placing these families between, rather than in front of, the other families of the *Tineina*, which seems the more warranted in view of Meyrick's recent intermediate family, *Chlidanotidae* (Journ. Bom. Nat. Hist. Soc., XVII, page 412, 1906); but it must be kept in mind that the *Tortricidae* are a terminal branch, from which no other family has developed. The writer regrets

\*Nor does *Arctoscelis*, Meyrick. In his generic table, above-mentioned, Lord Walsingham differentiates these two genera on the character: no antennal pecten, a character which, if true, alone would tend to eliminate them from the family; *Endrosis*, however, possesses a very strongly-developed pecten.

one single feature in this masterful work, namely, the erection of genera (*Ptychotrix*, *Catamempsis*) on secondary sexual characters alone, and this in spite of His Lordship's own statement in his remarks (page 738-9), that such characters are of very doubtful value, and especially so in the Hawaiian fauna, where the most embarrassing plasticity of such characters prevails. Undoubtedly, other sounder structural characters, common to both sexes, could have been found, or if not, the genera are, in the writer's judgment, not justified. To him it seems essential, for a sound appreciation of the natural grouping of the *Microlepidoptera*, that we get away altogether from these superficial characters, however tempting, and rely solely on the more subtle but dependable internal modifications presented in the venation.

In his discussion of the variability of the secondary sexual characters, Lord Walsingham also comments on the variability in the Hawaiian fauna of certain other, normally dependable, generic characters. Some of these the writer is not able to discuss without a more extended study of the fauna than is at present possible; but the one case of instability of venation (in *Diplosara*, Meyrick, pages 646-7), appears to be nothing more than might be expected, or than is found in other unspecialized genera (a similar case is *Monopis*); these conditions do not in the least lessen the value of the venation as a dependable character, only the same importance must not be given to certain fluctuations in generalized families, such as the *Tineidae* and *Hyponomeutidae*, as would be warranted in more crystallized families, such as the *Gelechiidae* or *Ecophoridae*.

The few dissenting opinions on certain details that may be found in the above notes do not detract from the fullest general appreciation of Lord Walsingham's excellent work. It has been an enormous and very difficult study, and he is to be sincerely congratulated on the result, which casts great credit on the author and on his valuable assistant, Mr. J. Hartley Durrant, whose important share in the work is liberally credited by Lord Walsingham.—AUGUST BUSCK.

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JOURNAL OF ECONOMIC ENTOMOLOGY: Official organ of the Association of Economic Entomologists. Concord, N. H. Volume I, No. 1. February, 1908.

We are glad to welcome this first number of a new serial publication devoted to Economic Entomology. Since its formation, twenty years ago,

the Association has depended upon the Department of Agriculture at Washington for the publication of its proceedings, in the form of an annual Bulletin. Some inconvenience was experienced owing to the unavoidable delay in the appearance of some of the papers, which were of immediate importance. To obviate this difficulty, and also to provide a magazine for the early publication of original observations made by workers in all departments of Economic Entomology, this Journal has been established. It is to be issued bi-monthly, beginning with February of the current year. It is hoped that not only all Entomologists will support the venture by their subscriptions, but also fruit-growers, nurserymen, horticulturists and all others in any way interested in the depredations of insects.

The number before us contains the first instalment of the papers read at the recent Chicago meeting of the Association, as well as a report of its proceedings. The eighty pages include some very interesting contributions, among which may be mentioned: Mr. Wilmon Newell's Notes on the Habits of the Argentine, or "New Orleans" Ant; Mr. W. A. Hooker's papers on the Life-history, &c., of the Ixodea, and the Role of Ticks in the Transmission of Disease; and Mr. W. D. Hunter's discussion of the effects of temperature on the incubation of eggs of *Margaropus annulatus*. The magazine is edited by Dr. E. Porter Felt, State Entomologist, Albany, N. Y., with Mr. A. F. Burgess, Bureau of Entomology, Washington, as Associate Editor, and an advisory board consisting of Drs. Howard, Fletcher, H. T. Fernald, Forbes, Morgan and Osborn. The subscription for non-members of the Association is two dollars per annum, which should be sent to the Business Manager, Prof. E. Dwight Sanderson, Durham, N. H.

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BULLETIN OF THE BRITISH COLUMBIA ENTOMOLOGICAL SOCIETY: Edited by R. V. Harvey, M. A., Victoria, B. C. No. 8. December, 1907.

This number contains a list of the Syrphidæ of British Columbia, by Prof. R. C. Osborn, and a continuation of Mr. Harvey's Notes on Noctuidæ, treating of five species of Autographa. This little quarterly always contains some valuable and interesting matter, and must be of great assistance to Entomologists in the Pacific province.

## NOTES.

While in search of beetles last June, one of my companions drew attention to a colony of large black ants in a decayed pine stump. We noticed a great many minute yellow creatures running unmolested among the ants. Examination proved them to be Staphylinids, which I thought were of the genus *Ateleus*, and afterwards they were identified as such. We have been unable to learn the species as yet. The beetle is about an eighth of an inch long, and the abdomen, which is always held erect, bears a peculiar depression on the upper side in such a way as to leave a distinct ledge around the edge. Shortly afterwards we found one of the same species in a spider's web. On July 15th I was surprised to see *Cicada tibicen* with its proboscis buried in a squash bug, *Anasa tristis*. This was my first intimation that the Cicada might feed on animal matter.—ERIC MONTIZAMBERT, Port Hope.

We regret to record the death, at the age of seventy-six, of DR. H. GUARD KNAGGS, F. L. S., an English Entomologist of note, which took place on the 16th of January. He was the author of many contributions to entomological literature, among the most widely known of which is his "Lepidopterist's Guide," a third edition having been published a few years ago. This is a popular work, containing instructions for collecting, rearing and preserving Butterflies and Moths for the use especially of the young collector.

THE LAKE LABORATORY maintained by the Ohio State University announces the usual programme for the coming summer, including courses in General Zoology and Botany, Entomology, Ornithology, Experimental Zoology, Comparative Anatomy, Ecology, Embryology, Invertebrate Morphology and Ichthyology; also opportunities for research work and accommodations for investigators as in previous years. The opportunities offered are especially good for Entomology and for fresh-water conditions, and special attention is given to the aquatic life of the locality. Opportunities for research work in these directions are very favourable. Independent investigators are given the use of tables free of charge, but are expected to furnish their own microscopes and other apparatus. The locality is an excellent one for summer work, the laboratory being situated on the point separating Sandusky Bay from Lake Erie, with its frontage on a fine beach. For circulars or information address the Director, Professor Herbert Osborn, Ohio State University, Columbus, Ohio.

Mailed April 6th, 1908.