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CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND PARASITIC WASPS, OR THE SUPERFAMILY VESPOIDEA.

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(Paper No. 4.—Continued from Vol. XXXII., 1900, p. 296.)

SUBFAMILY III.—Aporinæ (= Pompilinae).

1815. Aporida, Leach, Edinb. Encyc. IX., p. 149.

Pompilus, Fabr., is preoccupied, and the family name *Pompilidae* must be changed to *Ceropalidae*, as has been shown recently by Fox (*vide* Ent. News, Vol. XII., 1901, p. 268). In consequence, my subfamily *Pompilinae* must be changed to *Aporinae*.

This subfamily is unquestionably the largest in number of genera and species of any of the groups of the family *Ceropalidae* (Pompilidae). Most of the species, in comparison with those found in the *Pepsinæ*, are of medium size or small, few attaining much over an inch in length, while the vast majority are much smaller.

All of the species, so far as we know, dig burrows in the ground, in which they store up spiders as food for their young. I suspect, however, that some of the genera, judging from their structural characters and the absence of a tarsal comb, will prove to be *inquilinous in the nests of others*, as with the *Psithyridae*, *Stelididae* and other families in the Hymenoptera.

The characters made use of in my table of subfamilies readily separate the subfamily. The spiny or strongly bristly legs, which are never smooth nor serrate, and the absence of a transverse grooved line or furrow on the second ventral segment separate it from the *Pepsinæ* and the *Ageuiniæ*; the antennæ being placed higher up on the face, and not low down on or below an imaginary line drawn from the base of the eyes,

or the non-produced clypeus, separate it from the *Planicipinae* and from *males* in the *Ageniinae*; while from the *Notocyphinae* and the *Ceropalinae* it is separated by the hidden or only partly visible labrum, which is never very large or free, and by other characters.

The *Aporinae* may be separated into two tribes :

- Front wings with *three* cubital cells, the second and third each receiving a recurrent nervure.....Tribe I., Anopliini.
 Front wings with only *two* cubital cells, rarely with only one, the second usually receiving both recurrent nervures, rarely receiving only one—the first; head lenticular, the antennæ inserted only slightly above an imaginary line drawn from the base of the eyes.....Tribe II., Aporini.

Tribe I.—Anopliini.

Many new genera have been recognized in this tribe, and I have restored many genera suppressed by various authorities, but I believe these may all be readily separated now by the characters made use of in the following table :

Table of Genera.

- Cubitus in hind wings originating *before* the transverse median nervure, the submedian always shorter than the median.....2.
 Cubitus in hind wings not originating before the transverse median nervure, either interstitial or originating from *beyond* the transverse median nervure.
 Cubitus in hind wings *interstitial*, or very nearly, with the transverse median nervure.....10.
 Cubitus in hind wings originating beyond the transverse median nervure.....23.
 2. Metathorax posteriorly rounded, *not* impressed, and without a median impressed line or furrow above, or the impressed line very vaguely defined.....7.
 Metathorax posteriorly rather abruptly or obliquely truncate, impressed or emarginate, or *with* a more or less distinct median impressed line or furrow above; anterior tarsi in ♀ combed.
 Pronotum shorter than the mesonotum; eyes extending close to the mandibles; third cubital cell subquadrangular or trapezoidal, rarely subtriangular.....3.
 Pronotum long, as long or a little longer than the mesonotum; eyes not quite extending to base of mandibles, a linear space between; third cubital cell narrowed above or subtriangular;

submedian and median cells equal or nearly; claws in ♀ with a tooth beneath, in ♂ cleft; first joint of flagellum in ♀ not longer than the second, in ♂ shorter. (1) *Ferreola*, Lepel.
(Type *F. algerica*, Lepel.)

3. Head viewed from in front *not* wider than long, usually a little longer than wide, the eyes *not* strongly converging above, although usually slightly converging. 4.

Head viewed from in front *wider* than long, the eyes strongly converging above.

Claws in ♀ with a median tooth, in ♂ cleft; first joint of flagellum in ♀ longer than the second, in ♂ not longer, about equal; submedian cell in front wings a little shorter than the median. (2) *Batozonus*, Ashm., g. nov.
(Type *Pompilus algidus*, Smith.)

4. Claws in ♀ with a median tooth beneath, in ♂ cleft. 6.
Claws cleft in both sexes. 5.

5. Clypeus in ♀ anteriorly entire; metathorax posteriorly obliquely truncate or more or less impressed; tarsal comb in ♀ long.

Wings black, fuscous or subhyaline; first joint of flagellum in both sexes elongate, longer than the second; basal joint of front tarsi *shorter* than tibia; abdomen usually marked with white. (3) *Spilopompilus*, Ashm., g. nov.
(Type *Pompilus biguttulatus*, Fabr.)

Wings red or ferruginous, the tips black; first joint of flagellum in ♂ not longer than the second; basal joint of front tarsi longer than tibia; abdomen not marked with white, sericeous. (4) *Paracyphonyx*, Magretti.
(Type *P. metemmensis*, Magr.)

6. Clypeus and labrum with a median sinus anteriorly; pronotum with the hind margin arcuately or very obtusely angularly emarginate.

Abdomen wholly black; second joint of front tarsi less than half the length of the first. (5) *Pompilogastra*, Ashm., g. nov.
(Type *Pompilus aethiops*, Cress.)

Abdomen with the second segment marked with red or yellow; second joint of hind tarsi fully half as long as the first. (14) *Arachnoproctonus*, Ashm. (part.)

7. Metathorax bare or nearly, at least not clothed with a silvery pubescence; claws in ♀ with a median tooth, in ♂ cleft. 8.

Metathorax clothed with a fine, usually dense, silvery pubescence; claws in ♀ cleft, in ♂ with a median tooth.

Submedian and median cells equal, the transverse median nervure interstitial with the basal nervure; third cubital cell large, trapezoidal; mandibles 2-dentate; first joint of flagellum in ♂ as long as the second (6) *Sericopompilus*, Ashm., g. nov.
(Type *Pompilus cinctipes*, Cress.)

Submedian cell a little longer than the median; third cubital cell subtriangular; mandibles 3-dentate; first joint of flagellum in ♂ short, shorter than the second (7) *Nannopompilus*, Ashm., g. nov.
(Type *N. argenteus*, Ashm., M. S.)

8. Pronotum normal and always shorter than the mesonotum 9.

Pronotum broad and as long as the mesonotum.

Submedian cell in front wings much longer than the median; third cubital cell large, not or only slightly narrowed above (8) *Hypoferreola*, Ashm., g. nov.
(Type *Ferreola cephalotes*, Sauss.)

9. Wings red or ferruginous, their tips black; third cubital cell subquadrangular or trapezoidal, never distinctly triangular; mandibles 2-dentate, the inner tooth large, acute. (9) *Epizuron*, Schiödt.
= *Cryptocheilus*, Panzer.
(Type *Pompilus rufipes*, L.)

Wings differently coloured, not red, usually fuscous or subfuscous; mandibles in ♀ 3-dentate, the inner tooth small, in ♂ 2-dentate; body marked with yellow or red (10) *Poecilopompilus*, Ashm., g. nov.
(Type *Pompilus navus*, Cress.)

10. Metathorax posteriorly rounded, *not* impressed, and *without* a distinct median longitudinal impressed line or furrow above, or this line is very vaguely defined 19.

Metathorax posteriorly truncate, impressed or emarginate, or *with* a more or less distinct median longitudinal impressed line or furrow above.

Third cubital cell triangular, subtriangular, or at least always strongly narrowed above and sometimes petiolate; claws in ♀ with a median tooth, in ♂ cleft 16.

- Third cubital cell large, trapezoidal, or at least never distinctly triangular nor petiolate..... 11.
11. Claws in ♀ with a median tooth, in ♂ cleft; metathorax posteriorly not striate..... 12.
- Claws cleft in both sexes; metathorax posteriorly striate..... (11) *Pseudoferreola*, Radoszk. (Type *P. striata*, Radosz.)
12. Transverse median nervure in front wings *interstitial* with the basal nervure, the median and submedian cells of an equal length.... 14.
- Transverse median nervure in front wings *not* interstitial with the basal nervure, the submedian cell more or less distinctly the longer..... 13.
13. Clypeus anteriorly truncate or very slightly rounded, *without* a median sinus; body black or blue-black; pronotum posteriorly obtusely angularly emarginate, first joint of flagellum in ♀ longer than the second, in ♂ not or scarcely longer than the second, but at least thrice as long as thick; tarsal comb short and sparse..... (12) *Pycnopompilus*, Ashm., g. nov. (Type *Pompilus scelestus*, Cress.)
14. Clypeus in ♀ with a median sinus, in ♂ simple, the labrum slightly exposed..... 15.
- Clypeus in both sexes truncate or slightly rounded, *without* a median sinus.
- Body black or blue-black, the abdomen partly red; first joint of flagellum very elongate, much longer than the second; posterior face of metathorax concave, the upper and lower angles obtusely dentate; third cubital cell very large, the second quadrangular..... (Siam) (13) *Tachypompilus*, Ashm., g. nov. (Type *T. Abbotti*, Ashm., M. S.)
- Head and thorax black, the abdomen towards base marked with red; posterior face of metathorax only slightly impressed; third cubital cell triangular..... (21) *Entypus*, Dahlb. (part.)
15. Abdomen red or marked with red or yellow, rarely wholly black; first joint of flagellum in ♀ elongate, longer than the second; in ♂ short, never longer than the second..... (14) *Arachnoproctonus*, Ashm., g. nov. (Type *Pompilus ferrugineus*, Say.)

16. Third cubital cell small, distinctly triangular, and either petiolate or subpetiolate, rarely elliptical 18.
 Third cubital cell larger, triangular or subtriangular, but never petiolate, the marginal cell obliquely truncately pointed at apex 17.
17. Transverse median nervure in front wings interstitial with or originating a little before the basal nervure; pronotum as long or nearly as long as the mesonotum.
 Pronotum with the hind margin in ♀ obtusely angularly emarginate, in ♂ arcuately emarginate; first joint of flagellum in ♀ elongate, much longer than the second, in ♂ not longer than the second (15) *Schiztosalius*, Sauss.
 (Type *S. Elliotii*, Sauss.)
 Pronotum with the hind margin in both sexes arcuately emarginate; first joint of flagellum in ♀ short, not longer than the second, in ♂ shorter than the second (16) *Sophropompilus*, Ashm., g. nov.
 (Type *Pompilus ingenuus*, Cress.)
18. Transverse median nervure in front wings *not* interstitial with the basal nervure, the submedian cell most frequently distinctly longer than the median 19.
 Transverse median nervure in front wings *interstitial* with the basal nervure, the submedian and median cells equal.
 Pronotum shorter than the mesonotum, with the hind margin obtusely angularly emarginate (rarely arcuate); first joint of flagellum in ♀ elongate, much longer than the second, in ♂ not longer than the second (17) *Pompilodes*, Radoszk.
 (Type *P. unicolor*, Radoszk.)
19. Marginal cell not elliptical, but triangularly pointed at apex; claws in ♀ with a median tooth beneath, in ♂ cleft 20.
 Marginal cell elliptical; claws cleft in both sexes.
 Second and third cubital cells longer than wide, narrowed above; first recurrent nervure interstitial with the second transverse cubitus, the second recurrent nervure joining the third cubital cell a little beyond the middle (18) *Lophopompilus* Radoszkowski.*
 (Type *Pompilus grandis*, Eversm.)

*I do not know this genus; judging from the shape of the marginal cell, it may probably prove to belong to the *Pepsinc*.

20. Third cubital cell trapezoidal or, at most, subtriangular, never distinctly triangular or petiolate; abdomen black 21.
 Third cubital cell triangular and petiolate or subpetiolate, especially in the males; abdomen more or less red basally 22.
21. Pronotum hardly shorter than the mesonotum, the hind margin arcuately emarginate; first joint of flagellum in ♀ longer than the second, in ♂ not longer than the second; tarsal comb not long (19) *Pompilinus*, Ashm., g. nov.
 (Type *Pompilus cylindricus*, Cress.)
 Pronotum shorter than the mesonotum, the hind margin obtusely angularly emarginate; first joint of flagellum in ♀ very elongate, longer than the second, in ♂ about equal to the second; tarsal comb long, flexible (20) *Agenioideus*, Ashm., g. n. (part).
 (Type *Pompilus humilis*, Cress.)
22. Pronotum shorter than the mesonotum, the hind margin obtusely angularly emarginate; first joint of flagellum in ♀ elongate, very distinctly longer than the second, in ♂ not or scarcely longer than the second; abdomen usually marked with red or yellowish on basal segments (21) *Entypus* Dahlbom.
 (Type *E. ochraceus*, Dahlb.)
23. Metathorax posteriorly rounded, neither impressed nor obliquely truncate, and usually *without* a distinct median longitudinal impressed line or furrow above, the latter, if present, is very vaguely defined; pronotum rarely much lengthened 30.
 Metathorax posteriorly obliquely truncate or impressed, often concave or subconcave posteriorly; if rounded posteriorly, then the metanotum has a median longitudinal impressed line or furrow 24.
24. Front tarsi in ♀ *without* a distinct long comb, at most with a scopa of short stiff bristles beneath and a few short bristles at apex of the joints 34.
 Front tarsi in ♀ *with* a distinct, usually long comb; claws in ♀ with a median tooth beneath, in ♂ cleft (rather otherwise and then noted) 25.
25. Submedian and median cells in front wings equal, the transverse median nervure being interstitial with the median nervure 26.
 Submedian cell in front wings longer than the median 29.
26. Third cubital cell trapezoidal, usually as large or nearly as the second 28.

- Third cubital cell in front wings triangular or subtriangular, smaller than the second and sometimes petiolate 27.
27. Body wholly black, but more or less distinctly clothed with a silvery or sericeous pubescence; first and second joints of flagellum in both sexes equal or very nearly . . . (22) *Anoplius*, Lepel. (Dufour).
(Type *Pompilus nigerrimus*, Scopoli.)
Body not wholly black and not clothed with a silvery pubescence, the abdomen smooth, shining, always red at base; first joint of flagellum in ♀ longer than the second, in ♂ about equal (24) *Arochnophila*, Ashm., g. nov.
(Type *Pompilus divisus*, Cress.)
28. Body wholly black, usually more or less clothed with a silvery pubescence; first joint of flagellum in ♀ longer than the second, in ♂ not longer than the second . . (23) *Aporoideus*, Ashm., g. nov.
(Type *Pompilus sericeus*, V. de Lind.)
29. Pronotum with the hind margin obtusely angularly emarginate; first joint of flagellum in ♀ always longer than the second, in ♂ sometimes shorter 31.
Pronotum with the hind margin arcuately emarginate 30.
30. Body in ♂ usually clothed with a silvery pubescence; third cubital cell triangular, usually petiolate, especially in males (19) *Pompilinus*, Ashm.
(Type *Pompilus cylindricus*, Cress.)
31. Body black and usually *with* a more or less distinct silvery pubescence, especially in males; abdomen black, immaculate; third cubital cell triangular and often petiolate or subpetiolate (22) *Anoplius*, Lepel. (Dufour).
(Type *Pompilus nigerrimus*, Scopoli.)
Head and thorax usually black, but without a silvery pubescence, the abdomen smooth and shining, always red basally; third cubital cell variable, sometimes triangular and petiolate (24) *Arachnophila*, Ashm., g. nov.
32. Pronotum with the hind margin obtusely angularly emarginate . . 33.
Pronotum with the hind margin arcuately emarginate.
33. Submedian cell in front wings a little longer than the median; third cubital cell trapezoidal or narrowed above, never distinctly triangular or petiolate; mandibles in ♀ 3-dentate, in ♂ 2-dentate.

Third cubital cell usually a little smaller than the second; first joint of flagellum in ♀ longer than the second, in ♂ not longer than the second, about thrice as long as thick; claws in ♀ with a median tooth, in ♂ cleft. . . (25) *Aphiloctenus*, Ashm., g. nov.
(Type *Pompilus virginiensis*, Cress.)

Third cubital cell larger than the second; first joint of flagellum in ♀ elongate, nearly as long as 2 and 3 united, in ♂ not or scarcely longer than the second, but about four times as long as thick; claws cleft in both sexes. . . (26) *Hemisalius*, Sauss.
(Type *H. albistylus*, Sauss.)

Tribe II.—*Aporini*.

The front wings with one or two cubital cells, never three as in the tribe *Pompilini*, and the slight difference in the insertion of the antennæ, will readily distinguish the tribe.

The group comes quite close to the subfamily *Planiceptine*, in which are found forms with only two cubital cells in the front wings, so that the closest attention must be given to the characters used in separating the subfamilies or the student will go astray and confuse some of these forms with genuine *Aporini*.

Table of Genera.

- | | |
|---|---|
| Metathorax posteriorly rounded, the hind angles unarmed. | 2. |
| Metathorax posteriorly truncate, depressed or emarginate, the hind angles more or less distinctly produced into conical teeth or spines. | |
| Cubitus in hind wings usually interstitial or nearly; tarsal comb present; claws with teeth; mandibles 3-dentate. | (1) <i>Aporus</i> , Spinola.
(Type <i>A. unicolor</i> , Spin.) |
| 2. Cubitus in hind wings originating <i>beyond</i> the transverse median nervure. | 4. |
| Cubitus in hind wings interstitial with the transverse median nervure. | 3. |
| 3. Transverse median nervure in front wings interstitial with the basal nervure; tarsal comb in ♀ present; claws toothed and combed; mandibles 2-dentate. | (2) <i>Evagetes</i> , Lepeletier.
(Type <i>Pompilus bicolor</i> , Fabr.) |
| 4. Transverse median nervure in front wings uniting with the median vein <i>beyond</i> the origin of the basal nervure. | 5. |

- Transverse median nervure in front wings interstitial or uniting with the median vein *before* the origin of the basal nervure. 6.
5. Hind margin of pronotum arcuate; antennæ rather thick; front tarsi with a comb; claws in ♀ with a tooth beneath, in ♂ cleft; second cubital cell receiving one recurrent nervure, the second recurrent joining the cubitus *beyond* the second transverse cubitus. (3) Actenopoda, Ashm., g. n. (Type A. Rileyi, Ashm., MS.)
6. Front tarsi combed; claws cleft, without or, at most, with only a rudimentary comb. 8.
- Front tarsi *not* combed; claws with a tooth and combed. 7.
7. Pronotum not large, the hind margin obtusely angularly emarginate; second cubital cell triangular. (4) Xenaporus, Ashm., g. n. (Type *Pompilus amoenus*, Klug.)
8. Front wings with two cubital cells; hind margin of the pronotum obtusely angularly emarginate. (5) Gonaporus, Ashm., g. nov. (Type *Pompilus gracilis*, Klug.)
- Front wings with only one cubital cell; hind margin of the pronotum arcuate. (6) Aporinus, Ashm., g. nov. (Kohls gr. 17.)

NEW COCCIDÆ FROM THE ARGENTINE REPUBLIC AND PARAGUAY.

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

The Coccidæ herein described were collected by Professor L. Bruner in 1897 and 1898. I examined the collection with more than ordinary interest, as practically nothing was known of the Coccidæ of the Argentine or Paraguay. The flora of the southern part of South America resembles in many respects that of the arid region of North America, and it was therefore not wholly unexpected that this resemblance should extend to the Coccidæ. The collection is too small to show how far such a resemblance may extend, but the species of *Orthezia* and *Lichtensia*, at least, are entirely representative of North American types.

(1.) *Orthezia ultima*, n. sp.—♀. Waxy lamellæ in two dorsal series, with a deep median sulcus, and the usual lateral series; the dark surface of the back is narrowly exposed between the dorsal and lateral series; anterior lamellæ of the dorsal series thick, prolonged over the head, but *not greatly produced nor divergent*; posterior lateral lamellæ narrow and

about equal in length, *not adherent to the ovisac*. Dried ♀ very dark brown, about 1100 μ long and 1200 broad. Ovisac 3 mm. long, fluted above.

Skin densely beset with small spines. Antennæ and legs very dark brown; lighter and redder after boiling. Antennæ 8-jointed, last joint flat on one side, convex on the other, tipped with a spine. Joints measuring in μ : (1.) 60, (2.) 60, (3.) 84, (4.) 45, (5.) 48, (6.) 60, (7.) 57, (8.) 102.

Hab.—Locality uncertain, but probably Ceres, Argentine Republic. On some herbaceous plant (probably Compositæ) with linear leaves. Allied to *O. nigrocineta* from New Mexico.

(2.) *Asterolecanium viridulum*, n. sp.—♀. Scale circular, 2 mm. diameter, yellowish green, with hardly any fringe; ♀ boiled in caustic potash turns madder red; margin with two rows of figure-of-eight glands, those of either row 12–18 μ apart, and one row of simple glands, the latter not different from the scattered glands of the skin. Mouth-parts large, about 120 μ diameter; labium very short, twice as broad as long.

Hab.—Tucuman, July 26, 1897, "on a kind of ironweed." It is close to *A. pustulans*, and, like it, lives on the stems of the plant, producing cavities. It is a larger scale than *pustulans*, and has not the distinct fringe of that insect.

(3.) *Akermes Bruneri*, n. g., n. sp.—♀. Long. 5½, lat. 6½, alt. 5½ mm.; shape and colour, *Kermes*-like; globular, shiny, smooth, broader than long, very pale ochreous, faintly marbled with a darker tint, and sparsely dotted with raised black points, which are perforated in the centre; two sulci extend upwards from the anal region in the form of a V, and other sulci occur somewhat irregularly; some individuals have a dusky reticulation. Inferior aperture, long and narrow (long. 5, lat. 1½ mm.), broadly margined with piceous.

♀. Boiled in caustic potash turns the liquid a dark yellowish brown; skin with a microscopical polygonal reticulation, after the manner of *Eulecanium*; no legs or antennæ found; in the adult the anal plates are wholly obscured, the anal region being occupied by a large, very thick, dark red-brown chitinous mass, having a coarsely radiate structure; in half-grown specimens the usual two plates are easily seen. The skin presents a number of large round dark chitinous areas, such as Signoret figures for *A. verrucosus*.

Larva of ordinary form, with a row of large figure-of-eight (double) glands on each segment; numerous smaller round glands; no spines except the marginal ones, one on each segment on each side, about 15μ long; no greatly produced caudal tubercles; caudal bristles two, moderately long; anal ring with six long bristles. Antennæ 5-jointed, joint 5 with very long bristles. Joints measuring in μ : (1.) 21, (2.) 15, (3.) 42, (4.) 30, (5.) 42.

Hab.—San Bernardino, Paraguay, Sept. 23, 1897, on spiny plant, probably leguminous.

The genus *Akermes* is closely related to *Lecanium*, but is distinguished by its globular form, round chitinous areas in the skin, microscopical tessellation, and the characters of the larva as described. It has some resemblance to *Cryptes* from Australia, but it is not likely that it has the peculiar male scale of that genus.

One other species is known, *Akermes verrucosus* (*Lecanium verrucosum*, Signoret), which I had erroneously referred to *Saissetia*. This is from Montevideo, and is very much larger than *A. Bruneri*.

(4.) *Lichtensia simillima*, n. sp.—♀. Red-brown, with a narrow white margin, varying to ochreous; ovisac white, firm, texture leathery; ♀ with ovisac about $5\frac{1}{2}$ mm. long, $2\frac{1}{2}$ high.

♀. Margin with strong simple spines, about 25μ long and 30 apart; skin with many tubular glands; labium small and semicircular (as in *L. viburni*); anal plates triangular, about 180μ long, outer sides about equal, upper surface with a long finger-like process passing from near the middle backwards and inwards, the two processes nearly meeting in the middle line.

Middle leg: femur and trochanter about 270μ , tibia 180 , tarsus 120 ; tarsal digitules filiform, 60 long; claw digitules slender, about 24 long. Antennæ 8-jointed, with sometimes a "false joint" in the third; joints measuring in μ : (1.) ?, (2.) 45-48, (3.) 96-105, (4.) 33-39, (5.) 48-51, (6.) 36, (7.) 33, (8.) 51.

Hab.—On some shrubby plant. The label reads, "Scale, General Acha." Closely related to *L. lycii* from New Mexico.

Ceroplastes. (*Wax Scales*.)

The female insects are to be separated by the following tables:—

(a.) External Characters.

Wax of the different individuals confluent, wholly surrounding the branch.....*Bruneri*.

- Wax not thus surrounding branch 1.
1. Waxy scale small, adults less than 5 mm. long, light yellowish...*scutigera*.
Waxy scale larger, over 5 mm. long. 2.
 2. Wax light amber, two lines of white secretion down each side...*Mendozæ*.
Wax creamy white, no line of white secretion down each
side *Bernardensis*.

(b.) Microscopical Characters.

- Strongly chitinous, with well-defined patches of perforations . . *Bruneri*.
Less chitinous, without such patches. 1.
1. Small species, under 3 mm. long, with a large, very well defined chitinous caudal patch. *scutigera*.
Larger, with the chitinous caudal area gradually shading into the surrounding areas. 2.
 2. Antennæ 7-jointed, about 190 μ long. *Mendozæ*.
Antennæ 8-jointed, about 240 μ long. *Bernardensis*.

(5.) *Ceroplastes Bruneri*, n. sp. (T. D. A. & W. P. Ckll.).

♀. Wax cream-colour, surrounding twigs, the whole mass 15 mm. diam., the twig being 7 mm.; dorsal nuclei shining white, sunken in deep depressions; close behind each is a small aperture through which the caudal horn is seen; the waxy mass is conspicuously flecked with snow-white secretion.

♀. Dark red-brown, dorsally almost black, basally lighter and redder; subpyriform, with a truncate base; alt. $5\frac{1}{3}$, long. 4, lat. 5 mm., breadth of base $2\frac{1}{2}$ mm.; dorsum shiny; caudal horn short, placed at top of posterior slope and directed upwards. The horn is placed higher up than in *C. candela*. The insects are not separated by wax, but their adjacent sides show much chalk-white secretion, in vertical bands. Skin (dorsal and lateral surfaces) strongly chitinous throughout, orange-feruginous by transmitted light, anal region a rich dark chestnut; large oval areas (the largest about 240 μ long) full of perforations; at and near the margins the skin is strongly tuberculate, and perforate; antennæ and legs ordinary. Legs measuring in μ : femur + trochanter, about 135; tibia 105 (with a rather long hair 27 μ from the end); tarsus 75; claw 33, slender, nearly straight, with a slight denticle within near the base; tarsal digitules 45 μ long, rather stout.

Hab.—San Bernardino, Paraguay, Sept. 23, 1897. Close to *C. confluens* and *C. utilis*, but especially to the S. African *C. candela*.

(6.) *Ceroplastes scutigera*, n. sp.—♀. Waxy scale about $4\frac{1}{3}$ mm. long, 3 broad, and 2 high; pale ochreous, with a lateral patch of white secretion, but no distinct lines; wax not divided into plates; area around central nucleus not darkened. ♀ denuded of wax, about 2 mm. long, flattish, margin tuberculate, caudal horn short. Skin semitransparent, except anal area, which is occupied by a very large and conspicuous red-brown chitinous patch, which has perfectly-defined margins, and a transverse diameter of about $900\ \mu$; this patch shows a few scattered perforations, and just above the anal plates are a large number of furrows radiating from small perforations; anal plates with their long outer inferior slope strongly convex; margin with very numerous short stout spines; antennæ very pale, only about $300\ \mu$ long, 7-jointed, joints measuring: (1.) 30, (2.) 45, (3.) 60, (4.) 75, (5.) 27, (6.) 24, (7.) 33. Femur + trochanter, 177; tibia, 123; tarsus, $70\ \mu$.

Hab.—Ceres, Argentine Republic, June 30, 1897, on a shrub with small entire oval-lanceolate leaves. This may be compared with: (a.) *C. minutus*, which is closely allied, and has the same well-defined caudal patch; but it also has two chitinous patches on each side, containing perforations, these being quite absent in *scutigera*. (b.) *C. speciosus* has the caudal patch just as in *scutigera*, and lacks the lateral patches of *minutus*; it has spines only near the stigmata (for a distance of about $210\ \mu$ on each side), whereas *scutigera* has them all around; the antennæ of *speciosus* are very short, only about $165\ \mu$ long; externally, *speciosus* is easily distinguished from *scutigera* by its dark reddish wax, with a large whitish dorsal patch. (c.) *C. rotundus* is smaller, with well-defined waxy plates. (d.) *C. purpureus* is much smaller. (e.) *C. Iheringi* looks just like *scutigera* externally, but it has not the caudal patch. (f.) *C. formosus* has bright yellow wax.

(7.) *Ceroplastes novaesi mendozæ*, n. subsp.—Waxy scale about $6\frac{1}{2}$ mm. long, 6 broad, 5 high; pale amber, with a decided ferruginous tint; sides with two white lines more or less defined; wax not divided into plates, strongly nodulose.

♀. Denuded of wax lively ferruginous, convex, about 5 mm. long, 4 broad, $3\frac{1}{2}$ high; dorsum rounded, without prominences; caudal horn short, directed upwards, from hind margin to tip of caudal horn is about $2\frac{1}{2}$ mm. Skin not very strongly chitinized, except around anal area; diameter of mouth-parts about $135\ \mu$; antennæ about 180–195 μ long, joints measuring: (1.) 24, (2.) 33, (3.) 24, (4.) 36, (5.) 18, (6.) 20, (7.) 25;

the suture between 3 and 4 is not very distinct. Legs with femur + trochanter 90; tibia 51; tarsus 50, or rather more.

Hab.—Mendoza, Argentine Republic, Jan. 26, 1898, on pithy stems of some herbaceous plant. This agrees with Hempel's *C. novæsi* in the small legs, with the tibia and tarsus about equal; it also agrees externally, except that the wax of *novæsi* is paler and not so red. It seems best to regard the two as geographical races of one species.

(8.) *Ceroplastes Bernardensis*, n. sp.—Waxy scale about $6\frac{1}{2}$ mm. long, 6 broad, and $5\frac{1}{2}$ high, creamy white, not divided into plates nor marked with white lines; dorsal nucleus white, with no dark area surrounding it. Denuded ♀ lively ferruginous, blackish dorsally; length $4\frac{2}{3}$, breadth 3, height $2\frac{1}{2}$ mm.; dorsum with a longitudinal crest; caudal horn short but large, *directed backwards*.

Anal area with a ferruginous chitinous patch, the edges of which are not well defined; anal plates shaped as in *C. scutigera*; skin with scattered minute perforations; mouth-parts small, about $130\ \mu$ diameter.

Femur + trochanter, $135\ \mu$; tibia 100; tarsus 66.

Antennæ about $240\ \mu$ long, 8-jointed; joints measuring: (1.)?, (2.) 42, (3.) 33, (4.) 33, (5.) 39, (6.) 18, (7.) 18, (8.) 30.

Hab.—San Bernardino, Paraguay, Sept. 23, 1897. On twigs of undetermined plant. This agrees externally with the species which Hempel regards as *C. Janeirensis*, but the structure appears to be different. I cannot reconcile Hempel's *Janeirensis* with Signoret's account of that species, and believe it is wrongly identified. The South American species of *Ceroplastes* are so numerous that it is next to impossible to identify them by such descriptions as were given by the older authors; fortunately, these descriptions are few, and the great majority are well described by Mr. Hempel.

C. Amazonicus resembles *Bernardensis*, but on close inspection it is seen that the wax is divided into plates, though the sutures are colourless.

A CANADIAN ANOPLONYX.

BY W. HAGUE HARRINGTON, F. R. S. C., OTTAWA.

Among Hymenoptera which I sent to Provancher in 1885 was a sawfly which he determined as *Nematus malacus*, Nort. As it did not correspond to the description of that species, it was set aside with some undetermined material. While rearranging my Nematidæ, I recently examined the insect to ascertain its generic position, and found that

it had simple claws. As it has not the appearance of *Gymnonychus*, I was somewhat puzzled until, on examining the wings, I found that the lanceolate cell was widely contracted as in the subfamily *Cladiniæ*, instead of petiolate as in the *Nematinaë*. The insect, therefore, must be placed in the genus *Anoplonyx*, which Marlatt has separated from *Camponiscus*, which has bifid claws. As no representatives of these genera were known to Marlatt when he published his Revision of the *Nematinaë* (Technical Series No. 3; Dept. Agric., U. S., 1896), the following description of this Canadian form is submitted:

Anoplonyx Canadensis, n. sp.—Length, 5 mm. Rather slender; black, impunctate; frontal area distinct, but not strongly marked; clypeus emarginate; antennæ slender, piceous, finely pubescent, joints three to five subequal; edge of clypeus, labrum, mandibles, tegulæ and legs, except coxæ, pale honey-yellow; veins of wings pale, especially the costa and stigma; four submarginal cells, the second receiving both recurrent nervures.

One ♀ collected at Ottawa about 1885.

CHANGES IN THE COLOUR OF BUTTERFLIES.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

While studying the specializations of the wing in the *Papilionides*, the general results of which are published in the Proc. Am. Philosophical Society, Jan., 1899, I found that *Iphiclides*, *Ajax*, *Marcellus*, etc., differed so strongly from the type of *Turnus* as to be generically separable. *Ajax* is, in fact, allied to species having a greenish or yellowish white ground colour, from South America and the Old World, while *Turnus* is evidently related to the black North American forms, *Troilus*, etc., with which it flies. This fact enables me to draw the probable conclusion that *Glaucus* represents the original colour of the species, which, so to speak, is turning into *Turnus*. The black ♀ *Glaucus* is the more conservative, whereas the males are already, with very rare exceptions, of the yellow type of *Turnus*. It is different with certain cases of so-called "melanism," now spreading in Europe, as *Eubyja* var. *Doubledayaria*, and *Aglia* vars. *ferre-nigra* and *melaina*. Here the original ground colour is changing to black indifferently in both sexes.

Conversely it is the male *Callosamia promethea* which appears to have more recently become black, while the female retains what was probably the original red-brown colour of the species. I have alluded to this probability in my paper on the Saturnians, Mitt. aus d. Roemer Museum, June, 1896, p. 14. When compared with *C. angulifera* in this respect, *C. promethea* seemed to me to be the younger, more modern form, in which sexual dimorphism has more recently taken place.

THE YELLOW-WINGED CATOCALÆ.

BY G. H. FRENCH, CARBONDALE, ILL.

At the time of writing the paper on the red-winged Catocalæ* I thought I should very soon complete the list ; but other matters have too long crowded out the work I had planned to do. I shall now give, however, my idea of how they should be arranged, with some notes on some of the species. The numbering is continuous with the numbering of the red-winged species :

- | | |
|------------------------------|---------------------------|
| 62. Nebulosa, Edw. | 80. Badia, G.-R. |
| 63. Piatrix, Grote. | 81. Coelebs, Grote. |
| 64. Dionyza, Hy. Edw. | var. Phoebe, Hy. Edw. |
| 65. Neogama, A.-S. | 82. Habilis, Grote. |
| var. Communis, Grote. | var. Basalis, Grote. |
| var. Snowiana, Grote. | 83. Clintonii, Grote. |
| 66. Subnata, Grote. | var. Helene, Pilate. |
| 67. Cerogama, Guenée. | 84. Abbreviatella, Grote. |
| var. Bunkerii, Grote. | 85. Whitneyi, Dodge. |
| 68. Paleogama, Guenée. | 86. Nuptialis, Walker. |
| var. Annida, Fager. | <i>Myrrha</i> , Strecker. |
| var. Phalanga, Grote. | 87. Polygama, Guenée. |
| 69. Consors, A.-S. | <i>Blandula</i> , Hulst. |
| 70. Muliercula, Guenée. | var. Cratægi, Saunders. |
| var. Peramans, Hulst. | var. Mira, Grote. |
| 71. Delilah, Strecker. | 88. Pretiosa, Lintner. |
| <i>Adoptiva</i> , Grote. | 89. Amasia, A.-S. |
| 72. Desdemona, Hy. Edw. | <i>Sancta</i> , Hulst. |
| 73. Calphurnia, Hy. Edw. | var. Virens, French. |
| 74. Andromache, Hy. Edw. | 90. Cordelia, Hy. Edw. |
| 75. Frederici, Grote. | 91. Chelidonia, Grote. |
| 76. Illecta, Walker. | 92. Similis, Edw. |
| <i>Magdalena</i> , Strecker. | <i>Formula</i> , Grote. |
| 77. Serena, Edw. | var. Aholah, Strecker. |
| 78. Amestris, Strecker. | var. Isabella, Hy. Edw. |
| <i>Anna</i> , Grote. | 93. Fratercula, G.-R. |
| var. Westcottii, Grote. | var. Atarah, Strecker. |
| 79. Antinympha, Hubner. | var. Jaquetta, Hy. Edw. |

*CAN. ENT., XXXIII., 205 (July, 1901).

- | | |
|-------------------------|-----------------------------|
| var. Ouwah, Poling. | 100. Gracilis, Edw. |
| var. Timandra, Hy. Edw. | var. Sordida, Grote. |
| var. Hero, Hy. Edw. | 101. Minuta, Edw. |
| var. Gisela, Meyer. | var. Parvula, Edw. |
| 94. Olivia, Hy. Edw. | var. Mellitula, Hulst. |
| 95. Præclara, G.-R. | 102. Amica, Hubner. |
| 96. Dulciola, Grote. | <i>Androphila</i> , Guenée. |
| 97. Grynea, Cramer. | var. Lineella, Grote. |
| var. Constans, Hulst. | var. Nerissa, Hy. Edw. |
| 98. Alabamæ, Grote. | 103. Jair, Strecker. |
| 99. Titania, Dodge. | |

I have examined a number of specimens of *Dionysa*, Hy. Edw., from Arizona, through the kindness of Mr. Poling, and see no reason for calling it a variety of *Piatrix*, Grote. The wings are constantly lighter and somewhat differently marked, and it is a smaller insect.

Desdemona, Hy. Edw., is quite a distinct form from *Delilah*, Strecker. While the mesial band of hind wings shows that it belongs to the same group, the general aspect and markings of the fore wings are quite different. The Eastern form *Delilah* has the general tone of the fore wings a distinct brown, while the Western form is gray, with lighter hind wings. All the Eastern forms I have seen agree with Dr. Strecker's figures, plate 11.

I do not know Henry Edwards's species *Calphurnia* and *Andromache*, except in the descriptions. As to *Badia* and *Coelebs*, there is quite a difference of opinion. From all the examples I have seen, I should regard them as distinct. Mr. C. M. Dodge, of Louisiana, Mo., says that, on the authority of his collectors, they fly at different times. I have seen no intergrades, and will leave them as distinct till breeding settles the question.

Abbreviatella and *Whitneyi* are very close, but from all the examples that have come to me, they seem distinct. They fly at different times, and *Abbreviatella* is the more northern form. I would suggest that Mr. Dodge should make an effort to breed *Whitneyi*, which occurs in his locality, and thus settle the question.

It seems to me that there is little excuse for the name *Blandula*. Our specimens of *Polygama* agree as well with Guenée's figure and description as we can expect of any of the figures and descriptions of the period in which they were made. With regard to *Cratægi* and *Mira*,

they seem to me to be varieties of *Polygama*. None of the forms occur here, but many times I have been called upon to identify them, which I have done with hesitation. Last summer a lot of bred specimens were sent me which contained all three of the forms, but the larvæ seemed to the one who bred them to be identical. Of course, this is not as conclusive as breeding from one brood of eggs, but from this and other observations I should place them together.

I append here three figures, one of *Amasia*, A.-S. (Fig. 1), as it flies in our woods in July. The second is a copy of Abbott's figure of *Amasia* (Fig. 2). The third is a figure of *Cordelia*, Hy. Edw. (Fig. 3), as it also occurs here in the same month. As to the latter, my first examples were identified by Henry Edwards soon after he described the species, so that I have no hesitation in thinking that I know his species. I have taken both forms for a number of years and have never found any variation of



FIG. 1.

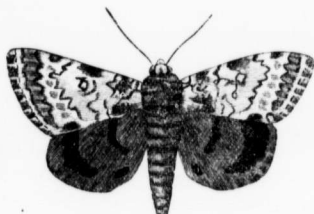


FIG. 2.



FIG. 3.

one towards the other. *Amasia* is rather a variable species, the variations consisting in some being lighter than others, and in some showing a greenish tinge as in var. *Virens*. On the other hand, *Cordelia* varies but little. As to which one Abbott had before him when he made the figure, I think no one who sees these figures will doubt. I have shown these figures to several who are well versed in the genus, and without hesitation they said *Amasia* as I have it here and not *Cordelia*. Dr. Strecker's figure 12, plate 9, is a very good copy of either Abbott's figure or of a specimen of *Amasia*.

I have many times had *Alabama* from the South for identification, and I can see no reason for regarding it as a variety of *Grynea*. The

colour of the fore wings is always lighter and of a greenish tinge, and there is less brown in the markings.

Mr. Dodge's addition to the list, *Titania*, is a good species. So is, also, Dr. Strecker's addition, *Jair*. I have seen examples of both of these.

Before closing this I want to speak again of the *Junctura* group. The more I see of the Arizona specimens, the more satisfied I am that the Texan form is separate from both of those that occur in Arizona. There are two forms there: one that is even reddish gray, that should be known as *Babayaga*, Strecker; the other one is a more broken light and dark reddish gray, and this is *Arizonae*, Grote. The Texan form is a larger insect than either of the Arizona forms, of an even greenish gray, and may be known as *Texanae*.

THE DECTICINEAN GENUS EREMOPEDES.

BY A. N. CAUDELL, WASHINGTON, D. C.

The genus *Eremopedes* was established by Scudder in 1894, CAN. ENT., XXVI., p. 178, 181. It was founded on a female specimen in the National Museum, but the species was not described till 1900. Previous to that date Mr. Cockerell described a species from New Mexico, together with a colour variety of the same, and I can now add a third species to the genus. In connection with its description it may be well to give a short account of the genus, which may be characterized as follows:

Insects of medium size. Head with the fastigium moderately prominent. Thorax with the prosternum unarmed.* Pronotum smooth, moderately rounded, nearly as much arched posteriorly as anteriorly, and without carinae. Legs moderately spinose, hind pair long, the femora extending far beyond the tip of the abdomen, usually as much as half their length. Fore tibiae spined above on the outer margin only, the spines three in number. Ovipositor moderately curved upwards.

The species, so far as now known, occur in the south-western part of the United States, from Colorado southwards, and all appear to be comparatively rare. The species may be separated as follows:

A. Lateral lobes of the prothorax well developed, the posterior border distinctly sinuate. (Fig. 4b.)

a. Larger. Unicolorous, a uniform pale

brown.....*unicolor*, Scudd.

aa. Smaller. Variegated, dark above, paler below.. *Balli*, n. sp.

* There are two small blunt spines present, but they are not conspicuous.

AA. Lateral lobes of the prothorax somewhat feebly developed, the posterior border without a sinus. (Fig. 4a.)

a. Colour brownish ochreous marked with black..... *Scudderi*, Cock.

aa. Uniformly apple green in colour.. *Scudderi*, var. *viridis*, Cock.



FIG. 4.

EREMOPEDES UNICOLOR, *Scudd.*

Eremopedes unicolor, Scudd., Cat. Orth. U. S., 78, 97-98, pl. 2, fig. 1 (1900); Index N. A. Orth., 110 (1901).

The author's description is here given :

"Nearly uniform dull brownish testaceous, the hind femora feebly infuscated apically. Head full, the face somewhat ferruginous and the genæ with fuscous blotches, the fastigium rather prominent, rounded; antennæ very slender, about half as long again as the body, testaceous. Pronotum well rounded, equally arched in front and behind, without lateral or median carinæ, the front margin feebly convex, the hind border truncate, but laterally rounded; lateral lobes obliquely deflexed, well rounded beneath, the oblique posterior margin with a distinct though slight sinus. Tegmina aborted. Legs rather long and slender, the fore tibiæ with three spines above on outer margin. Ovipositor more than two-thirds as long as the hind femora, distinctly arcuate, moderately slender, faintly tapering, apically acuminate, castaneous, the apical margins darker.

"Length of body, 25 mm.; pronotum, 8 mm.; fore femora, 7 mm.; hind femora, 21 mm.; ovipositor, 16.5 mm.

"One female. Arizona, U. S. National Museum." (Type No. 5736.)

It is pointed out by the describer that this, being the species on which the genus was established, is the type of the genus, even though another species, *E. Scudderi*, Cock., had been previously described. This view may be questioned according to the latest published laws on this subject, and the genus previous to the publication of Cockerell's species in 1898 was certainly invalid, being based on an undescribed species. However, the circumstances seem to justify the retention of *unicolor* as the type of *Eremopedes*, Scudd.

EREMOPEDES BALLI, n. sp.

Very similar in form to *E. unicolor*, but readily distinguished from that species by the average smaller size and varied coloration. It is also a slightly less robust species.

General colour brownish above, much lighter below. Head moderately full, dark brown above, face and lower part of the genæ pale, the upper portion of the genæ generally much mottled with fuscous. Mandibles rufous distally, with piceous teeth, the overlying labrum pallid. The fastigium as in *unicolor*. Eyes black, small, rounded, slightly longer than broad. Thorax shaped as in *unicolor*, very dark above and pallid below, the lateral lobes ample and with pale yellowish margins, broadest on the posterior margin; this pale emargination is continued narrowly across the anterior edge of the pronotum above, but on the posterior edge it gives way above, and towards the upper part of the lateral lobes to a narrow piceous emargination. Abdomen dark above, but usually distinctly lighter than the pronotum and pallid beneath. Legs light brown, paler beneath, the posterior femora black at apex, armed beneath on inner side with from 1-3 short spines, usually 1; fore and middle femora with a small genicular spine, often very indistinct or absent on the anterior ones. All the tibiæ spined both above and below, the spines concolorous with the tibiæ, and usually, especially those on the upper side of the posterior pair, apically infuscated. Wings invisible in the female, in the males the tympanum is visible, a fourth as long as the pronotum, very dark brown, with veins and margins pallid. Ovipositor gently arcuate, castaneous, apically infuscated.

Length of body: male 19-24 mm., female 20-25 mm.; pronotum, male 5.5 mm., female 6-6.5 mm.; hind femora, male 15.5-17 mm., female 18.5-21 mm.; ovipositor, 13-15 mm.

Six males, three females, Ft. Collins, Colorado. (Type No. 6150, U. S. Nat. Mus.)

These specimens were collected on August 10th, 1901, on a stony hill a mile or so west of Ft. Collins. They were very active in eluding pursuit, and their colour harmonized so well with the surrounding grass and stones that they were with difficulty captured. They mature early in August and seem to be quite local in their distribution. I was guided to their haunts by Mr. E. D. Ball, to whom I take pleasure in dedicating the species.

EREMOPEDES SCUDDERI, Cock.

Eremopedes Scudderi, Cock., Ann. Mag. Nat. Hist. (7), II., 323-324 (1898); Scudd., Cat. Orth. U. S., 78 (1900); Index N. A. Orth., 109 (1901).

The original description is here given in full :

"Length of body 19-21 mm., of pronotum 6 mm., hind femora 21.33 mm., hind tibiæ 23 mm., ovipositor 19.20 mm., antennæ about 51 mm.

"Sepia brown in effect, but in reality ochreous, closely and finely marked with blackish; the density of the black marking somewhat variable, but the lateral margins of the pronotum always broadly pale ochreous. Pronotum truncate in front and behind, the margins narrowly castaneous and slightly concave; lateral lobes not greatly developed. Ovipositor dark brown, only moderately curved. Hind femora with 5-7 very short spines on the inner side; hind tibiæ with from 28 to 33 spines in the outer row. Spines of the anterior tibiæ pale ochreous, tipped with black and having a black longitudinal line on the upper side; there is also sometimes a black patch immediately at the base of each spine. Spines of hind tibiæ brown tipped with black, but the ridge from which they spring is whitish.

"Var., *viridis*. Similar to the type, but entirely bright apple-green.

"*Hab.*—Mesilla Park, New Mexico, on the campus of the New Mexico Agricultural College. Eight of the brown form and two of the green. They were found in an outhouse, and are doubtless nocturnal in their habits. One specimen was found in the jaws of a *Scolopendra heros*, which had killed it."

The National Museum collection contains one male specimen of this species from Mesilla Park, N. M., a topotype probably sent by Prof. Cockerell. The pronotum of this specimen is dark ferruginous above, and the posterior femora are but 19 mm. in length. The pronotum is also slightly flattened posteriorly above, probably due to shrinkage in drying.

I desire to acknowledge the kind consideration of an unknown friend, in sending to me 38 *Cecropia* cocoons, apparently all sound. The package bore the postmark of Chicago.

J. ALSTON MOFFAT, Cur. and Libr., Ent. Soc., Ont.

Erratum.—Page 67, third line, for *Hammaniella* read *Harrimaniella*.

LABELS.

Anyone who has had even the slightest experience in attempting to get intelligent notes to accompany his acquisitions by exchange has doubtless been sorely vexed—to put it no more strongly. Anyone who has tried to keep a careful record of the conditions under which his own collections were made has also doubtless felt the need of some better scheme than the regulation notebook. It is for these reasons that I suggest an idea which I find very useful.

In the first place, I write (or print with a hand stamp) my own locality labels so that I can fix the places definitely. The ordinary entomologist, unless he has a large collection from precisely the same *limited* locality, can scarcely afford to have special labels printed, and general ones are useless when the collection is to be used for more than a purely æsthetic exhibition. "Chicago, Ill." tells almost nothing of value for Chicago, if only the region within city limits is meant; it is a big place and any attempt to find a second specimen must necessarily be made as much in the dark as the first.

But the real plan which I wish to present is one by which full notes of the insect's environment are kept upon the same pin with the insect, and its ecology can thus be taken in with the same glance that sees the mounted specimen.

Botanical ecologists have divided plant habitats into hydrophytic, mesophytic, and xerophytic. The same classification can be applied to animals, and we would term those insects living in moist situations "hydrozoic." "Xerozoic" follows naturally for the dry habitats; but when we come to "mesozoic" we have an interesting preëmption by the geologists. Nevertheless, whatever the names used, the habitat types remain, and I have chosen to represent them in the following manner:

Across the top of the locality label a solid (—) blue line indicates that the specimen was found in water—the most extreme hydrozoic situation imaginable. A line of blue dashes (---) means that the insect was taken in a swamp; while blue dots (.) signify a swale. Green is used for medium conditions—a solid green line standing for dense woods; green dashes for open woods; and green dots for thickets. A solid red line represents the driest sort of places—a desert or dry rocks; red dashes, grass land, prairie, etc.; and red dots, the boundary between grass land and forest.

This may seem to be a very cumbersome plan, but I feel confident that a little use will convince even the most skeptical that it is not. My labels are cut from sheets of thin Bristol-board which have previously been ruled as indicated above—the lines being spaced according to the size of the labels desired. This ruling may be done with a pen and different coloured inks, or any printer will do it quite cheaply. The cutting is done so that the lines come at the top of the finished label, and a supply of each kind of these is kept in separate compartments in my label box. It is then as easy a matter to pick out the right sort of slip upon which to write the locality as it is to use a plain white label which means nothing.

One beauty of the plan is that it is capable of almost indefinite expansion, and so can never be outgrown. An addition which I have found useful is to have a supply of very small bits of paper, or preferably light Bristol-board. These are of various colours and shapes. If the specimen be of a night-flying species, I put a square black bit on the pin just above the locality label. If it be active only at twilight, I use a narrow black bit. If it was found in the ground, a square brown bit in the same place shows that; while a narrow brown piece indicates that it was found under a board, stone, or some such thing. A minute green square tells at a glance that the insect lived in a tree; a green oblong stands for a log; and a roughly circular green bit signifies a stump habitat. A yellow square indicates a carrion insect; while a yellow oblong is put upon the pin of one found in manure. And so we can run through the whole gamut of insect environment, although, I think, these will be found to cover most of the ground, providing we add a symbiosis label. This may conveniently be a white one, small as possible, upon which is written the name of the other symbiont; e. g. "golden-rod," "dog," or "Formica *sp.*"

We have, by this means, always with the insect, not only the date and locality of its capture, but compact notes of its habitat and general environment. Your notebook is always open and never lost. A case of insects becomes, in fact, a notebook illustrated by specimens. It is then something more than mere "dried bugs," interesting as they may be. Furthermore, a supply of such labels taken into the field is an exceedingly easy and accurate method of making field notes, as the appropriate ones can readily be slipped into the paper or box with the insect.

FRANK E. LUTZ, Chicago, Ill.

NOTE ON CTENUCHA CRESSONANA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

In the Catalogue of the Lep. Phalænæ, p. 528, this species is incorrectly referred to *C. venosa*. The specimens there recorded are probably all *C. venosa*, at least those from my collections are. Mr. Geo. Francke sends me two fresh specimens of *C. Cressonana*. In these, as stated in my original description, Proc. Ent. Soc., Phil., June, 1863, the third stripe of *C. venosa* is wanting. The stripes on cubitus and branches and along anal region of primaries may vary from white (as I described them) to yellow, and the costa may be yellow (in the first instance) or red. For the yellow-striped form with red costa I propose the name var. *lutea*. The fringes in *C. Cressonana* are entirely white, and I was careful to point out other differences from *C. venosa*, which should not have been overlooked by the author of the Catalogue above referred to.

ON THE USE OF EUPETHECIA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

In reference to a recent "protest" in the pages of the CAN. ENT. (Vol. XXXIII., p. 263) against a change in the generic name *Eupethecia*, I believe its abandonment, in favor of a Hübnerian name chosen out of the Verzeichniss by Mr. Meyrick, to be invalid. I retain it myself in the collection here for the reason that its date is certain, and there is a rule of the German zoological code that if exact dates cannot be ascertained (and this is the case for that part of the Verzeichniss which contains the Geometrids), preference shall be given to the genus which has a type cited. This is reasonable, and custom has correctly sanctioned the use of *Eupethecia*. I am indebted to Mr. L. B. Prout, of London, England, for the information that Curtis himself, in founding the genus *Eupethecia*, explicitly chooses *absinthiata*, L., as type of the genus, April 1, 1825. In my study of the Geometrid genera (1895-96), only a fragment of which appeared in the Transactions of the Entomological Society of London, I pointed out some of the errors into which I have reason to believe Mr. Meyrick has fallen. I express here no opinion as to the use of *Phalæna* as a generic title, but, if used, I believe its restriction by Fabricius in Gen. Ins. Mant., 1777, would give *prosopiaria*, L., as type. The European *papilionaria* is the type of *Terpne*, Hübner, 1806. I have not found the type of *Geometra*. I believe we must keep *Eupethecia* for the "pugs."

DESCRIPTION OF A NEW NOCTUID.

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

Aleptina inca, n. gen., et sp.

Two males, Arizona (Cox); So. Ariz., Apr. 1-15 (Poling).

Fore wings gray, cinereous shaded at base, followed by a large ochreous patch that extends to the t.-a. line on lower half of wing. T.-a. line upright, germinate, black, twice waved; orbicular large, oval, whitish, black ringed and containing a large, oval, brown-black centre; reniform similar, but obscure and lost in a pale shade that extends to costa at t.-p. line. T.-p. line black, parallel to external margin cut off above by the white shade, followed closely outwardly by a blackish subterminal line. A crenulated, pale, blackish edged terminal line. Fringe pale, dark spotted. Hind wings whitish, a dusky shading before the fringe. Abdomen gray; thorax concolorous with fore wings. Expanse 23 mm.

Two females, Comfort, Texas (Holland); Kerrville, Tex. (Barnes).

Similar to the male, but paler, more ashen gray, the markings less contrasted; hind wings largely shaded with brownish gray except on the base and on the fringe. Expanse 23 mm.

Antennæ filiform; front moderately produced, with a wide platelike projection above, nearly as wide as the space between the eyes, a similar, but curved and less prominent plate below on the lower edge of the front. Palpi upcurved, reaching above the middle of the front, uniform, scaled, the third joint slightly narrowed at base. Tongue distinct. Fore femora stout, tibiæ short, unarmed; tarsi spined; hind tibiæ with the spurs long. Thoracic vestiture of broad flat scales; abdomen untufted. Vein 5 of hind wings distinct, arising from lower part of cell. Wings shaped much as in *Baileya*, Grote (*Leptina*, Guen., nec Meig.), but narrower.

BOOK NOTICES.

GENERA INSECTORUM.—Published by P. Wytzman, 108 Boulevard du Nord, Brussels, Belgium.

The first part of this important work has been received and amply fulfills any expectations that one may have formed regarding its style and appearance. It is of quarto size, beautifully printed, with broad margins to the leaves, and an admirably-executed plate in black and white. The family Gyrinidæ (Coleoptera) is treated by Dr. Regimbart, who gives a general description of the characteristics of the family and a synoptic

table of genera ; this is followed by descriptions of each genus and a list of the species belonging to it, with their geographical distribution. On the plate a specimen of each genus is depicted, with beautifully clear figures of structural details.

The original plan of publication has been somewhat modified and the work will now be issued in smaller parts, each containing a single family of insects. The price will vary in accordance with the number of pages and plates contained in the part, at the rate of 1 franc 60 per plate and 20c. per page. The first part, consisting of 12 pages and 1 plate, will thus cost 4 francs = 80 cents. The language adopted for the work is French. It is to be hoped that the number of subscribers will be sufficient to enable the enterprising publisher to complete the work without loss ; he certainly cannot have any anticipations of profit.

FUMIGATION METHODS.—By Willis G. Johnson, New York: Orange Judd Company, 52 Lafayette Place. One Vol., pp. 313. (Price, post-paid, \$1.00.)

The writer of this handy volume is well-known amongst economic entomologists as the Apostle of Hydrocyanic Acid Gas, the virtues of which as an effective insecticide he has never lost any opportunity of extolling. He has now brought together in concise form the results of his own methods as well as the experiences of others, and furnishes a most convenient manual of information for fruit-growers, florists, nursery-men and others who may be compelled to resort to this drastic means of exterminating noxious insects. The material used for fumigation is of such a deadly poisonous nature that it cannot be recommended for general use and should only be adopted by experienced persons who understand the necessary precautions and will see that they are carefully carried out. The study of this book will give all necessary information regarding the practical application of the gas, the apparatus required and the appliances that have been found most satisfactory, and it should be in the hands of everyone who has anything to do with fumigation. Besides the gas referred to, an account is given of the use of Carbon Bisulphide, which—with simple precautions—may be employed by anyone for the destruction of household pests, underground vermin, mill or granary insects. The book is fully illustrated and written in a clear and concise manner.

Mailed April 5th, 1902.