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CONTRIBUTIONS
TO THE
NATURAL HISTORY
OF THE
LEPIDOPTERA
OF
NORTH AMERICA

VOL. III
No. 1

**NEW SPECIES OF NORTH AMERICAN
LEPIDOPTERA**

**NOTES ON WALKER'S TYPES OF
GEOMETRIDAE IN THE D'URBAN
COLLECTION**

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DECATUR, ILL.
THE REVIEW PRESS
NOVEMBER 27, 1916



Published
Under the Patronage
of
MISS JESSIE D. GILLET
Elkhart, Ill.

CORRIGENDA & ADDENDA TO VOLUME II.

page 50, line 24, for Genitalia of *o. basiflava* Pack. read Genitalia of *O. basiflava* Pack.

page 124 Genus SCIAGRAPHIA.

In our remarks on this genus we evidently had misread Hulst's characterization of the genus as we differentiate it from *Macaria* on the strength of the latter genus possessing a hair pencil on the δ hindtibia; as a matter of fact both genera show the hair pencil and in all probability *Sciagraphia*, the type of which is *granitata* Gn., will fall to *Macaria* Curtis.

page 206, line 1, for FIDONIA ATOMARIA Gn. read FIDONIA AMITARIA Gn.

page 209, line 18, for APÆCASIA DEFLUATA Wlk. read APÆCASIA DUCTARIA Wlk.

This error and that on p. 206 must be attributed to a *lapsus calami* on our part which should certainly be corrected.

page 212, line 12, for Pl. XII fig. 14 read Pl. XII fig. 16.

NEW SPECIES AND VARIETIES OF NORTH
AMERICAN LEPIDOPTERA

NOCTUIDAE

AGROTINAE

SCHINIA CUPES DESERTICOLA var. nov. (Pl. III, Fig. 16).

Similar in maculation to the typical form from Texas but much paler in color; the head and thorax are whitish, lightly peppered with black, the ground color of the primaries is a very light ochreous or cream-color shaded with deeper ochreous terminally and without any of the smoky-brown color characteristic of typical *cupes*; the outer dark border of secondaries is paler than in the type form and the underside is less heavily shaded with black.

HABITAT: S. Arizona (Poling) (April); Palm Spgs., Riverside Co., Calif. 2 ♂, 1 ♀. Types, Coll. Barnes.

We have had the 2 ♂'s from Arizona in the collection for some time; the receipt of a ♀ from the desert region of California convinces us that we are dealing with a good geographical race which evidently inhabits the hot, arid regions of the south-west. In the coast region of California typical *cupes* is again found, redescribed by Hy. Edwards under the name *crotchi*.

GROTELLA CITRONELLA sp. nov. (Pl. III, Fig 13).

Head, thorax, and primaries lemon yellow, the latter crossed by two faint black lines, tending to become punctiform; the inner line is slightly outwardly inclined, forming a rather prominent projection above the inner margin and accentuated in the cell by a dark dot; the outer line is well rounded about the cell with a slight inward bend opposite the same, then inwardly oblique to inner margin fairly close to t. a. line, the median space being only half as wide as at the costa, the line accentuated by black dots opposite the cell, in the submedian fold and on the inner margin. Secondaries blackish with pale fringes. Beneath primaries blackish with lemon yellow costa and outer margin; secondaries pale ochreous. Expanse 19 mm.

HABITAT: Palm Springs, Riverside Co., Calif. 3 ♂, 2 ♀. Types, Coll. Barnes.

The species is very similar to *spaldingi* B. & McD., of which we have also a single specimen from the same locality; it is however much deeper yellow in color and has not such a prominent prow-shaped process to the frontal protuberance as in *spaldingi*.

RYNCHAGROTIS ORBIPUNCTA sp. nov. (Pl. I, Fig. 2).

Head, thorax, and primaries in the ♂ fawn brown, in the ♀ largely suffused with pale reddish; basal line indicated by a dark spot on costa and another in the center of the wing; t. a. line scarcely visible, consisting of a dark spot on costa, a curved mark below the cubitus followed by an outwardly oblique mark below vein 1 to inner margin; orbicular and reniform prominent, filled with blackish, the former a small round dot, the latter upright, broad; t. p. line obsolescent in ♀, distinct in ♂, pale, rather evenly rounded, accentuated by smoky shading on both sides and with a black mark on the costa at its inception; submedian and terminal area sprinkled with smoky which is crossed by a pale wavy s. t. line, preceded, especially in ♀, by small dark blotches; terminal dark dots; fringes ochreous, cut by two smoky lines. Secondaries smoky, paler towards base; fringes pale with a yellowish basal line followed by a similar smoky one. Beneath ruddy, somewhat suffused with smoky with a postmedian dark line and discal dot on all wings. Expanse 40 mm.

HABITAT: ♂ Palmerlee, Ariz.; ♀'s Huachuca Mts., Ariz. 1 ♂, 4 ♀. Types, Coll. Barnes.

The species is readily distinguished by the black filled spots and small orbicular, which in two of the ♀'s is entirely wanting; otherwise in size and coloration it is close to *alcandola* Sm.

HADENINAE

ANARTA SIERRÆ sp. nov. (Pl. III, Fig 3).

Head and thorax clothed with gray and black hairs; primaries greenish black, heavily suffused in the median area with whitish; basal area dark with scattered white scales near base, defined outwardly by an oblique t. a. line dentate on cubital vein and vein 1 and shaded inwardly in costal region with slight white scaling; median area heavily scaled with whitish leaving a small dark patch on inner margin and a larger dark patch extending obliquely from costa to t. p. line and containing the reniform which is indistinct and slightly white centered; t. p. line dentate, rounded outwardly below costa and then subparallel to outer margin; s. t. line marked by pale scaling preceding and following it, rather irregular, forming a large dark blotch on costa; terminal area rather pale; fringes checkered. Secondaries even smoky black with pale fringes, a white blotch of the underside partially showing through. Beneath primaries blackish at base and along inner margin, outer area silvery white with a large quadrate black reniform and a sinuate subterminal line; terminal area sprinkled with gray with dark terminal line and checkered fringe; secondaries black with a large white patch beyond the cell preceded by an indistinct dark reniform blotch, the outer edge of the white patch being parallel to outer margin of wing; fringes pale. Expanse 25 mm.

HABITAT: Mineral King, Tulare Co., Calif. 1 ♂. Type, Coll. Barnes.

The species is allied to *laertes* Sm. differing in the more variegated appearance of the primaries and their greenish-black tinge rather than brownish-black as in *laertes* and *melanopa*; we have a second very worn specimen from the same locality which agrees with the types in the unicolorous secondaries; two ♂'s, one from Deer Park Spgs., Lake Tahoe, and the other simply labelled 'S. Calif.' agree in the maculation of primaries with the type of *sierræ* but show a white patch on the upper side of secondaries as in *laertes*; we propose for these the varietal name of LAERTIDIA and figure a specimen on Pl. III, Fig. 4.

POLIA (MAMESTRA) BRENDA sp. nov. (Pl. I, Fig. 3).

Head and thorax clothed with gray scales mixed with black and with a distinct black line across the collar; abdomen tinged with pinkish laterally; primaries with very distinct and decided maculation, gray suffused with smoky; basal half line black, geminate, filled with pale; a short black basal streak; space to t. a. line rather even dark gray; t. a. line geminate, black, composed of three improminent scallops, in general upright; orbicular large, whitish, touching t. a. line, partially outlined with black; claviform large, almost hemispherical, white, outlined with black, and connected with t. p. line by a black dash; reniform very large, white, with a central smoky lunule, partially outlined in black especially on inner side and resting with its base on t. p. line; an upright smoky median shade, angled outwardly below cubital vein; t. p. line indistinctly geminate, bent strongly outward around cell and dentate, with a single prominent scallop between veins 1 and 2 which is slightly tinged with pale yellowish; s. t. space in general paler gray than median area except at costa where there is a smoky patch with 3 pale costal dots; veins dotted with black and white; s. t. line pale yellow, angled below costa, forming an indistinct W mark on veins 3 and 4, accentuated by black arrow marks preceding the line and blackish shades outwardly above and below the W; a broken black terminal line; fringes checkered smoky and ochreous; secondaries pale smoky with darker terminal line and pale fringes. Beneath whitish with slight ruddy tinge, primaries largely suffused with smoky with the commencement of a postmedian line at costa and a broad indistinct discal lunule; secondaries paler than primaries with a prominent discal dot and a faint postmedian line, dotted on the veins with black; terminal dark lines on both wings and checkered fringes on primaries.

HABITAT: Stockton, Utah (May 17, Spalding). 1♂. Type, Coll. Barnes.

Seemingly closest to *distincta* Hbn. but with a much less oblique t. a. line and less heavily shaded median area.

POLIA (MAMESTRA) DELECTA sp. nov. (Pl. I, Fig. 17).

Head, thorax and primaries a rather dull smoky brown, slightly sprinkled with gray scales; maculation of primaries rather indistinct, traces of an

angled black geminate basal half line filled with paler; t. a. line geminate, the outer dark line and the pale filling alone showing, slightly crenulate and directed outwards to just above inner margin where it curves gently inward; orbicular small, round, partially outlined in black; reniform rather narrow, outlined partially in pale ochreous, followed by a black line on side toward orbicular; a smoky median shade curved outwardly; t. p. line indistinctly geminate, composed of the inner dark crenulate line and the pale filling, curved outwardly to well beyond reniform, then rigidly oblique from vein 4 to inner margin; beyond it pale dots on the somewhat black-outlined veins; s. t. line pale ochreous, wavy, indistinct; a dark terminal line; fringes the color of the wing with pale dots at base. Secondaries smoky with pale terminal line at base of fringes. Beneath primaries largely smoky, outwardly paler, sprinkled with brown with an indistinct postmedian line starting from a dark spot on costa; secondaries considerably paler, sprinkled with brown, with distinct postmedian line and discal dot. Expanse 30 mm.

HABITAT: Camp Baldy, S. Bernardino Mts., Calif. (Pilate) (June, July); Loma Linda, S. Bernardino Co., Calif. (Mch.) 2 ♂, 4 ♀. Types, Coll. Barnes.

Superficially greatly resembling *Trachea pavie* Behr but easily separated on structural characters; it will probably fall in the *goodelli* group.

ERIOPYGA DISCRETA sp. nov. (Pl. I, Fig. 18).

Palpi ochreous, outwardly smoky; thorax and primaries a pale fawn gray, the latter somewhat shiny; basal half line black, angled below costa; t. a. line single, black, composed of three prominent scallops, in general course upright, preceded by a faint pale shade; orbicular almost invisible, round, faintly outlined in smoky; reniform a rather obscure dark blotch more or less hidden by the median band which is oblique outwardly from costa to reniform where it forms almost a right angle and is then inwardly oblique to inner margin close to t. p. line; t. p. line bent outward below costa, then strongly dentate and in general parallel to outer margin with a strong scallop in the submedian fold; s. t. line indicated by darker shading in the subterminal area, angled below costa, then slightly waved; a terminal dark line and a yellow line at base of smoky fringes; secondaries smoky, noticeably excavated on outer margin between veins 4 and 6 with a yellow line at base of fringes. Beneath shiny smoky, secondaries rather paler; a postmedian line and discal dot on both wings. Expanse 33 mm.

HABITAT: Camp Baldy, S. Bernardino Co., Calif. (July 8) 2 ♂, 2 ♀. Types Coll. Barnes.

The species is close to *mania* Stkr. and *dubia* B. & McD.; from the former it differs in its rather more slender build, paler color, the lack of white dots around base of reniform and beyond t. p. line and the less prominent shading before s. t. line; from the latter it differs structurally, the 3rd joint of the palpi being much shorter and the

antennæ much thinner with finer ciliations; the eyes too are more sparsely haired than in either of the other species. Besides the types we have a series of what seems to be the same species from Truckee, Calif., captured in September.

CUCULLIINAE

ONCOCNEMIS SAGITTATA sp. nov. (Pl. I, Fig. 8).

Front whitish, sprinkled with black and with a dark interantennal tuft; collar white, crossed by a black line at base, a smoky one at center and a broader line at the apex leaving the tips white; thorax rather blackish with scattered white sprinkles and a small orange tuft on metathorax dorsally; primaries gray, basal portion to t. a. line blackish; t. a. line outwardly oblique, obsolete in costal portion, consisting of a scallop in the fold and another below vein 1, both edged inwardly by white; median space gray, suffused with blackish between the spots; orbicular small, oval, outlined with pale gray; reniform diffuse outwardly, defined inwardly by a black lunate line bordered with white beyond which is a dull orange shade; t. p. line scarcely visible, marked by a curved dark shade line at costa and a perpendicular white waved line below reniform; subterminal area deep blackish except in costal portion beyond the t. p. line which is gray, bordered outwardly by a very sharply dentate white s. t. line, close to the outer margin, the points of the teeth mostly touching the same, the inward dentations being prolonged by black arrow marks of which that above vein 4 is heaviest; terminal area sprinkled with whitish with black shading in the central interspaces and a terminal dark broken line; fringes pale, checkered and sprinkled with smoky. Secondaries whitish ochreous with broad black terminal band and pale fringes. Beneath white with a broad dark terminal border, the pale area of primaries more or less suffused with smoky and with an indistinct discal lunule, secondaries with costa sprinkled with smoky and with small discal dot; fringes as above. Expanse 32 mm.

HABITAT: Yavapai Co., Ariz. (Sept. 20) 1 ♂. Type, Coll. Barnes.

CONISTRA FRINGATA sp. nov. (Pl. I, Fig. 1).

Head and thorax red-brown tinged with gray; primaries rather a bright red-brown, basal area to t. a. line sprinkled with gray; an angled basal half line; t. a. line pale, narrow, concave outwardly; median space red-brown; reniform long, narrow, only distinct outwardly where it is edged with pale yellow; t. p. line pale, angled below costa, slightly incurved below reniform; s. t. line pale yellow, rather irregular, preceded by an olivaceous shade which is defined inwardly by a rigid, whitish, rather broad line proceeding from costa near apex to inner margin at anal angle where it touches the s. t. line; terminal space slightly sprinkled with gray; fringes ruddy. Secondaries deep smoky with contrasting ruddy fringes. Beneath smoky, tinged considerably

with ruddy sprinkling and with two faint subterminal dark lines crossing both wings and a prominent discal lunule on secondaries. Expanse 39 mm.

HABITAT: Truckee, Calif. (Oct. 24). 1 ♂. Type, Coll. Barnes.

Similar in type of maculation to the Eastern *devia* Grt. but considerably larger in size with much ruddier fringes.

ACRONYCTINAE

LEUCOCNEMIS OBSCURELLA sp. nov. (Pl. III, Fig. 9).

Palpi and head ochreous, thorax ochreous suffused with blue-gray; primaries ochreous evenly overlaid with bluish gray, leaving the ground color only visible partially in the terminal area where it is cut by the darker veins; the only maculation visible is the orbicular and reniform spots, both small, round and ochreous with a slightly deeper central dot; fringes obscurely checkered; secondaries even smoky brown with paler fringes. Beneath light smoky ochreous. Expanse 20 mm.

HABITAT: Denver, Colo. 3 ♀. Types, Coll. Barnes.

This obscurely marked species is allied to *perfundis* but lacks all indications of cross lines; our three ♀'s have only one fore-tibia between them but this shows a distinct claw which, combined with the non-tuberculate front, seems to warrant the above generic reference.

CATABENA PRONUBA sp. nov. (Pl. III, Fig. 11).

Palpi and thorax gray, sprinkled with smoky, collar pale ochreous at base, this area limited by a black transverse line; front pale ochreous crossed by a dark line; primaries long, narrow, rather dark gray with ill-defined maculation; a very fine black basal hair streak extending through fold halfway to outer margin; t. a. and t. p. lines indicated by small dark costal blotches; a dentate mark above inner margin evidently marks a portion of the t. a. line; orbicular rather prominent, consisting of a very narrow decumbent white oval with a central dark line; reniform indicated by a small dark lunule below and around which are some indistinct dark strigæ which may form portions of the t. p. line; an oblique dark shade extends inward from apex of wing and below this the s. t. line can be traced as a faint white wavy line, angled inwardly above inner margin and with narrow black dashes beyond it in terminal area, most prominent in fold and opposite cell. Secondaries hyaline white, immaculate. Beneath primaries pale smoky, secondaries as above. Expanse 27 mm.

HABITAT: Jemez Spgs., N. Mex. (July 24). 1 ♂. Type, Coll. Barnes.

The species approaches *sagittata* B. & McD. in wing form but apart from the maculation of primaries is at once separated by the

pure white secondaries; it is possible that other specimens will show a better defined maculation on primaries which will make it possible to trace the course of the transverse lines more accurately, an impossibility with the single specimen before us.

STILBIA FOTELLOIDES sp. nov. (Pl. III, Fig. 1).

Head and thorax an admixture of black and gray scaling, slightly tinged with ochreous; fore wings in general grayish, in basal area to t. a. line, whitish strongly suffused with blackish and ochreous; t. a. line geminate, the outer line deep black, evenly outcurved, the inner paler and angled inwardly below cell; orbicular large, round, gray, ringed with white and outlined in black; reniform broad, outlined as orbicular; claviform a small dark loop attached to t. a. line; t. p. line black, indistinct at costa where it is lost in a whitish shade extending from reniform to near apex of wing, rather squarely exerted around cell and strongly bent in below reniform, then slightly outwardly inclined to inner margin; an oblique costal dash defining the outer margin of pale costal patch and touching the t. p. line at vein 7; terminal area rather even gray with darker terminal line; secondaries hyaline white, smoky along costa and outer margin with traces of a dark subterminal line. Beneath primaries smoky, secondaries as above. Expanse 22 mm.

HABITAT: Baboquavaria Mts., Ariz. (July, Poling). 1 ♀. Type, Coll. Barnes.

The species greatly resembles *Fota minorata* or a species of the genus *Oxycnemis* in type of maculation but the front is smooth and the fore tibiæ without claws; we place it doubtfully in the genus *Stilbia* as vein 8 of secondaries is quite strongly anastomosed with the cell.

CRAMBODES LUNATA sp. nov. (Pl. I, Fig. 6).

Head, thorax, and primaries a rather dull smoky black somewhat sprinkled with white scales; the maculation is obsolescent with the exception of a white lunule marking the reniform; faint traces of a claviform outlined in black and preceded by a short black basal dash; t. p. line sinuate, most distinct above inner margin; veins and interspaces in the area preceding the s. t. line rather streaked with black, tending to accentuate a very irregular pale s. t. line which is much as in *discistriga* Sm.; terminal broken dark line; fringes dark, slightly checkered with white points opposite veins at base and with a crenulate outer margin. Secondaries rather squarely angled at vein 3, pale smoky, deepening towards outer margin and with a distinct dark terminal line and smoky fringes. Beneath heavily sprinkled with smoky with a large dark discal lunule on secondaries and a broken terminal dark line, more continuous on secondaries; primaries with white costal marks near apex. Expanse 34 mm.

HABITAT: Reno, Nevada. 1 ♀. Type, Coll. Barnes.

In type of maculation quite similar to *discistriga* Sm. but lacking all of the brown tinges, in this respect approaching *leucorena* Sm. which is placed by Hampson in the genus *Namangana* but which possibly should be more closely associated with *discistriga*.

CHAMÆCLEA BASIOCHREA sp. nov. (Pl. III, Fig. 22).

Head yellow; thorax pale ochreous; abdomen orange-yellow; legs ochreous tinged with purplish; fore wings with basal area to t. p. line pale ochreous tinged with purplish along costa; t. a. line very indistinct, indicated by a deep purple mark on costa and an olivaceous oblique stripe above inner margin; the general course as indicated being strongly outcurved below costa to near middle of wing and then inwardly oblique to inner margin near base of wing; median area largely purplish, more or less suffused with deep olive above inner margin; t. p. line indistinct, in general subparallel to t. a. line, strongly outcurved below costa, bent in below cell and angled inwardly on vein 2, then slightly rounded to inner margin; the angle on vein 2 is connected with t. a. line by a dark olive shade; beyond t. p. line are pale shades on costa, in the angle below cell and on inner margin, the remainder of the subterminal space being deep olivaceous; terminal space pale ochreous crossed by an olive shade below vein 6; a slightly darker terminal line and pale fringes divided by a darker line. Secondaries yellow-brown at base, deep smoky outwardly with pale fringes. Beneath primaries smoky, strongly suffused with orange-brown and tinged with purplish along costa and outwardly; secondaries rather deep ochreous tinged along costa with purplish. Expanse 25 mm.

HABITAT: Brownsville, Tex.; S. Benito, Tex. (Sept.) (G. Dorner) 1 ♂, 6 ♀. Types, Coll. Barnes.

The species is very similar to *peruana* Grt., differing in the less distinct t. p. line on primaries with deeper angle on vein 2 and the yellow-brown basal area of secondaries; *peruana* was figured in our 'Contributions' Vol. II (1), Pl. 21, Fig. 20.

STIRIA OLIVALIS sp. nov. (Pl. III, Fig 8).

Head and thorax white, slightly tinged with gray; abdomen gray; fore wings white, more or less suffused with olivaceous and crossed by three diffuse olive-green bands, the first, representing the t. a. line, is in general course inwardly oblique, dentate below costa and again on cubital vein, the second, in the place of the t. p. line is subparallel to the first, rather indistinct and broadly diffuse in costal portion, narrower and well defined above the inner margin, the third is submarginal, broken, consisting of a costo-apical patch, another between veins 4 and 6 and a third above inner margin, more or less joined together by a narrow olive green line; a broken terminal olivaceous line; fringes pale, tipped with fuscous. Secondaries entirely deep smoky brown. Beneath primaries deep smoky brown; secondaries pale whitish gray

crossed by an indistinct smoky median line and suffused with smoky on costa at base of wing. Expanse 29 mm.

HABITAT: Loma Linda, S. Bern. Co., Calif. (Mch., Apr.) (G. R. Pilate) 2 ♂, 3 ♀. Types, Coll. Barnes.

There is considerable variation in the amount of olivaceous suffusion on primaries, worn specimens, in which the white overlying scales have been rubbed off, being much darker in general appearances; in the ♀'s the coloration is rather yellower than in the ♂'s. The species is allied to *hutsoni* Sm. but is considerably larger.

STIRIODES VIRIDA sp. nov. (Pl. III, Fig. 7).

Head and thorax creamy, abdomen ochreous; primaries pale creamy, shaded basally and terminally with dull green and crossed by two oblique bands of the same color of which the inner is twice as broad as the outer, occupying the whole median area except at costa which is white; the outer band is subterminal, in general parallel to the outer margin with the outer edge slightly waved; fringes pale, checkered with smoky; secondaries smoky with pale fringes cut by a dark line; traces of a dark discal dot and curved median line. Beneath primaries smoky, costa edged with whitish with a triangular patch of same color near apex; secondaries pale, whitish, with dark discal dot. Expanse 21 mm.

HABITAT: Palm Springs, Riverside Co., Calif, 2♂, 2♀. Types, Coll. Barnes.

The species agrees structurally with Hampson's definition of the genus *Stiriodes* but differs entirely in general appearance from the included species, looking more like *Polenta tepperi* in coloration scheme.

NOCLOA TORNIPLAGA sp. nov. (Pl. I, Fig. 7).

Head and thorax brown-black, collar heavily sprinkled with gray; primaries rather deep velvety brown, basal area somewhat paler, limited by a blackish t. a. line, rounded gently outwardly to vein 1, then jutting outwardly forming a prominent tooth just above inner margin; orbicular and reniform rather paler than the surrounding area, former round, latter rectangular; t. p. line bent outward below costa and slightly dentate, incurved below cell and followed at this point by a pale ochreous patch occupying the whole subterminal area from vein 3 to inner margin; s. t. line pale, irregular, preceded by darker arrow marks from costa to vein 2; terminal dark line; fringes dark. Secondaries whitish toward base, smoky outwardly. Beneath whitish, suffused with smoky and with faint postmedian line on secondaries. Expanse 29 mm.

HABITAT: Palmerlee, Ariz. (Sept.). 2 ♀. Types, Coll. Barnes.

The frontal protuberance is rather reduced, especially the central process but the species bears such an undoubted resemblance to *dis-similis* B. & McD. that we place it in the genus *Nocloa*.

COPANARTA SEXPUNCTATA sp. nov. (Pl. III, Fig. 17).

Palpi pale ochreous mixed with black; front and thorax dull blackish slightly peppered with whitish and with some bluish iridescent scales; primaries dull black crossed by three deep black lines, the first subbasal, straight, extending only to middle of wing, the second antemedian, angled slightly outwardly below costa and with a prominent outward bulge below the cubital vein, the third postmedian, crenulate, angled below costa and well rounded about cell, bent in strongly below reniform and slightly angled on vein 1; a prominent white reniform, partially filled with smoky brown centred with white, preceded by a faint whitish shade on costa; a faint wavy white s. t. line, considerably broken; fringes black with a white point at extremity of veins; secondaries black with a large round white spot filling entire end of cell and another oval white spot at middle of inner margin. Beneath black, primaries with inner margin shaded with white and with a single large round white discal spot, secondaries with two white spots as on upper side. Expanse 20 mm.

HABITAT: Shasta Retreat, Siskiyou Co., Calif. (July 1-7) (McDunnough). 5 ♂, 7 ♀. Types, Coll. Barnes.

The species was taken flying in the hottest sunshine around patches of *Apocynum* on the railway tracks a short distance north of Shasta Retreat. It shows considerable likeness to *Pseudacontia aterrima* and *groteana* but the outer claw on the fore tibia, which characterizes the genus *Pseudacontia*, is wanting, so we judge the species better placed in *Copanarta*.

ERASTRIINAE

PHOBOLOSIA BILINEATA sp. nov. (Pl. III, Fig. 10).

Palpi white, dark at base; front pale with a bronze interantennal tuft; thorax white, sprinkled with black; primaries olivaceous, crossed by numerous fine black striae, forming parallel lines across the wing; t. a. and t. p. lines black, thickest on costal half of wing, bordered on each side by white, former slightly rounded, latter well rounded below costa then parallel to outer margin and subparallel to t. a. line; reniform represented by a short black longitudinal streak; a narrow apical white patch, from which a faint white s. t. line arises, bent in opposite cell and in fold; terminal area whitish with prominent black terminal line; fringes ochreous at base, olivaceous outwardly. Secondaries smoky with broken terminal dark line and pale basal line to fringes. Beneath primaries smoky with white apical patch and dark streak showing the commencement of t. p. line of upper side; secondaries white, sprinkled

with smoky with distinct discal dot and traces of a curved postmedian line; fringes as on upper side. Abdomen with a small bronze terminal tuft. Expanse 14 mm.

HABITAT: San Benito, Texas (July, Sept.). 2 ♂, 3 ♀. Types, Coll. Barnes.

In wing shape and maculation very similar to *brimleyana* Dyar and *grandimacula* Schaus but lacking the black patch at end of cell; the latter species or one very similar also occurs on our Texan border; we have six specimens from Brownsville before us.

PHÆNICOPHANTA BICOLOR sp. nov. (Pl. III, Fig 15).

Head and thorax rosy pink, with a yellow line behind the antennæ and another crossing the tips of the tegulæ; the metathorax and tips of patagia are also yellow; abdomen with basal half yellow, the remainder rosy pink. Primaries yellow, costa and terminal area broadly pink with a pink median oblique fascia, irregular on outer edge and defined on costa by a narrow yellow streak on each side; a brownish terminal line, defined on inner side by yellow. Secondaries pale ochreous tinged with brown and slightly pinkish outwardly with indistinct pale curved median line. Beneath pale, tinged with smoky in basal half with pinkish shading on costa. Expanse ♂ 12 mm., ♀ 16 mm.

HABITAT: ♂, Santa Catalina Mts., Ariz. (July 24-31); ♀, Yavapai Co., Ariz. 1 ♂, 1 ♀. Types, Coll. Barnes.

Very similar to *flavifera* Hamp. from Argentina of which it may be merely a race; it is apparently smaller in size with the yellow sub-terminal area much broader and the median pink band consequently narrower.

TARACHIDIA ALBIMARGO sp. nov. (Pl. III, Fig. 25).

Head and thorax deep purple black; primaries purplish-black with the exception of an irregular terminal border of creamy white; the color is deepest at the base of the wings, lightening somewhat outwardly, with a sinuate dark t. p. line, broadly geminate above inner margin and filled in with a pale shade which contains an inconspicuous dark patch at end of cell marking the termination of the geminate portion; beyond the t. p. line the s. t. area is greenish black with a very irregular outer margin marking the position of the s. t. line; terminal area and fringes pale creamy. Secondaries deep smoky-black. Beneath smoky with inner margin of primaries somewhat paler. Expanse 18 mm.

HABITAT: Esperanza Ranch, Brownsville, Tex. (Aug. 28); S. Benito, Tex. (Sept. 8). 3 ♀. Types, Coll. Barnes.

The species differs from Hampson's characterization of the genus *Tarachidia* in having vein 7 of primaries from the cell and not from the apex of the areole; the bulging front shows also a slight central tubercle; it is quite distinct from any described N. American species

of *Tarachidia* and has a superficial resemblance to *Chrysæcia scira* Druce with which, but for the fact that veins 3 and 4 of secondaries are stalked, we should have been inclined to associate it.

TARACHIDIA ALBITERMEN sp. nov. (Pl. III, Fig. 6).

Head and thorax creamy, abdomen pale ochreous; primaries olivaceous brown overlaid by sparse white scales (in the ♀ the ground color is yellower); the terminal area is narrowly whitish tapering toward apex, broadest in submedian fold (in ♀ of even width throughout); orbicular a dark dot, reniform faintly indicated by an obscure shade below which in ♂ traces of a dark t. p. line are visible; a terminal dark line of dots; secondaries whitish, somewhat suffused with smoky. Beneath creamy, rather shiny; primaries partly suffused with smoky. Expanse 23 mm.

HABITAT: Paradise, Cochise Co., Ariz. (♂); Palm Springs, Riverside Co., Calif. (♀). 1 ♂, 1 ♀. Types, Coll. Barnes.

The species is larger than its near ally, *modesta* Hy. Edw.; the white shaded terminal area is quite distinctive. In connection with this genus we might note that the species *bicolorata* B. & McD. (Contr. I, (5) p. 26) was erroneously described under *Tortricidia*, a *lapsus calami* for *Tarachidia*.

EUAONTIA CLARKI sp. nov. (Pl. III, Fig 14).

Head and thorax whitish ochreous; primaries whitish or creamy heavily shaded subterminally with brown or reddish-brown; a small basal dark spot on costa; t. a. line about one-fourth out, dark brown, gently curved, thickened somewhat at costa and in submedian fold; t. p. line rather nearer base than usual, about the centre of the wing, in general parallel to t. a. line, forming a prominent outward projection in the cell and bent inward in the fold, the enclosed area between the lines forming a broad whitish band crossing the wing; beyond the t. p. line the submarginal area is almost entirely deep brown, at times with a decided reddish tinge and a little whitish suffusion; the reniform is faintly marked on this area as a bluish-black patch; the outer margin of this area is formed by an irregular white s. t. line, rather diffuse outwardly and bent in prominently opposite cell and in submedian fold; terminal space more or less smoky shaded; prominent terminal broken dark line; fringes white; secondaries white, slightly smoky terminally, more so in ♀ than in ♂. Beneath white with the maculation of primaries showing faintly from upper side. Expanse 20 mm.

HABITAT: Palm Springs, Riverside Co., Calif. 1 ♂, 3 ♀. Types, Coll. Barnes.

We take much pleasure in naming this pretty species, which is closely related to *semirufa* B. & McD., after Mr. B. Preston Clark of Boston, Mass., through whose kind offices we have secured a very

interesting lot of material from the desert region of Southern California.

EREBINAE

MELIPOTIS BRUNNEIFASCIATA sp. nov. (Pl. I, Fig. 4).

Head and thorax gray, two longitudinal dark streaks on the collar; metathorax tinged with ruddy; primaries with basal space gray limited outwardly by a band of deep brown about 1 mm. in width, outwardly oblique from costa to submedian fold with a slight outward bulge in the cell, in the fold making a rather sharp angle and then inwardly oblique to inner margin; this band is edged outwardly by a blackish t. a. line followed by a faint narrow yellowish shade; median space bright ruddy brown forming a very conspicuous band across the wing, the outer third slightly suffused with smoky; this median band is limited outwardly from the base of vein 3 to inner margin by a rather rigid black t. p. line shaded inwardly with yellowish and bent outward below vein 1; the white rigid inner border line of the reniform which practically continues the t. p. line from vein 2 forms the boundary of the median band for the remainder of the wing except at costa where there is no sharp defining line; the dark gray reniform is not sharply defined outwardly but is followed by a white shade line tending to extend along veins 3 and 4 in short streaks; from vein 3 the t. p. line forms the customary bulge around the cell being slightly angled on vein 4, strongly angled on vein 6 and squarely angled below costa; the submedian space is dark gray, limited by a pale waved s. t. line, preceded in costal portion by several black arrow marks; the rather broad terminal space is light gray, slightly smoky outwardly; outer margin strongly scalloped with dark intervenular points; fringe smoky. Secondaries white in basal half, deep smoky brown outwardly with a slight whitish patch on outer margin below vein 2; fringe white tinged with smoky between veins 2-4 and at inner angle. Beneath white with a broad blackish band outwardly, primaries with a curved blackish band from costa at the end of cell to the outer dark band, enclosing a quadrate white space; secondaries with a faint discal dot; fringes pale, shaded with smoky. Expanse 37 mm.

HABITAT: Camp Baldy, S. Bern. Co., Calif. (July 16). 1 ♂, 1 ♀. Types, Coll. Barnes.

This handsome species is closely allied to *fumosa* Stkr. of which it is possibly merely a geographical race; it may be readily distinguished by the ruddy brown median band, much deeper and brighter than in *fumosa* from Texas.

HYPENINAE

OXYCILLA BASIPALLIDA sp. nov. (Pl. III, Fig. 2).

♀. Palpi porrect, smoothly scaled, extending well beyond head, dark gray, 3rd joint ochreous; primaries with basal area gray with a slight purplish

tinge, this area extending over about one-third of the wing and very sharply defined outwardly by an almost perpendicular narrow band of deep ruddy brown; median area deep purplish, with a narrow reniform outlined in black and bent toward apex of wing in upper portion; below reniform traces of a dusky median shade; t. p. line brown, thicker at costa where it is outwardly oblique for a short distance, then crenulate and subparallel to outer margin with slight inward teeth on veins 1 and 2, preceded by a narrow purplish shade paler than the rest of the median area and bordered outwardly by an ochreous line; s. t. area pale purplish with three or four orange-ochreous costal dots; s. t. line very irregular, pale, accentuated inwardly by diffuse dark arrow marks; terminal area shaded with smoky over purple and with a terminal dark line broken by orange dots; fringes deep smoky; secondaries deep smoky with traces of a curved median line bordered outwardly with whitish, most prominent at inner margin; a very faint subterminal dark band with whitish edging, only distinct above anal angle; terminal line and fringes as on primaries. Beneath primaries smoky with costal dark dash and beyond it four ochreous dots; secondaries as above but much paler. Expanse 23 mm.

HABITAT: Palmerlee, Ariz. 1 ♀. Type, Coll. Barnes.

In default of a ♂ the species is only temporarily placed in *Oxy-cilla* Grt.; the strong contrast between the pale basal area and the deep purplish outer portion renders the species quite easily recognizable and distinct from any N. American species with which we are acquainted.

PHYTOMETRA (PROTHYMIA) APICATA sp. nov. (Pl. III, Fig. 23).

Palpi, front, and base of collar pink, remainder of collar and thorax pale yellow; primaries pale yellow or straw color, at times suffused with pinkish terminally; basal half of costa pinkish; a faint pinkish oblique line proceeds from apex of wing inwardly to vein 2 just below the base of vein 3; fringes slightly pinkish; secondaries whitish, shiny. Beneath whitish, primaries suffused with smoky in costal portion of wing from base to end of cell. Expanse 20-23 mm.

HABITAT: Redington, Ariz. 4 ♂, 3 ♀. Types, Coll. Barnes.

This must be allied to *plana* Grt. but can hardly be the same species as Grote's description makes no mention of the oblique pink line from apex.

PHYTOMETRA CURVATA sp. nov. (Pl. III, Fig. 24).

Palpi longer than in the preceding species, obliquely upturned and blade-like, pink; front pink; thorax straw-yellow. Primaries straw-yellow with a faint curved pale line from apex of wing to base of vein 2 between which and costa is more or less pink suffusion; basal half of costa pink; fringes

pinkish; secondaries pale whitish. Beneath pale, suffused with smoky through the cell of primaries. Expanse 22 mm.

HABITAT: Paradise, Cochise Co., Ariz. (Oct.); Jemez Spgs., N. Mex. (July). 2 ♂'s. Types, Coll. Barnes.

Very similar to the preceding species but differing in the distinctly longer palpi and the curved character of the apical line.

DYSPYRALIS NOLOIDES sp. nov. (Pl. III, Fig. 5).

Palpi blackish outwardly, the joints tipped with yellow; front and thorax pale ochreous mixed with a few black scales, the latter crossed by a dark band on prothorax; abdomen ochreous; primaries whitish, ochreous-sprinkled and suffused somewhat with black; a blackish spot on costa at base, another larger one marking the inception of the t. a. line which is indistinct, black, bulging in the fold and outwardly oblique above inner margin; t. p. line rather indistinctly geminate, squarely exerted around the cell with an inward angle opposite the reniform, straight to vein 1 where it bends outwards to inner margin; reniform a narrow diffuse black patch situated just above bend in t. p. line with two short black streaks from its base toward t. a. line; s. t. space with irregular dark dashes marking the inner edge of s. t. line; a terminal broken black line, fringes smoky; secondaries very pale ochreous, smoky outwardly. Beneath primaries smoky, secondaries as above. Expanse 19 mm.

HABITAT: San Benito, Texas (Sept. 8). 1 ♂. Type, Coll. Barnes.

Rather similar in general character to *illocata* Warr. (*humerala* Sm.) but considerably larger and without such a well defined median dark band; it looks at first sight like a Nolid.

EPIZEUXIS PUNCTALIS sp. nov. (Pl. III, Fig. 12).

♂. Antennæ ciliate, palpi upturned, smooth, ochreous, smoky outwardly; head, thorax and primaries ochreous, the latter suffused with smoky in median and terminal areas; t. a. line single, dark smoky, angled below costa, bent outwards below cubitus and then rather inwardly oblique to inner margin; two small black dots represent the orbicular and reniform spots; t. p. line smoky, thicker at costa and bent strongly outward below same then rather waved to inner margin, parallel to t. a. line with a slight bulge in the fold; s. t. line faint, accentuated by the darker shaded s. t. area, irregular, bent in opposite cell and again in the fold, preceded on costa by three ochreous dots; terminal row of dark lunules; fringes dusky; secondaries smoky, rather paler at base with ochreous fringes, smoky outwardly. Beneath smoky ochreous, immaculate except that the costo-apical ochreous spots of upper side are repeated. Expanse 25 mm.

HABITAT: Palmerlee, Ariz. 1 ♂, 1 ♀. Types, Coll. Barnes.

The fore legs are missing in the ♂ specimen so the species is doubtfully referred to *Epizeuxis* with which genus however it agrees in other particulars.

GEOMETRIDAE

HEMITHEINAE

CHLOROSEA PULCHERRIMA sp. nov. (Pl. II, Fig. 10).

Palpi deep wine red; front wine red slightly mixed with ochreous, a white band between the antennæ bordered posteriorly with wine red which shades into ochreous distally; thorax and primaries a brilliant emerald green, the latter strongly striate with white and with the veins distinctly outlined in whitish, costa narrowly deep ochreous shaded with wine red at base; a faint white postmedian line, subparallel to outer margin; a prominent black discal dot; fringes greenish spotted opposite the veins with wine-red, each spot containing a darker central dot; secondaries whitish green, semitransparent, pale basally, with traces of a curved white postmedian line; fringes pale green with a whitish basal line and traces of the red spotting of primaries; a small black discal dot. Beneath much as above but paler and primaries not speckled with white, costa wine red at base for about one-third the length of wing. Abdomen green at base then shiny white with small red dorsal patches containing white diamond spots on segments 2-4; fore coxæ green, tibiæ wine-red outwardly, tarsi pale ochreous. Expanse 27 mm.

HABITAT: Eldridge, Sonoma Co., Calif. (Feb. 1-7). 7 ♂. Types, Coll. Barnes.

This very handsome species we place provisionally in the genus *Chlorosea* on account of the single pair of spurs on hind tibiæ in ♂ (one specimen shows a single spur preceding the terminal pair); a ♀ will be necessary to correctly place the species. The bright green color shows a great tendency to fade even in unspread specimens, possibly due to the action of the cyanide jar; the red spotting on the fringes is variable, being reduced in some specimens to the apical portion of primaries.

LARENTIINAE

LITHOSTEGE DESERTICOLA sp. nov. (Pl. II, Fig. 15).

♂. Antennæ strongly bipectinate, fore tibia with claw, front protuberant; head and thorax clothed with an admixture of black and white scales; primaries dark gray crossed by numerous parallel lines, in general subparallel to outer margin and somewhat inwardly oblique in consequence; basal space dark gray crossed by two dark lines between which is slight whitish shading;

beyond this is a narrow white band, obscured by smoky scaling and traversed by two further dark lines; median space similar in color to basal space with three pairs of darker lines, the lines of each pair tending to coalesce; a faint discal dot; the outer border of this area bent in slightly opposite cell and again below vein 2 and followed by a narrow white band edged outwardly by a dark line and with a similar central one; terminal space dark smoky crossed by a faint whitish s. t. line originating in a short white apical streak; terminal black line broken at ends of veins; fringes pale, with central dark line and slight checkering opposite the veins; secondaries whitish, sprinkled with smoky, with traces of the parallel lines of primaries, the only one however that is at all distinct being a post median line corresponding to the outer border of the median area of primaries; terminal dark line and fringes as on primaries. Beneath rather pale smoky, sprinkled, with a broad paler outer border on both wings defined inwardly by a dark line corresponding to the postmedian line of upper side; white apical dash on primaries and small discal dots on all wings; fringes as above. Expanse 27 mm.

HABITAT: La Puerta Valley, S. Calif. 3 ♂. Typès, Coll. Barnes.

The species is very similar in maculation to *elegans* Grossb., wrongly placed in the genus *Coenocalpe* as the fore tibia is clawed and the front tuberculate; it is however rather paler in color and the antennæ are strongly pectinate, not ciliate as in *elegans*. We place the species in *Lithostege* as it appears to agree structurally, apart from the pectinate antennæ, with the characterization of this genus.

LITHOSTEGE MARCATA sp. nov. (Pl. III, Fig. 19).

♀. Head and thorax white with dark speckles and a blackish line across the collar, abdomen ochreous; primaries whitish, sprinkled lightly with purplish gray and with the terminal area entirely this color; traces of an angled basal line; t. a. line distinct, geminate, purple gray, the outer line heavier, straight for a short distance below costa, then rounded outwardly, bent inward in the fold, straight to inner margin with three blackish dots on outer line, one just above inner margin the other two on fold and cubital vein; t. p. line purplish-gray, starting from a prominent costal dark streak, rather diffuse and concave opposite cell its inner edge marked by a dark upright streak representing the reniform and with dark streaks on veins 3 and 4, below vein 4 narrower and parallel to outer margin with three equidistant dark dots, the lowest resting on inner margin; beyond it two equidistant parallel fine purplish gray lines, the inner scalloped, the outer diffuse below costa; fringes checkered. Secondaries white with a faint smoky tinge, deeper outwardly. Beneath whitish, primaries with two dark costal blotches near apex and slight smoky terminal shade; secondaries immaculate. Expanse 25 mm.

HABITAT: So. New Mexico (Sept. 1) (Poling) 1 ♀. Type, Coll. Barnes.

Very similar to *Scelidacantha triseriata* Pack. in general appearance and possibly confused in collections with this species; the pres-

ence of two pairs of spurs on the hind tibiæ however at once separates it.

HYDRIOMENA TERMINIPUNCTATA sp. nov. (Pl. II, Fig. 7).

Palpi moderately long, blackish; front and thorax ochreous sprinkled with black; primaries gray, slightly tinged with pale olivaceous, sprinkled and banded with purplish; with the exception of slight blackish shading along costa the basal space is pale, bordered outwardly by a black line which is outwardly oblique from costa to middle of cell, then rather sharply angled and almost perpendicular to inner margin or bent slightly outwardly above vein 1; this line is followed by a pale band of ground color the outer edge of which forms a prominent outward tooth in the cell and is then subparallel to the basal line with a slight tooth above vein 1; the median band is fairly broad, the inner $\frac{2}{3}$ being purple, the outer $\frac{1}{3}$ olivaceous-gray, a fine dark line marking the division of the two colors; the outer margin of this band is formed by a dark line, broad at costa and oblique outwardly to vein 5, then very fine, slightly waved, and almost perpendicular to vein 1 where it bends outward reaching inner margin considerably before anal angle; vein 1 on the outer portion of this area is rather broadly black-lined, extending at times almost to anal angle; in the ♂ the subterminal space is rather immaculate gray sprinkled with purple, bordered outwardly by a broad purple band, oblique from costa to near outer margin on vein 4 and then greatly narrowed, close to and parallel with margin with an inward bend in the fold; this band is preceded by a fine dark subparallel line more or less obsolete in lower portion of wing; in the ♀ this line is much more prominent, thickened at costa, the remainder crenulate with a purplish blotch preceding same opposite cell; a purplish apical patch and two black subapical streaks, the lower one cutting the submedian purple band below vein 6; terminal area olivaceous gray with veins lined on both sides by short purplish streaks; fringes pale, checkered; secondaries pale smoky with a faint postmedian dark line, sharply bent on vein 3 to inner margin above anal angle, shaded outwardly with whitish, a terminal series of pale oblong intravenular spots; fringes white, checkered with black opposite veins. Beneath pale, slightly smoky with the maculation of the upper side faintly visible. Expanse ♂ 24 mm., ♀ 27 mm.

HABITAT: Stockton, Utah (July). 1 ♂, 3 ♀. Types, Coll. Barnes.

The species is closest apparently to *similaris* Hlst. (*glenwoodata* Swett) but much paler and the terminal pale spots on secondaries seem quite characteristic.

HYDRIOMENA MEDIODENTATA B. & McD.

Since describing this species from a unique and almost unicolorous dark ♀ we have received a ♂ from Palmerlee, Arizona; it is less dark than the ♀ and has an ochreous patch at base above inner margin crossed by a brown perpendicular line; the median area is

more or less ochreous bordered inwardly above inner margin by a dentate brown line and with traces of an irregular brown defining line outwardly.

HYDRIOMENA CYRIADES Druce.

Judging by the figure (Biol. Cent. Am. Pl. 56, Fig. 10) we have a specimen of this species from Tucson, Ariz. It is rather smaller than the figure but agrees well in coloration and maculation.

XANTHORHOE ALTICOLATA sp. nov. (Pl. I, Fig. 9).

♂. Antennæ very shortly bipectinate; head, thorax, and abdomen dark gray, the latter black-banded; primaries dark gray crossed by a prominent bright brown median band edged on both sides by whitish, the inner edge gently rounded, the outer edge oblique at costa (*not* inwardly rounded) projected outward at vein 4, bent back to near base of vein 2 and then straight to inner margin; a dark upright cross line near base of wing, preceding which the basal area is slightly ochreous tinted; equidistant between this line and the inner edge of median band is a second dark line slightly crenulate; the area beyond slightly paler gray and crossed by a fine hair line very close to median band; the central portion of the median band is rather paler tinted than the outer portions, this area being bounded inwardly by a dark line parallel to inner edge and outwardly by a slightly waved geminate dark line, distinctly bent inward at costa and then sub-parallel to outer margin of wing; subterminal area gray with dark dots on the veins, faintly connected by a dark shade line; s. t. line white, evenly scalloped, preceded and followed by smoky shades, especially distinct opposite cell; a dark broken terminal line; fringes smoky, paler outwardly; secondaries smoky, paler in basal and median areas with two central parallel curved lines, bent downward from vein 2 to inner margin; faint traces of a dark postmedian line and white s. t. line; terminal dark line and fringes as on primaries. Beneath smoky with postmedian line of upper side repeated; small discal dots on all wings. Expanse 30 mm.

HABITAT: Silverton, Colo. (July 8). 1 ♂. Type, Coll. Barnes.

The short pectinations of the ♂ antennæ at once distinguish the species from the *munitata* group; its appearance is rather like that of a large *designata* Huf.

PERIZOMA TAHOENSIS sp. nov. (Pl. II, Fig. 8).

Palpi short, blackish; front and collar ochreous; thorax blackish, sprinkled with white; primaries pale gray, shaded with smoky; costa with a dark patch near base from which a vertical dark line crosses the wing; beyond this is a geminate dark line, the outer portion most distinct and slightly dotted on the veins, followed by a narrow pale band of ground color; in the middle of the costa is a quadrate dark blotch from the inner and outer edges of which parallel and nearly vertical dark lines cross the wing, the included area being shaded

with smoky; the junction of the cubital vein with vein 2 is outlined in black forming a V mark and vein 1 in this area is also outlined in black; the following area is paler, especially in costal half which contains a prominent discal dot; this area is bounded outwardly on costa by a third quadrate black patch giving rise to two lines as before, the inner being subparallel to the preceding lines, the outer more irregular, angled outwardly below costa, then strongly concave opposite the discal spot, forming an outward angle on vein 4, then inwardly oblique to the fold and rounded outwardly to inner margin; the included area is very narrow for a short distance below vein 2, shaded with smoky and crossed by dark dashes on veins 1, 3 and 4; beyond this line at a distance of about $1\frac{1}{2}$ mm. is a smoky line more or less parallel followed at a short distance by a whitish, crenulate, s. t. line, parallel to outer margin, preceded, especially above and below vein 5, by dark shading; a terminal broken dark line and slightly checkered fringes; secondaries pale smoky with discal dot, crossed by indistinct curved, dark, median and subterminal lines shaded outwardly with paler; distinct terminal broken dark line preceded by pale spots; fringes checkered. Beneath primaries smoky with ochreous blotches on costa accentuating a dark patch corresponding to the third patch of upper side; subterminal markings of upper side faintly discernable; secondaries as above with markings rather more distinct. Expanse 29 mm.

HABITAT: Glen Alpine, Lake Tahoe, Calif. (July 8). 1 ♂. Type, Coll. Barnes.

Very similar to *curvilinea* Hlst, but the first subterminal line is well defined and not represented by dots and the discal dot is prominent; the apex of wing is also less rounded.

PERIZOMA EPICATA sp. nov. (Pl. III, Fig. 20).

Primaries pale brown, narrowly banded with whitish; an upright white subbasal line; beyond this a narrow white band with central brown line forming the inner edge of the median fascia; this white band is straight from costa to cubital vein then bent inward to inner margin where it touches the white subbasal line, the included triangular space being brown; median area brown, centrally whitish, especially around the discal dot and above inner margin, crossed by three faint wavy lines, one before and two beyond the discal dot, the inner two tending to coalesce; the outer margin of the median area shows a prominent bulge between veins 2 and 4 with a slight inward angle on vein 3; a narrow white band edges the median area outwardly, crossed by a central dark line; a dentate white s. t. line beyond which the terminal area is gray shaded with a smoky suffusion below apex; fringes checkered ochreous and smoky; secondaries whitish, slightly smoky, with indistinct median and subterminal dark curved lines, a terminal dark broken line and checkered fringes. Beneath primaries smoky, costa and terminal area paler; a dark spot on costa near base and discal dot; postmedian and s. t. lines of upper side repeated faintly, accentuated on inner side by smoky shades; secondaries whitish, sprinkled with smoky, a dark

discal dot, a curved median line and an s. t. line composed of confluent dark patches most distinct below costa. Expanse 20 mm.

HABITAT: San Diego, Calif. 1 ♂. Type, Coll. Barnes.

The species is evidently allied to *osculata* Hlst. but not very closely and as far as we know is quite distinct from any described species.

GEOMETRINAE

DREPANULATRIX (DEILINIA) LUTEARIA sp. nov. (Pl. II, Figs. 5, 6).

♂. Antennæ heavily pectinate; front, thorax, and primaries orange yellow with a slight pinkish suffusion the latter crossed by three equidistant, parallel, upright, purple lines, thicker at costa and with slight outward angle just below same, the 3rd line only prominent on costa and inner margin in the single male before us but the course better indicated in some ♀ specimens; some diffuse subterminal purplish shading most prominent between veins 2 and 4 where it rests on t. p. line; a black discal dot just outside of 2nd line and a row of faint dark terminal dots; fringe purplish; secondaries pale ochreous basally, shading into pinkish outwardly, without any dark sprinkling, but with distinct discal dot and two slight black marks on inner margin showing inception of median lines; faint terminal dots and purplish fringes. Below pale ochreous much suffused with pink outwardly and with discal dot on each wing.

♀. Deeper orange than in ♂, shading into maroon outwardly; all maculation very indistinct except the discal dots. Expanse 23-26 mm.

HABITAT: Camp Baldy, S. Bern. Mts., S. Calif. (July). 1 ♂, 5 ♀. Types, Coll. Barnes.

Rather close to *carnearia* Hlst. but entirely lacking the black sprinkling characteristic of this species, the secondaries bearing great resemblance in this respect to those of *bifilata* Hlst. The antennæ are much more strongly pectinate than in *nevadaria* Hlst.

DREPANULATRIX (DEILINIA) SECUNDARIA sp. nov. (Pl. II, Figs. 11, 12).

♂. Antennæ finely pectinate, the pectinations shorter than in *quadraria* Grt. but longer than in *nevadaria* Hlst.; head, thorax, and primaries pale orange-ochreous, sprinkled finely with dark atoms; maculation indistinct, consisting of three upright, parallel, equidistant dark lines; a subterminal narrow dark band, bent in toward the 3rd line below vein 5; a small discal dot and distinct terminal dark points; secondaries pale flesh-color, sprinkled lightly with dark speckles and with dark discal and terminal dots; traces of two median dark cross lines

only visible at inner margin; fringes pale. Beneath creamy slightly sprinkled with smoky and shaded outwardly and apically with pinkish.

♀. Deeper in color than the ♂ with maroon shades in the terminal area. Expanse 26 mm.

HABITAT: Mineral King, Tulare Co., Calif. 4 ♂, 4 ♀. Types, Coll. Barnes.

Allied to *celataria* Hlst. in type of maculation but more ochreous in color and with the pectinations of the ♂ antennæ considerably shorter; it has rather more dark sprinkling on the primaries but the secondaries, especially in the ♀, are lighter in color.

ITAME PERORNATA sp. nov. (Pl. II, Fig. 16).

Male antennæ shortly pectinate; head, thorax, and primaries pale purplish shading into reddish purple outwardly, cross lines faint except at costa; t. a. line oblique and well defined from costa to cell, then angled, faint, and perpendicular to inner margin; median line only represented by a very oblique black streak on costa, more oblique than the similar portion of t. a. line; t. p. line concave and well defined at costa, angled slightly above vein 6, straight for a short distance to below vein 5, then bent gently inward and slightly waved, but very indistinct, to inner margin; indistinct terminal dark dots and smoky fringes; outer margin of primaries excavate below apex; secondaries pale ochreous, sprinkled with purplish, with traces of a discal dot and median oblique dark line; outer margin scalloped slightly. Beneath light ochreous sprinkled with purplish with markings of upper side faintly repeated. Expanse 20 mm.

HABITAT: Redington, Ariz. 1 ♂. Type, Coll. Barnes.

Belongs in the *inquinaria* group but is smaller than any described species we know; we have a ♀ from the same locality still smaller with similar maculation but pale orange in color which may be the other sex of this species, but on account of the color distinction and lack of a sufficient series to establish the range of variation we do not venture to make it a type.

NEPYTIA REGULATA sp. nov. (Pl. II, Fig. 13).

Head and thorax gray; primaries gray-sprinkled over a paler ground color, giving a general pepper and salt effect; t. a. and t. p. lines subparallel and upright, dark smoky, the former bent slightly outward at costa and somewhat wavy, accentuated on median, cubital and anal veins by short dark dashes on its outer edge; t. p. line crenulate, scarcely curved at costa, the veins on inner edge streaked with black, edged outwardly with whitish, most prominently at costa; s. t. line very indistinct, indicated by whitish, diffuse, irregular shading; secondaries paler than primaries with the outer line continued obliquely across the

wings; all wings with discal dot. Beneath pale ochreous with black discal dots and traces of the t. p. line of upper side. Expanse 35 mm.

HABITAT: Redington, Ariz. 3 ♂, 2 ♀. Types, Coll. Barnes.

The species bears such a close general resemblance to *semiclusaria* Wlk. that we place it in *Nepytia* in spite of the fact that the ♂ hind tibiae have hair pencils; the course of the cross lines is much as in *nigrovenaria* Pack. without the strong bend at costa.

PLATÆA TRIANGULARIA sp. nov. (Pl. III, Fig. 18).

Primaries whitish to s. t. line, sparsely sprinkled with gray; terminal area olivaceous; a large semitriangular olivaceous patch occupies the median area of the wing, the base resting on costa, the apex just above the center of inner margin, the outer edge bent inward in the cell and connecting with a small white discal spot; s. t. line white, angulate on vein 5, preceded by a narrow smoky shade band; apex of wing slightly falcate with the outer margin toothed on veins 6 and 4; secondaries light brown shading into whitish at base, outer margin entire. Beneath whitish, slightly speckled, with maculation of upperside partially visible. Expanse 25 mm.

HABITAT: Palm Springs, Riverside Co., Calif. (April). 1 ♂. Type, Coll. Barnes.

This may be a mere aberration of one of the described species but if so it is a very beautiful one and worthy of a name.

MORINA CURVATA sp. nov. (Pl. II, Fig. 17).

Primaries dark gray with rather indistinct maculation; t. a. line obsolete or represented by a few indistinct marks near base of wing; t. p. line from costa near apex, pale-shaded outwardly and parallel to outer margin as far as vein 2, then curved inward to about middle of inner margin, accentuated on the veins by dark dots; a dark median shade line parallel and closely approached to the t. p. line with the intervening area rather paler than the basal and remaining median portion of wing; a whitish crenulate s. t. line parallel to outer margin; terminal dark line; fringes smoky, faintly checkered; secondaries whitish, dusted with smoky outwardly and along inner margin with traces at inner margin of a smoky antemedian band, a median line edged outwardly with white and a white s. t. line edged inwardly by a smoky band; a terminal dark line and slightly smoky fringes. Beneath whitish, peppered with smoky. Expanse 22 mm.

HABITAT: La Puerta Valley, S. Calif. 4♂, 2♀. Types, Coll. Barnes.

The species differs from *coniferaria* Grossb., the type of the genus, in having the t. p. line evenly curved and not wavy as in the latter species.

*PTEROTÆA TREMULARIA sp. nov. (Pl. II, Fig. 4).

Thorax light gray crossed by a black line at apex of tegulæ; primaries pale to dark gray, sprinkled lightly with smoky; t. a. line black, bent outward

*This is probably *Cleora Melanocarpa* Swett the description of which has just appeared.

at costa, strongly bent backward above inner margin to near base of wing, preceded by a light brown shade and separated from it by a narrow pale area; t. p. line black, sinuate, slightly broken at costa, preceded by a broad dark median shade which more or less unites with it in lower half of wing but which is separated in costal half by a narrow pale area; discal dot usually obscured by this shade; following the t. p. line is a light brown parallel band; s. t. line indistinct, crenulate, whitish, shaded inwardly and outwardly in costal portion with smoky, this shade being in some instances pronounced, in others only faint; a distinct crenulate dark terminal line; secondaries much as primaries with t. a. line wanting except for a dot at base of wing and median and t. p. lines wider apart and parallel. Beneath pale, shaded somewhat with smoky outwardly; dotted with black along costa and with a faint dotted postmedian line and small discal dots. Expanse 32 mm.

HABITAT: Camp Baldy, S. Bern. Mts., Calif. 4 ♂. Types, Coll. Barnes.

Very similar to *cariosa* Hlst., but with much more strongly pectinate antennæ and with a distinct brown band beyond t. p. line; there is considerable variation in the depth of ground color and the amount of smoky suffusion caused by the union of the median and t. p. lines.

PTEROTÆA SERRATARIA sp. nov. (Pl. II, Fig. 9).

Thorax gray, sprinkled with black; primaries whitish-gray, largely suffused with blackish especially in the ♂ sex rendering the maculation obscure and diffuse; t. a. line bent outward at inner margin, geminate, the intervening space tending to become filled with smoky; a sinuate dark median line, crossing in the cell a faint discal dot, the lower median area in the ♂ largely suffused with blackish; a curved geminate dark t. p. line, bent considerably inward below vein 2 and filled above inner margin by a faint ochreous tinge; s. t. line white, crenulate, most prominent in the central portion where it crosses a smoky shade extending outwardly from t. p. line; above the inner margin the subterminal area is rather conspicuously whitish, forming an irregular blotch; a black crenulate marginal line; fringes checkered; secondaries strongly crenulate, especially in the ♀ sex, with the maculation of primaries repeated and much as in the preceding species. Beneath pale, shaded with smoky and with small discal dot on all wings. Expanse 29 mm.

HABITAT: Witch Creek, S. Diego Co., Calif.; Alpine, S. Diego Co., Calif. (1 ♀). 1 ♂, 2 ♀'s. Types, Coll. Barnes.

On account of the general similarity to the preceding species we place this species in the genus *Pterotæa* although the ♀ antennæ are not pectinate but merely slightly serrate; its smaller size, more diffuse appearance and the strongly crenulate outer margin in the secondaries of the ♀ should serve to distinguish it from *cariosa* and *tremularia*.

CLEORA PERPICTARIA sp. nov. (Pl. II, Fig. 14).

Antennæ in ♂ pectinate, the pectinations short and thick; palpi short, porrect, blackish; thorax heavily and roughly scaled with dark olive; primaries dark olive green, tinged with pinkish along inner margin and slightly on veins beyond the cell, presenting a general mossy appearance with rather diffuse maculation; t. a. line blackish, outwardly rounded, forming a small dark patch at costa, preceded by a dark parallel shade near base of wing; median line from a dark patch on costa, rather irregular, in general parallel to t. a. line; t. p. line emphasized by dots on the veins, parallel to median line as far as vein 3 then strongly curved inward, touching this line at base of vein 2 and more or less united with it to inner margin; s. t. line whitish, crenulate, very indistinct, shaded inwardly prominently with smoky at costa and on both sides of vein 5; outer margin crenulate, bordered by a fine dark line; a rather prominent dark discal dot; secondaries similar to primaries in color and maculation; median line wanting; inner line an oblique dark shade, outer line forming an inward angle shortly above inner margin; outer margin strongly crenulate; distinct discal dot. Beneath whitish, shaded with smoky with discal dots on all wings. Expanse 30 mm.

HABITAT: Paradise, Cochise Co., Ariz.; Palmerlee, Ariz. 5 ♂. Types, Coll. Barnes.

The species is quite distinct from any North American form; it rather reminds one of some of the European species belonging to the genus *Gnophos*; until this large group is thoroughly worked over generically we are in doubt as to its exact location; the ♂ hind tibiæ appear to be without a hair pencil and the curious short pectinations of the antennæ are quite characteristic and much as in the genus *Tracheops*.

Genus COCHISEA gen. nov. (Type, *C. rigidaria* sp. nov.)

Eyes hairy; fore tibia with a strong terminal claw; wing shape, vestiture, and venation as in *Amphidasis* Tr. (type, *betularia* L.)

C. RIGIDARIA sp. nov. (Pl. II, Figs. 2, 3).

Palpi and pectus blackish, front and collar whitish, the latter with the apical portion crossed by a deep black line; thorax deep gray, metathorax crossed by a faint dark line and tufted with white; primaries in ♂ whitish, sprinkled and suffused with dark gray especially in costal and terminal areas, in ♀ rather even dark gray; two prominent heavy lines cross the wing, the inner is slightly angled below the costa, prominently rounded outwardly in the cell and strongly oblique from the base of vein 2 to the inner margin near base of wing; the outer line, near outer margin, is slightly lunate from costa to above vein 4, then strongly oblique and parallel to inner line to about the middle of inner margin; it is followed by a broad brownish band (not distinct in ♀), heaviest and broadest at inner margin and edged faintly outwardly with smoky;

secondaries whitish in the ♂, darker outwardly, in the ♀ slightly paler than primaries; a dark subterminal line, slightly bent on vein 4 but in general parallel to outer margin and followed in ♂ by traces of similar brown shading as on primaries; a dark median line, distinct only on inner half of wing. Beneath much paler, whitish, gray sprinkled, with the maculation of the upper side repeated with the addition of a discal dot on all wings. Expanse 38-44 mm.

HABITAT: Paradise, Cochise Co., Ariz. (Aug.-Oct.). 12 ♂, 8 ♀. Types, Coll. Barnes.

COCHISEA SINUARIA sp. nov. (Pl. II, Fig. 1).

Palpi and pectus black; collar and thorax gray, sprinkled with black and with indistinct dark lines crossing apex of collar and metathorax; wings whitish, lightly sprinkled with blackish; t. a. line black, rounded below costa, angled inwardly on cubitus, then curving backward to inner margin near base of wing, preceded by a diffuse smoky shade; an indistinct dark median shade, forming a diffuse patch on costa and broken centrally; a strongly sinuate black t. p. line forming a prominent outward angle above vein 4 and below vein 2, followed by a dark shade band, extending in the lower portion of wing across the whole terminal area and crossed by a faint white s. t. line; prominent inter-venular terminal dots; secondaries with an indistinct continuation of the median shade, a dark discal dot and a black submarginal line, forming a distinct angle on vein 4 and slightly crenulate towards inner margin; terminal dark dots as on primaries. Beneath much as above but with the lines rather paler and less prominent. Expanse 40 mm.

HABITAT: Paradise, Cochise Co., Ariz. (Aug. 24). 1 ♂. Type, Coll. Barnes.

Easily separable from the preceding species, with which it agrees generically, by the course of the t. p. line on primaries.

PAREXCELSA INCONSPICUARIA sp. nov. (Pl. II, Fig. 18).

Primaries rather dark smoky brown, almost immaculate, with faint traces in the cell and above inner margin of a dentate t. p. line followed by short sub-terminal dark dashes; secondaries unicolorous smoky white. Beneath whitish, primaries slightly smoky. Expanse 27 mm.

HABITAT: Paradise, Cochise Co., Ariz. (July 24-31, Aug. 1-7). 7 ♂'s. Types, Coll. Barnes.

We place this species in the genus *Parexcelsa* for the present, although it has a distinct tongue, as the venation appears very similar and the hind tibiæ of the ♂ are without a hair pencil. It is probable that a new genus will be required but in the present unsatisfactory condition of the genera in this subfamily we hesitate to add to the confusion without very strong reasons; in general appearance

the species seems allied to *lineata* Hlst. but the lack of any definite maculation renders it easily distinguishable.

ELLOPIA (THERINA) PHANTOMA, sp. nov. (Pl. I, Fig. 12).

Thorax and primaries pale ochreous, the latter rather thinly scaled and very faintly dark sprinkled, with smoky purple discal dash and two prominent thick cross lines of same color, the inner bent outward at costa and then gently oblique to middle of inner margin, the outer oblique from costa to vein 4 and then curved gently inward to inner margin rather close to inner line; fringes rather smoky; outer margin slightly angled at vein 4; secondaries still paler ochreous, unsprinkled, with outer line of primaries continued but more faintly, outer margin rounded. Beneath pale, immaculate, with markings of primaries showing through. Expanse 27-29 mm.

HABITAT: White Mts., Arizona. 2 ♀. Types, Coll. Barnes.

We had wrongly identified this species as *laeta* Hlst. but as this has proved to be the same as our *flavilinearis* there is apparently no name available for the present species which seems to differ considerably from any described N. American *Ellopia* species.

SICYA OLIVATA sp. nov. (Pl. I, Fig. 10).

Head and thorax pale yellow; primaries pale yellow marbled and suffused with olivaceous especially prominent in the median area on the inner side of the cross lines; t. a. line inwardly oblique, white, slightly bent below costa, bordered outwardly by an olivaceous shade line; black discal dot; t. p. line subparallel to t. a. line with a slight angle on vein 4 between which vein and costa it is less oblique than in lower portion reaching costa shortly before apex; on inner side at costa a narrow triangular dull reddish shade with a central yellow streak on costa; beyond the t. p. line the whole outer area from inner margin to vein 3 is whitish shaded with pinkish, this area gradually narrowing above vein 3 to a point at intersection of t. p. line and vein 6; the apical terminal area rather bright yellowish; fringes yellow, reddish just below apex of wing; secondaries whitish at base, shading into salmon color outwardly with very faint discal dot and curved faintly geminate post-median line most distinct above inner margin where it is rather broad and purplish, otherwise salmon colored. Beneath primaries pale orange-pink, shaded with yellow apically, with markings of upper side repeated; secondaries much as above, less smooth in appearance, the cross line being emphasized by dots on the veins and distinctly geminate at inner margin. Expanse 30 mm.

HABITAT: Jemez Spgs., N. Mex. (Sept.) 1 ♂. Type, Coll. Barnes.

Rather similar to *Sicya neda* Druce (Biol. Pl. 45, Fig. 10) but differing in the maculation of secondaries; the olivaceous shading of primaries should readily distinguish the species from our other N. American forms.

GONODONTIS MACULARIA sp. nov. (Pl. I, Fig. 16).

Head and thorax orange, the latter clothed with rather long hairs; primaries deep orange with a prominent large oval ochreous spot at the end of the cell slightly sprinkled with orange; an indistinct oblique t. a. line, bent downward above inner margin, shaded inwardly with ochreous; a smoky median band just beyond the discal spot, curving slightly around it and then perpendicular; a sinuate t. p. line more or less parallel to outer margin and dotted outwardly with ochreous, most prominently below costa; secondaries orange, costal area ochreous. Beneath paler, rather shiny, secondaries with a large dark discal dot. Expanse 38 mm.

HABITAT: Ft. Wingate, New Mex. (June). 1 ♂. Type, Coll. Barnes.

The rather worn type lacks fringes; we have a second very rubbed specimen before us from the same locality which is too poor to make a type. The species would seem to fall into the same group as *ocellaria* Grossb. with which it agrees well in wing shape.

EUCHLÆNA DETRACTARIA sp. nov. (Pl. I, Fig. 11).

Head and thorax ochreous; primaries light olivaceous brown, paler in terminal area; t. a. line very faint, angled below costa; t. p. line inwardly oblique, whitish, sharply angled to costa at a point on vein 7 close to apex of wing, shaded diffusely inwardly with a slightly darker shade than the ground color except at costa; a faint discal dot; terminal area rather paler than remainder of wing except along the extreme outer border; secondaries rather paler than primaries with the outer line continued obliquely across wings; primaries well angled at vein 4, secondaries slightly so. Beneath rather shiny ochreous with faint discal dots on all wings. Expanse 27 mm.

HABITAT: Babaquivera Mts., Ariz.; Tucson, Ariz. 2 ♂'s. Types, Coll. Barnes.

The species looks somewhat like a very pale *distycharia* Gn. but the antennæ are much less strongly pectinate and the hind tibiæ have hair pencils; it has possibly been already described from Mexico but if so we have been unable to locate it; for the present it may be placed in *Euchlæna* next to *galbanaria* and *argillaria*.

LYCIMNA PECCATARIA sp. nov. (Pl. I, Figs. 13, 14).

♂. Thorax heavily clothed with purple-brown hairs; wings purple-brown with a slight ochreous tinge at base and very diffuse and indistinct maculation; primaries with t. a. line marked by a blackish patch on costa then faintly continued as a dark band bent below the costa; median dark shade band beyond middle of wing angled below costa and inwardly oblique; t. p. line fine, inwardly oblique, angled sharply to costa just below apex of wing, ending in a small black patch; secondaries with median band and t. p. line continued from primaries, the former very diffuse at inner margin. Beneath paler and the maculation of

upper side with the exception of the t. a. line repeated and much clearer; median band prominent, dark; t. p. line accentuated on veins by dots and rather crenulate; terminal space shaded with smoky below apex of primaries.

♀. Much paler than the ♂ with better defined t. a. and t. p. lines on primaries, the latter dotted outwardly with whitish on the veins; median shade almost wanting in our single ♀ except at costa; beneath whitish, smoky sprinkled, with distinct maculation as in the ♂. Expanse 40 mm.

HABITAT: ♂, Palmerlee, Ariz. (April); ♀, Chiricahua Mts., Ariz. (Aug. 16). 1 ♂, 1 ♀. Types, Coll. Barnes.

We place the species in the genus *Lycimna* Wlk. as used by Druce in the *Biologia*; it seems closest to *matalia* Druce (1 c. Pl. 43, Fig. 3) but lacks any subterminal dark blotches and is deeper in color.

SABULODES TRIANGULATA sp. nov. (Pl. I, Fig. 15).

♀. Antennæ bidentate; palpi short, blackish; head, thorax, and primaries ochreous, the latter suffused with ruddy and slightly peppered with dark dots; a black patch on costa indicates the inception of the t. a. line which is otherwise obscure but in general course perpendicular to inner margin after a slight outcurve below costa; a large triangular dark apical patch shaded with white scales, ochreous along costa, the inner edge rather sharply defined, outwardly oblique from costa to vein 6 and forming the costal portion of the t. p. line which is otherwise faint, orange, inwardly oblique with a very slight curve inward opposite the cell; above the inner margin the t. p. line is shaded outwardly with a prominent black patch consisting of a small dot below vein 1 and a larger patch above same extending almost to vein 2; outer margin of wing strongly angled at vein 4, apex slightly falcate; secondaries ochreous, slightly ruddy, evenly sprinkled with smoky-purple dots, no maculation except a small discal dot; angle of the wing at vein 4 not prominent. Beneath ochreous, sprinkled with smoky purple, with traces of the dark apical patch of upperside. Expanse 35 mm.

HABITAT: Paradise, Cochise Co., Ariz. 1 ♀. Type, Coll. Barnes.

We have another ♀ from Kerrville, Texas apparently belonging to the same species, but rather more orange in color and without the black patch on inner margin beyond the t. p. line. The position of the species is rather doubtful until the ♂ is known; apparently it would fall in the *arcasaria* group from which it is at once distinguished by the lack of lines on secondaries and the much less prominent angulation of the outer margin. The species has possibly been described from Mexico or the West Indies, but if so we have been unable to discover it.

PSYCHIDAE

APTERONA FRAGILIS sp. nov. (Pl. III, Fig. 21).

♂. Antennæ strongly bipectinate; head and thorax sparsely clothed with long whitish hair; wings semitransparent, blackish, finely clothed with long black hair; abdomen scarcely exceeding hind wings. Expanse 11 mm.

HABITAT: Redington, Ariz.; Paradise, Ariz. 2 ♂. Types, Coll. Barnes.

The reference to this genus as defined by Spuler (Schmett. Europ. II, 180) would seem to be indicated by the presence of 7 veins on secondaries and 10 veins on primaries; on secondaries veins 4 and 5 are either connate or slightly stalked, 8 is connected with 7 by a cross bar; on primaries vein 1 a is obsolete and the other veins are well separated, almost equidistant, with the exception of 4 and 5 which are rather closer to each other at the point of origin.

COSSIDAE

ACOSSUS CONNECTUS sp. nov. (Pl. I, Fig. 5).

Thorax roughly scaled, pale brownish, tinged with white at base of metathoracic tufts; primaries with the basal half light smoky brown, the outer half paler and tinged with silvery white; numerous deep black transverse streaks are present besides two rather prominent postmedian irregular lines, connected together in the fold by a black streak, diverging towards costa, the outer one forking near the apex of the wing; along the outer margin are slight black reticulations. Secondaries paler with only traces of reticulation. Beneath smoky brown with faint reticulation. Expanse 30 mm.

HABITAT: San Benito, Texas (April 24-30). 1 ♂. Type, Coll. Barnes.

The species at first sight greatly resembles *Fania nanus* Stkr. but apart from a somewhat different arrangement of the lines and reticulations differs in the venation of the secondaries in which veins 6 and 7 are well stalked and veins 4 and 5 connate from the end of the 'cellula intrusa' which is only faintly developed owing to the partial obsolescence of the discocellular vein. We place the species provisionally in *Acosus*, until more material is obtainable, as it seems to show considerable affinity to *undosus* Lint.; it is however very much smaller than this species.

NOTES ON WALKER'S TYPES OF GEOMETRIDÆ IN THE D'URBAN COLLECTION

Through the kindness of the Rev. Dr. Bethune we have recently had the opportunity of examining the D'Urban Collection of N. American Lepidoptera, now the property of the Entomological Society of Ontario and contained in their collection at the Ontario Agricultural College, Guelph. This collection contains a number of specimens which served as types to Francis Walker of the British Museum, the descriptions of the species occurring both in Walker's Catalogue of the Lepidoptera of the British Museum and also in a paper by Mr. D'Urban in the Canadian Naturalist and Geologist Vols. V and VI on the Lepidoptera of the Rouge River. Our attention was largely confined to the Geometridæ and as the results obtained from an examination of these types vary considerably from the idea of the species as given in Dyar's Catalogue, we offer the following notes with a view to clearing up the synonymy of the species involved.

We might preface our remarks by stating that none of the specimens actually are marked with the word 'type', except in some few instances where Dr. Bethune has recently labelled them as such; the specimens however, bear Walker's written label containing the name of the species and very often the letter 'n', presumably an abbreviation for '*nova*'; in some few instances there has evidently been an unfortunate shifting of labels, due doubtless to the many hands the collection has passed through since its original determination by Walker and it has been necessary to check up each presumable 'type' with the original description before definitely pronouncing it to be the true type.

As far as our present knowledge goes there are twenty-five presumable species of *Geometridæ* described by Walker, the types of which are stated to be contained in the D'Urban Collection; in the following notes we treat the species in their order of publication, irrespective of their present position in our lists.

ELLOPIA AEQUALIARIA Wlk. (1860, C. B. M. XX, 164).

This species has been listed as a synonym of *fiscellaria* Gn., but the specimen so labelled, which agrees excellently with the description, does not at all agree with Oberthur's figure of Guenee's type (Et. de

Lep. Comp. VI, Pl. 156, fig. 1511); on the contrary the type of *aqualiaria* would appear to be a normal specimen of *athasaria* Wlk. which was described from a specimen in which the cross lines were unusually close together. Packard already suggested this synonymy (Mon. Geom. p. 495) and we would point out in confirmation of this reference that the description does not call for any orange border to the dark cross lines.

ENDROPIA EFFECTA Wlk. (1860, C. N. & G. V, 260; EFFECTARIA, 1862, C. B. M. XXVI, 1504).

The specimen bearing Walker's label is a ♀ of *Sabulodes transversata* and quite in discrepancy with the original description which calls for a ♂, a *much notched* exterior border of hind wings and the middle and exterior lines *very distinct* on underside; we imagine that the label has been at some time or other wrongly transferred to this specimen and are strengthened in this belief by the fact that a ♂ specimen agreeing in all particulars with the description and also with our usual conception of the species is present in the collection without any written label; this specimen is in all probability the true type. In any case we can see no grounds for accepting the *transversata* specimen as type nor for changing the usual idea of the species.

ENDROPIA ANNISARIA Wlk. (1860, C. N. & G. V, p. 260; ANIUSARIA, 1862, C. B. M. XXVI, 1507).

There are no specimens in the collection bearing this name; the species was described from a ♂ and ♀ and has generally been conceded to be a synonym of *ribearia* Fitch; a ♂ and a ♀ of this latter species are present in the collection without labels and as they agree well with the description we believe them to be the true types from which the labels have possibly dropped off and been lost; in any case the synonymy need not be changed.

BISTON URSARIA Wlk. (1860, C. N. & G., V, 261; C. B. M. XXI, 304).

The type specimen is present and confirms the general conception of the species.

ACIDALIA SIMILARIA Wlk. (1860, C. N. & G., V, 261-2; C. B. M. XXVI, 1592).

On the authority of Dr. Hulst (Ent. News, VI, 72) this species has been considered the same as *quadrilineata* Pack. and this appears

to be borne out by the specimen labelled *similaria* in the collection; unfortunately however for this reference all the *Acidalia* species of this group have a distinctly *black* front whereas the original description of *similaria* just as distinctly states that the head is *white*, besides disagreeing in other particulars. We believe that this is another case of interchanging of labels and that a poor ♀ specimen of what appears to be *Cabera erythemaria* Gn., masquerading in the collection under the label *Numeria inceptaria* (which it cannot possibly be), is probably the true type of *similaria*. The description would certainly apply much better to *erythemaria* than to any of the known white species of *Acidalia* and we would suggest therefore the sinking of *similaria* to *erythemaria*. We point out later our grounds for believing that the name to be employed for what has been called *similaria* Wlk, is really *junctaria* Wlk.

ACIDALIA ANTICARIA Wlk. (1860, C. N. & G., V, 262; 1862, C. B. M., XXVI, 1593).

The specimen under this label, which agrees excellently with the original description, we cannot separate from strongly marked specimens of the common Eastern species, *inductata* Gn., and believe the name should fall as a synonym.

PELLONIA SUCCESSARIA Wlk. (1860, C. N. & G., V, 262; 1862, C. B. M., XXVI, 1617).

This is correctly listed as a synonym of *Hæmatopis grataria* Fabr.

LOZOGRAMMA SUBÆQUARIA Wlk. (1860, C. N. & G., V, 262; 1862, C. B. M. XXVI, 1660).

The usual conception of this series is correct; the name *subæquaria* will however take priority over *defluata* Wlk. which was not published until 1861 (Cat. B. M. XXIII, 984); the earlier publication of *subæquaria* in the Can. Naturalist appears to have been overlooked by Hulst in his compilation in Dyar's Catalogue.

NUMERIA INCEPTARIA Wlk. (1860, C. N. & G., V, 263; 1862, C. B. M., XXVI, 1667).

As stated above the specimen bearing this label in the collection is a *Cabera erythemaria* Gn. and cannot possibly be made to fit in with the original description which reads as follows:

'Male. Cinereous, slender, minutely speckled. Antennæ rather broadly pectinated. Wings with a slender blackish marginal line. Forewings hardly

acute, with two slight oblique undulating blackish lines and with a diffuse and indistinct submarginal brown line; discal lunule small, blackish. Hindwings with two somewhat diffuse, brown lines. Length of body, 5 lines; of the wings, 12 lines.'

We found nothing in the collection that would fit in with the above description; the species was unknown to Packard; Hulst (Ent. News, VI, 11), on the strength of Moffat's determination, placed the species as synonymous with *argillacearia* Pack. but quite recently Swett (C. Ent. 48, 253) takes exception to this and claims the two are distinct; we certainly agree with him in the light of the description but confess our inability to correctly identify the species; perhaps some of our Montreal friends who have collected in the Rouge River region can solve the problem; for the present *inceptaria* Wlk. must remain one of the troublesome 'unknowns.'

ANISOPTERYX RESTITUENS Wlk. (1860, C. N. & G., V, 263; 1862, C. B. M., XXVI, 1696).

Correctly placed as a synonym of *pometaria* Harris.

SCOTOSIA AFFIRMARIA Wlk. (1860, C. N. & G., V, 264).

This species seems to have been omitted in Dyar's Catalogue; it proves to be the same species as *Triphosa indubitata* Grt. and takes priority over Grote's name; Hulst (Ent. News, VI, 43) also gives this reference but confuses *affirmaria* Wlk. with *Scotosia affirmata* Gn. from Brasil, probably dropping the former name as a homonym; as however Guenee's species will doubtless fall into a different genus we imagine that the use of *Triphosa affirmaria* Wlk. for our N. American species will be permissible.

MACARIA SPILOSARIA Wlk. (1860, C. N. & G., V, 266; 1862, C. B. M., XXVI, 1641).

This name seems to have been omitted from Dyar's list; the specimen in the collection is labelled '*Cidaria? spilosaria*', agrees well with the original description and proves to be a specimen of *Earophila vasa-liata* Gn. of the unicolorous brown form. Hulst states that the type is lost (Ent. News, VI, 105) but he was presumably misled by the different generic reference; in our opinion there is no question as to the authenticity of the type.

CLEORA TINCTORIA Wlk. (1860, C. B. M., XXI, 486; DISTINCTARIA D'Urban, 1861, C. N. & G., VI, 39).

Considerable confusion exists concerning the three *Cleora* species and the five *Boarmia* species described by Walker in the Addenda to Part XXI of his Catalogue (pp. 486-9) and listed as being in the D'Urban Collection; of these eight species Hulst lists the types of *Cleora tinctoria*, *Boarmia convergaria* and *B. ejectaria* as lost and refers these names in Dyar's Catalogue to *pampinaria* Gn., *larvaria* Gn. and *humaria* Gn. respectively. If we now turn to D'Urban's paper in the Can Nat. VI, 39 we find that he also lists three *Cleora* species and five *Boarmia* species as new but omits the descriptions of all except *Cleora limitaria*, the description of which tallies with that given by Walker in his catalogue; with regard to the other two *Cleora* species it may be noted that he lists *diversaria* Wlk. which evidently is *divisaria* as published by Walker, his third species being *distinctaria* Wlk. which just as evidently may be held to be the *tinctoria* of the catalogue. Turning to the *Boarmia* species we find *cineraria* Wlk. listed as *cunearia*, *convergaria* as *converzaria*, and *Boarmia? ejectaria* not mentioned at all, but in its place a *Boarmia? patularia*, the query following the generic reference making it almost certain that both names refer to the same species; it would seem that Walker for some reason or other had, in publishing his descriptions, not rigidly adhered to the names placed originally on D'Urban's specimens and this would at once account for the fact that Hulst could receive from Dr. Moffat no word of the types of *tinctoria* and *ejectaria* as these were labelled respectively *distinctaria* and *patularia*.

Taking the species in order we would note that the specimen labelled *C. distinctaria* exists in the collection and agrees so well with Walker's description of *C. tinctoria* that we have no hesitation in accepting it as the type of this species; unfortunately only the fore wings are left to the specimen, but these are sufficient to show that the species has nothing in common with *pampinaria* but is really what has been passing under the name of *Orthofidonia exornata* Wlk., the type being a rather pale and worn specimen; the name *tinctoria* will take priority.

CLEORA LIMITARIA Wlk. (1860, C. B. M. XXI, 487; 1861, C. N. & G., VI, 39).

The present reference of this species to the genus *Nyctobia* is correct.

CLEORA DIVISARIA (1860, C. B. M., XXI, 487; DIVERSARIA D'Urban, 1861, C. N. & G., VI, 39).

The reference of this species to *Hydriomena autumnalis* would seem to be correct; we could not exactly match the type, which is worn, with a specimen of the latter species from Ottawa, Ont., which we had taken with us but believe the slight differences presented would fall under the category of individual variation; the type shows great resemblance to a figure before us of the type of *renunciata* Wlk. in the British Museum.

BOARMIA INORDINARIA Wlk. (1860, C. B. M., XXI, 488; 1861, C. N. & G., VI, 39).

If the ordinary identification of *granitata* Gn. is correct then the reference of *inordinaria* to this species will hold; the type is a rather well marked specimen of the common pine feeder of the northern woods, the many forms of which have received various names from Walker e. g. *disrupta*, *irregularata*, *retinotata* etc.; as far as our present knowledge goes it would best be placed as a synonym of *disrupta*.

BOARMIA CINERARIA Wlk. (1860, C. B. M., XXI, 488; CUNEARIA D'Urban, 1861, C. N. & G., VI, 39).

The specimen labelled *cunearia* is present and appears correctly referred to *Ectropis crepuscularia* D. & S.; it is a large, pale and strongly marked male.

BOARMIA CONVERGARIA Wlk. (1860, C. B. M., XXI, 488; CONVERZARIA, D'Urban, 1861, C. N. & G., VI, 39).

The type of this has apparently been destroyed as only a pin with the name label is present in the collection. We cannot however see how this species can possibly be placed as a synonym of *larvaria* Gn. as the description, which we append, calls for a totally different insect:—

'Male. Whitish with numerous and irregular brown speckles which are here and there confluent on the fore wings. Head and thorax brownish. Antennæ moderately pectinated except at the tips. Wings beneath with a black discal dot. Fore wings irregularly banded. Hind wings white with a few irregular brown marks. Length of body 4 lines, of the wings 11 lines.'

In our opinion there is much more chance of *convergaria* being one of the forms of *Eufidonia notataria* Wlk. than of any other species we know; the locality and size would agree and there is nothing in the

description which would definitely prevent this association, especially with such a form as *bicoloraria* Minot.

BOARMIA EJECTARIA Wlk. (1860, C. B. M., XXI, 489; PATULARIA D'Urban, 1861, C. N. & G., VI., 39).

We have already stated our reasons for believing that the specimen marked *patularia* in the collection is the type of *ejectaria* Wlk.; this specimen agrees well with the original description of *ejectaria* and proves to be a specimen of the ordinary pale brownish form of *canadaria* Gn.; this reference of *ejectaria* to *canadaria* would to us seem far more probable than that of Hulst's to *humaria* Gn., which latter species can hardly be said to fit in well with Walker's description.

BOARMIA DIVISARIA (1860, C. B. M., XXI, 489; 1861, C. N. & G. VI, 39).

The reference of this species as a synonym of *abraxaria* Wlk. is correct.

ACIDALIA JUNCTARIA Wlk. (1861, C. N. & Geol., VI, 39; 1862, C. B. M., XXVI, 1593).

The ♀ bearing this label is very poor but would appear to bear out Grote's reference of the species (C. Ent. IX, 27) to *vestaliata* Gn.; the original description of the species however leads us to believe that this specimen cannot be considered to be the true type as Walker distinctly states that the head is *black* in front which is certainly not the case with the labelled specimen. It would almost seem as if the labels of *junctaria*, *similaria* and *Numeria inceptaria* had become loose at some time or other and then been replaced on the wrong specimens for certainly the description of *junctaria* would fit much better to what has been called *similaria* than the original description of this latter species does; as it is in all cases this original description which defines the species rather than any so-called type specimen we believe we are justified in applying the name *junctaria* in the above sense.

MACARIA SUBAPICIARIA Wlk. (1861, C. N. & G., VI, 40; 1862, C. B. M. XXI, 1641).

Grote's reference of this species to *inordinaria* Wlk. (C. Ent. IX 27) is correct; the ground color is rather more evenly gray than in this latter species but the difference is only slight.

MELANIPPE PROPRIARIA Wlk. (1861, C. N. & G., VI, 40; 1861, C. B. M., XXV, 1293).

The reference to *albovittata* Gn. is correct.

COSEMIA? PALPARIA Wlk. (1861, C. N. & G., VI, 40; 1862, C. B. M., XXV., 1309).

Grote referred this species to the genus *Bomolocha*, but the name has been apparently dropped from our lists; the species proves to be the same as that described later by Grote as *Bomolocha scutellaris* and *palparia* Wlk. will take priority therefore over Grote's name.

CIDARIA LACTISPARGARIA Wlk. (1861, C. N. & G., VI, 41; 1862, C. B. M., XXV, 1387).

This species, listed by Dyar as *latispargaria*, is correctly placed as a synonym of *Homochlodes fritellaria* Gn.

PLATE I

- FIG. 1. *Conistra fringata* B. & McD. Type ♂.
FIG. 2. *Rynchagrotis orbipuncta* B. & McD. Type ♂.
FIG. 3. *Polia brenda* B. & McD. Type ♂.
FIG. 4. *Melipotis brunneifasciata* B. & McD. Type ♂.
FIG. 5. *Acosus connectus* B. & McD. Type ♂.
FIG. 6. *Crambodes lunata* B. & McD. Type ♀.
FIG. 7. *Nocloa torniplaga* B. & McD. Type ♀.
FIG. 8. *Oncocnemis sagittata* B. & McD. Type ♂.
FIG. 9. *Xanthorhoe alticolata* B. & McD. Type ♂.
FIG. 10. *Sicya olivata* B. & McD. Type ♂.
FIG. 11. *Euchlaena detractaria* B. & McD. Type ♂.
FIG. 12. *Ellopia phantoma* B. & McD. Type ♀.
FIG. 13. *Lycimna peccaria* B. & McD. Type ♂.
FIG. 14. *Lycimna peccaria* B. & McD. Type ♀.
FIG. 15. *Sabulodes triangulata* B. & McD. Type ♀.
FIG. 16. *Gonodontis macularia* B. & McD. Type ♂.
FIG. 17. *Polia delecta* B. & McD. Type ♂.
FIG. 18. *Eriopyga discreta* B. & McD. Type ♂.

PLATE I



PLATE II

- FIG. 1. *Cochisea sinuaria* B. & McD. Type ♂.
FIG. 2. *Cochisea rigidaria* B. & McD. Type ♂.
FIG. 3. *Cochisea rigidaria* B. & McD. Type ♀.
FIG. 4. *Pterotaea tremularia* B. & McD. Type ♂.
FIG. 5. *Drepanulatrix lutearia* B. & McD. Type ♂.
FIG. 6. *Drepanulatrix lutearia* B. & McD. Paratype ♀.
FIG. 7. *Hydriomena terminipunctata* B. & McD. Paratype ♀.
FIG. 8. *Perizoma tahoensis* B. & McD. Type ♂.
FIG. 9. *Pterotaea serrataria* B. & McD. Type ♀.
FIG. 10. *Chlorosea pulcherrima* B. & McD. Type ♂.
FIG. 11. *Drepanulatrix secundaria* B. & McD. Paratype ♂.
FIG. 12. *Drepanulatrix secundaria* B. & McD. Type ♀.
FIG. 13. *Nepytia regulata* B. & McD. Type ♂.
FIG. 14. *Cleora perpictaria* B. & McD. Type ♂.
FIG. 15. *Lithostege deserticola* B. & McD. Paratype ♂.
FIG. 16. *Itame perornata* B. & McD. Type ♂.
FIG. 17. *Morina curvata* B. & McD. Type ♂.
FIG. 18. *Parexcelsa inconspicuaria* B. & McD. Type ♂.

PLATE II

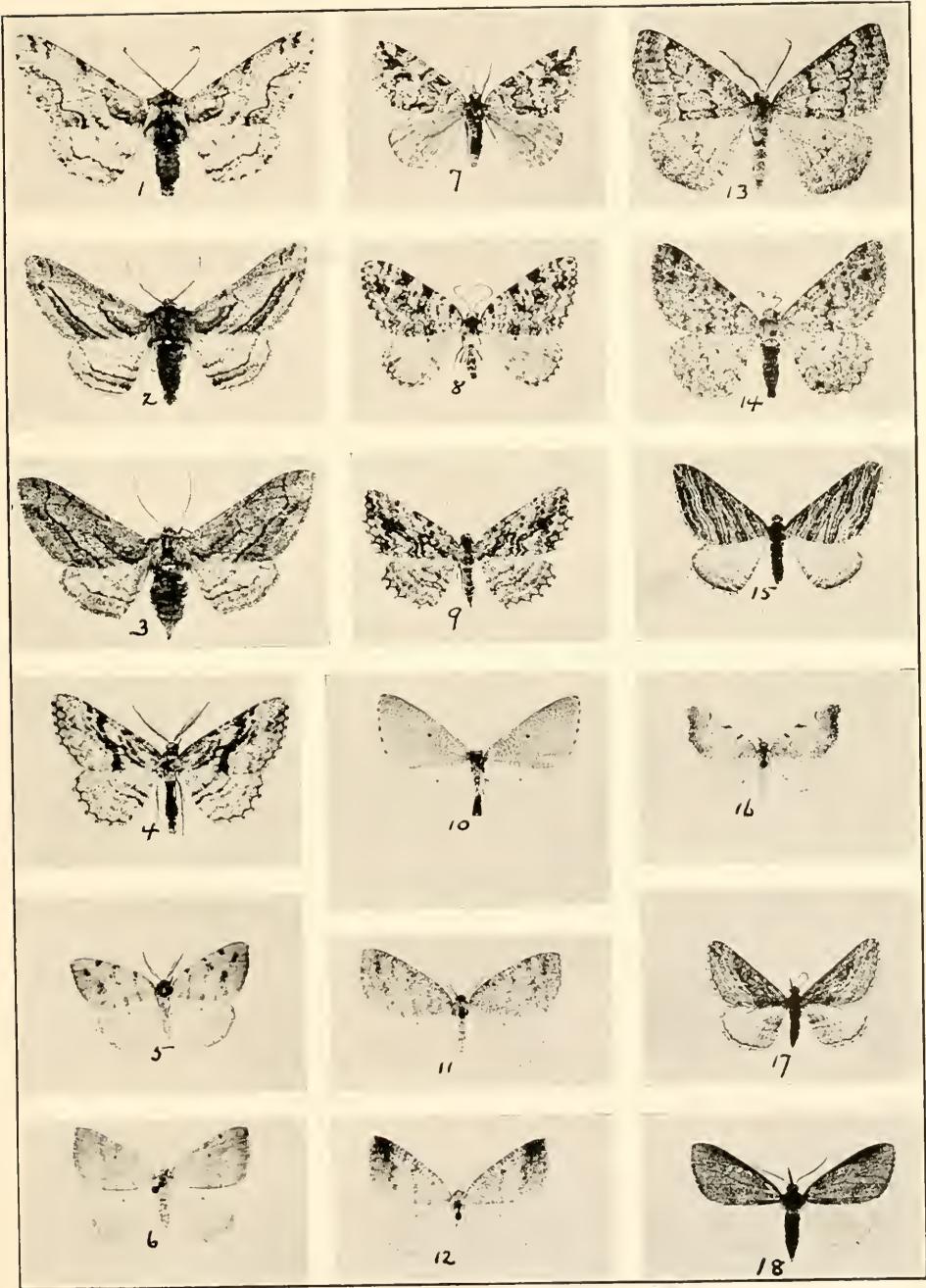
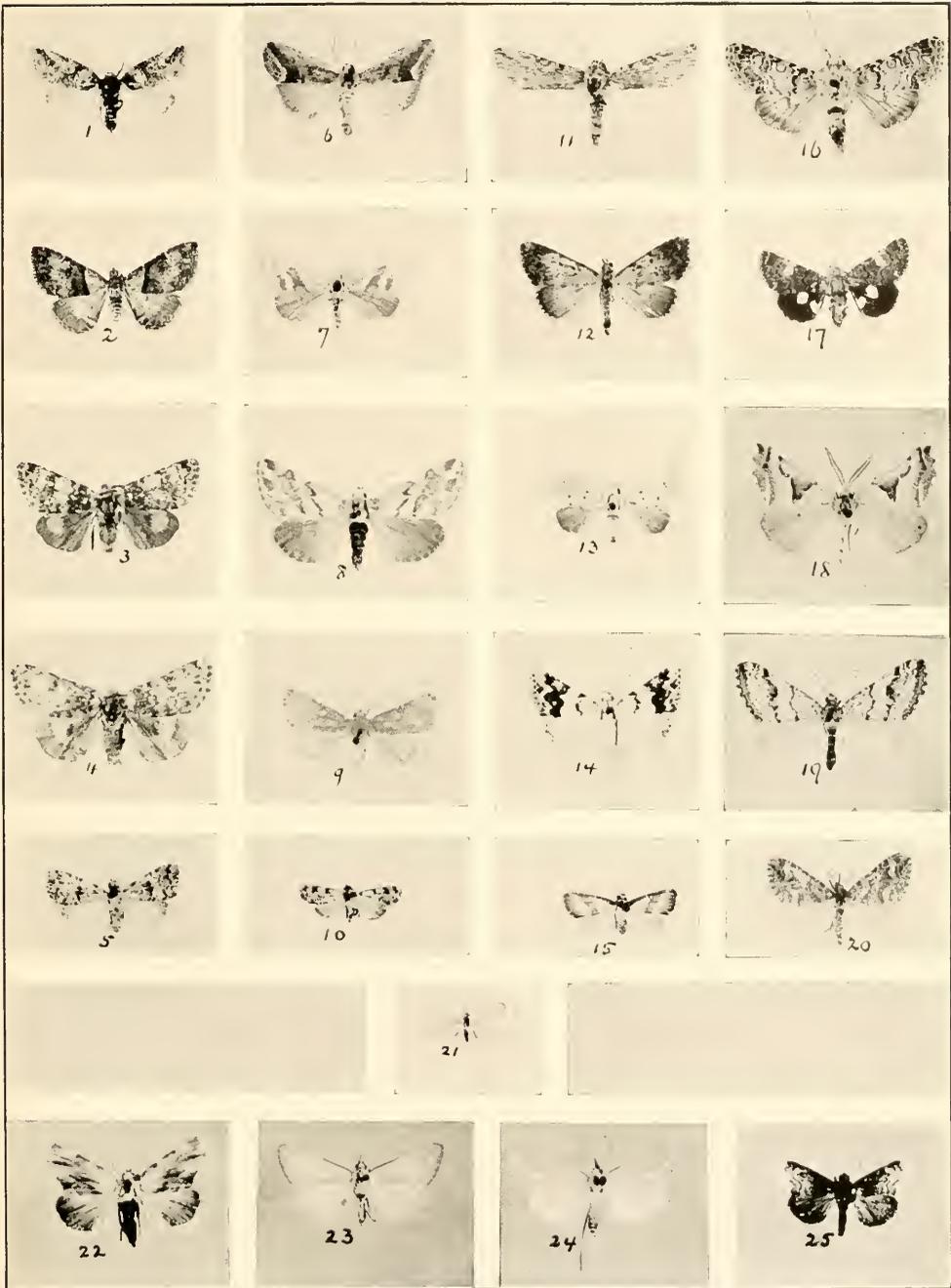


PLATE III

- FIG. 1. *Stilbia fotelloides* B. & McD. Type ♀.
FIG. 2. *Oxycilla basipallida* B. & McD. Type ♀.
FIG. 3. *Anarta sierrae* B. & McD. Type ♂.
FIG. 4. *Anarta sierrae laertidia* B. & McD. Type ♂.
FIG. 5. *Dyspyralis noloides* B. & McD. Type ♂.
FIG. 6. *Tarachidia albitermen* B. & McD. Type ♂.
FIG. 7. *Stiriodes virida* B. & McD. Type ♀.
FIG. 8. *Stiria olivalis* B. & McD. Type ♀.
FIG. 9. *Leucocnemis obscurella* B. & McD. Type ♀.
FIG. 10. *Phobolosa bilineata* B. & McD. Paratype ♀.
FIG. 11. *Catabena pronuba* B. & McD. Type ♂.
FIG. 12. *Epizeuxis punctalis* B. & McD. Type ♂.
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FIG. 14. *Euaontia clarki* B. & McD. Type ♀.
FIG. 15. *Phoenicophanta bicolor* B. & McD. Type ♀.
FIG. 16. *Schinia cupes deserticola* B. & McD. Type ♂.
FIG. 17. *Copanarta sexpunctata* B. & McD. Type ♂.
FIG. 18. *Plataea triangulata* B. & McD. Type ♂.
FIG. 19. *Lithostege marcata* B. & McD. Type ♂.
FIG. 20. *Perizoma epictata* B. & McD. Type ♂.
FIG. 21. *Apterona fragilis* B. & McD. Type ♂.
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FIG. 24. *Phytometra curvata* B. & McD. Type ♂.
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PLATE III



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CONTRIBUTIONS
TO THE
NATURAL HISTORY
OF THE
LEPIDOPTERA
OF
NORTH AMERICA

VOL. III
No. 2

NOTES ON NORTH AMERICAN DIURNAL
LEPIDOPTERA

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DECATUR, ILL.
THE REVIEW PRESS
DECEMBER 5, 1916

Published
Under the Patronage
of
MISS JESSIE D. GILLET
Elkhart, Ill.

INTRODUCTION

In a recent re-arrangement and revision of the Diurnals in the Barnes' Collection we have been struck not only by the difficulty in determining what is the nymotypical form of a given species but also by the numerous errors which occur in the literature regarding many of the species especially in such difficult groups as the Melitaeas and Lycaenids, one of the worst offenders in this respect being W. G. Wright, whose "Butterflies of the Pacific Coast" fairly bristles with errors.

We offer the following notes based on a study of the material in the collection and also of many of the still existant type specimens in various museum collections and trust that they may serve as a spur to collectors to endeavor to clear up the still doubtful points, many of which can only be solved by patient work in the type localities of the species.

NOTES ON NORTH AMERICAN DIURNAL
LEPIDOPTERA
PAPILIONIDAE

P. AMERICUS Koll. (Pl. IV, Fig. 1).

This species is figured by Edwards (Butt. N. Am. III, Pap. III) and listed as having been captured by the Wheeler Expedition in Arizona. Rothschild and Jordan in their revision of N. Am. Papilios (p. 542) cast doubt on this record and imagine some mistake in labelling has occurred. A couple of years ago we received a batch of *Papilio* pupae from Mr. C. Biederman of Palmerlee, Ariz. which hatched out in the early spring into normal *asterius* with the exception of one ♀ which proved to be almost an exact counterpart of Edwards' figure of *americus*, the color being merely slightly paler and the abdomen lacking the subdorsal rows of spots and having in their place a broad lateral stripe; we at first took it to be *oregonia* but the cell on the underside of the primaries showed no trace of yellow shading and precluded association with this species. We could detect no difference in the pupae and can only conclude that occasionally specimens of *asterius* occur in Arizona which can scarcely be separated from *americus*; this is all the more strange as the ♀ form in this region tends to a diminution of the yellow markings rather than to an increase of the same. We figure the specimen in question.

P. GLAUCUS Linn. (Pl. IV, Figs. 3, 4).

The race described as *canadensis* by Rothschild & Jordan (1906, Rev. Am. Pap. p. 586 (Aug.)) was apparently described a few months later by Skinner as *rutulus* var. *arcticus* (Ent. News. XVII, 378, Dec.). The typical form of *canadensis* is from Newfoundland and that of *arcticus* from Alaska; we have specimens before us from both localities and from many intermediate points and fail to find any marked points of distinction between them; we imagine the race is common to the whole of Northern America even extending down into the higher portions of New York state; *canadensis* resembles *rutulus* in having the submarginal yellow spots on the underside of the primaries more or less united into a band and this doubtless led Skinner to place *arcticus* as a race of *rutulus*; on the other hand the orange costal spot at the apex of the secondaries points very de-

cidedly towards *glaucus* and doubtless the structural characters of the ♂ genitalia show similar affinities as Rothschild & Jordan have referred the race to *glaucus* rather than to *rutulus*. We might note that we have a specimen of typical *rutulus* as well as several of *canadensis* from Chatanika, Alaska, proving that both species occur in the far north; our Alaskan *rutulus* can hardly be distinguished from Californian specimens although the marginal yellow lunules are considerably reduced which may or may not be a racial character; it differs markedly from *canadensis* in its larger size, almost entire lack of orange submarginal shading on underside and in having the discal black dash on the underside of the secondaries sprinkled with blue scales. We figure both sides of the ♂ *canadensis* from Alaska.

P. ALIASKA Scud. (Pl. IV, Fig. 2).

Verity has made *aliaska* synonymous with *kamtschadalis*, following Holland's figure (Butt. Book Pl. 41, Fig. 1) and redescribed the true *aliaska* as *machaon* var. *joannisi* from Numato, Alaska, one of the type localities of *aliaska*. There is no doubt from Scudder's original description that the form to which he applied the name *aliaska* is what Verity has redescribed; whether Holland's figured specimen really came from Alaska or not is an interesting point for collectors to clear up; if it be correct we would then have two distinct forms of *machaon* in our northern fauna differing in the width of the black submarginal band of secondaries; the few authentic specimens we personally have seen have all been of the form *aliaska*; we figure one of these from Rampart House as Verity's work is not very accessible to American entomologists.

PARNASSIIDAE

P. SMINTHEUS Dbldy. & Hew. (Pl. V, Figs. 1-6).

Considerable misconception exists concerning the typical form of this species; Edwards and other authors have treated the Colorado form, such as is figured in Butt. N. Am. I, Pl. II, as the nimo-typical race. We find however that the types of *smintheus* (3 ♂, 1 ♀ in the British Museum) were collected by Lord Derby in the Canadian Rocky Mountains, and Sir Geo. Hampson, who has been kind enough to examine them for us, writes that 'it is the ordinary Canadian Rockies form found at Laggan and Banff', i. e. the

small form which has usually gone under the name of *nanus* Neum. An examination of the ♂ and ♀ types of *nanus* in the Neumoegen Collection has shown us that while the ♀'s are normal and typical *smintheus* the ♂ type is of an aberrant form in which the *red* ocelli of the secondaries are wanting, the costal one being replaced by a black ocellus and the discal one being entirely missing; these types have recently been figured by Dr. Skinner (1916 Ent. News, p. 210-16); a tendency to such forms is found in all specimens from the higher altitudes of Colorado (over 10,000 ft.) and presumably other states and the race described by Stichel as *mendica* (Gen. Insect. Parn. 20, 1907) from Montana, B. C. and Colorado we do not believe can be separated from typical *nanus*. Another similar form is *minor* Verity from the neighborhood of Laggan. The ♀'s of all these small races, whether from the far north or from the high peaks of Colorado show a marked tendency to become suffused with black; the name *hermodur* was given by Hy. Edwards to such a ♀ from S. Colorado and the type which we have examined can scarcely be separated from the normal ♀ *smintheus* of the Laggan region; it is figured by Dr. Skinner in the above mentioned article.

Although in our opinion all the above mentioned names are practically synonymous in that specimens agreeing with each of the types may be picked out of any good series from either Colorado or Laggan, still, if it be considered necessary to keep the high altitude form of Colorado separate from the form of the Canadian Rockies, the name *hermodur* Hy. Edw. might be correctly used for this Colorado race; *nanus* Neum. may be applied *in sens. strict.* to the aberrational form of typical *smintheus*, whilst *mendica* Stichel and *minor* Verity must fall to either *hermodur* or *nanus*. We figure two pairs of *hermodur* from Silverton, Colo. (10,000 ft.) which will serve to illustrate the great variability found in the species even in one locality; the dark ♀ is Verity's *nigerrima*.

For the form common in the lower altitudes of Colorado and adjoining states which is figured by Edwards as typical *smintheus* and which is distinguished by its larger size and pale white ♀'s the name *sayi* Edw. may apparently be used. The type of *sayi* is lost but the description points to this form in the measurements given ($2\frac{1}{2}$ in.), and Edwards himself states (Butt. N. Am. Parn. II) that he considers it to be merely an extreme form with the red costal

spots of primaries lacking. We figure a ♂ and ♀ of this race from Provo, Utah.

In the central regions of Brit. Columbia at lower altitudes and extending down through Eastern Washington, Idaho, and Montana we find a very large form with the ♀'s more heavily marked with black than in *sayi* Edw. and tending towards *hermodur* in everything except size. This has been named *magnus* by Wright in his Butterflies of the West Coast and renamed *pseudocorybas* by Verity (Rhop. Pal. 107, 1909); the specimens figured by Wright as *hermodur* (1. c. Pl. II, Fig. 6) are typical *pseudocorybas* but we cannot separate this from *magnus* (which is figured on the same plate); in the series from various localities before us we have specimens which would fit either figure equally well.

In the Southern Sierras the form *behri* Edw. with yellow or orange spots instead of red seems fairly constant; *niger* Wright may be an extreme aberration of this race, although superficially it agrees with *nanus* or *mendica*.

In the light of the above remarks we offer the following grouping:—

<i>smintheus</i> Dbl. & Hew.	Can. Rockies.
<i>ab. nanus</i> Neum.	
<i>mendica</i> Stichel	
<i>minor</i> Verity	
<i>form alt. hermodur</i> Hy. Edw.	Rocky Mts. of Colorado (high altitudes).
<i>ab. nigerrima</i> Verity.	
<i>a magnus</i> Wright.	Cent. B. C., Idaho, Mont.
<i>pseudocorybas</i> Verity.	
<i>b sayi</i> Edw.	Colorado (low altitudes) Utah.
<i>c behri</i> Edw.	High Sierras, Calif.
<i>ab. niger</i> Wright.	
<i>d. apricatus</i> Stichel.	Alaska.

P. CLODIUS Men.

Stichel's arrangement of this species seems in general satisfactory; the type form is the large Californian race taken at medium altitudes; this grades into the high altitude form *baldur* Hy. Edw. of the Sierra Nevadas which is considerably smaller in size and tends to a reduction of the red spots of secondaries (form *menetriesi* Hy. Edw.) culminating in *ab. lusca* Stichel in which the posterior spot is

a mere black dot. The large race from Vancouver Is. and Washington State with prominent subterminal lunules on the secondaries in the ♂ sex has been named *claudianus* Stichel and this form seems to intergrade in Washington with a race from Montana called by Stichel *gallatinus* and based on Elrods's figures (Butt. Mont. p. 16, Fig. 15/16); we have no Montana material but doubt whether the character mentioned by Stichel *viz.* that in the ♂ the postdiscal costal streak is joined by a band to the black spot of the inner margin, will hold good for all Montana males. *Altaurus* Dyar is based on specimens from Alturus Lake, Idaho with yellow instead of red spots; whether this is mere individual aberration or a race such as *behri* of *smintheus* remains to be determined. *Immaculata* Skin. (Ent. News XXII, 108) is probably an aberration with red spots of secondaries lacking and *lorquini* Oberthur a still more extreme aberration with great reduction of the black patches on primaries as well as on secondaries.

PIERIDAE

PIERIS NAPI. L. (Pl. VI, Figs. 1-10; Pl. VII, Figs. 1, 2).

Verity has lately (Rhop. Pal. Vol. I) dealt at considerable length with the various races and forms of this species; we offer the following remarks as to an arrangement of our North American races as it is probable that Verity's work is inaccessible to the majority of American entomologists.

It is doubtful if *napi* as typified by the central European spring form and as figured in Seitz Fauna Pal. Vol. I, Pl. 21, b is found in this country; specimens from the higher altitudes of Colorado (Silverton 10,000 ft.), where it is single brooded, are however very close, although in the ♀'s the black dots of primaries are practically obsolete. For this race, which seems to warrant a name, we would propose using PSEUDONAPI and figure the type ♂ and ♀ taken at Silverton, Colo. (Figs. 1, 2) in the last week of July; the ♀'s of our series are variable in the amount of black markings, tending in this respect toward *cruciferarum* Bdv.; we figure one of the palest ones (Fig. 3).

In the extreme north three distinct forms are separable; in the inland Arctic region (Barren Plains) we have the form *arctica* Verity with strongly blackish marked veins on the underside in both sexes and on the upper side in the ♀; there is however no suffusion of black and the markings are clear cut; we figure a ♂ and ♀ from Chatanika, Alaska (Figs. 6, 7). Along the Alaskan coast we meet with the form

pseudobryoniae Verity which is what has been considered until recently to be *bryoniae* Ochs., a race now restricted to the Alps of Europe; Wright's figures (Butt. W. Coast Pl. VI, Fig. 43b and 42bb) are typical of the variation of the ♀. On the numerous islands of the Behring Sea and Alaskan coast the form *hulda* Edw. is found in which the secondaries on the under side are almost totally suffused with greenish in the ♂ sex, leaving only dashes of yellowish ground color; the ♀'s are usually less suffused and on the upper side are intermediate between *arctica* and *pseudobryoniae*; we figure a ♂ underside and ♀ upperside (Figs. 8, 9).

Three forms have been described from the north eastern coast, viz. *frigida* Scud., *borealis* Grt. and *acadica* Edw. According to specimens in the Scudder Collection at Cambridge from Labrador labelled *frigida* this form is the spring generation of the race of which *acadica* Edw. is the partial second generation; we have specimens of *frigida* from Newfoundland captured in July and figure a ♂ and ♀ (Pl. VII, Figs. 1, 2); the specimen figured by W. H. Edwards (Pap. I, Pl. II, Fig. 4) as ♀ *bryoniae* from Newfoundland is really the ♀ of *frigida* of which Scudder only had ♂'s. *Borealis* Grt. is said by the author to differ from *frigida* by the less elongate hind wings; we do not know the form nor have any information regarding the location of the types; if Edwards' figure is correct (l. c. Fig. 9) it must be very close to *frigida*.

The spring race *oleracea* Harr. and its summer form *cruciferarum* Bdv. (*oleracea-aestiva* Edw.) are too well known to need discussing; we might remark that we have forms from high altitudes in California which cannot be well separated from *oleracea*, lacking as they do the heavy black spot of *venosa*, the usual spring form of the west coast.

Marginalis Scud. has for some reason or other been sunk as a synonym of *rapae* although the original description states that the underside is as in *venosa*, a feature which cannot possibly apply to *rapae*; it was described from two specimens, the ♂ from the Gulf of Georgia and the ♀ from Crescent City, Calif.; the ♂ will hold the name and the type locality will be either in the vicinity of Victoria or Vancouver, B. C., or possibly on the north coast of Washington State; we do not know the exact localities in which Agassiz collected his material labelled 'Gulf of Georgia'; *pallida* Scud. from the same locality appears to be a form of *marginalis* with only slight traces of

dark markings on the veins of underside; it is probable that these two forms represent the spring and summer generations, but our dated material from the type localities is too scanty to settle this point. Wright's figures (l. c. Pl. VI, Figs. 45b and 45c) possibly represent *marginalis* as they were captured in May; they are certainly not *venosa* as he lists them; his figures 45 and 46b represent the two sexes of *pallida*.

In Utah we meet with a second generation (July, August) which is extremely pale, being practically immaculate in both sexes on both sides; the underside is tinged with pale yellow on secondaries and apex of primaries and the ♀ on the upperside of primaries shows faint traces of upper black spot; it is a further development of *castoria* apparently differing from both this form and *pallida* in the reduction of the black spots in the ♀; we propose the name *PALLIDISSIMA* for the race and figure the type ♂ and ♀ from Provo, Utah (Figs. 4, 5, 10).

P. NELSONI Edw.

This appears to us, after an examination of the type, to be nothing but a northern form of *occidentalis* Reak.; the maculation of the underside of the secondaries is practically identical with that of the spring form *calyce* Edw. and the gray-brown color emphasized by Edwards in his description is largely due to the worn nature of the single specimen from which the description was made. The only marked point of distinction for *nelsoni* is the narrowness of the discal black mark on the primaries and a small series from Alaska before us shows considerable variation in this respect, some specimens having the mark as broad as in *calyce* and others agreeing with the figure of *nelsoni* (Butt. N. Am. II, Pieris I.).

EUCHLOE CREUSA Dbldy.

This species and its various forms are extremely difficult to elucidate and it is impossible for us to satisfactorily establish at the present moment whether we are dealing with several forms or races of one species or several closely allied species. The misidentification of the true *creusa* is responsible for a good deal of the confusion in nomenclature; the types of this species are in the British Museum and were taken by Lord Derby in the Canadian Rocky Mts.; they are figured by Verity (Rhop. Pal. Vol. I, Pl. 68, Figs. 8-10) and a recent examination by ourselves confirms Verity's opinion that these are the

true types; as Butler has already pointed out (Can. Ent. XXXI, 19, 1899) this is exactly the same form as that described and figured by Beutenmuller in his revision of the genus *Euchloe* (Bull. Am. Mus. N. Hist. X, 243, 1898) as *elsa*; it is apparently a northern race distinguished by its heavy green markings on underside of secondaries leaving only traces of the white ground color visible. *Creusa*, being the oldest name, must be used for the species collectively.

Since Beutenmuller's revision of the group *Verity* has attempted to deal with our North American forms in his Rhop. Pal. Vol. I, pp. 181 and 338/9 but, apart from overlooking Beutenmuller's paper, he has, we fear, only added to the confusion by describing several forms as new which have already been named; he attempts to divide the group into spring and summer generations following the example of the European *belia* and *ausonia*, but from the fragmentary accounts we have been able to glean in the literature the general consensus of opinion among collectors is that the American forms are single brooded (*vide* Edwards, Can. Ent. XXIV, 109; Butt. N. Am. Vol. II, *Anthocharis ausonides*, text).

Hyantis Edw. (*creusa* Beut. et Auct.) appears to be the Californian race of *creusa*; it was originally described from Mendocino Co., but apparently occurs through a good proportion of the Sierras; Dr. McDunnough took it sparingly in the Shasta region in June and Dr. Barnes in the Lake Tahoe region in June and July; *Verity* has re-described it as *pseudoausonides*, regarding it as the spring form of *ausonides*; this opinion is evidently refuted by the dates above mentioned and further by the fact that no second generation nor any specimens of *ausonides* at all were taken in the above localities; *Verity's* *orientalides*, said by the author himself to be very close to *pseudoausonides*, we cannot separate by *Verity's* figures alone and presume it to be a slight varietal form only; however an examination of the type material will be necessary to correctly place it. *Hyantis* may be separated from *creusa* by the much greater proportion of white on the underside of the secondaries; in the ♀ the general rule seems to be for the discal spot of the primaries to be much larger and more quadrate than in the ♂; Beutenmuller's figure (l. c. Pl. XIV, Fig. 2) gives a very accurate idea of this form of which we have a specimen compared with the type; Holland's figure of *creusa* (Butt. Book Pl. 32, Fig. 23) presumably refers to this form, his figure of the underside however (Pl. 34, Fig. 2) is probably referable to *lotta* Beut.

Wright's figures (Pl. VII, Figs. 54, 54b, 55, 55b, 55c) we think may all be referred here. The larva of *hyantis* has been briefly described by Mead from the Yosemite Valley (Psyche, Vol. II, p. 183) and seems to show points of distinction from the description of the larva of *ausonides* found in Edward's Butt. N. Am., Vol. II.; careful breeding and observation by collectors on the spot is however very essential to establish the relationship of the forms and the number of yearly broods.

Lotta Beut. is in our opinion a race of this same species from Utah, Arizona and the Rocky Mt. region in which the discal spot of the primaries has become greatly enlarged and quadrate; Verity has redescribed it under the name of *belioides*; in Utah it occurs from the end of April to the beginning of June and we have a few specimens from Glenwood Spgs., Colo., taken in May; our Arizona material is unfortunately undated; these Arizona specimens are intermediate between *hyantis* and Utah specimens of *lotta* in the size of the discal spot and the amount of green on underside of secondaries; they are figured by Wright (l. c. Pl. VII, Figs. 54a, 56b).

E. AUSONIDES Bdv.

Although it is extremely difficult to point out any definite means of separation between this species and *creusa* we incline to think it a distinct species and not a summer form of the preceding as surmised by Verity. The larger size, greenish white ground color in the ♂ in contrast to the pure white of *creusa*, the tendency in the ♀'s to show ochreous tinted secondaries and the narrower and yellower character of the markings on the underside of the secondaries with less of the pearly hue on the white portions all point to a specific distinctness; we have further the fact that the larvae as described by Mead and Edwards do not appear identical; our dated specimens from the lower regions of California (Alameda Co.) show no date later than May; specimens from Mineral King, Tulare Co., at an altitude of about 10,000 feet, were captured in the first week of July, but it is extremely improbable that they were preceded by a spring generation. The species is well figured by Holland (l. c. Pl. XXXII, Figs. 24/25) and Wright's figure (Pl. VII, Fig. 57c) evidently represents this species also; the type from Coll. Oberthur is figured by Verity (l. c. Pl. 37, Fig. 20). The species extends northward into Alaska and eastward into Colorado where it has received the name *coloradensis* Hy. Edw. of

which *montana* Verity from Hall Valley, Colo., is apparently a synonym; this Colorado race can in our opinion scarcely be separated from the Californian form.

ANTHOCHARIS STELLA Edw.

This form is characterized in the original description as having the ♂ pale lemon yellow but the series in the Edwards Collection at Pittsburgh is very varied, both white and yellow forms being labelled *stella* in Edwards' handwriting. A ♂ from Yosemite however agrees with the description and is further labelled 'type' in red ink so we would restrict the type to this specimen as the locality is mentioned in the original description. We doubt if the form is constant.

CALLIDRYAS EUBULE L.

As stated in the *Biologia* (p. 141) Linné evidently described this species from a ♀ from Carolina and his *sennae* from a ♂ from Jamaica. Butler, in his revision of the genus (*Lep. Exot.* p. 58) regards them as two species and his figures are quite accurate; he separates them mainly on the heaviness of the purplish markings on the underside in *sennae* as compared with *eubule* and the deeper tone of the ground color. In a pair from Jamaica before us this is certainly very evident, especially in the ♀ sex.

Typical *eubule* is the form with the ♀ the same yellow color as the ♂ and with the marginal dark spots confined generally to the ends of the veins and not continuous; this form seems to be the only one in Florida, judging by a long series before us from Palm Beach, Chockoloskee, and Glenwood and extends northward through the Eastern and Middle States. In Texas we meet with a ♀ form which has much heavier marginal markings and is either yellow in color with the secondaries considerably tinted with orange or else a very pale whitish; in Arizona this latter seems to be the usual form. These ♀'s approach very close to our Jamaica ♀ of *sennae*; although the ground color of the underside is rather paler, the maculation is just as heavy; the pale ♀ may be *yamana* Reak, but we do not know the type nor where it may be found. In the ♂ sex the form can scarcely be separated from typical *eubule*; in general the maculation is heavier and some Arizona specimens agree exactly with our Jamaican ♂; there is also a tendency for the discal spot on underside of primaries to become decidedly larger and more figure-of-eight-shaped; other

Arizona and Texan ♂'s from the same localities cannot be separated from ♂'s from Florida or the Eastern States; it is quite possible that the variation is seasonal as we have noticed in the little dated material we possess, that the most heavily marked forms have all been captured in September whilst those from the same region (Huachuca Mts.) taken in July are all more lightly marked. Careful breeding will be necessary to settle the number of generations of this species in the south and the possible variation between the various generations as well as in each generation, nothing definite having to our knowledge ever been published on this subject. We think in view of the fact that Florida ♀'s vary so constantly and markedly from the western ♀'s that the name *sennae*, which, *in sens strict.* is only applicable to the Jamaican race, might for the present with a fair degree of accuracy be applied to the race of *eubule* from Southern Texas and Arizona. It would be interesting to learn from what further localities the *sennae* form of ♀ is known.

KRICOGNIA LYSIDE Godt.

After careful examination of a very long series from Brownsville, Texas, we have come to the conclusion that this is an extremely variable species and that the various names included as species under this genus are in reality merely ♂ or ♀ forms.

Typical *lyside* is the form with deep yellow base to primaries and no maculation with the exception of a small black streak at base of inner margin on primaries in the ♂; *terissa* Luc. is the form with a black streak from costal margin of secondaries $\frac{1}{4}$ across the wing; although Lucas mentions the ♀ sex we have only seen ♂'s and imagine it is a male form entirely; Aaron calls this the summer form (Pap. IV, 174) but all our dates of capture are March which would rather point to its being a spring form; it is figured by Holland (Pl. 34, Fig. 20) as *lyside*. *Fantasia* Butl. is a ♀ form with smoky apex of primaries, the ground color varying from white to yellow; the base of the wing is generally not noticeably yellow; this form intergrades with another ♀ form, *unicolor* G. & S., which is entirely immaculate yellow, and which has been redescribed and figured (Pl. 26d) as *xanthophila* by Röber in Seitz Macrolepidoptera.

Lanice Lint. was a mixture of two forms; the ♂ as stated by Aaron (l. c. p. 174) is evidently *lyside* Godt. and the ♀ belongs to

fantasia Butl.; the following arrangement seems to be more correct than our present one:

lyside *Godt.*

♂ *lanice* Lint.

form ♂ (? *gen. vern.*) *terissa* Luc.

form ♀ *unicolor* G. & S.

xanthophila Rob.

form ♀ *fantasia* Butl.

♀ *lanice* Lint.

EURYMUS EURYTHEME Bdv. (Pl. VII, Figs. 3-5).

Verity has figured the type ♂ and ♀ of this species from the Oberthur Collection in Rhop. Pal. Vol. I, Pl. 49, Figs. 42, 43; the ♂ is distinctly what has heretofore been known as *ariadne* Edw. (Wright Pl. X, Fig. 77) although Verity states it is *keewaydin* Edw. This ♂ does not entirely fit in with Boisduval's short description (Ann. Soc. Fr. 1882, p. 386) which is largely comparative with the Russian *chrysotheme* and it is possible that his specimens were not all exactly alike; as however he immediately follows the description of *eurytheme* with that of *amphidusa* from Northern California, which he compares with the European *edusa* (an orange species) and the types of which Verity also figures (l. c. Figs. 44/45) and as *amphidusa* is clearly the *eurytheme* of Edwards and later authors, it would seem reasonable to suppose that there was really some noticeable difference between *eurytheme* and *amphidusa* or Boisduval would scarcely have described them so close together and that therefore the specimens figured by Verity are correct representations of what Boisduval intended to describe under these two names.

Having determined that *eurytheme* Bdv. is the *ariadne* of Edwards and that *amphidusa* Bdv. must be used for the *eurytheme* of various authors there remains the form *keewaydin* Edw. to be correctly placed. This form was described in Butt. N. Am., Vol. I, Colias, Pl. IV, text, Figs. 1-4; the main description appears to have been drawn up from specimens from California and Texas with varieties from Illinois, but at the close Edwards states that the species is found 'in the valley of the Mississippi from Nebraska and Illinois to Texas and westward to the Pacific' so that he evidently had a large and possibly mixed series before him. The original description states 'upper side *sulphur yellow* the disk of the wings more or less tinted with orange' which certainly reads like something very close to *eurytheme* (*ariadne*); the figure however (Fig. 1), represents a small form much closer to

amphidusa but somewhat paler in color with costa rather broadly yellow. In his volume II of Butt. N. Am. Edwards again deals with *keewaydin* figuring it on *Colias* Pl. IV, Fig. 7, but this figure can scarcely be distinguished from his figure of *eurytheme* on the same plate except by its smaller size and certainly does not agree well with his former figure. In the text to this plate he states that '*keewaydin* was originally separated as a species from examples received principally from Texas and Mississippi' and treats it as an early summer form of *ariadne* with *eurytheme* as a late fall generation; from notes he publishes received from Hy. Edwards it would seem that San Francisco collectors were accustomed to refer to the true *amphidusa* as *curytheme*. We have a series of typical *amphidusa* from Siskiyou Co., N. California, captured in June and July, and some specimens cannot be separated from the type of *keewaydin* as figured by Edwards in Volume I; in Southern California the same form occurs along with *curytheme* (*ariadne*) and intergrades. In Arizona and Texas the late summer generation (*eurytheme* Edw.) as a rule is considerably larger and the orange quite vivid, but specimens occur which are paler and tend towards *keewaydin* and in a long series of δ 's from Decatur, Ill., taken in the early part of August, we have color forms ranging from deep orange to quite pale yellow with only a slight orange suffusion. It appears to us therefore that *keewaydin* Edw. represents no definite race or generation but is rather a form, somewhat intermediate between *curytheme* and *amphidusa*, found flying with typical specimens of these two forms wherever the species occurs and usually most common in the early summer generation; on the one hand it may intergrade with *eurytheme*, many specimens showing only traces of orange on the secondaries, and on the other hand it may approach *amphidusa* in being almost entirely suffused with orange; the name seems scarcely worthy of retention.

With regard to the yellow forms it seems fairly well established (*vide* Edwards, Can. Ent., XIX, 170) that in Colorado at least the yellow form is polymorphic; the early spring brood and apparently occasional late fall specimens are distinguished by the narrower border on the primaries, smaller size and heavier sprinkled underside; these have been called *autumnalis* Ckll., the name being rather unfortunately chosen as the form is only occasionally met with in the fall, single specimens of the brood that would normally hibernate as pupae emerging under favorable conditions earlier than usual. The second brood of early summer is *hageni* Edw. of larger size and broader

black borders, the ♀'s especially heavily black; Edwards' original description leaves no doubt that it was this form that he had before him when he proposed the name *hageni*; the type locality may be restricted to Pueblo, Colo., as he had received numerous specimens from Mr. Nash of this town.

Until quite recently we had been of the opinion that *eriphyle* Edw. described from Lake Lahache, B. C., could be held separate from *hageni* and was the same form as that described later by Cockle as *kootenai*; an examination and comparison of the type material in the Edwards Collection has however led us to revise our opinions; there seems to be no doubt that *eriphyle* and *hageni* both are summer forms and personally we utterly failed to separate them. *Kootenai* Cockle is evidently the spring form of British Columbia, distinguished by its pale lemon yellow color and heavily sprinkled underside; it approaches very close to *autumnalis*, but the yellow has a greener tinge and the ♀'s have no complete submarginal band of yellow spots owing to the obsolescence of the inner black shading; this form extends northward into Alaska where it is probably single brooded. Apparently Wright's figures under the name *emilia* (l. c. Pl. XI, Fig. 92) refer to this form; we figure a ♂ and ♀ from Okanagan Falls, B. C., (May) and the underside of a ♂ from Atkin, B. C., on the Alaskan border (Figs. 3-5). Much breeding and study will be necessary before all these forms and their interrelationship are satisfactorily placed but for the present we offer the following synonymy:

- eurytheme *Bdv.*
- ariadne* Edw.
- gen. aest.* *amphidusa* *Bdv.*
- keewaydin* Edw.
- californiana* Men.
- ab.* ♀ *fumosa* *Stkr.*
- form* *eriphyle* *Edw.*
- hageni* Edw.
- gen. vern.* *autumnalis* *Ckll.*
- ab.* *intermedia* *Ckll.*
- ab.* ♀ *pallida* *Ckll.*
- gen. vern.* *kootenai* *Cockle.*

E. BARBARA Hy. Edw. (Pl. VII, Fig. 9).

This species, which was described from 2 ♀'s from Gilroy, Calif., and Santa Barbara, Calif., has generally been accepted as the ♀ of *harfordi* Hy. Edw. A recent examination of the types in the New

York Museum has convinced us that this is incorrect; *harfordi* in both sexes shows very little black at the base of the wings on the upper side, is a deep yellow color and apparently closely related to *interior* Scud; the species is common in S. Calif. and is figured by Wright on Pl. X, Figs. 84 and 85 under both *harfordi* and *barbara*, the latter species having been misidentified by him. The true *barbara*, just as stated in the author's description, has a strong sprinkling of black at the base of the wings extending on the secondaries along the inner margin to almost the anal angle; the types are in wretched condition but in our opinion bear a close relationship to *occidentalis* and *chrysomelas* of which variable species *barbara* will probably prove to be a southern race; we figure a ♂ from Santa Rosa, Calif., which approaches the closest to our idea of *barbara* of any specimens we have seen; the great similarity to Wright's figure of *occidentalis* (l. c. Pl. XI, Fig. 86) should at once be evident.

E. PELIDNE Bdv. (Pl. VII, Figs. 6-8).

After a careful comparison of a long series from Labrador with Boisduval's figures both in Lep. de l'Am. Sept. Pl. 21 and Icones Pl. 8 we must agree with Scudder (Proc. Bost. Soc. N. H. 1862, p. 105/6) that the figures were certainly not drawn up from Labrador specimens and as Iceland and Greenland are mentioned among the type localities, were probably taken from specimens from one of these localities. Possibly an examination of the material in the Boisduval collection now in the possession of M. Oberthur would throw some light on the matter; for the present we think it advisable to apply the name *labradorensis* Scud. to the Labrador race the ♂'s of which appear to be constantly smaller than Boisduval's figures.

In Labrador specimens (Fig. 6) the discal dot of the forewing is either entirely absent or only very faintly outlined by a few scattered dark scales; in specimens from Laggan and from Saskatchewan (Fig. 7) this mark is present as a distinct but fine dash and the secondaries are very heavily black-sprinkled; this form is *minisni* Bean which has usually been regarded as an Mss. name but which appears to be sufficiently, if rather poorly, characterized by Bean himself in a paper on *C. hecla* and *meadi* in Psyche, Vol. VII, p. 228; Verity refers to the same form as *menisme* in his Rhop. Pal. Vol. I, p. 218.

Skinneri Barnes from Yellowstone Park (Fig. 8) is close to *minisni* but is considerably larger and yellower with a still more distinct discal dash, in fact apart from this dash this form looks much more like Boisduval's figure of *pelidne* than any Labrador specimens

we have seen; it also has a certain percentage of the ♀'s yellow. We figure ♂'s of all three forms for comparison.

Gigantea Stkr. described from Hudson Bay and at present placed as a form of *pelidne* seems to be the same species as that named *pelidneides* by Staudinger from material from the same locality. We have recently examined the type series of *gigantea* in the Strecker Collection and believe that it represents in reality the yellow form of *christina* rather than a race of either *pelidne* or *palaeno*; the size and maculation of the underside point very decidedly to this and the ♀'s can scarcely be separated from the paler forms of *christina* ♀. Mr. Wolley Dod mentions this yellow form in his List of Alberta Lepidoptera (C. Ent. XXXIII, 169, 1901) and besides a series from Calgary we have before us specimens of both sexes from Chatanika, Alaska which agree excellently with Strecker's specimens. It is very possible that the Ft. Simpson specimens mentioned by Scudder in his description of *occidentalis* really belonged to this yellow form of *christina* and for this reason we would restrict the name *occidentalis* to the Vancouver Is. form which, while close, can at once be distinguished by the much greater suffusion of black at the base of both wings on the upper side, approaching in this respect *chrysomelas* Hy. Edw. We figure both sexes of *gigantea* from Chatanika, Alaska. (Pl. V, Fig. 7-9.)

EUREMA GUNDLACHIA Poey.

Holland's figure of this species (Butt. Book, Pl. 37, Fig. 1) represents the ♀, not the ♂ as stated. The ♂ is very similar to *proterpia* but generally lacks all trace of the black on the veins and has the tailed secondaries. It seems to occur in the same localities as *proterpia* and specimens of this latter species without the black veining (as sometimes occurs) are very apt to be confused with *gundlachia*; the ♀ *proterpia* has usually considerable black marginal bordering on the secondaries but is otherwise similar to *gundlachia* apart from the wing shape.

E. BLAKEI Mayn.

We cannot see why this should be made in Dyar's list a form of *gnathene* Bdv. (not *gnatheme*) a species described from Yucatan which is white with a complete black border to both wings, broadening out on the apical portion of primaries to twice the width of the lower portion. Maynard's description states 'greenish white above,

narrow border to apex of fore wings and a spot on upper angle of hind pair dusky', which certainly leads one to expect an entirely different species to *gnathene*; it was described from material from the Bahama Islands and a single ♀ from Sandford, Fla. The description agrees admirably with Boisduval's translation of the description of *messalina* Fabr. (Sp. Gen. I, p. 679) and as both Kirby and Seitz list this species from Jamaica we imagine that *blakci* will become a synonym of *messalina* Fabr.; not possessing the species however we leave the decision to those who have access to material from the Bahama Isles.

DANAIDAE

DANAUS PLEXIPPUS L.

In view of Linné's original description in the tenth Edition of his *Systema Natura* we do not see how it is possible to apply this name to the American species in spite of the locality 'North America' given by the author.

The description reads:

'P. D. alis integerrimis fulvis, venis nigris dilatatis, margine nigro punctis albis.'

This is all very excellent but unfortunately for those who contend that the name applies to the N. American form Linné adds: 'Alae primores *fascia alba* ut in sequente, cui similis', the following species being *chryssipus*. This does *not* apply at all to the N. American form but *does* to the Asiatic and would bear out Aurivillius' statement that the only specimens in the Linnaean Collection were of the latter form.

Apparently the locality given and the references to Catesby and Sloan are the only reasons for holding the name to the North American species; opposed to this we have the direct contradiction of the diagnosis and it would seem to us that this is far too weighty a point to be overridden; it is known that Linné frequently has given erroneous references and localities in connection with other species so we see no reason for not supposing that such was the case in this instance. The Fabrician name *archippus* would be the correct one to use for the N. American species in our opinion: Fruhstorfer in Seitz *Macrolepidoptera* also applies *plexippus* to the Asiatic Species and *archippus* to the American one.

SATYRIDAE

COENONYMPHA CALIFORNIA West. & Hew.

Edwards treats *california*, or, as it is usually misspelled, *californica*, as the summer generation of the spring form *galactinus* Bdv.; unfortunately for Edwards' reasoning a recent examination of the types of *california* in the British Museum by Dr. McDunnough has shown that these represent the form with dark underside, i. e. the spring form. What *galactinus* Bdv. really is we are unable to say not having seen the type which should be with M. Oberthur; Boisduval evidently only knew *california* from Hewitson's figure which is poor and described his *galactinus* as being of a white color a little yellower than that of *california* but the description cannot be definitely interpreted to refer to either the spring or the summer form; on the face of it Dr. Skinner in his revision of the genus (Tr. Am. Ent. Soc. XXVI, 301) would seem to be correct in claiming the name *galactinus* for the summer form but the type locality given by Boisduval (Mountains of North California) would possibly preclude a second generation. Dr. Skinner places *ceres* Butl. as a synonym of *galactinus*; according to Sir Geo. Hampson (*in litt.*) the type of *ceres* agrees exactly with that of *california*.

Eryngii Hy. Edw., described from Soda Spgs., Siskiyou Co., Calif., represents a race without ocelli on the underside; Dr. McDunnough, who spent the season of 1915 collecting in this locality, found the species rare during the first half of June but all specimens captured showed either no ocelli or the mere traces of them so we imagine the form is fairly constant and the name should be retained; it is true that the number of spots on the underside of *Coenonympha* species is very variable and unspotted specimens doubtless occur in other localities, making the presence or absence of such spots a poor means of differentiation, but where the unspotted form has become more or less constant and has developed therefore into a race such a change should not in our opinion be disregarded.

Pulla Hy. Edw. which is described as being of a dark fawn color above and a dull brown beneath is another form about which little is known.

Wright's figures (Butt. W. Coast, Pl. XXV) of this entire group are quite unreliable and should be completely disregarded by collectors trying to identify their material.

C. AMPELOS Edw.

This species was originally described from a ♂ and ♀ from Oregon, but the specimen labelled 'type' in the W. H. Edwards Collection is from Vancouver Is. and the name has been pretty generally applied to specimens from this locality. There is nothing in the description that would contradict such an association, but we would point out that this Vancouver Is. specimen must not be held to be the type, the whereabouts of which is unknown to us. We should not be surprised if *ampelos* proved to be a form of *ochracea* Edw. in which the ocelli of the underside had become regularly obsolete; occasional specimens, particularly in series before us from Plumas Co., Calif., and Ft. Klamath, Oregon, show traces of ocelli on both fore and hind wings.

C. INORNATA Edw.

We cannot agree with authors who sink this species as a synonym of *laidion* Bork. on the strength of a paper by Dr. Bucknell in Ent. Rec. Vol. IX, 1897. *Laidion* which is figured by Borkhausen and described from specimens taken at Gladenbach, in the vicinity of Frankfurt on the Main, in Germany, is recognized by all prominent continental lepidopterists as being merely an aberration of *typhon* with the normal number of six well defined and white ringed ocelli on secondaries reduced to one or two. Dr. Bucknell, who applies the name *laidion* to a Scotch form with reduced ocelli, which is in any case not the true *laidion* but the race *scotica* Staud., has himself been forced to admit that our N. American form shows points of distinction as compared with this Scotch race. Dr. Bucknell has been followed by most English entomologists, including Tutt and Rowland-Brown, in calling the Scotch form *laidion* and in a recent paper on the species (Oberthur, Etud. de Lep. Comp. Fasc. VII, 1913, p. 85) the latter author quotes Tutt, and agrees with him in censoring Staudinger for creating the name *scotica* for the Scotch form which is excellently figured on Pl. 195 by M. Oberthur. Both these gentlemen have overlooked the vast disparity in the type localities for *laidion* and *scotica* which amply confirms Staudinger's judgment; it is very questionable whether an aberrational name may be properly used for a racial form from another locality. In our opinion *inornata*, while doubtless related to *typhon* and its forms, is distinct enough in any case to warrant the retention of the name. It is typical in the region about Lake Winnipeg and is well figured by Skinner in his revision (Pl. VII, Figs.

10, 11); occasional specimens lack the apical ocellus on underside of primaries but normally this is well developed.

C. OCHRACEA Edw.

The species was described from specimens from Lake Winnipeg, California, and Kansas; the common species from the Lake Winnipeg region is *inornata* according to information received from Mr. Wallis of Winnipeg but there is a ♀ type of *ochracea* in the Edwards Coll. labelled Winnipeg and we also have a ♀ from Cartwright, Man., which agrees with the description; we do not know the species from California. The main home of the species is the Rocky Mt. region of Colorado, Utah and adjoining states; it may be generally recognized by the white blotches at base of secondaries on underside and by the usually well developed ocelli, especially noticeable in Utah specimens (*vide* Skinner, l. c. Fig. 14); *inornata* may prove to be a dark form with reduced ocelli on secondaries; we have specimens of *ochracea* from Colo. which lack the basal blotches and merely differ from *inornata* in the paler color. *Brenda* Edw. described from some of Reakirt's material, ostensibly from Los Angeles, Calif., is a typical *ochracea* as a study of the types in the Strecker Collection has shown us; the locality was very possibly erroneous as we know of no authentic records for *ochracea* from this region; Wright's figures of *brenda* should be referred to one of the summer forms of *california*.

CERCYONIS OETUS Bdv. (Pl. VIII, Figs. 5-7).

We cannot, after a careful study of both types, separate *charon* Edw. from this species; it has a wide range over all the western high mountain regions and extends far into the north, *phocus* Edw., described from specimens taken at Lake Lahache, B. C., proving to be a form of this species with dark, almost immaculate underside. Edwards (Can. Ent. XII, 55) has referred *oetus* to *silvestris* on the strength of a so-called 'type' received from Boisduval; the real type however remained in the Boisduval collection and has recently been figured by M. Oberthur (Et. de Lep. Comp. IX (2) Pl. 264, Figs. 2203/4). The specimen referred to by Edwards we have recently seen in Pittsburgh and it proves a misidentification on Edwards' part; this specimen agrees with Oberthur's figure of *oetus* type but the remainder of Edwards' series labelled *oetus* are pure and simple *silvestris*. The distinctness of the median band on the underside of the hind wings is very variable but usually sufficient is present for one to

recognize the characteristic jagged nature of the bounding dark lines, especially on the basal side; another feature which will generally serve to separate it from *silvestris* and its forms is the fact that the δ sex has usually only a single ocellus on upper side of primaries, although this is not an absolutely infallible rule as occasional specimens show traces of a second. We figure δ and φ and underside of both *silvestris* from Marin Co., Calif., (Figs. 1-3), and *oetus* from Nevada Co., Calif., (Figs. 5-7), as well as the underside of *paulus* from Tulare Co., Calif., (Fig. 4).

The synonymy of the two species should stand:

- 1 *silvestris* Edwards.
okiuis Oberthur.
form paulus Edwards.
- 2 *oetus* Boisduval.
charon Edwards.
form phocus Edwards.

C. SILVESTRIS Edw. (Pl. VIII, Figs. 1-4).

The species was described in 1861 from specimens sent by Dr. Behr of San Francisco. In the original description the author (Proc. Acad. N. Sci. Phil. 1861, p. 162) mentions both δ and φ , but this supposed φ was evidently a δ , as the dark sex patch is mentioned, and may presumably be referred to *oetus* Bdv., the type φ of which is figured by Oberthur (Etud. de Lep. Comp. IX (2) Figs. 2203/4); a characteristic feature of the δ sex of *oetus* is the single ocellus on the upper side of primaries, a point referred to by Edwards as distinguishing his supposed φ from δ *silvestris*. Only very occasionally do we find δ *oetus* with two ocelli on the upper side of the primaries.

The δ *silvestris*, which will hold the name, is described as possessing two ocelli on upper side of primaries; in the Edwards Collection are two δ 's, one marked '*silvestris* δ type' (in black ink) from California, the other '*charon* var. *silvestris*, type' (in red ink) also from California; this latter is probably the one figured in Butt. N. Am. III, Satyrus III and mentioned in the text as being only a variety of *charon* Edw.=*oetus* Bdv.; the first specimen may be the original δ type of *silvestris* and is a different species, being apparently a form bearing the same relation to *paulus* that *boopis* does to *ariane* Bdv. i. e. a form with reduced ocelli on the underside of secondaries; this form is common around San Francisco Bay and we have a long series from Marin Co.

The form *paulus* Edw. described from Nevada (Morrison) (probably east slope of Sierras) is found all through the Sierras from Mt. Whitney southward and also in Oregon and Washington States; the specimens marked type in the Edwards Collection are a ♂ and ♀ labelled W. T. (Morrison), evidently those spoken of in Can. Ent. XII, 54, and cannot be considered more than typical in any case. The figure given by Oberthur (l. c. Fig. 2184) under the name of *okius* is a typical ♂ of *silvestris* Edw.

NYMPHALIDAE

ARGYNNIS NITOCRIS Edw.

This species was described from a single ♂ from the White Mts., Arizona. We have a long series of both sexes from this locality taken by Mr. R. D. Lusk; we also have a series of the so-called var. *nigrocaerulea* Ckll. from the type locality, Beulah, Sapello Canon, N. M., and can see absolutely no difference between the two series. In our opinion *nigrocaerulea* should fall as a direct synonym of *nitocris* which is figured by Holland, Pl. XIII, Fig. 4. *Caerulescens* Holl. is easily distinguished by the dark basal area on both wings on the upper side.

A. NAUSICAA Edw. (Pl. IX, Fig. 1).

The species is listed by Dyar as a synonym of *aphrodite* but can at once be distinguished, apart from wing shape, by the fact that the veins of the primaries in the ♂ beyond the cell are distinctly and broadly enlarged by black scaling whereas in *aphrodite* the scaling is scarcely perceptibly present. The exact relationship of *nausicaa* is doubtful to us; it shows certain affinities to *halcyone* and perhaps might be better placed in this group. We figure a typical ♂ and comparison with our figure of the following species will readily show our point in connection with the veins of the forewing.

A. COLUMBIA Hy. Edw. (Pl. IX, Fig. 2).

A careful examination of the type ♂ in the Hy. Edwards' Collection forces us to the conclusion that *columbia* is nothing but a small northern form of *aphrodite* Fabr. Its relationship is clearly shown by the fact that the veins on the primaries in the ♂ sex are *not at all enlarged* by black scales, at once separating it from *atlantis* with which it has often been associated. This form seems to extend right across

the northern part of the Continent and specimens before us from Nepigon, Ont., one of which we figure, are quite indistinguishable from specimens from Northern B. C. *Atlantis* appears to occur in practically the same region but the ♂'s at least should be separated without much difficulty on account of the thickened veins on primaries.

A. *CHITONE* Edw. (Pl. IX, Figs. 3, 4).

This species was described from specimens taken by Neumoegen in S. Utah and N. Arizona. In the Edwards' Collection 1 ♂ 1 ♀ from S. Utah bear type labels, but unfortunately 1 ♂ 3 ♀ from Weber Mts., Utah, which are not the same species, also bear type labels although they cannot possibly be considered types. This has doubtless led to the confusion that exists concerning the identity of *chitone*. The true species is scarcely to be separated from what is generally known as *cornelia* Edw. and the two will probably prove to be forms of one species; it shows considerable variation in the amount of silvering of the spots on the underside, series before us from S. Utah and Provo, Utah ranging from well-silvered specimens to those with scarcely a trace of silver; we figure both sides of typical ♂ specimens.

A. *ELECTA* Edw.

This species was described from 12 ♂ 4 ♀, some taken in N. Colo. by Mead in 1871, others in S. Colo. by Morrison in 1877; it is evident by the description that the specimens showed considerable variation and a recent examination of the series in the Edwards' Collection has confirmed our suspicion that several forms at least (if not species) were included under the one name. A ♂ in the series labelled 'Colo., Mead, 71' is marked type and as the label clearly shows that it must have been one of the type lot we consider it would be advisable to restrict the name to this specimen. The ♂ type of *cornelia* Edw. from Ouray, Colo., proves to be absolutely identical with this type of *electa* and *cornelia* will therefore sink as a synonym. The species is well illustrated by Holland (Butt. Book, Pl. XI, Fig. 8); we do not know what his figure of so-called *elccta* (l. c. Pl. X, Fig. 8) represents; it looks more like a *lais* or *aphrodite* form.

A. *BREMNERI* Edw.

Wright's figures of this species (l. c. Pl. XIII, Fig. 119) are incorrect; they represent *rhodope* Edw., the underside of the ♂ being much more typical than the figure given under the name *rhodope*

(Fig. 124a). The true *bremneri* is probably figured by Wright as *carpenteri* (Pl. XIII, fig. 112) from Vanc. Is., B. C. The form called var. *sordida* by Wright we cannot place without seeing the type; Wright makes it a variety of his *bremneri* and if this be correct *sordida* must then be referred to *rhodope*.

A. HIPPOLYTA Edw.

The species was described from several specimens taken in Oregon by Mr. Dodge; no further locality is given but very possibly the specimens were taken in the vicinity of Portland. In the Edwards' Collection is a single ♂ type from Oregon; it appears to us to be a rather dwarfed form of *bremneri*; apart from the smaller size the types cannot be separated, agreeing in the maculation and color of the underside excellently.

A. ZERENE Bdv.

A great deal has already been written about this species and *monticola* Behr. Behr claimed that under the name *zerene* Boisduval had two species mixed and diagnosed them as No. 8 and No. 9 (Proc. Cal. Acad. Sci. II, 175, 1862); later (l. c. III, 84) he gave the name *monticola* to No. 8. Edwards claimed (Proc. Ent. Soc. Phil. III, 436, 1864) that Behr's action therefore restricted the name *zerene* Bdv. to Behr's species No. 9 and figures *monticola* in Butt. N. Am. I, Arg. VIII. In 1869 (Lep. de la Calif., 60) Boisduval described *hydaspe* which Edwards, when figuring *zerene* Bdv. (l. c. Pl. XIII, Arg. 1870), claims becomes a synonym of *zerene* owing to Behr's previous limitation; Edwards even states in the text that Boisduval "intimates that his former diagnosis of *zerene* includes two species and he applies that name to *monticola* Behr, giving to the other that of *hydaspe*. Nevertheless according to the recognized rule in such cases, the names *monticola* and *zerene* will remain as Dr. Behr determined them." We have gone into the matter rather carefully with the following results:

(1) After reading Boisduval's original description we can see no reason for Behr's supposition that Dr. Boisduval's series of *zerene* was mixed; it is true that the short diagnosis would include both species equally well, but that is no proof of a mixed series; in the Oberthur Collection the types of *zerene* which we have seen certainly do not indicate this and the specimens figured in Etudes de Lep. Comp. IX, (2) Fig. 2168/9 as certainly belong to the same species as does the type ♂ of *monticola* Behr in the Strecker Collection. Boisduval's

specimens were evidently captured by Lorquin in the mountains of Central California (which he calls Juba Mts.) at low elevation.

(2) Behr did not restrict the name *serene* to his species No. 9; he simply gave the name *monticola* to his species No. 8 and it was Edwards himself who applied the name *serene* Bdv. to 'No. 9' (Proc. Ent. Soc. Phil. III, 436) without any definite knowledge apparently either of it or that such a form was *actually included* among Boisduval's types of *serene*.

(3) Edwards' statement in the text to his figure of *serene*, as quoted above, is erroneous. Boisduval did *not* describe *hydaspe* from specimens separated from his former series of *serene* but from specimens collected by Lorquin in the south of California (sud de la Californie) at a date much later than 1852 so that his series of *serene* could not possibly have contained the types of *hydaspe*; it is true that Boisduval makes the statement that *hydaspe* may be a local variety of *serene* but this can hardly be construed to mean that he had confused them when describing *serene*. It seems to us therefore that *monticola* Behr must be made a synonym of *serene* Bdv. the types being almost identical.

Wright's figures (l. c. Pl. XIV, 120 and 122) both refer to *serene* Bdv.

A. HYDASPE Bdv.

As stated under *serene* Bdv. this name will replace *serene* Edw. *nec* Boisduval, typical specimens being found in the Yosemite Valley and other valleys leading up to Mt. Whitney and the High Sierras; further north in Plumas County and Siskiyou Co. it is a very common species and is considerably darker on the underside than the southern form. In our opinion it is a distinct species from *serene* (*monticola*); Dr. McDunnough had the opportunity of observing it during a season's collecting in the Upper Sacramento Valley where it flies together with *serene* Bdv; on the wing it can soon be distinguished by its smaller size and darker brown color; it is also much more heavily black on the upper side, due largely to the great extent of the black sexual scales along the veins of primaries in the ♂; on the underside of secondaries the color tends more towards brick-red than purplish and there is often a good deal of blackish suffusion; the spots are usually larger and yellower and the marginal lunules are more triangular surmounted by a *narrower* but *much*

deeper shade of brown than is found in *serene*; in fact in *hydaspe* this shade at times is almost black; a comparison of Holland's figures of *monticola* Behr (*serene* Bdv.) Pl. XIII, Fig. 7 and *serene* (*hydaspe* Bdv.) Pl. XIV, Fig. 9 will show these points of distinction.

A. PURPURASCENS Hy. Edw.

An examination of the types in the American Museum proves that the ♂ and ♀ types do not belong to the same species. The single ♂ type from Soda Spgs., Siskiyou Co., Calif. (the other ♂'s from Sierra Nevadas cannot be considered as types) is undoubtedly the dark form of *hydaspe* mentioned above; the ♀ types from the same locality on the other hand are ♀'s of *serene* (*monticola*); they are partially silvered on the underside, a point mentioned in the original description, whereas the true ♀'s of *purpurascens* are, as far as we can judge, quite unsilvered. From personal experience we know that in the type locality the ♀'s of *serene* fly at the same time that the ♂'s of *hydaspe* are on the wing, the ♀ *hydaspe* emerging two or three weeks later; the error is therefore easily explained. The ♂ type will hold the name and *purpurascens* will become a racial form of *hydaspe* Bdv., connecting up the paler nimo-typical southern form with the extremely heavily marked form of Vancouver Is., B. C., *rhodope* Edw.

A. IRENE Bdv.

This seems to be a good species and not a variety of *rupestris* Behr. Dr. McDunnough has taken it at Castle Lake, Siskiyou Co., Calif. in the early part of August at an altitude of about 6000 ft. but it was not seen in the upper Sacramento Valley where *rupestris* was taken flying in June; it is apparently confined to higher altitudes; we have series from Truckee and Plumas Co., Calif. Wright's figure under *inornata* of the underside of a ♀ from Mt. Shasta (1. c. Pl. XVI, 137c) is this species but figures 137 and 137b of a ♂ and ♀ from Tenino, Wash. refer to some other species, probably the true *hippolyta* Edw. The upper side rather resembles *egleis* in the paucity of black markings but the maculation of the underside would apparently throw it into the *rhodope* group.

A. HALCYONE Edw.

The types of this species, 2 ♂'s from Colo., are stated in the original description to be in the collection of B. D. Walsh which was destroyed in the Chicago fire; the specimens labelled type in the Ed-

wards' Collection were collected at a later date in Colorado, probably by Morrison, and cannot be considered to be more than typical; Edwards' figure (Butt. I, Pl. 28) should be sufficient to identify the species; typical specimens with the basal area of hind wings to second row of silver spots deep reddish-brown are taken in the canons near Denver, Colo. Specimens from Glenwood Spgs., Colo. and Southern Utah are apparently intermediate between *halcyone* Edw. and *snyderi* Skin. some of the ♀'s being scarcely distinguishable from *snyderi* ♀'s, but in general they show more ruddy suffusion on the underside of secondaries, typical *snyderi* being very pale greenish. We imagine that the form of the Sierra Mts., Calif. which is generally known as *coronis* (Wright, l. c. Pl. XIV, Fig. 126) and which seems to extend along the whole range into Oregon is a race of *snyderi* rather smaller than typical specimens but otherwise with no marked points of distinction; it is apparently rather common around Quincy in Plumas Co., Calif.; our series, mostly ♀'s, shows a great deal of variation in the color of the underside of secondaries, from pale greenish to rather bright pinkish-brown.

A. ATOSSA Edw.

We imagine this will prove to be a rare unsilvered form of *semiramis* Edw. with the upper side paler and with reduced markings. This latter species also flies at Tehachapi, the type locality of *atossa*, and we have specimens of both forms before us; the general wing shape of both sexes and type of markings certainly points to a very close relationship between the two. *Adiaste* Behr. (*adiante* Bdv.) is a third species that by its reduced maculation on upper side shows close affinity to *semiramis* Edw. and may prove to be a northern unsilvered race; the fact that a form like *atossa* occasionally occurs with typical *semiramis* would certainly support this view as the under sides of the secondaries in *atossa* and *adiaste* are strikingly similar.

A. RUPESTRIS Behr.

The types in the Strecker Coll. agree with the specimens figured by Edwards (l. c. II, Pl. VII, Argynnis). Dr. McDunnough has taken the species sparingly in the Upper Sacramento Valley in several localities north of Dunsmuir but the species is very local and hard to capture; it occurs earlier in the season than any of the other Argynnids taken in the same neighborhood, flying during the early part of June; occasional partially silvered specimens are found. Wright's figure

(l. c. Pl. XV, 132) is again quite erroneous and should be referred to *hydaspæ* Bdv. as far as we can judge.

A. JUBA Bdv.

Judging by the figure of the type published by M. Oberthur (l. c. Pl. 262, Fig. 2197) and our knowledge of the type of *laura* Edw. the latter name will fall as a synonym of *juba*. The two other specimens figured as *juba* (Figs. 2198 and 2199) are however *not* this species but probably the Sierran race of *snyderi*, to which we have already referred. *Juba* occurs in both silvered and unsilvered forms as is shown by a small series before us from Placer Co., Calif. and this latter form bears such very close resemblance to *rupestris* that we should not be surprised to find that these two so-called species were in reality forms of one species. *Inornata* Edw. belongs also without doubt in this group and is possibly the unsilvered form of *juba* or merely a large *rupestris*, but our material is too limited to have exactly matched the type with any specimen in our series and we must leave the matter undecided for the present. Edwards' figure (l. c. II, Arg. Pl. V) gives the impression of a rather larger species than *juba* but this size of course may be merely individual. All three forms were described from the same general locality, viz. the Central Sierras.

A. MACARIA Edw.

This is placed in Dr. Dyar's list as a synonym of *curynome* Edw. which is entirely erroneous. The species was described from material taken at Havilah, Kern Co., Calif. and the types are in the Edwards' Collection; it is very closely related to *laura* Edw. and the two are possibly northern and southern races of one species; we have long series from both Havilah and Tehachapi before us; Wright's figures of *laura* and *macaria* (Pl. XV, 133, 135) both refer to this species, his *laurina* being the unsilvered form which is quite commonly met with. The true *laura*, which is a synonym of *juba* Bdv., as we have already pointed out, is a darker, more heavily marked insect than *macaria*, although the marking of the underside would point to the two being but forms of one species bearing to each other a relationship similar to that existing in our opinion between *montivaga* and *oweni*.

A. CORONIS Behr.

In the Strecker Collection is a pair purporting to be the types of this species and regarding these and other Argynnis types of Behr's describing Strecker states (Lep. Rhop. Het. Suppl. 3, p. 22) that they

were sent him by Dr. Behr in 1876 along with other typical examples with a letter saying "I send you *all* my Argynnides in their doubtful state and with your better collections and literature you can do far more than I with my limited opportunities." Under these circumstances we see no adequate reason why we should not accept these specimens as the types. Edwards first applied the name *coronis* Behr with Dr. Behr's consent to the species "No. 2" of Behr's paper in Proc. Cal. Acad. Sci. II, 173, 1862 (Proc. Ent. Soc. Phil., III, 435); the species figured by Edwards as *coronis* in Butt. N. Am. III, Argynnis IV was determined as such by him from a colored figure received from Dr. Behr and this conception of the species has evidently been generally accepted since then.

We have examined the Strecker types extremely carefully, comparing them with a long series of specimens and find them absolutely identical with the species known as *liliana* Hy. Edw. and *not* the same as the species figured by Edwards. One of the main points of distinction is the *narrowness* of the yellow subterminal area on the underside of the secondaries which in Edwards' figures is relatively broad. Dr. Behr in the original description states that the species is very similar to *callippe* Bdv. but actually differs in the lack of the pale markings of the upper side and this statement is perfectly true as *callippe* possesses the same narrow band on the underside as does *coronis* (*liliana*), which is additional proof that the Strecker "types" are more to be relied upon than Edwards' determination from a figure. The species is said by Dr. Behr to frequent several localities near the bay of San Francisco and this would therefore be in the same general region as the type locality of *liliana* Hy. Edw. which is St. Helena, Napa Co.

A. MORMONIA Bdv. (Pl. X, Fig. 2).

The species has been confused with *montivaga* Behr but is apparently a good one and may be distinguished from this latter species by the fact that in the ♂ sex the branches of the median and cubital veins of primaries are never enlarged by black scales as is the case with *montivaga*; our figures of both species bring out this point of distinction. *Arge* Stkr. is a synonym and *erinna* Edw. a very closely allied form hardly worthy of a name; however, as it was described from Spokane, Wash., the name *erinna* may be used to indicate the northern race, *mormonia* applying to the Californian and South Oregon form. Oberthur's figure of *mormonia* (Etudes de Lep. Comp. IX (2)

Figs. 2192/3) should make the species readily recognizable; it is apparently much rarer than *montivaga* although occurring in the same localities. Whether *eurynome* Edw. and its various forms should be considered as races of *mormonia* is doubtful; personally we consider that the presence of considerable green scaling on the underside would point to a distinct species showing much greater affinities to the Alaskan *bischoffi* Edw. than to *mormonia*; we have already offered a few notes on this species (Cont. N. Hist. N. Am. Lep. II, (3) p. 93) and have nothing further to add.

A. MONTIVAGA Behr. (Pl. X, Fig. 1).

There seems no doubt but that *egleis* Bdv. is a synonym of this species; we have examined the Boisduval types in the collection of M. Oberthur and also the specimens in the Strecker Collection purporting to be the types of *montivaga* and these both are similar; the species shows all grades of variation on the underside from well-silvered forms to those without any trace of silver; we have a series taken in Truckee, Calif. as early as May 9th and another series taken in the same locality in the first week of July but cannot find any good point of distinction between the two. The species is common all through the higher altitudes of the Sierras. From a study of some of the original type material of *oweni* Edw. from Mt. Shasta, Calif. it would seem to us that this species is more closely related to *montivaga* than to *hippolyta*, as it is now placed, and would represent a darker heavier marked form from the northern end of the same chain of mountains which has gradually developed, due to its isolation, into practically a good species. It is very possible that Behr's series of *montivaga* contained specimens of *mormonia* Bdv.; at any rate *montivaga* Behr as identified by Edwards, who makes *arge* Stkr. a synonym (Can. Ent. XI, 52), was evidently *mormonia* Bdv.; in the same paper Edwards claims to have received the "types" of *egleis* and *mormonia* from Boisduval and declares them ♂ and ♀ of one species; we doubt if these were more than specimens from the type lot, or "cotypes", as Boisduval would hardly part with his actual types; in any case it would seem to be both just to Dr. Boisduval and more scientifically correct to consider the specimens still contained in the Boisduval Collection and marked "type" as being the originals of the description; these have been figured by M. Oberthur (Études de Lep. Comp. IX, (2) Figs. 2192/5) although it would seem that the figures of *egleis* are ♀'s and not ♂'s as stated; there is however no difficulty in determining, by

careful comparison, to which of the two closely allied species each name should be referred. Wright's figures of *arge*, *erinna* and *egleis* (Butt. W. Coast, Pl. XVII, 143-145) all refer to *montivaga* Behr, as well as the figure on Pl. XVI, 142; his identifications of nearly all of the Argynnids are hopelessly mixed. *Nenoquis* Reak. listed by Dyar as a synonym has been referred by Strecker, who had the type, to the European *dia* Linn. (Lep. Rhop. Hist. Suppl. III, p. 22); we think this action is correct.

GENUS MELITAEA, Fabr.

Being forced to reject the genus *Lemonias* Hbn. which is a 'Tentamen' genus and regarded at the present time by the majority of workers as unpublished (*c. f.* Prout, Hampson, etc.) we have recently made a short study of the various generic names involved with a view to deciding which can be used for our American forms.

The genera available are as follows:

MELITAEA Fabr. 1807.

According to Scudder the type was fixed by Westwood in 1840 as *cinxia* L., Dalman's fixation in 1820 of *athalia* as type being erroneous as *athalia* was not included in the original list of species.

SCHOENIS Hbn. 1818.

Sole species and therefore type, *cinxia* L.

The genus falls before *Melitaea* Fabr.

CINCLIDIA Hbn. 1818.

Scudder specifies *phoebe* Wien. Verz. as type in 1875 (Buff. Bull. II, 266); later in the same year (Proc. Am. Acad. Arts & Sci.), following an erroneous reference by Kirby of *phoebe* Wien. Verz. to *athalia*, he gives *athalia* as type but his text readily shows that *phoebe* Wien. Verz. is meant under *athalia*. In any case his previous action of designating *phoebe* as type will hold.

MELICTA Bill. 1820.

Scudder, without specifying any type, says this will fall before *Lemonias*, *Schoenis* and *Cinclidia*. In order to avoid any later misunderstandings we specify the type as *cinxia* L. and *Melicta* will therefore fall before *Melitaea*.

LIMNAECIA SCUD. 1872.

Type specified as *harrisi* Scud.

THESSALIA Scud. 1875.

Type specified as *leanira* Feld.

EUPHYDRYAS Scud. 1872.

Type specified as *phaeton* Drury.

Having established the available genera and their types we have examined the ♂ genitalia of *cinxia* and *phoebe*, the two European species which are the respective types of *Melitaea* Fabr. and *Cinclidia* Hbn. We have further examined the genitalia of practically all our N. American species and find that they may be divided very readily by this means into two main groups, the first group including *phaeton*, *chalcona* and all the species listed in Dyar's catalog under *Lemonias* as far as *helvia* (No. 160) and the second the remainder of the species included in the same list under *Lemonias*, *Cinclidia*, *Thessalia*, and *Schoenis*. The first group, which also would include the European *matura* and probably allied species which we have not examined, shows a marked similarity in pattern among the included species and would admirably bear out the conclusions of Mr. Bethune Baker in a recent paper (Ent. Record, XXVI, 177, 1914) where he claims that a correlation of structure and pattern is to be met with all through the Rhopalocera; for this group the only generic name available seems to be *Euphydryas* Scud. which we propose using. We have not extended our studies further than the genitalia but imagine other structural characters may be found bearing out the above results. With regard to the second group the genitalia show considerable affinity to those of the European *phoebe* and *cinxia*; it is true that the genitalia of *cinxia* vary from those of *phoebe* in the form of the claspers but the general type is the same and we would not for the present separate these two species into different genera. Our N. American species, especially in the *palla* group, show distinctly a further development of the *phoebe* type; we think therefore that the genus *Melitaea* Fabr. may safely be used for all the members of this group; neither *harrisi* nor *leanira*, the types respectively of the genera *Limnaecia* Scud. and *Thessalia* Scud., shows any peculiarity which would warrant a separation either from each other or from the remainder of the species, and these two genera would therefore fall. If it be considered necessary, after further study, to separate our N. American forms from the European the genus *Limnaecia* Scud. would still be available. In the *minuta* group we find the greatest points of difference from the general type

of genitalia common to the genus; it appears to have a tendency towards the *Euphydryas* group, almost forming a connecting link between this genus and *Melitaea*.

EUPHYDRYAS CHALCEDONA Dblly.

The type specimen as figured by Doubleday and Hewitson (Gen. Diur. Lep. Pl. XXIII, Fig. 1) is a ♀ and shows no trace of red on the upper side; it is erroneously listed as from Haiti but Boisduval corrects this later to California and it is probable that the specimen in question came from the neighborhood of San Francisco as the majority of specimens from this region before us either show no red or only weak red marginal spots with occasional red spots in and beyond the cell. Both Dr. Behr and Hy. Edwards agree in stating that the larva is found feeding principally on *Scrophularia* and is black with a dorsal row of orange tubercles and the base of the second lateral row of tubercles also orange, no mention being made of pale dorsal or lateral stripes (Proc. Cal. Acad. Sci. 1863, Vol. III, p. 90; 1873, Vol. V, p. 167); their material was probably collected around San Francisco. W. H. Edwards, however, describes the larva of *chalcedona* (Pap. IV, 63) from material received from W. G. Wright of San Bernardino as feeding on *Pentstemon* and having a double whitish dorsal stripe and a macular whitish stripe in line with the second lateral spines the remainder of the description agreeing with that of the above mentioned authors; this larval description exactly agrees with that given by Rivers (Proc. Cal. Acad. Sci. 2nd. Ser. I, p. 103, 1888) of the larva of the species he separates from *chalcedona* as *macglashani* from material taken at Truckee feeding also on a *Pentstemon* sp.; the imago differs from typical *chalcedona* according to Rivers in having the marginal red spots always well developed and very frequently with prominent red spots in and beyond the cell of primaries between the ordinary yellow patches; a large series before us from the type locality confirms this diagnosis; specimens from Havilah and S. Bernardino Co. in our collection agree with Truckee specimens in showing generally this greater development of red color although specimens occur from both localities that can scarcely be separated from San Francisco Bay material. In the summer of 1915 Dr. McDunnough found exactly similar larvae to those described by Rivers and W. H. Edwards very common in the neighborhood of Dunsuir, Siskiyou Co. on a *Pentstemon* sp. and these also produced imagines with strong tendency to develop the red markings although

again specimens occurred which were almost typical *chalcedona*. Mr. Jas. Cottle of San Francisco, who was at Dunsmuir at the time, stated emphatically that these larvae differed from those of *chalcedona* he had collected at San Francisco.

It is evident then that we have two larval forms; one lacking the dorsal and lateral pale stripes and producing an imago almost wholly black and yellow which frequents the low lying coast land particularly around San Francisco and feeds on *Scrophularia* species; the other very similar, with the addition of a geminate dorsal and a lateral pale stripe, found on *Pentstemon* species throughout the whole Sierra range at moderate altitudes and producing an imago with generally well defined red marginal spots and often red spots in the discal cell; we imagine they are merely forms of a single species, the differences in both imago and larva being due largely to environment but they certainly represent good geographical races and as such should be kept separated. For the former the name *chalcedona* (not *chalcedon* as generally written) will be used; for the latter we believe the correct name to be *dwinellei* Hy. Edw.; this was described as a variety of *chalcedona* (Pap. I, 51, 1881) from McCloud fishing station at Baird, Shasta Co. and specimens of our bred series from Siskiyou Co. have been compared with the type and agree exactly; the red suffusion of the yellow spots mentioned in the description is not nearly so marked in the types as one would be led to suppose but the red marginal spots are well defined and the specimens as a whole cannot be separated from a series from Truckee, the type locality of *macglashani* Rivers. *Dwinellei* Edw. will have priority over this name in our opinion but if desired *macglashani* may be employed for the Truckee form which is scarcely distinguishable but *does* in general, as noted by Rivers, show a more checkered appearance than either the San Francisco or Shasta Co. specimens; San Bernardino specimens are also very close to *macglashani*; it is possible that specimens from the coast region of southern California may approach typical *chalcedona* but this is a point for our entomological enthusiasts on the spot to settle as we have no authentic material from this region before us.

Wright figures what we consider almost typical *chalcedona* as *colon* (Pl. XVIII, Fig. 154) his *quino* (Fig. 155) is also we think the same species; his *chalcedona* (Fig. 157) is the San Bernardino race, almost inseparable from *macglashani* which is correctly figured (Fig.

159); the figures of *dwinelli* are merely those of stained specimens of the same thing.

E. COOPERI Behr.

This species has never been satisfactorily identified; it was described from Clear Lake, Lake Co., Calif. and separated from *chalcedona* largely on the strength of the very different larva which according to Behr is 'brimstone yellow with a dorsal and lateral black stripe' and feeds on *Scrophularia*; the imago is said to be similar to *chalcedona* but lacking 'the yellowish halo around the lunules of the brown band on the underside' of secondaries, the red portions of both being more somber and less of a fiery red than in *chalcedona*. Our Californian entomologists should be able to solve the puzzle by searching in the type locality for the larva which seems readily recognizable. In the Edwards' Collection are two specimens labelled *cooperi* and purporting to have been bred by Dr. Behr and sent to Edwards in 1863 as types; we were utterly unable to separate these from *chalcedona*, the wing shape and type of maculation being the same in both species.

Perdiceas Edw., described from Tenino, Wash., has been placed as a synonym of *cooperi*; in the Edwards' Collection are 2 ♂ 1 ♀ labelled 'Puget Sound, Wash.' '*cooperi*=*perdiceas*' and several other specimens from the same region simply labelled *cooperi*; these seemed to us distinct from Behr's two specimens but we had no material that would exactly match the *perdiceas* types and do not therefore feel competent to decide the point.

E. BARONI Edw.

This species is usually credited to Hy. Edwards with the description published in *Papilio*, Vol. I, 52, 1881, but the name *baroni* was first used by W. H. Edwards in 1879 (*C. Ent.* XI, 129) the larva being described and a very short diagnosis of the imago being given at the close of the article; the species was figured in *Butt. N. Am.* III, Mel. Pl. I. We recently discovered two of the presumable types which served for Hy. Edwards' description mixed up with the types of *E. rubicunda* in the Hy. Edwards' Collection; they are from Mendocino Co., Calif., the type locality, and agree with W. H. Edwards' figures so that it is evident that whichever author receives the credit for the specific name there will be no mix-up regarding the species itself. Wright's figures of the upper-side of *baroni* (Pl. XVIII, Fig. 156)

seem to be that of *colon* Edw. but his underside figure is correct; what he figures as *rubicunda* (Fig. 162) is really the true *baroni*.

E. RUBICUNDA Hy. Edw. (Pl. X, Fig. 3).

In the original description (Papilio I, p. 52, 1881) the type locality is given as the Sierra Nevada Mts. at from 2500-7000 ft. elevation. In Butt. N. Am. Vol. III, Mel. II, W. H. Edwards quotes Henry Edwards as stating that Mendocino Co. is the home of *rubicunda* and a specimen is figured taken by Mr. O. Baron in the Comptche district of Mendocino at an altitude of less than 2000 ft; we cannot see that this specimen is any other than *baroni*; it is a little larger than the specimens figured as *baroni* by W. H. Edwards on the previous plate but Edwards' specimens were probably undersized, due to breeding; both W. H. and Henry Edwards state that the types of *baroni* came from Mendocino Co. and in a long series before us from the same locality we can match either of the figures excellently. We have recently, through the kindness of Prof. E. T. Owen, seen a series of a *Melitaea* taken by Prof. Rivers at Tulare, Calif., which proves, after a comparison with the type in the Hy. Edwards' Collection, to be the true *rubicunda*; it is very similar to *baroni* on the upper side and can very readily be confused with this species; it is however rather larger with considerably more red on the secondaries, resembling in this respect *nubigena* Behr, just as stated by Henry Edwards in his original description; on the underside of the secondaries the outer fourth of the median yellow band, beyond the dividing black line, is the same color as the inner portion whereas in *baroni* it is generally distinctly red, the same color as the submarginal row of spots. It is probably this species which Behr called *anicia* Dbldy. and to which he compared his *nubigena* in the original description (Proc. Cal. Acad. Sci. III, 91, 1863). The home of the species seems to be the valleys of the High Sierras between the Yosemite Valley and Mt. Whitney; it is extremely close to *augusta* Edw. (*quino* Behr) and will probably prove to be merely a local form of this species. We figure a ♂ which agrees almost exactly with Hy. Edwards' type.

E. QUINO Behr.

In 1907 Fordyce Grinnell, in a paper in the Can. Ent. Vol. 39, p. 380, claims that this much disputed and misidentified species is the same as that described later by W. H. Edwards as *augusta*; there is a good deal in favor of this suggestion which is further supported by

the fact that a so-called 'type' of *quino* in the Strecker Collection bears out this theory as well as a specimen we have recently received from Prof. Owen which was identified by Behr himself as *quino* for Prof. Rivers. On the other hand there are several points that unfortunately lead in a different direction. (1) The original description distinctly states that in the difference of wing shape between the ♂'s and ♀'s the species closely approaches *chalcedona*; this is not very clearly borne out by the San Diego series of *augusta* before us; there is of course a difference but not nearly so marked as in *chalcedona* and in fact several ♂'s have almost as rounded an apical area as the ♀'s.

(2) The underside of the primaries is said to closely resemble that of *chalcedona* in showing little indication of the markings of the upper side, being almost entirely of a reddish-brown color; this also does not apply at all well to our S. Diego specimens which generally have distinct yellow quadrate patches in and beyond the cell whereas in *chalcedona* the cell is practically unicolorous with the rest of the wing.

(3) Behr's description is largely comparative with *anicia* Dbldy. but we do not know definitely what species Behr had identified as *anicia*; he certainly had not the true *anicia* before him which was described from material taken in the Canadian Rockies by Lord Derby, notwithstanding Grinnell's statement that California is the type locality of the species (l. c. p. 382). Behr claimed to have *anicia* from Mariposa and we suspect that what he calls *anicia* is the *rubicunda* of Hy. Edwards.

In the first two points mentioned *quino* would be much more closely duplicated by *sierra* Wright than by *augusta* and if it were not for the fact that *sierra* is a form of the High Sierras whereas *quino* is stated to have been collected near San Diego, we would almost advise this reference. Is it possible that the locality is erroneous and that Dr. Cooper, who evidently, judging by Grinnell's statement, travelled in various regions of California, got his labels mixed?

For the present, however, we accept Grinnell's synonymy but we imagine the last word in connection with *quino* has yet to be spoken.

E. NUBIGENA Behr. (Pl. X, Figs. 8-10).

The correct identity of this species is very puzzling. It was described from the head waters of the Tuolumne River and the description is largely comparative with what Behr called *M. anicia* but which

we have already (under *quino*) stated could not be this species, which is not found in California, but might possibly be *rubicunda*. *Nubigena* is said to differ from Behr's *anicia* in having the club of the antennae blackish, not orange, and the portion of the median band on the underside of secondaries beyond the black dividing line *not* yellow but orange; Behr was of the opinion that it might prove to be a high altitude form of his *anicia*. With regard to the two points of distinction mentioned by Behr we do not believe that the first can be used with any certainty at all as we have observed that the club of the antenna in most *Melitaea* species is variable in color between the two extremes of yellow and black; with regard to the second point this seems to be of greater value but not infallible as is shown in the case of *baroni* in which the outer portion of the median band is generally suffused with red but is occasionally yellow like the inner portion. We have before us a few specimens from Mineral King, Tulare Co., taken at a high altitude, and also some specimens from some of the higher points around Lake Tahoe and some of these distinctly show the peculiarity mentioned by Behr; they also bear a great resemblance to *rubicunda* Hy. Edw. (*anicia* Behr) on the upper side, being however rather smaller in size; for the present and until careful collecting can be done in the type locality of *nubigena* we are inclined to place these specimens as the true *nubigena*; they probably will prove to be a high altitude form of either *rubicunda* or *quino* (*augusta*) as all three are very closely allied; the former two however do not as far as we have observed show the tendency to the red suffusion of the outer portion of the median band on the underside of secondaries. We imagine that the specimens referred to *anicia* by Grinnell in his article on *quino* are also *nubigena* Behr as we identify it. *Colonia* Wright, (l. c. Pl. 20, Fig. 180) described from Mt. Hood, Ore. seems to be a northern race of *nubigena*; the red outer portion of the median band beneath is present and much more constant than in southern *nubigena*; we have long series from Crater Lake, Ore. and Mt. Ranier, Wash. taken by Dr. McDunnough on the highest points where vegetation occurred; the most northerly form and the smallest one is we believe *beani* Skin. which was described as a variety of *anicia* from the high peaks around Laggan, Alta. but really belongs here as an examination of the type has shown us. Wright's figure of *beani* (Fig. 168) should be referred to *anicia*; Hollands figure (Pl. XVIII, Fig. 13) seems correct.

Since writing the above notes we have received a long series of *nubigena* taken this summer (1916) by one of our collectors in the type locality (Tuolumne Meadows); these specimens, of which we figure three, corroborate our identification.

E. ANICIA Dbldy.

This species was described from specimens taken in the Canadian Rockies by Lord Derby who we believe was one of the members of the Boundary Commission; the types are in the British Museum and specimens from the neighborhood of Laggan and Banff are typical; the species extends down through the Rockies into Colorado and has been described from there by Edwards as *brucei* but there is practically no difference between these high altitude Colorado specimens and the Canadian ones and the name is scarcely worth retaining. A much larger and brighter form which occurs in Colorado at lower altitudes than *anicia* has been named *capella* Barnes; it was described as a variety of *nubigena* but we think it is probably the form of *anicia* which occurs in lower altitudes. Wright figures this form as *nubigena* (Pl. XIX, Fig. 171).

E. WHEELERI Hy. Edw.

We do not believe that this is a form of *nubigena* as at present listed. It was described from S. Nevada and the description is very poor; we have however exactly matched the types with specimens from Glenwood Spgs., Colo. and have others from Utah so that the species would appear to be one of the Great Basin inhabitants. It is more closely related to *sierra* Wright, in our opinion, than to anything else but is duller in color and sufficiently distinct to warrant a name. Wright's figure (Pl. XIX, Fig. 166) is correct and his *anicia* (Fig. 165) probably refers to the same species.

MELITAEA PALLA Bdv.

We believe that *whitneyi* Behr will prove to be merely the high altitude form of *palla*, distinguished in general by the greater amount of red on the upper surface especially of the ♀. In the coast region of California (Alameda Co., etc.) the black ♀ (*eremita* Wright) seems to predominate; in the valleys of the interior at 2-3000 ft. altitude both forms of the ♀ are found in about equal numbers; in a long series before us taken by Dr. McDunnough at Shasta Retreat, Siskiyou Co. some of the specimens are typical *palla* and others again match well with *whitneyi*. The true home of *whitneyi* is apparent-

ly the region around Lake Tahoe and the High Sierras and all the ♀'s we have seen from such localities are red and very similar to the ♂'s having generally however the median row of spots of a paler color than the other rows.

M. ARACHNE Edw.

There has been considerable confusion between this species and *minuta* Edw. due to misidentifications by W. H. Edwards himself. *Arachne* was described from a ♀ from Colo. received from Reakirt and the type, which we have examined, is in the Strecker Collection. *Minuta* was described from a specimen from Texas in the collection of J. W. Weidemeyer and Edwards states in his description of *arachne* that the type is no longer in N. America and that he only has preserved a coarsely executed lithograph of it, a fact which is probably responsible for the confusion; Mead in the Wheeler Report (Pl. XXXVI, Figs. 1, 2) figures as *minuta* what is really *arachne*, an error which led Strecker to redescribe the true *minuta* as *approximata*; in the Edwards' Collection at Pittsburg the species are reversed, ♂ and ♀ specimens from Colorado being labelled '*minuta*, type' and specimens from S. Colo. bearing the label '*arachne*, type' which in view of the localities given in the original description clearly brands these types as spurious.

Pola Bdv. described from Sonora will take priority over *arachne* Edw. the figure of the type being excellently depicted by M. Oberthur in Et. de Lep. Comp. IX, 2, Fig. 2188; the species occurs with apparently very little variation in Arizona, New Mexico and Colorado.

Minuta Edw. (*approximata* Stkr.) is seemingly much more restricted in its distribution; we have only seen the typical species from Kerrville, Texas but it is quite possible that *nympha* Edw. from Arizona is merely a brighter and more varicolored race of *minuta*; the maculation of the underside would certainly point to this. Holland's figure (Pl. XVIII, Fig. 11) is that of *pola* (*arachne*); we figure upper and undersides of the true *minuta* (Pl. X, Figs. 4, 7).

M. CALLINA Bdv. (Pl. X, Fig. 11).

After a careful study of the figure of the sole remaining type from Mexico (Oberthur, Et. de Lep. Comp. IX, (2), Fig. 2185) we have found that the species agreeing best with this figure is the Texan one known heretofore as *ulrica* Edw. (*imitata* Stkr.); we had suspected from the localities that it would have been the Arizona species

that would best agree, i. e. *perse* Edw., but this latter form shows certain features of maculation, notably on the underside of primaries that do not fit in at all well with Oberthur's figure; we figure a ♂ from Kerrville, Texas which seems to be typical *callina*. It is possible of course that Boisduval had two forms before him at the time of describing but the Sonoran types being lost we think it advisable to restrict the name to the Mexican type especially as the original description not only does not contradict this but rather seems to point in this direction. It is possible that *elada* Hew. may take priority over *callina* Bdv. but we only know the species from Godman and Salvin's figure and M. Oberthur is of the opinion that the true *elada* is something different from Godman and Salvin's conception of it (Et. de Lep. Comp. IX (2) p. 80) which to us looks more like *perse* than *callina*; a study of the type in the British Museum will be necessary to settle the matter. *Socia* Feld. is another very closely related form which may supplant one of our present names but a careful study of the type, which is possibly in the Tring Museum, is also necessary in this case.

M. BOLLI Edw. (Pl. X, Figs. 5, 6).

This species was described from a single ♀ from San Antonio, Texas; in the Edwards' Collection the only specimens of both *bolli* and *thekla* are from Arizona and cannot be considered as types; in Philadelphia we discovered however a ♀ labelled in Edwards' handwriting '*M. bolli*, S. Ant., Tex.' which is without much doubt the true type. The type of *thekla* from S. Calif. which should be in the Smithsonian Inst. we were unable to find; it is probably lost. These two are very closely related and are without doubt forms of one species; the Texas form (Fig. 6), to which the name *bolli* will apply, is distinguished from the western form *thekla* (Fig. 5) (Ariz. S. Calif.) by the fact that on the underside of primaries the yellow submarginal and discal spots are not so sharply defined but tend to merge into the ground color of the wing. Both are closely allied to the Central American *theona* Men.; we figure the underside of both forms.

PHYCIODES GORGONE Hbn.

Figs. 1 and 2 of Hubner's Samml. Exot. Schm. Pl. 41, as stated by Scudder (Buff. Bull. II, p. 266), certainly refer to the species at present listed as *ismeria* Bdv. whilst Figs. 3 and 4 are as plainly the ♀ of *phaon* Edw. If the name be held to the ♂ sex, *gorgone* Hbn.

will have priority over *ismeria* Bdv. and the synonymy of the two species will be:—

gorgone Hbn.
ismeria Bdv. & Lec.
carlota Reak.
phaon Edw.
gorgone Hbn. ♀ (nec ♂).

If it be contended that Boisduval by his description of *ismeria* limited *gorgone* to the ♀ sex (Figs. 3 and 4) then *phaon* must fall.

P. VESTA Edw.

In Butt. N. Am. II, Phyc. II, Edwards proposes the names *hiemalis* and *aestiva* for the two broods of this species. *Hiemalis* will sink however as a direct synonym of *vesta*, which leaves *aestiva* Edw. to apply to the summer generation.

P. PHAON Edw.

In the same work mentioned in our note on the preceding species Edwards proposes the same two names to separate the spring and summer forms. In this case however *aestiva* represents the typical *phaon* and will sink into the synonymy whilst the name *hiemalis* Edw. is free to be used for the spring form.

P. THAROS Drury.

According to the original figures and descriptions both *tharos* Dru. and *morpheus* Fabr. were described from specimens of the summer brood with pale underside of secondaries and *morpheus* Fabr. must therefore sink as a synonym. *Marcia* Edw. is the name to be retained for the spring form. *Pascoensis* Wright is the western form, distinguished in general by the lack of black markings in the extra discal area of both wings; *packardi* Saund. is a melanic aberration. The synonymy would therefore stand as follows:—

- (a) *tharos tharos* Dru. Eastern States to Rocky Mts.
cocyta Cram.
morpheus Fabr.
form vern. marcia Edw.
ab. packardi Saund.
ab. reagli Reiff.
- (b) *tharos pascoensis* Wright. Western States beyond the divide.

P. CAMPESTRIS Behr.

This species and *pratensis* Behr, both described in the same paper (Proc. Cal. Acad. Sci. III, 86) have generally been considered as referring to the ♀ and ♂ respectively of one species, although Behr apparently had both sexes of each and gives the habitat of the former as "marshy places where *Hemizonia* abounds" (presumably in the vicinity of San Francisco Bay) and of the latter "grassy hillsides" around San Francisco. A careful comparison of his descriptions with numerous specimens before us fails to show any definite points of distinction and we concur for the present with the synonymy as generally adopted. We would point out however that *campestris* has "line" priority over *pratensis* and if the two names do actually refer to a single species this should be designated as *campestris* Behr. It is a matter we will have to leave to our Californian lepidopterists to determine whether the marsh form and the hill-side form show any material points of distinction. Wright's Fig. 201 as well as his figures 202, 202b, and 202c (as *orseis*) are all *campestris* (*pratensis*); his figure 201b should probably be referred to *pallida* Edw.

P. CAMILLUS Edw.

Emissa Edw. is at present listed as a variety of this species but apparently is only the ♀ and should fall into the synonymy. The types on which both names were founded were taken in Colorado by Mr. Mead. The species is probably merely the Rocky mountain form of the California *campestris* Behr; in fact specimens from Northern B. C., Idaho, and Washington before us could as well be referred to the one name as the other.

The other two names, *pallida* Edw. and *mata* Reak., at present placed as forms of *camillus*, presumably on the authority of Edwards' Catalogue, we treat as forms of *mylitta* Edw. for reasons stated below.

P. ORSEIS Edw.

This was described from Mt. St. Helena, Napa Co., Calif., and is stated to be the largest of the Californian species. It is at present doubtfully listed as a form of *pratensis* Behr. We have two specimens from Sonoma Co. which we have identified as this species from a comparison with the types in the Hy. Edwards' Collection; we believe it will prove to be a good species; besides its larger size, it is very heavily black on the upper side, the fore wing is distinctly emarginate below the apex and the scallops of the outer edge of secondaries

more pronounced than in other species; Holland's figure (Pl. XVII, Fig. 31) seems correct although a poor specimen.

P. MYLITTA Edw.

This species was originally described (1861 Proc. Acad. N. Sci. Phil., p. 161) from specimens from Texas, Kansas, and California; later (1864 Proc. Ent. Soc. Phil. II, 504) Edwards claims that *collina* Behr, described from California, is a synonym and states that he had several specimens included under *mylitta* as varieties which were apparently good species; two of these Behr had described as *campestris* and *pratensis* and Edwards (p. 505) now describes a fourth as *pallida* from Texas and Kansas which to use his own words "I also supposed to be a variety of *mylitta*;" it would seem therefore that by this action Edwards restricted his *mylitta* to the Californian specimens. Recently we examined the series of *mylitta* in the Edwards' Collection with a view to determining just what his conception of this species might be; the series is very mixed; a specimen from S. Colo. which we consider to be *pallida* Edw. is labelled '♀ type' but this must be rejected as such as the locality is not mentioned in the original description; several specimens from various localities are present representing the usual conception of *mylitta* (Holland, Butt. Book, Pl. XVII, Fig. 41), one from Mt. Hood being labelled type (!), and finally a ♂ labelled '*mylitta*, Calif. type' which is neither of the above forms but apparently a peculiar race of *montana*, possibly from a lower altitude. There is nothing definite to prove that this specimen was one of the original types and as it is well known that Edwards never marked his specimens at the time of description as types but very often at a later date wrote 'type' in red ink on some other specimen which he considered typical (a fact abundantly proved by numerous specimens in his collection) we consider it the safest policy to follow Edwards' own statement that *mylitta* was identical with *collina* Behr and leave the conception of the species unchanged; it seems fairly evident from the description of *collina* Behr and Oberthur's figure of *epula* Bdv. that these two names refer to the same species.

P. PALLIDA Edw.

The species was described in 1864 from Texas and Kansas; in the Edwards' Collection the only specimen we could find in which the locality agreed with the description was a ♀ labelled 'type ♂ *camillus* v. *pallida*, Texas'. This label must obviously have been put on at a

later date as *camillus* was not described until 1871; the specimen appeared to us to be an ordinary ♀ *camillus* and did not agree at all well with the original description of *pallida*; Edwards' statement, 'upper side fulvous, the markings disposed in spots and bands which nearly cover the whole surface, the black shade being mostly confined to the costal edge, hind margin and narrow spaces between the transverse bands', hardly applies to *camillus* but does apply much better to the large form of *mylitta* common in Colorado; the size mentioned by Edwards (1½ in.) also points to this species. We imagine therefore that the specimen so labelled can hardly have been the true type. As further proof that *pallida* is rather a race of *mylitta* than of *camillus* (over which in any case it would have priority) is Scudder's statement (Buff. Bull. II, 267) that Edwards considered *mata* Reak. a synonym of *pallida*; we have seen the type of *mata* in the Strecker Collection and it is certainly the Colorado form of *mylitta*; it is a very worn and faded specimen, the white color mentioned by Reakirt being due in our opinion to the age of the specimen when captured and not to albinism; it is figured by Strecker (Lep. Rhop. Het. Pl. VIII, Fig. II) and we would call particular attention to the size and shape of the three ochreous submarginal bands on both wings as compared with those of *camillus*.

In the light of the above remarks we believe that the following grouping is advisable.

<i>mylitta mylitta</i> Edw.	Calif.
<i>collina</i> Behr.	
<i>epula</i> Bdv.	
<i>mylitta pallida</i> Edw.	Rocky Mt. region.
<i>mata</i> Reak.	

P. BARNESI Skin.

This is probably a large form of *mylitta pallida* with reduced black markings on both wings above; some of our ♀'s from Glenwood Spgs., the type locality, are very close to ♀'s of *pallida* from the vicinity of Denver.

ANTHANASSA TEXANA Edw.

We cannot see how *cincta* Edw. has been listed as a synonym of this species. The original description states that it is allied to *leucodesma* Feld. a species figured in Reise Nov. Lep. Pl. 50, Fig. 11 and totally unlike *texana*.

The localities given are Texas and Florida but we doubt very much that this is correct and imagine the species will prove to be South American.

CHLOSYNE LACINIA Geyer.

We doubt if any typical specimens of this species as figured by Godman and Salvin (Biol. Cent. Am. Rhop. Pl. XIX, Fig. 6) have ever been taken in the United States; it seems to be confined to the southern portion of Mexico and Central America. The species as it occurs in our territory can easily be separated into two forms.

(1) The Southern Texas form characterized by broad orange bands on both wings more or less tinged with pale ochreous. In long series from various Texan localities before us we fail to find any great variation on the upper side; what variation there is consists in the reducing of the band of primaries to more or less ovate spots; we have seen no specimens to which the name *saunderi* Dbldy. and Hew. could be applied; in this form described from Venezuela the whole basal area of the secondaries is orange and the band on the primaries broader with scarcely any ochreous tint. Scudder (Buff. Bull. II, 269) has proposed the name *adjutrix* for this Texan form which seems to us to be an excellent geographical race.

(2) The Arizona form which Edwards described as a separate species under the name *crocale* (Tr. Am. Ent. Soc. V, 17); this form typically has *no* trace of orange in the median band on upper side which is *punctiform* on primaries and *narrow* but continuous on secondaries; a variety in which the band is tinged with orange is common and has been named *rufescens* by Wright; another variety with more or less total loss of the band on upper side of secondaries Wright has called *nigrescens*, but with numerous intergrades these two names are hardly worth holding. We have seen no specimens with total loss of band on both upper and under side of secondaries to which the name *adelina* Staud. has been given; this form is figured in the Biologia (Pl. XIX, Figs. 16, 17) and is evidently a race not occurring in our territory.

As far then as our N. American forms are concerned we would suggest the following tabulation:—

- | | |
|-----------------------------------|-----------|
| (a) <i>lacinia lacinia</i> Geyer. | not U. S. |
| (b) <i>lacinia adjutrix</i> Scud. | S. Texas. |
| (c) <i>lacinia crocale</i> Edw. | Ariz. |
| <i>form rufescens</i> Wright. | |
| <i>form nigrescens</i> Wright. | |

California Wright we prefer to treat for the present as a separate species as the base of the primaries on underside is orange. It extends from Western Arizona to the San Bernardino Mts., Calif.

POLYGONIA SATYRUS Edw.

Chrysoptera Wright (Butt. West Coast Pl. XXII, Fig. 222) seems to be nothing but a slight variety of this species in which the subterminal markings are more or less obsolete especially in the ♀; this form occurs with *satyrus* together and is quite common among Arizona specimens.

P. MARSYAS Edw.

We are in doubt as to just what this species is; the original description was drawn up from a pair from *California* in Coll. Reakirt; later (Butt. N. Am. II, Pl. 3, Grapta) Edwards figures the species stating that the type pair, the only specimens known, were collected by Mr. Lorquin in the *Rocky Mts.* and sent to Mr. Reakirt. The specimens under *marsyas* in the Edwards' Collection are from Mendocino Co., Calif., and are absolutely identical with *satyrus* but no type is to be found; Scudder claims that it is a dimorphic form of *satyrus* but Edwards disapproves of this reference and in his original description calls it a small form of *comma*. Usually a dark form of *satyrus* from Vancouver Is., B. C., has been considered to be this species and Wright (Butt. W. Coast, Pl. 22, Fig. 214) figures such a specimen. We have seen nothing that entirely corresponds with Edwards' figures among our British Columbia series so cannot say if this reference is correct.

P. SILVIUS Edw.

This species has caused a good deal of perplexity. In the original description both ♂ and ♀ from California (Hy. Edw.) are described. Later (Butt. N. Am. II, Grapta III) Edwards states that his ♀ *silvius* was bred from a larva taken on *Azalca occidentalis* in the Yosemite Valley and is merely a slight aberration of *rusticus*. This ♀ we have been seen in the Edwards' Collection and concur with his reference. The ♂ type of *silvius* has been destroyed unfortunately (Butt. N. Am. II, Grapta III, foot note) and the original description makes it very doubtful whether the ♂ also can be referred to *rusticus*; we would call particular attention to the description of the underside where among other things we read, 'common series of extra discal

spots complete and consist of *dark brown scales on an ochraceous ground*, those next inner margin of primaries enlarged and the interior scales replaced by ochraceous; the submarginal lunules on incision of primaries indistinct and on secondaries obsolete.' This hardly applies to *rusticus*, no mention being made of the green color of the submarginal dots and lunules so noticeable in this latter species; it does however apply excellently to the underside of *sephyrus* Edw. and we believe that *silvius* may possibly be a form of this species. In the Hy. Edwards' Collection is a ♂ with a printed 'Co-type' label and a written label '*silvius*' which bears out this association; the ground color of the underside is however a peculiar deep brown color such as we have never seen in any other specimen.

P. RUSTICUS Edw.

We fail to separate this from *faunus*, but if desired the name may be retained for the western coast form of this species, the type specimens being collected by Hy. Edwards in Vancouver Is., B. C., and at Big Trees, Calaveras Co., Calif. The types are missing in the Edwards' Collection with the exception of a possible single ♀ labelled "California" and marked 'type'. In the Henry Edwards' Collection is a ♂ from each of the above localities and these are probably the types.

P. OREAS Edw.

This is listed as a variety or dimorphic form of *silenus* Edw. on the strength of Scudder's remarks in Buff. Bull. II, 252. If this be so, according to the rules of nomenclature *oreas* must be used as the specific and *silenus* as the varietal name, the former having a year's priority. The types of *oreas*, which came from Dr. Behr, were presumably returned to him and lost with the rest of his collection in the San Francisco earthquake; the ♂ and ♀ now marked type in the Edwards' Collection are labelled "N. Calif. O. B." (O. Baron) and cannot be considered more than typical in any case. The species is one of the doubtful ones whose biology needs clearing up.

P. SILENUS Edw.

The species was described from a ♂ taken by Hy. Edwards in Oregon; the specimen marked type in the W. H. Edwards' Collection is labelled W. T. (Wash. Terr.) probably one of Morrison's captures. It can only be considered as typical, *not a type*. The true type is in the Hy. Edwards' Collection in New York.

JUNONIA GENOVEVA Cram. (Pl. IX, Fig. 6).

We have received from our collector in Chokoloskee, Fla., a few specimens of what seems to be *genoveva* Cram. listed by Kirby as a West Indian species; these specimens differ from *coenia* in the form of the large black eye-spot on primaries; in *coenia* (Pl. IX, Fig. 5) this is encircled with gray-brown of various shades which is well-defined outwardly by a black line; beyond this towards the base of the wing the white subapical banding extends downward almost to the anal angle; in *genoveva* the black eye-spot shows none of this but is merely surrounded by a rather suffused orange shade on both upper and under sides. The white subapical patches are also more or less tinged with orange. In our present lists the species is placed as a synonym of *coenia*, although having many years priority; we think however it represents a good species and would list it as such. We have several specimens from Miami, Fla., where typical *coenia* also occurs. Apparently *genoveva* is confined to subtropical Florida. Our figures illustrate the above-mentioned differences.

BASILARCHIA ARTHEMIS Drury.

It seems to have been generally overlooked by authors that the type locality of this species as given by Drury is New York, which, if we have regard to the time of the description (1773), probably means the vicinity of New York City; Scudder in his Butt. East. States, Vol. I, p. 299 states that it has not been taken south of Massachusetts and but rarely in this State; Newcomb, in his description of *albofasciata* states that most of the Massachusetts records of *arthemis* as well as those from Long Is., Staten Is. and Jersey City refer to *albofasciata* and not *arthemis*. What then did these authors consider to be the true *arthemis*?

Drury's figure in Westwood's edition shows a white banded form with distinct red submarginal spots on secondaries preceded towards the base of the wing by green lunules; on the under side these red spots appear as on the upper side and are separated from the white band and from the marginal green lunules by broad black spaces; the basal area is reddish tinged. We have before us a series of specimens received from a dealer, some simply with the State label New York, others purporting to have been taken in Sullivan and Ulster Co's.; others from Woodland, N. J., and Passaic Co., N. J., and six bred specimens from Scranton, Pa., sent us as *albofasciata*; besides these we have one pair of the types of *albofasciata*, a ♂ from Sharon,

Mass., (A. C. Sampson) showing a tendency towards an elimination of the white band of secondaries and a ♀ from Bedford, Mass., (L. Swett). Half of these specimens are without red spots on secondaries, others show traces of same and several, notably one of the bred specimens from Scranton, Pa., a ♂ from Woodland and 2 ♂'s from Ulster Co., N. Y., have well defined spots as in Drury's figure; in the specimens without red spots the green lunules have become as a rule much broader and more prominent, in many of the specimens there is also a distinct greenish cast in the basal area of the upper side.

With regard to the status of *albofasciata* Newc. we are unable to separate it satisfactorily from our New York and New Jersey specimens which in view of the locality should be typical *arthemis*; we do not however feel that the last word has by any means been said regarding the relationships of *arthemis* and *astyanax* and their various forms and we would emphasize the necessity for Eastern collectors occupying themselves in securing exact data concerning the localities where any or all of these forms occur, and endeavoring by rearing the larvae to ascertain how true to type they breed.

We figure the underside of the recently described race, *rubrofasciata* B. & McD. (Pl. IX, Fig. 7).

B. LORQUINI Bdv.

The northern race of this species from Vancouver Is. and surrounding territory seems quite separable under the name of *burrisoni* Mayn.; it is distinguished by the small amount of orange at the apex of primaries as well as by the almost entire lack of submarginal white lunules on the under side and a general deeper brown color; specimens similar to *burrisoni* occur sparingly along with typical *lorquini* in some of the higher regions of California.

LIBYTHEA CARINENTA Cram. (Pl. VIII, Fig. 8).

Larvata Stkr. seems to be only a ♀ form of this species in which the three whitish subapical spots of primaries have become more or less coalescent forming an irregular and partially interrupted band across the wing; we have several such specimens, one of which we figure, from Brownsville, Tex., which agree with the types in the Strecker Collection.

RHODINIDAE

APODEMIA CYTHERA Edw.

This species was described from 3 ♂'s captured in Arizona by Lieut. Wheeler's expedition; judging by an account of the route taken by this expedition the specimens were captured in the western portion of the state near the California boundary. Mead figures the species from one of the types on Pl. 36, Figs. 3 and 4 of the Report of this Expedition; this figure leaves little doubt in our mind but that *cythera* must sink as a synonym of *virgulti* Behr described from S. California; the small size, the sharp contrast between the dark base and the subterminal orange band on secondaries with scarcely a trace of white spots on the basal edge of this band and the small size of the white subterminal spots as well as the very dark under side all point to its identity with *virgulti* and the type localities of the two species are not at all divergent. In the Edwards' Collection the specimens standing under this name are forms of the variety *duryi* of *mormonia* in which the whole hind wings are more or less suffused with orange; such a form is figured by Wright as *cythera* (Pl. XXVII, Fig. 295). Our Arizona localities for *mormonia* and its forms are all from the southeastern portion and it seems quite possible that *duryi* is a synonym of *mejicanus* Behr (Proc. Cal. Ac. Sci. III, 178); an examination of Mexican material will be necessary however to settle this. The types of *cythera* which should be in the National Museum are presumably destroyed.

CALEPHELIS NEMESIS Edw.

We can see nothing that would separate *australis* Edw. from this species. *Nemesis* was described in 1871 from a ♂ taken in Arizona by Dr. Palmer and the type which should be in the National Museum has probably been lost before the collection of the Agricultural Dept. was transferred. In the Edwards' Collection are several specimens, all poor, from Arizona and S. California under this name; they cannot be separated from other specimens from S. Calif. and Texas placed under *australis*; this latter species was described in 1879 from specimens received from Boll in San Antonio, Texas, and at about the same time Strecker described *guadcloupe* from material received from the same source, antedating his paper in order to secure priority. We have seen Strecker's types and also the specimens from Texas in the Edwards' Collection under *australis* which are probably types although

not labelled and as already stated cannot distinguish them from *nemesis*. The species seems to occur commonly all along our southern border.

LYCAENIDAE

STRYMON CALANUS Hbn.

Lorata G. & R. has been placed as a variety of this species with a black transverse line on the underside near base of wings. An examination of the type specimen in the American Museum at New York very clearly shows that this line has been painted on the specimen which is *calanus* pure and simple. *Inorata* Grt. the type of which we also examined is a slight varietal form of *calanus* with the inner white border line to the transverse dark band on underside of fore wing obsolete; in our opinion the name is not worth retaining.

S. AURETORUM Bdv.

In our paper in Ent. Record XXVI, 195 (1914) we expressed our inability to identify this species but associated it doubtfully with *tacita* Hy. Edw. Since writing the above article we have received a pair of *Theclas* from Sonoma Co., Calif., the ♂ of which agrees with the description of *tacita* Hy. Edw., described from Mendocino Co., excellently; it also approaches very close to Oberthur's figure of *auretorum*, only differing in possessing some slight blue scales on the underside of secondaries near the anal angle which in a single (and possibly worn) specimen might easily be missing. Both Boisduval and Hy. Edwards in their descriptions mention that on the upper side near the anal angle of secondaries are some faint ochraceous or reddish scales; these are also very faintly present in our ♂ from Sonoma Co. Boisduval in his introduction states that the insects described in this first paper on Californian Lepidoptera were collected by Lorquin either in the placer mining districts, i. e. Placer, Eldorado, and Nevada counties chiefly, or the northern portions of California; at all events we can accept the type locality for *auretorum* as north of an imaginary line drawn between San Francisco and Virginia City, Nevada.

Skinner (Ent. News, XXV, 47) and Comstock (Jour. N. Y. Ent. Soc. XXII, 34) list *spadix* Hy. Edw. as a synonym of *auretorum* Bdv. *Spadix* was described from 2 ♀'s from Tehachapi Pass, Kern Co., S. Calif.; we have a series of both sexes before us including specimens from the type locality and find that the ♂'s certainly approach

very closely to *auretorum* Bdv. (*tacita* Hy. Edw.); none of our series of eight specimens however shows any trace of fulvous at anal angle and the markings of the underside are still more obscure and the ground color more ochreous. Our single ♀ of *auretorum* is the same color as the ♂ on the upper side whilst *spadix* ♀'s are largely suffused with fulvous. *Spadix* is probably merely a southern race of *auretorum* but we think the name should be held for this southern race, the type locality for *auretorum* being distinctly northern as we have already shown. Regarding *tetra* Behr, which Comstock also lists as a synonym of *auretorum*, we know nothing further of this species but are inclined to agree with the reference after carefully reading the description; it was described from a single ♀ (no locality given) received from Dr. Behr, which is said to be 'uniform light brown' on upper side; just what color Edwards meant by this is doubtful, if it is gray-brown then *tetra* probably should be referred to the true *auretorum*, if ochreous brown then possibly it takes priority over *spadix* although we have seen no ♀'s of this latter form of a uniform color; they all have considerable dark gray brown scaling at base and apex of wings.

Wright's figures of *tacita* are incorrect; they probably should be referred to one of the *californica* forms but the underside figure is too poor to make identification certain; his figures of *spadix* look like very worn *adenostomatis* but are certainly not *spadix*. We figure the underside of a ♂ *spadix* from San Bernardino Co., Calif., (Pl. X, Fig. 12).

GENUS MITOURA Scud.

The genus as listed in Dyar's Catalogue comprising the three species *damon* Cram., *simaethis* Dru. and *acis* Dru. seems mixed; the latter two species should be removed as they do not appear to be closely associated with *damon* which is the generic type. In our opinion the following species should be added as the type of maculation in all of them shows great affinity to *damon*:—

castalis Edw., *loki* Skin., *xami* Reak. (*blenina* Hew.), *nelsoni* Bdv., *siva* Edw. and probably *spinctorum* Bdv. and *johnsoni* Skin.

BLENINA Hew. (Pl. XI, Figs. 19, 20).

With regard to this species there is not much doubt but that it sinks to *xami* Reak. (1866, Proc. Ac. Sci. Phil. p. 332); we have a specimen compared with Hewitson's type and it agrees perfectly with

Reakirt's description of *xami*, the type of which we could not find, although we searched in the Philadelphia, Pittsburgh, and Chicago Museum collections; *siva* Edw. at present listed as a synonym of *blemina*, must be removed, it seems very closely associated with *nelsoni* Bdv. or rather with its form *muiri* Edw., practically the only difference being the green color of the underside; that this color is however very fugitive is shown in certain Utah specimens before us in which one side is green, the other brown, probably due to moisture in relaxing the specimens; we should incline to list *siva* as the Rocky Mt. race of *nelsoni* Bdv. We figure both sides of *xami* (Figs. 19, 20) from specimens from Brownsville, Texas, and the underside of *siva* (Fig. 21) from Redington, Ariz., for comparison.

CASTALIS Edw.

We are unable to separate this form from *damon* Cram. and it has already been listed as a synonym by Scudder (Butt. II, 861). The species was described from specimens received from Belfrage collected near Waco, Texas; there are no types of the species marked in the Edwards' Collection, but under this name are 3 specimens from Texas, apparently all ♀'s, which cannot be separated from *damon* by the markings on the underside. Skinner's variety *discoidalis* was also described from presumable ♂'s from Blanco Co., Texas, a locality but little removed from Waco. If a name is to be used for the Texan form, which as a rule has the yellow color on upper side in the ♂ sex paler and more extended (this is however not entirely constant) and the tails considerably longer it seems to us that *castalis* Edw. will take priority over *discoidalis* Skin.; the Texan ♀'s in our series from Shovel Mt. and Kerrville vary from specimens strongly overlaid with chestnut brown scales to entirely sooty brown forms, these latter specimens agreeing with the form described as *patersonia* by Brehme (Ent. News, XVIII, 82) and which is now considered to be a seasonal form of *damon*.

HEODES FLORUS Edw.

The species was described from specimens received from Capt. Geddes collected on the Red Deer River, Alta., presumably south of Edmonton; the specimens in the Edwards' Collection under this name are from Laggan, Alta. so cannot be considered as types. Through the kindness of Mr. A. Gibson we have recently had the opportunity of examining a ♂ specimen of *florus* from the Geddes Collection at

Ottawa taken by Capt. Geddes in Aug. 1883 in the Crow's Nest region of the Canadian Rockies; this agrees with the Laggan specimens in the Edwards' Collection and in our opinion represents a form of *helloides* in which the orange submarginal band on the upper side of secondaries is greatly reduced; such forms occur occasionally among typical *helloides* in California and Colorado and develop apparently into a constant race in the northern Rockies; we have a number of such specimens from Yellowstone Park, Wyo.

LEPTOTES STRIATA Edw.

We have examined the types of this species in Pittsburgh and find they are the same as the type of *cassius* var. *floridensis* Morr. (Buff. Bull. I, 187) the ♀ type of which is in the Edwards' Collection; both names will probably fall to *theonus* Luc. but one may possibly be retained if the Floridan and Texan form proves distinct from the Cuban one.

BREPHIDIUM ISOPHTHALMA H. S.

According to genitalia the species is identical with *exilis* Bdv. and this is borne out by the pattern; *isophthalma* should probably be considered as the Floridan and West Indian race of *exilis*, this latter name having priority; we found it fairly common in a salt marsh in S. W. Florida in April.

HEMIARGUS HANNO Stoll.

In the synonymy of this species as given in Skinner's list there are apparently several species involved. The species, as usually identified, occurs in Florida and is well figured on the underside by Holland (Butt. Book, Pl. 32, Fig. 3); it may be distinguished by the single large black ocellus sprinkled with metallic scales between veins 2 and 3 on underside of secondaries. Stoll's figure of *hanno* is very crude and the upperside does not agree at all well with our Floridan ♂'s, showing no trace of the black border or slight black spot on upper side of secondaries between veins 2 and 3; the underside does however show the single black anal spot and the two small costal dots so that the lack of the dark border might perhaps be attributed to inaccuracies of the artist; the species is stated by Stoll to occur in Surinam and Cape of Good Hope, so that in all probability, if the localities given are correct, two species were involved. For the present we can see no reason why the name should not be applied according to the prevailing custom. Hubner's figure of *Rusticus adolescens hanno* (Exot.

Schm. I, Pl. 98) although agreeing fairly well in the ♂ upper side shows great dissimilarity on the underside; there is no black anal spot at all, but merely a double series of marginal lunules; it seems hardly probable that Hubner would overlook such a prominent feature especially as according to Boisduval (Lep. Am. Sept. p. 115) he was noted for his accuracy so we imagine some other allied W. Indian species has been figured; *gyas* Edw. approaches much closer to Hubner's figure than does the true *hanno*. Lucas' *hamo* (Sagra, Hist. Cuba VII, p. 612) probably refers to the same species as Hubner figures as there is also no mention made in the diagnosis of the black anal spot. *Astenidas* Bdv. (Lucas in Sagra, Hist. Cub. VII, p. 613) must also be rejected from the synonymy of *hanno* as the under side of secondaries is stated to possess 3 or 4 black ocelli, margined with fulvous, "tribus vel quatuor ocellis, nigris, fulvocircumcinctis." We have not seen the figure of Poey's *filenus* (Cent. Lep. Cuba) but accept Boisduval's word that it is the species figured in Lep. Am. Sept. Pl. 35, Figs. 5-7 under *pseudoptiletus*; this species certainly is our Floridan one and if *hanno* be accepted as referring to the same insect, *filenus* and *pseudoptiletus* become synonyms.

The final name in the synonymy of *hanno* is *Hemiargus antibubastus* Hbn. (Zutr. Ex. Schm. I, Pl. 18, Figs. 99, 100) from 'Georgia'. the type of the genus, which Hubner later (Verz. p. 69) apparently confuses with *bubastus* Cram. Taking into account the locality from which the species was described and allowing for some slight inaccuracies of the artist we imagine the name to be correctly applied; it may have to be employed instead of *hanno* Stoll if this prove to be referable to some West Indian species, but this is a point for some one to decide who is more favorably situated with regard to West Indian material than we are.

H. GYAS Edw.

The type of this we have not seen; it should be in the National Museum as it was described from a single ♂ taken in Ariz. by Dr. Palmer, but we could find no trace of it there. The specimens in the Edwards' Coll. belong to what has later been described as *astragala* Wright (Butt. W. Coast, p. 232) and *florencia* Grinnell (Ent. News, XXV, 28) and as these specimens fit in well with the original description they are probably typical. Wright's figure of *hanno* from Ariz. (Pl. 30, Fig. 397) should also be referred to this species. The marginal spotting on the underside of secondaries is rather variable; in

our series both from Arizona and S. Calif. specimens of *both* sexes are met with in which the two black spots between veins 2 and 3 and 3 and 4 are quite evident and also the two smaller silvery spots at the anal angle; other specimens show a reduction of the spot between veins 3 and 4 which may be carried so far as to leave only a few silver traces and no black underlying color at all; Wright assumed that this distinction was sexual but this is not the case. The species is closely related to the Florida *hanno*, in fact the genitalia are practically the same, and it is probably only a western race of this species; it can at once be distinguished by its pale violet-blue color in the ♂ without any appreciable dark border. We cannot see any points that would separate *florencia* from *astragala* and believe that they both fall before *gyas* Edw.

A fourth name that has been applied to this same species is *sachaeina* Butl. and Dru. The ♀ of the original description has been referred to *isola* Reak. by Godman and Salvin but the ♂ as figured in the *Biologia* (Pl. 58, Figs. 36-38) is this species. We have a series from Brownsville, Texas and as it differs from the Arizona form in the deeper blue of the upper side (the *Biologia* figure is too pale) and the rather broader dark margin, as well as in the apparent constancy of the two black ocellar spots on the underside the name *sachaeina* may be held as a racial form of *gyas* occurring in southernmost Texas and Mexico.

EVERES COMYNTAS Godt.

From a large series of specimens before us from Huachuca Mts. and other mountain chains of S. E. Ariz. we should be inclined to refer *herri* Grinnell to *comyntas* rather than *amyntula*; the original description is rather vague and we wonder if the ♀ of *herri* was not after all a ♂ as we have seen no Arizona ♀'s which are all blue with a narrow black border; the statement however that *herri* differs from *amyntula* in the broader black border on the upper side and the better defined and larger spots on the under side points to *comyntas*; further our Huachuca Mt. series is distinctly double-brooded while *amyntula* is said to be single brooded (Bethune-Baker, Ent. News, XXIV, 154) and most of the specimens show red lunules near the anal angle on secondaries above which is not met with in *amyntula* to our knowledge and is supposed to be one of the distinguishing features between *comyntas* and *amyntula*. Our Arizona specimens average rather larger than Eastern *comyntas*, but large specimens from the East can hardly

be distinguished from the Arizona race. We imagine that Bethune-Baker's series from Ft. Wingate, N. M., which he refers to *comyntas* (l. c. p. 101) is the same as our Arizona form.

The species described by Wright from a single ♀ as *sissona* (Butt. W. Coast, p. 232, Pl. 30, Fig. 400) is apparently, to judge by the figure, a worn ♀ specimen of this species; the wings are decidedly rubbed so it is probable the tail has been torn off. Dr. McDunnough took a small series of this species during the first week of July at Shasta Retreat in the summer of 1915, the ♀ agreeing excellently with Wright's figure; the ♂'s show little or no orange at angle of hind wings above but the clearness of the under side maculation and the small size would seem to point to *comyntas*; he also took a single fairly typical *amyltula* in the same locality in the last week of June.

PLEBEIUS SCUDDERI Edw.

The name has been applied generally to the form of the Eastern States, but the type locality given is Lake Winnipeg; the Edwards' Collection contains only N. Y. specimens under *scudderi* and we could find nothing in the Scudder Collection at Cambridge from the type locality. The type form according to both the original description and Edwards' later statement (Tr. Am. Ent. Soc. IV, 348) has *no* red submarginal lunules on the under side of primaries and to judge by a few Nepigon specimens before us which seem to be typical is paler and rather rougher looking on the under side with more greenish scaling at base of wings; Toronto specimens are fairly typical but our N. Y. and North Indiana series show considerable red and are brighter and more heavily marked. The species extends far into the north; we have a series from Atlin, B. C., near the Alaskan border with the ♀'s largely suffused with a pale grey-blue, more so than in *aster* Edw.; this latter name will apply to Newfoundland specimens which seem sufficiently distinct to warrant a racial name. Specimens from high altitudes in Colorado (Silverton, 10,000 ft.) are intermediate in the ♀'s between *scudderi* and *melissa*, some being without the red submarginal band on primaries above and considerably suffused with blue and others almost as in typical *melissa*; the ♂'s and the under sides of both sexes are close to typical *scudderi*.

Melissa, judging by the presumable types from Colorado in Pittsburgh, apart from its heavy red submarginal markings on the underside, appears to vary from what we call typical *scudderi* in having the discal row of black spots on the underside distinctly closer to the red

submarginal band; whether this will prove of specific value or not we cannot say, but we mention the fact in the hope that it may prove helpful in separating the two forms and elucidating their geographical distribution. Typical *melissa* we possess in series from Colorado, Utah, Arizona, and N. Mexico; a very similar form occurs in S. California but further north in the same state we meet with a form, apparently quite rare, which has a paler and more brilliant blue in the ♂ and an almost white underside (as in *anna*) with the spots reduced in size; this we take to be *lotis* Lint., described from Mendocino Co., Calif., (Pl. XI, Fig. 12). The types should be in the Edwards' Collection in Pittsburgh but we were unable to find them there; however in the Henry Edwards' Collection in New York under *lotis* is a ♂ from the type locality which agrees perfectly with Lintner's description and is presumably correctly identified; we have a few specimens from Havilah and Tehachapi, Calif. which agree with it and from which we have made the above notes figuring a specimen from the latter locality. Wright's figures of *melissa* (Fig. 379) are apparently correct but his *lotis* (Fig. 383) should be referred to *anna*.

Annetta Mead, judging by the ♂ genitalia, cannot be referred as a variety of *anna* but belongs in the *scudderi-melissa* group and is possibly a race of the former.

Kodiak Edw., according to Wright's figures (l. c. Pl. 29, Fig. 265), which agree well with the description, also falls into this group.

P. ANNA Edw.

This is a good species with the falces of the tegumen in the ♂ genitalia far less developed than in *scudderi*; it seems prone to diminution of the eye-spots of the underside and we consider that Behr's *cajona* is correctly referred as a synonym after examining the type in the Strecker Collection. The food-plant is a yellow-flowering species of *Hosackia* common on moist hill sides in Northern California. Wright's figures (Fig. 384) are correct; the ♂ is usually much more scantily marked on the underside than in his Fig. 384c.

P. SAEPIOLUS Bdv.

As already remarked by us (Ent. Record XXVI, 199) the form with the ♀ scaled with blue at the base is the nimitypical form; this form seems rare in California but Wright figures such a ♀ from Emigrant Gap (l. c. Pl. 29, Fig. 363b) and as this locality corresponds in a general way with the country collected in by Lorquin before 1852

it will probably not be far wrong to fix the type locality of *saepiolus* as the high mountains of Placer and Sierra Cos. Long series before us from Lake Tahoe region, and Nevada Co. show only the brown ♀'s so that the blue ♀'s are either very local or confined to high altitudes; this latter theory would be borne out by the fact that in the north of the continent i. e. Northern British Columbia, Saskatchewan, etc., the blue ♀ is apparently the usual and possibly the only one; it is also found in the high altitudes of Colorado (Hall Valley, Silverton) and in southern Utah and White Mts., Ariz.

The brown ♀ form of northern and middle California may have the name *rufescens* Bdv. applied to it; it is usually of large size with obsolete reddish marginal lunules; the ♂'s cannot be distinguished from *saepiolus* ♂'s, the width of the dark border being very variable in specimens from the same locality; the brown ♀ extends into Southern British Columbia and is also prevalent in the Yellowstone Park region. Holland figures a typical specimen as *daedalus* (Pl. XXXI, Fig. 12).

In the high mountains of Southern California we find a form with very heavy spots in both sexes on the underside, with broad dark border on upper side in ♂ and with the ♀'s rather small and much darker on upper side (usually black-brown) with consequently more prominent marginal red lunules; this has been named *hilda* by Grinnell but we fear this name must fall before *achaja* Behr, described from the Tuolumne meadows, and compared by Behr to *alexis* (*astrarche*) of Europe. Behr mentions *both sexes* as brown but we imagine he had only ♀'s before him as the description can only apply to *saepiolus* and there is no species of *Lycaena* known in California with brown ♂'s (*fuliginosa* is not a *Lycaena* but a *Thecla*).

After a careful reading of Behr's description of *daedalus* we cannot see how it can be referred to *saepiolus* as has been done by Wright (l. c. Pl. 29, Fig. 361). Behr knew *saepiolus* as he lists it in the same paper and states his *achaja* was found flying with this species which is not to be wondered at when we recognize that the name was based on ♀ *saepiolus*; we think *daedalus* is some aberrant form of *icarioides* with which it was associated in the first place by Behr himself.

P. PODARCE Feld.

What Wright figures as *podarce* (Fig. 375) is totally wrong; his figures apparently represent a form of *pseudargiolus*.

Podarce is closely related to *rustica* Edw. from Colorado differing in having the usual bands of black dots on the underside of secondaries well defined and not suffused with white as in *rustica*; these along with *aquilo* Bdv. are North American representatives of the European *orbitulus*.

P. ICARIOIDES Bdv. (Pl. XI, Fig. 16).

As already stated (Ent. Rec. XXVI, 198) we can see nothing, after a further careful study of our material and Oberthur's figures of the types, by which to separate *phileros* from *icarioides* and sink the former as a synonym; *fulla* Edw. must also fall. *Maricopa* Reak. was presumably described from a ♀ specimen although Reakirt (1866 Proc. Ac. N. Sci. Phil, p. 245) calls it a ♂; Strecker states (Lep. Rhop. Het. p. 85) that the type did not come into his possession along with Reakirt's other types but later lists the type (Suppl. III. p. 20) as a ♀ in his collection; this ♀ we have seen and it scarcely corresponds to the original description which states "upper side brown, glossed with violet blue" whilst the ♀ of the Strecker Collection is entirely brown; it is probably not a type. The original description so clearly indicates a ♀ *icarioides* that we have no hesitation in placing *maricopa* as a synonym of this species; in a previous paper (Ent. Record p. 198) we were doubtful whether to associate it with *icarioides* or *pardalis* Behr, not having seen the original description and relying on Strecker's so-called type, but the reference to *icarioides* we believe to be correct.

Wright's underside figures of *heteronea*, *fulla*, *pheres*, and *icarioides* (Pl. 29, Figs. 355, 358, 359, 360) all refer to this species; of his upper side figures we prefer to say nothing without having seen the specimens, but *heteronea* and *pheres* are certainly misidentifications in both sexes.

EVIUS Bdv.

The species was described from Southern California and both ♂ and ♀ types are figured by Oberthur (l. c. Figs. 2072/3); the original description fits in best with figure 2073, the ♀, as both the broad dark border of primaries and the discal streak are mentioned; we have a specimen from S. Diego Co. that agrees closely with the ♂ (Fig. 2072) but no ♀'s. The species will probably prove to be a race of *icarioides*.

Daedalus Behr we think should be a form of *icarioides*, possibly an aberrant one with transversely drawn out spots on primaries; Behr associates it with *icarioides* which he had apparently identified correctly.

Mintha Edw. is a doubtful form from Nevada, possibly a well marked *ardea*; we have not been able to find the type either in Pittsburg or New York.

Helios Edw. is also doubtful and the types are seemingly lost.

ARDEA Edw.

The species was described from the neighborhood of Virginia City, Nevada, and the ♂ type is in the Hy. Edwards' Collection in New York; it is a rather small specimen with greatly reduced maculation on the underside of both wings, the ground color being a peculiar light-gray; we have a series from Pyramid Lake, Nevada, the ♂'s of which agree closely with the type in ground color of underside, but have the spots of the primaries better developed. We think *ardea* will prove to be a race of *icarioides* from the Great Basin region, with paler violet-blue color and very slight dark marginal border; on the underside the dark spots tend to become obsolete and appear as white spots with faint dark centers; throughout Utah and in Colorado west of the divide we meet with a very similar form showing the same tendency to reduction of spots, but with slightly more pronounced black marginal border; this form has been variously called *evius* or *pheres*, but we imagine should be rather referred to *ardea*. We figure the underside of a Nevada ♂.

LYCEA Edw.

This is the race from Colorado west of the divide and is typical in the canyons around Denver; *rapahoe* Reakirt is the ♀ of this form, a ♀ with rather more blue than usual being mistaken by Reakirt for the ♂.

PEMBINA Edw.

The species was described from Lake Winnipeg; we have no material from this locality, but specimens from Calgary and Yellowstone Park seem to fit in with the description well; the types seem to be lost. It is a small race with little blue on ♀'s and tendency to darker color, broader borders and distinct discal dash in ♂; the underside is rather brownish with often a reduction of the black spots to mere dots and a corresponding increase of white encircling color as in *ardea*.

The following synonymy of this involved species is offered:

<i>icarioides</i> Bdv.	Mts. of California.
<i>maricopa</i> Reak.	
<i>daedalus</i> Behr.	
<i>phileros</i> Bdv.	
<i>fulla</i> Edw.	
<i>helios</i> Edw. (?)	
<i>a evius</i> Bdv.	S. Calif.
<i>b ardea</i> Edw.	Great Basin Region.
<i>mintha</i> Edw.?	
<i>c lycea</i> Edw.	Western Rocky Mt. Region.
<i>d pembina</i> Edw.	Manitoba and Northern Rocky Mts. south to Wyoming and Montana.

P. PHERES Bdv. (Pl. XI, Figs. 14, 15).

Typical *pheres* is only known from the San Francisco Bay region; the types are figured by Oberthur (l. c. Figs. 1944/5); Holland's figure of the ♂ (Butt. Book Pl. 30, Fig. 37) is only doubtfully correct, as the color is certainly not sufficiently violet-blue and the marginal spots of hind wings less prominent; it probably is from Vancouver Island and a variety of *icarioides*, the underside (Fig. 42) of the ♀ seems correct; Wright's figures (l. c. Pl. 29, Fig. 359) are totally wrong and it is hard to say just what they are, owing to the poor condition of the specimens; judging by the underside they appear to be a form of *icarioides* with reduced spotting; writers generally seem to have identified the Vancouver Is. form of *icarioides* as *pheres* although the original description mentions S. Francisco as type locality. We figure a ♂ and ♀ from the type locality and would call attention to the white discal spot in the ♀ which is quite characteristic.

In the ♂ genitalia there is absolutely nothing to distinguish *pheres* from *icarioides*; it seems to be a race of this species which possibly through environment and change of food plant (the food plant is *Lupinus chamissonis* according to Williams, Ent. News, 1910, p. 41) has practically become constantly variant and may be designated as a species (*vide* Williams, Ent. News, XIX, 1908, p. 483).

Orcus Edw. which has generally been considered an aberration of *xerces* should we think be referred to *pheres*; the 'pruinose blue' color of upper side with 'broadly fuscous' margin and the 'grey cinereous' color of underside with 'scarcely discernible line of submarginal

points' all point to *pheres* rather than *xerces*; we have been unable to find the type specimen in either New York or Pittsburg.

P. SHASTA Edw.

Minnehaha Scud. described from N. Dakota should be separated as a race; it has much narrower black borders without trace of orange, but with white terminal line and distinct black dots on the upper side of secondaries; it is also found on the high mountains of Colorado; typical *shasta* occurs throughout the Sierra Nevada range as far north as Oregon. Wright's figure of *shasta* may be correct for the ♂ (Fig. 378) but the ♀ (378b) is doubtful and the underside (378c) is certainly not *shasta* but possibly *cnoptes*.

PHILOTES BATTOIDES Behr. (Pl. XI, Figs. 7, 8, 10).

We have already expressed the opinion (Ent. Rec., 1914, p. 201) that *battoides* is a species distinct from *cnoptes* Bdv. and our further studies have confirmed this opinion. A comparison of the ♂ genitalia shows that an extraordinary difference exists between the two species, more so than between any two other apparently closely related forms that we know of,—in fact, the difference is almost generic in character. Typical *battoides* is a high altitude form, originally described from specimens taken at the head waters of the Tuolumne River (11,000 ft. altitude); we have a long series from Mineral King, Tulare Co. and also similar specimens from Crater Lake, Oregon (7,200 ft.), taken by Dr. McDunnough in 1915 along the rim of the lake wherever a small yellow *Eriogonum* species was growing. In general the species is characterized by the heavy quadrate black markings of underside on a pale whitish ground heavily dusted with black scales and with broad black marginal line on both wings, and broad red submarginal band on secondaries; the fringes on both wings are decidedly checkered. On the upper side considerable variation is shown in regard to the amount of red on secondaries in ♂ sex, some specimens showing no trace of this color and others again with a distinct band as on the underside.

A much smaller race (20 mm. average expanse) (Pl. XI, Figs. 9, 11, 13) occurs at lower altitudes in the S. Bernardino Mts. and around S. Diego with a rather paler ground color and less heavy markings on underside, especially on the secondaries which show scarcely any of the black dusting so prominent in the type form; for this race we propose the name BERNARDINO; our type series is from

Camp Baldy, S. Bernardino Mts., but we have other specimens from San Diego, Pasadena and Havilah. We have seen no *battoides* from east of the Sierras and imagine such records refer to *enoptes*. Wright's description of *battoides* is quite misleading; he evidently did not know the species and his statement that it possesses tails is wrong entirely. We figure specimens of both races.

P. GLAUCON Edw. (Pl. XI, Figs. 2, 5).

The species was described from ♂ and ♀ taken in Nevada by Henry Edwards; in the W. H. Edwards' Collection the series under *glaucon* is very mixed, most of the specimens being *enoptes* pure and simple; a couple of specimens however from Colorado represent a different form; there are no Nevada specimens present which could be considered as types, the only ones from this region having, according to the label, been captured by Morrison. In the Henry Edwards' Collection in New York under *glaucon* is a ♀ from Nevada which agrees excellently with the original description and which is very probably one of the original types; the fulvous shading on the submarginal spots on the underside of primaries is present, but not at all strongly marked; a ♂ is also in the collection and is certainly the same species, but shows no fulvous shading on primaries beneath, so we would hesitate to call it a type. These specimens agree with the Colorado ones in the W. H. Edwards' Collection mentioned previously and we think without doubt represent the true *glaucon*; we have the species in series from Utah localities and it apparently represents a Great Basin form; in the color of the underside it is close to *enoptes*, but the black spots are rather heavier and the orange band of secondaries much broader, making the species intermediate between *battoides* and *enoptes*; according to our series the fulvous shades on the underside of primaries are not constant—in fact the majority of our specimens are without them; the ♂ genitalia point to a close relationship with *enoptes*. We figure what we consider typical *glaucon* from Provo, Utah as well as *enoptes* from Mineral King, Tulare Co. Calif. (Pl. XI, Figs. 1, 4) and our recently described *rita* from Arizona (Pl. XI, Figs. 3, 6) for comparison.

GLAUCOPSYCHE XERCES Bdv. (Pl. XI, Fig. 18).

It has been pretty well proven as we have already stated (Ent. Record 1914, p. 200) that this species occurs in two form i. e. with and without black centers to the white spots of the underside; typical

xerces has no black centers and being the oldest description applicable to this species (1852 l. c. p. 296) must hold the specific name. It is unfortunate that the next two descriptions referable to this species should be of rather abnormal forms; *antiacis* Bdv. (1852, p. 300) is a large form with rather broader borders on the upper side than usual and with a slightly different arrangement of black centered spots on the underside of secondaries, spot 2 of the postmedian row being absent and spot 1 closely approached to the costal spot above the discocellular; it is figured by Oberthur (l. c. Fig. 1951); we have no specimen just like it, but have a specimen of typical *xerces* showing this peculiarity. Wright erroneously figures the Southern Calif. race of *behri* under this name; his *mertila* is also not typical but an intergrade between *polyphemus* and *xerces*. *Mertila* Edw. (1866) is close to the normal black spotted form but between the discocellular lunule and the base of wing on primaries is a white dash; this form occurs in both sexes and in both the spotted and unspotted forms. *Polyphemus* Bdv. (1869) is the first name applicable to the normal spotted form; there are many intergrades between this and *xerces* and also towards *mertila* and in one ♀ before us which we figure the spots on one side are typical *xerces* and on the other side just as typical *polyphemus*, a further proof, if needed, that but one species is under consideration; there is also occasionally considerable reduction in the spots, such specimens passing under the name of *orcus* Edw. but as already stated we consider *orcus* referable rather to *pheres* than to *xerces*.

The synonymy of the species would be:

- xerces* Bdv.
- form ab. *antiacis* Bdv.
- form ab. *mertila* Edw.
- form norm. *polyphemus* Bdv.

The food plant of the species is given by Williams (Ent. News, XIX, 478) as *Lotus glaber* and the larva is stated to be separable from that of *behri* Edw. The species seems to bear the same relation to *behri* that *pheres* does to *icarioides*, being a species peculiar to the sand dunes of the Pacific coast.

G. BEHRI Edw.

After careful study of the original description we agree with Williams in adopting this name for the species closely allied to *xerces* found flying around the San Francisco Bay region (*vide*. Ent. News,

XIX, 477, 482). Scudder has shown (C. Ent. VIII, 234) that Edwards later misidentified his own species and this is borne out by the specimens in the Edwards' Collection under *behri*, the δ 's of which are distinctly referable to *icarioides* (*maricopa*); Scudder however has identified a Southern California race as *behri* not having seen any specimens from the middle section of the state; in view of the fact that Behr was residing in S. Francisco we believe there is more probability of typical *behri* having been captured around this city than in Southern California.

LYCAENA PARDALIS Behr. (Pl. XI, Fig. 7).

We have already referred *erymus* Bdv. to this species (Ent. Rec. 1914, p. 199). A study of the δ genitalia shows it referable to the genus *Lycaena* which contains the *arion* group of European blues; Behr's original comparison of the species with the *arion* group was therefore extremely well founded. This species has apparently been confused with *icarioides* as several specimens have come to us bearing this label. The species is local; the type locality is the Contra Costa Coast range and we have specimens from Sonoma Co. and Mill Valley, Marin Co. before us. We figure the underside of a ♀ showing the heavy black spotting on a deep brown ground color.

LYCAENOPSIS PSEUDARGIOLUS Bdv.

Tutt has shown (Brit. Butt. II, p. 405) that Butler's citation of *ladon* Cram. as referring to our N. Am. species is entirely ungrounded and that the name *pseudargiolus* must be retained. We cannot follow Edwards' reasoning at all, however, in restricting the name to the large, sparsely marked summer form of the Southern Atlantic States. He says (1866, Proc. Ent. Soc. Phil. VI, 205), following a redescription of *pseudargiolus* (according to his idea), that Boisduval's description might apply to either 'this species or to *neglecta* or to *violacea* and the figure of the male is not *pseudargiolus* but nearer *violacea*, being same size, very like it beneath but not well colored on the upper side,' and then strangely goes on to attempt to prove that *pseudargiolus* should be applied to the large form figured by Smith & Abbot as *argiolus* (Pl. 15). Later (Butt. N. Am. I, Lyc. II, text) he rejects Boisduval's figure of δ *pseudargiolus* as not coinciding with the text, apparently on the sole ground that Boisduval's description states that the fringes are checkered and his figure shows only those of the primaries to be so. If we turn to Boisduval's description which is com-

parative with the European *argiolus* we find among other things that the size is *a little smaller* than *argiolus*, the color of the ♂ *a delicate violet-blue* above and beneath 'a gray *much more obscure* than in *argiolus*' and that it may be distinguished from *argiolus* by the *stoutness* (*grosueur*) of the row of black dots on underside, (Edwards' translation of *grosueur* is merely 'size' which might mean larger or smaller). We find all these points admirably borne out by Boisduval's figure (Pl. 36, Figs. 1, 2) but not at all by the form to which Edwards' would apply the name and which he figures (Butt. N. Am. II, Lyc. II, Figs. 8, 9) in which the size is *larger* than *argiolus*, the underside is as pale *if not whiter* and the spots are *more reduced*. As Edwards himself has said *pseudargiolus* is nearest *violacca* and in our opinion this latter name should be sunk as a synonym, as it is only to this form that both Boisduval's *description* and *plate* could possibly be referred. Edwards' action was apparently an attempt to retain both his names (*neglecta* and *violacca*) and at the same time provide a name for the large summer form. Tutt (Brit. Butt. II, 405) in his discussion of the American forms of *C. argiolus* offers a good deal of criticism on Edwards' grouping of the various generations of this species and proposes (p. 407) the name *neglecta-major* for the form which has been generally regarded as *pseudargiolus*.

HESPERIIDAE

GENUS EUDAMUS Swains.

We are sorry to say that this genus must fall before *Goniurus* Hbn.; the type of this latter genus was specified as *simplicius* Stoll by Kirby in 1870 (Ent. Mo. Mag. VII, 56) and the type of *Eudamus* was specified by Swainson as *proteus* according to Scudder (1875, Hist. Sketch p. 169). These two species being congeneric the more recent generic name *Eudamus* will become a synonym of the older name *Goniurus*. Scudder's action in fixing (Hist. Sketch. p. 180) *coelus* as the type of *Goniurus* was *ultra vires* and not in accord with the present rules governing nomenclature; he is followed in this by Mabille (Gen. Ins. Hesp. p. 23).

GENUS HESPERIA Fabr.

Dr. Dyar in his Revision of the HesperIIDae of the U. S. (1905, Jour. N. Y. Ent. Soc. XIII, 117) has confused the three genera *Helioptetes* Billb., *Scelothrix* Ramb. and *Pyrgus* Hbn.; this is in part

due to an error on the part of Mabille (Gen. Insect. Hesp. p. 82) who placed *syrichtus* Fabr. in his section *Pyrgus* of *Hesperia* diagnosing it as '♂ with costal fold but without hair pencil on hind tibiae' whereas as Dr. Dyar has pointed out (l. c. p. 117/8) *syrichtus* possesses both. Unfortunately Dr. Dyar has overlooked the fact that *syrichtus* is the type of the genus *Pyrgus* and has removed *syrichtus* to *Heliopetes* instead of rather removing the other species from *Pyrgus*.

With regard to the fixing of the type of *Pyrgus* Tutt claims (Brit. Butt. I, p. 85) that Stephens in 1834 and 1850 fixed the type as *malvae* L. Both the works cited however are Lists of *British Butterflies*, the former being 'An Abstract of the Indigenous Lepidoptera contained in Hubner's Verzeichniss' and the latter a mere 'Catalogue of the British Animals in the British Museum' and we entirely agree with Bethune Baker (1914, Ent. Record, XXVI, 133) in not accepting Stephen's action as being in any way of the nature of a restriction but as merely an 'ordinary usage without references'. This would render Butler's action in 1870 in specifying *syrichtus* as the type perfectly valid. With regard to *Scelothrix* Ramb. Scudder states (1875, Hist. Sketch, p. 266), without designating any type, that the name falls before *Hesperia* Fabr. The type of this latter genus must apparently be accepted as *malvae* L., due to Cuvier's action in 1799 (*vide* Tutt, Brit. Butt. I, p. 84, 220), the later designation of *comma* L. as type being apparently *ultra vires* on account of Cuvier's restriction; it would be well then to fix the type of *Scelothrix* Ramb. definitely as *malvae* L. so that Scudder's action may be substantiated. Dyar states that there are no species of *Hesperia* in N. America but this error is evidently caused by his selecting Mabille's first section of *Hesperia* as typical instead of his last section which contains *malvae* L.; Dyar's genus *Scelothrix* must therefore be changed to *Hesperia*; we might note that *scriptura* shows no costal fold in the ♂ and differs slightly from the other N. American members of the genus in the squamation of the palpi; it may fall into one of Tutt's doubtful genera erected on p. 218 of *British Butterflies*, Vol. I. *Heliopetes* as used by Dyar is correct except that *syrichtus* and *philetas* must be removed; these should be placed in the genus *Pyrgus* and for the present we feel inclined to include with them *tessellata* Scud. and *occidentalis* Skin. which only differ in lacking the hind tibial pencil of hairs in the ♂ (Tutt has proposed the genus *Muschampia* (l. c. p. 218) for this group). A better means of separation of *Pyrgus* from *Hesperia* (*Scelothrix*) than

that given by Dyar, and one that would include both sexes appears to be found in the palpi; in *Pyrgus* they are only slightly upturned and the clothing under a strong lense is seen to be rather even and composed largely of scales with a few hairs of equal length intermingled; in *Hesperia* the palpi are strongly upturned and very heavily and roughly clothed underneath with long hairs, the scales being confined to the lateral basal portion; *syrictus*, *philetas*, and *tessellata* are quite typical of *Pyrgus* and *centaurae* of *Hesperia*.

H. XANTHUS Edw. (Pl. X, Fig. 13).

In the Edwards' Collection at Pittsburg are four specimens, all from S. Colo. (Morr.), labelled *xanthus*; 1 ♂ and 2 ♀'s of these belong to a larger species than the remaining one and would seem by the description and measurement given (4/5 in.) to be the true *xanthus* and presumably the types. The smaller species (Pl. X, Fig. 14) is probably Oberthur's *macdunnoughi* (1914, Et. de Lep. Comp. IX, (2) 86) so that in any case the name *xanthus* would be automatically restricted to the large forms; there is no costal fold in the ♂'s of *macdunnoughi* but the structure is otherwise identical with that of *malvae*. We figure our conception of both species which are very closely allied.

HELIOPETES NIVELLA Mab.

We have a specimen of this species from Brownsville, Texas. It is close to *macaira* Reak. but larger and with the dark border of secondaries on under side more broken and containing white spots; the upper side of secondaries also has black marginal markings. This species is new to our fauna.

GENUS THANAOS Bdv.

Tutt's action (Brit. Butt. I, 85, 260) in sinking *Thanaos* as a synonym of *Nisoniades* on the ground that the type species of both is *tages* L., is incorrect. Stephens' action in 1834 and 1850 in placing *tages* as sole species under *Nisoniades* cannot, for the same reasons as we have already stated under *Pyrgus*, be regarded as a restriction or a fixation of the type. The first definite type fixation that we know of for *Nisoniades* is by Scudder in 1875 (Hist. Sketch, p. 228) who gives *bromius* Stoll as type; this action is valid and has been followed by Watson, Godman & Salvin, and Mabille.

T. CALLIDUS Grinnell.

Lacustra Wright is made a synonym of this species by Grinnell (1905, Ent. News, XVI, 339). Dyar (1905, Jour. N. Y. Ent. Soc.

XIII, 121) places *callidus* as a small narrowly marked *brizo* on the strength of a presumable ♂ type sent him by Grinnell, and Skinner (1914, Tr. Am. Ent. Soc. XL, 202) follows these authors in listing *callidus*, with *lacustra* Wright as a synonym, as a variety of *brizo*. A reference to Wright's figure of *lacustra* (l. c. Pl. XXXII, Fig. 480) leaves little doubt in our mind that *lacustra* is properly referred to *brizo*, but after reading Grinnell's description we have considerable doubt in our minds as to whether *callidus* can be correctly referred here. In the first place the sketch of the ♂ claspings organs given by Grinnell is vastly different from that given by Dr. Skinner of *brizo* and secondly there are points in the description of the ♂ (which must hold the specific name), which almost prohibit an association with *brizo*; for instance Grinnell says the primaries show 'a small *white discal spot* and midway between this and outer margin a group of *three whitish spots* arranged in a diagonal line and close together; a somewhat *large white spot* in the same plane, half way between costal and inner margin,' all of which cannot possibly fit any form of *brizo*. The ♀ description on the other hand might very readily be made to agree with *brizo* and we wonder if Grinnell has not confused two species, the ♀ being a form of *brizo* and the ♂ some species related possibly to *persius*. Specimens distributed later by Grinnell as *callidus* certainly are *brizo* forms as a ♂ in our possession from San Jacinto Mts. shows; this however does not validate the name which must be held to the ♂ sex. The types should be in the Calif. Acad. of Science Coll. in S. Francisco and an examination by some of our West Coast collectors is much to be desired.

T. LILIUS Dyar.

The species was described from Kaslo, B. C.; Dr. Dyar says (Jour. N. Y. Ent. Soc. XIII, 122) that the ♂ genitalia resemble Scudder's figure of the genitalia of *tibullus* but lack spines on the middle lobe of the left side piece. Dr. Skinner (Tr. Am. Ent. Soc. XL, 208) states that the genitalia are like those of *pacuvius* Lint. which he figures as quite distinct from those of *tibullus* according to Scudder's figure. Dr. Skinner sinks *tibullus* to *propertius*, his figure of the genitalia agreeing however closer with Scudder's figure of *tibullus* than that of the same author's figure of *propertius*. It remains to be seen if Scudder's figures of the genitalia of *tibullus* and *propertius* represent specific differences or merely slight variations of one species and further it will be necessary to decide between Dyar and Skinner regarding the

identity of *lilius* as there seem to be two species involved. For the present we follow Skinner in making *tibullus* a synonym of *propertius*.

T. PACUVIUS Lint.

Godman & Salvin's figure of the genitalia of this species (Biol. Cent. Am. Pl. 91, Fig. 17) agrees with that of *scudderi* Skin. rather than with what Skinner figures as those of *pacuvius* although Skinner places Godman & Salvin's reference under *pacuvius*. The type ♂ should be in the Edwards' Collection at Pittsburg; we wonder if Dr. Skinner has seen it so that we may accept his identification as correct.

T. TATIUS Edw.

The single ♂ type is in the Neumoegen Collection in Brooklyn; this specimen shows on the underside of the hind wings a partial terminal border of white blotches; the type series in the Edwards' Collection of *clitus*, described from the same locality, contains specimens both with and without this white border; otherwise the two forms cannot be separated superficially. We do not know if these white spots will prove of specific value as we have made no study of the genitalia, but it would seem well to restrict the name *clitus* to the form without these white marks. *Tatius* is probably closely related to *albo-marginatus* G. & S. but the spots do not form a continuous band as in the figure in the Biologia (Pl. 91, Fig. 20) nor do they extend so far toward the costa.

GENUS CARTEROCEPHALUS Led.

Dyar's usage of the genus *Pamphila* for *palaemon* will not hold, the type of *Pamphila*, as we show later on, being *comma* L. Tutt uses the genus *Cyclopides* Hbn. for this species, based on a supposed restriction of Stephens in 1834 and 1850 which we have already criticized; Staudinger's action in 1861 (Cat. 15) would seem to be more of a restriction as he uses it for a single species *morpheus* (*steropes*) and this is confirmed by Butler in 1870, who definitely names *morpheus* the type of the genus; Scudder's action in 1875 in naming *metis* as type is based on a peculiar system of reasoning, the fallacy of which has been shown by Bethune-Baker (Ent. Rec. XXVI, 133). The well known name *Carterocephalus* Led. may once more be used for this genus, the type being fixed as *palaemon* in 1867 by Snellen.

ADOPAEA EUNUS Edw.

Edwards in his original description gives Mt. Hood as the type locality for *eunus*, but Morrison corrects this (Pap. III, 43) stating that the specimen came from near Bakersfield, Kern Co., Calif.; *wrighti* from the Mohave Desert would seem to be a form with immaculate secondaries on underside.

COPAEODES AURANTIACA Hew.

We have seen the type of this species in the British Museum; there is no doubt that the name is correct for the species generally known as *procris* Edw. Regarding the various synonyms *waco* Edw. was described in 1868 from a single specimen in the collection of Prof. Townend Glover from Waco, Texas; Edwards calls it a ♂ but we imagine that it was one of the immaculate ♀'s as no sex mark is mentioned; we do not know where the type is; in 1871 Edwards described *procris* from several ♂'s and ♀'s also from Waco, Texas; we have seen the types of this species and they are the same species as *aurantiaca*. *Candida* Wright is figured by Wright (Butt. W. Coast, Pl. XXX, Fig. 411) although he has hopelessly mixed his sexes in this whole group; we can see no difference between S. Calif. specimens and those from Arizona and Texas.

CHAEREPHON SIMIUS Edw.

We would remove this from *Amblycirtes* as the palpi lack the long 3rd joint and the antennal knob shows a close relation to *Chaerephon* and *Pamphila*; it may be necessary to erect a new genus for the species as the ♂ stigma is peculiar, but our material is too scanty and worn to warrant our doing so and for the present we place it in *Chaerephon*.

GENUS ERYNNIS Schrank.

We cannot agree with Dyar's usage of this generic term following Scudder and Godman & Salvin, the former author having erroneously fixed the type as *comma* L. due to the faulty system of reasoning we have already mentioned. According to Tutt, (Brit. Butt. I, 84) Oken in 1820 fixed the type as *alceae* Esp. (*malvae* L.) and this action must hold. *Pamphila* Fabr., with type *comma* L. fixed by Westwood in 1840, may be used in place of *Erynnis*, Scudder's action in 1875 in specifying *palaemon* as the type of *Pamphila* being as we have already stated, *ultra vires*. Tutt claims (Brit. Butt., I, p. 130)

that *Urbicola* Barbut (Linn.) takes precedence over *Pamphila* Fabr. but we hesitate to use this generic name as there seems some doubt among European authorities as to its validity; we note Tutt's procedure, however, and would leave the matter for the present open. With regard to the position of the genus we incline to placing it immediately following *Chaerephon* G. & S.; the short point of the antennal knob would point to this association.

P. *ATTALUS* Edw.

According to the type ♀'s from Texas in the Edwards' Collection this would appear to be distinct, at least as a race, from *seminole* Scud.; in the Texan form the underside of the hind wings is yellowish green whilst in the Florida form (*seminole*) it is dark blackish-brown. The type of maculation is the same but the ♂'s of *attalus* seem to have a greater extent of the yellow area on the upper side than is found in *seminole*; a ♂ presumably of this species from Black Jack Spgs., Texas before us agrees with Scudder's figure of *attalus* (Butt. N. Eng. III, Pl. 17, Fig. 12).

P. *SASSACUS* Harr.

This seems better placed in *Pamphila*, as the shortness of the point of the antennal knob and the shape of the ♂ stigma distinctly point in this direction; it is in some things intermediate between the two groups.

P. *COMMA* L.

In view of the fact that Scudder's type specimens of the various varieties described by him in 1874 (Mem. Bost. Soc. N. H. Vol. II, No. 4) are from widely divergent localities it would seem well to restrict each form to a single one of these localities. *Nevada* the first variety described is listed as from South Park, Colo. (Mead) and also California, Nevada and Oregon; the ♂'s figured are all from Colorado (Mead) and the figure of the genitalia is also taken from a Colorado specimen; we would therefore restrict the type locality to S. Park, Colo. and Fig. 1 of Pl. X (Colo., June 12th, Mead) may be taken as that of the type, which on a recent visit to Cambridge we were able to pick out of Scudder's material.

Colorado was described from specimens from Georgetown and S. Park, Colo. (Mead) and Arizona (Wheeler); the figured specimens and the specimen serving for the slide of the sexual organs are all from Colorado so we may regard Fig. 18 (Colo. July 13, Mead) as that of

the type which is in Cambridge; the forms possibly show intergrades but may, to judge from the material before us, represent high and low altitude forms of one race, typical *colorado* apparently not being found much below 9000 feet.

Manitoba Scud. was described from specimens from Colo. (Mead); Pike's Peak, Colo. (Edwards); Lake Winnipeg (Scudder and Kennicott); Lahache, No. B. C. (Crotch) and Riviere de Loup, Que. (Couper); both the ♂'s figured, as well as the one serving for the drawing of the genitalia, are from Lahache, B. C. so we see nothing for it but to make this the type locality in spite of the name which is unfortunately chosen; Fig. 11 will be that of the type, which we have found and labelled in the Scudder Collection at Cambridge. We cannot separate *laurentina* Lym. from this form; both show the same dark brownish-green underside in the ♂'s and we believe that both names apply to a race extending over the entire northern portion of the continent; the ♀'s are considerably greener beneath than the ♂'s.

Idaho Edw., described from Oregon, Washington, and California is a form with paler, yellowish green underside of secondaries, on which the white markings stand out very distinctly; we would restrict the type to the ♂ from *East Calif.* in the Edwards' Collection.

Assiniboia Lyman is a closely related form, but the spots on the underside of secondaries are suffused with the yellow ground color and rendered quite indistinct; they are also smaller.

Oregonia Edw. we would restrict to the four specimens (2 ♂ ♀) from N. Calif. in the Edwards' Collection; they have a distinct purplish tinge to the ground color on the underside of hind wings with rather indistinct spots; we have not seen anything just like them.

After an examination of the types of *cabelus* Edw. and *harpalus* Edw. in Pittsburgh we should not be surprised if both these so-called species prove to be forms of *comma*; *harpalus* approaches close to *assiniboia* Lym. whilst *cabelus* appears to be a form in which the spots on the underside of secondaries are reduced to mere points; we only offer this as a suggestion at present as we have no material from the type locality (Nevada) which matches these types.

Manitoboides Fletch has been separated from *comma* by Dr. Dyar; we have one of the ♀ Cotypes, a very poor specimen, before us and think this action is correct. The species seems close to *metea* of which it may possibly prove to be a race, yellower in maculation than the typical one. The larvae of both these species, in contradistinction to

comma, hatch about 10 days after egg laying, whereas *comma* eggs hibernate and hatch the following spring; this fact in itself would be sufficient to warrant a separation of *manitoboides* from *comma*.

P. COLUMBIA Scud.

This species was shortly described in Scudder's Syst. Rev. p. 77, attention being called to the difference in the ♂ sexual organs; the ♂ type from California, which is in Cambridge, is figured in Scudder's paper in Mem. Bost. Soc. N. Hist. (1874, Vol. II, No. 4) as *sylvanoides* Bdv. (Pl. 10, Fig. 22) and the genitalia are also figured (Pl. 11, Figs. 15, 17). The species is quite distinct from *sylvanoides* and we think also from *comma* and its varieties judging by the genitalia. Wright has called it *california*, figuring it on Plate XXXI, Fig. 423, his underside specimen having the markings rather more reduced than usual; as *columbia* he figures (Fig. 426) what is probably *sonora* Scud. and apparently not distinct from his Fig. 425. Dyar has also redescribed the species as *erynnioides* (Jour. N. Y. Ent. Soc. XV, 50); both Dyar and Scudder note the presence of a blackish patch below the stigma; this and the very straight oblique row of white spots on underside of secondaries with only a single spot in cell 6 and none in cell 7, separate it readily from *comma*; the dentate inner edge of the marginal border on secondaries is also a point of distinction. Scudder's ♀ *sylvanoides* (Pl. 10, Fig. 21) is probably not correctly referred; the band of spots on secondaries is differently shaped to that of the male and a pale spot near the base of the cubital branches is shown which is not present in the true ♀'s which further agree exactly with the ♂'s on the under side. W. H. Edwards (Can. Ent. XV, 148) discusses the species at length and also considers it a good species; he without a description, for *comma* Bdv. (*nec* Linn.); the species was described from a ♂ from California (Hy. Edwards) this specimen can, at best, be only typical.

P. JUBA Scud.

The name was first used in 1872 in the Systematic Revision, without a description, for *comma* Bdv. (*nec* Linn); the species was described and figured in Scudder's paper in 1874 in Mem. Bost. Soc. N. Hist., II (4), p. 349, Pl. X, Figs. 19, 20 and is stated to occur in California and the vicinity of Salt Lake City, Utah; the specimens figured are from Utah so this must be regarded as the type locality. We have specimens from various localities in the Sierra Nevada Mts.,

Calif., which exactly agree with Scudder's figures, as well as a ♀ labelled Utah (Bruce). The species has generally been considered distinct from *comma* and we think correctly so; it is most readily distinguished by its larger size and strongly dentate inner margin to the dark outer border of primaries, this color being sharply defined from the bright orange color of the remainder of the wing which projects along the veins into the black border, at times almost to the outer margin; the ♂ stigma, as noted by Dyar, seems to be generally longer and often narrower, due to the absence of black scales along its outer edge, but this is not so noticeable in typical *juba* as in what we consider a variety of this species from Arizona, Texas, and Colorado, and which is possibly the *viridis* of W. H. Edwards. *Viridis* was described from a single ♂ received from Prof. Snow from Las Vegas, N. M., 1882 and the type is not in the Edwards' Collection; the description (C. Ent. XV, 147) is poor and states that the "upper side is darker—more fuscous and less fulvous—and secondaries beneath and apical area of primaries are densely dusted with golden-green; the spots white and somewhat smaller than in the type." Through the kindness of Prof. S. Hunter of Lawrence, Kan., we have seen a specimen from the Snow Collection labelled '*juba*, Hot Spgs., N. M., July 82' which was probably one of the type lot of *viridis* if not the actual type. The underside of secondaries is a golden-green with large, white, more or less coalescent spots which show a tendency to curve downward and run parallel to the outer margin; the species seems common in Colorado, New Mex., Ariz. and W. Texas.

GENUS OCHLODES Scud.

The genus is closely allied to *Pamphila*, but the pointed end of the antennal knob is longer and slightly hooked and the ♂ stigma is not so oblique, crossing the vein Cu_2 considerably further from its base than in *Pamphila*. The species included in the genus are all Western and have been considerably confused owing to poor descriptions; now that we have M. Oberthur's excellent figures of Boisduval's types (1913, Etud. Lep. Comp. IX, (1) Pl. 211) we are at length able to correctly place the species. *Sylvanoides* Bdv. according to the ♂ sex, has usually been called *agricola* Bdv.; Boisduval's ♀ *sylvanoides* looks more like a small ♀ *campestris* so the name must be held to the ♂. Wright figures the species as *pratincola* (l. c. Pl. 31, Fig. 433) and his first figures of *nemorum* (Fig. 430) and *milo* (Fig. 432) are apparently the same species. *Napa* Edw. from Colorado is only a local race

scarcely to be separated, as already mentioned by Dr. Dyar. *Agricola* Bdv. is *yreka* Edw. and has often been called *nemorum* Bdv.; it may be distinguished by the rather hyaline spots along the outer margin of the stigma and the broad black border; Wright figures it correctly (l. c. Fig. 431b) and we think Fig. 430b is probably this species also; the underside of secondaries is almost immaculate deep orange yellow in the ♂'s but the ♀'s usually show the pale yellow band of spots; *milo* Edw., judging by the original description must be very closely related to *agricola*. *Nemorum* Bdv. is also very close to *agricola* and may merely be a local form; it is paler and the hyaline spots are scarcely to be traced, being merged in the yellow ground color; the underside is also much paler; *verus* Edw. is a synonym; the species is apparently figured by Wright as *agricola* (Fig. 431) and possibly also under *milo* (Fig. 432b) this latter figure approaching *pratincta* Bdv. which is we think only a form of *nemorum* rather more suffused with orange than usual; the ♀ *pratincta*, as figured by M. Oberthur, is seemingly better referable to *sylvanoides* than to *nemorum* but as in the afore mentioned case the ♂ will hold the name.

Snowi Edw. placed doubtfully by Dyar in this genus seems rather out of place with the remainder of the group, as the point of the antennal knob is quite long and at least equal to the width of the same; it would seem to be closely related to *verna* Edw., which Dyar places in the genus *Euphyes* along with *vestris* Bdv. but which must be removed from here as the mid-tibiae are strongly spined and in *metacomet*, the type of the genus, we find unspined tibiae. For the present both *snowi* and *verna* may be placed in *Atrytonopsis* G. & S. as they do not actually contradict the definition of this genus although it is quite possible they may form a new generic unit.

GENUS THYMELICUS Hbn.

This genus as characterized by Dyar (Jour. N. Y. Ent. Soc. XIII. 127) cannot stand; it is based on the false selection of *vibex* Hbn. as the type species by Scudder in his Hist. Sketch 1875. The type was specified in 1870 by Butler as *actaeon* Rott. but Scudder overrules this action by a peculiar process of reasoning, claiming that *actaeon* falls in the genus *Adopaea* Billb., of which *thauomas* had been made the type in 1820, and with which *actaeon* was congeneric. Butler's action is however perfectly valid and Scudder's proper procedure would have been to have sunk *Adopaea* to *Thymelicus* if the two types actually

proved congeneric; Bethune-Baker has already ably criticised this failing of Scudder's in his otherwise excellent sketch (Ent. Rec. XXVI, p. 133, 1914).

Instead of the generic name *Thymelicus* as used by Dyar, we have available *Hedone* Scud. (type, *brettus* Bdv. & Lec.), *Limochores* Scud. (type, *manataaqua* Scud.) or *Pyrrhosidia* Scud. (type, *mystic* Scud.). For the present however we think it advisable to place all these species in the genus *Polites* Scud. (type, *peckius* Kirb.) which is separated by Mabilie and Dyar on the strength of vein 3 of primaries being further from the apex of cell; we doubt the value of the position of this vein as a good generic character; it seems variable and needs further careful study; *peckius* in other respects seems but a further modification of *mystic*.

POLITES DACOTAH Edw.

An examination of the type ♂ of this species labelled 'napa = dacotah, type, Colo.' in the Edwards' Collection shows that the species has been wrongly sunk as a synonym of *napa* Edw. *Dacotah* is in reality the western form of *mystic* which has been recently described by Skinner as *pallida*; the original description of *dacotah* appears to bear out this reference as it mentions the 'pale fuscous hind margins of equal breadth' not dentate as in *napa*, and makes no mention of the black marginal shading on the underside of primaries above anal angle, usually quite distinct in *napa* but wanting in this form of *mystic*. The black scaling beyond the stigma is not mentioned, it is true, but the stigma is characterized as broad and Edwards might easily have regarded this scaling as part of the stigma itself. We see no grounds therefore to doubt that the specimen so labelled in the Edwards' Collection is the true type.

P. SONORA Scud.

For the species heretofore known as *sylvanoides* Bdv. we must now use the name *sonora* Scud., the type coming from the Sierra Nevada Mts. (Hy. Edwards). *Siris* Edw., described from Puget Sound, Wash. (the original description gives Mt. Hood as type locality, but Morrison later (Pap. III 43) corrects this) we consider a synonym. The Rocky Mt. form with white spots on the underside of secondaries has been named *utahensis* by Skinner. Wright figures the species as *sylvanoides* (l. c. Pl. 31, Fig. 425).

CATIA OTHO A. & S.

Godman & Salvin use the name *druryi* Latr. for this species, but we see no adequate reason why the older name *otho* should not remain; the ♂ figured by Abbot (Pl. 16) is easily recognizable by the peculiar sex mark; unfortunately Smith in the text restricts the name to the specimen figured in the upper right hand corner in case the two figures prove to be those of distinct species; this figure represents a ♀ and leaves a certain element of doubt as to its identity; however, allowing a slight margin for inaccuracies in delineation, we do not see that it actually contradicts our usual conception of ♀ *otho*; it is rather yellower than usual and the yellow spots at veins 5 and 6 project beyond the costal band of spots more than we have ever seen, otherwise it agrees quite well with specimens before us from Texas, and until more definite proof can be offered we think it well to accept the figures as being the ♂ and ♀ of one species; the amount of yellow is in any case variable and southern specimens frequently show considerably more of this color than northern ones; the matter of the spots could be put down to an inaccuracy of the artist. In any case it is doubtful if Latreille's name can be used at all as it was originally spelt *Hesperia drury* which is certainly not Latin or even a latinization of a foreign name.

GENUS ANATRYTONE Dyar.

As Dr. Skinner has pointed out (Ent. News, 1900, p. 317) Dyar in his revision has included the type of Scudder's genus *Atrytone* in his new genus *Anatrytone*. As far as we can judge the types of the two genera, viz. *arogos* Bdv. & Lec. (*iowa* Scud.) and *delaware* Edw. are conspecific, both lacking the spines on the mid tibiae; *Anatrytone* will therefore sink into the synonymy. The species at present placed by Dyar in the genus *Atrytone* we would place, rather than create a new genus, in *Poanes* Scud. along with *massasoit*, with which they seem to possess considerable affinity.

A. DELAWARE Edw.

This name must be superceded by *logan* Edw. which has page priority and will hold the name even though based on a ♀ specimen. We follow Godman & Salvin in keeping the species separate from *vitellius* Fabr. which probably does not occur in our faunal region.

A. BYSSUS Edw.

The species is placed in *Limochores* by Dyar, a genus, according to his conception, with stigma in the ♂ sex, and in the key to the species the form of this stigma is used in separating *byssus* from other species. The true *byssus* however has no stigma as a reference to the original description readily shows and falls apparently into the genus *Atrytone* Scud., the ♂'s showing great similarity to the ♀'s of *logan* Edw. In the Edwards' Collection the ♂'s of *arpa* Bdv. & Lec. are mixed with *byssus* which may have led to Dyar's misidentification.

GENUS LIMOCHORES Scud.

Dyar diagnoses the genus (which he misspells *Limochroes*) as possessing a stigma in the ♂ sex, having the point of the antennal club long, and lacking spines on the mid tibiae; these two latter characteristics are directly contradicted by the type of the genus, *manataaqu* Scud. as fixed by Scudder in 1872. *Manataaqu* has distinctly spined mid tibiae and a short point to the antennal club and, as pointed out by Dr. Skinner (Ent. News, 1905, 317), is very closely related to *cernes* Bdv. & Lec. The remainder of the species included in this genus by Dr. Dyar (except *byssus* and *yehl*) appear to agree with the diagnosis; they form a group related to the genus *Atrytone* Scud. but differing in possessing a stigma in the ♂ sex; for the present we would include these along with *vestris* in the genus *Euphyes* Scud. as the position of vein 3 on primaries, which is used by Dyar as a means of separating *Euphyes* and *Limochores*, needs further study to prove its validity for generic purposes.

EUPHYES CONSPICUA Edw.

This name has page priority over *pontiac* Edw.; although originally applied to the ♀ sex only, the name *conspicua* must be used for the species and replaces *pontiac*, which was the name given to the ♂ sex.

GENUS PARATRYTONE Dyar.

This genus cannot stand, being preoccupied by Godman & Salvin (1900, Biol. Cent. Am. Rhop. Vol. II, p. 487) for two new Mexican species of *Hesperiidae*, viz. *rhexenor* and *polyclea*, the former being designated as type. We do not know these species, but Godman & Salvin's characterization of the genus does not contradict that of Dyar; for the present, therefore we think it wise to follow Dyar's

use of the genus, but credit it to Godman & Salvin. The genus contains those species with stigma in δ and long point to antennal club as in *Euphyes* Scud. but differing in having spined mid-tibiae. Dyar includes *scudderi* Skin., *howardi* Skin. and *aaroni* Skin. in this genus. Removing *scudderi* from the group along with *howardi* and *aaroni* we would associate *yehl* Skinner, which has also spined mid-tibiae. *Scudderi* we would associate with *snowi* Edw. and place both for the present in the genus *Atrytonopsis* G. & S.; we imagine that *yuma* Edw. will take priority over *scudderi*; the type is apparently lost, but the description certainly fits this species excellently.

CALPODES COSCINIA H. S.

Godman & Salvin place this species, as a doubtful synonym of *ares* Feld., in the genus *Prencis* and are followed in this course by Dyar. Our specimens from Brownsville, Tex., which agree well with the figure in the *Biologia*, show spined mid tibiae and would appear better referred to *Calpodes*. Herrich-Schaefer in his description of *coscinia* also mentions the spined mid-tibiae; possibly two species are involved and the unspined form is the true *ares* Feld. For the present we think it would be wise to retain the name *coscinia* H. S. in our lists.

ATRYTONOPSIS MARGINATA Skin.

On examining the type we found that this species could scarcely be separated from *python* Edw. (figured by Wright Fig. 479) and Dr. Skinner concurred with us in this opinion; for the present the name may be left and applied to the New Mexican form which may prove distinct enough when long series have been compared to warrant a racial name.

A. CESTUS Edw.

The single δ type of this species is in the Neumoegen Coll. and we were surprised to find that the species passing under this name was not the true *cestus* at all; *cestus* is closely related to *python* but larger, the spot in cell 2 of the primaries being very large and triangular; the underside of the secondaries is marbled with purplish and the spots are semihyaline; the species is apparently rare as we only know it from the single type specimen.

A. EDWARDSI n. sp. (Pl. VIII, Figs. 9, 10).

For the species passing under the name of *cestus* we apparently need a name and we would propose calling it *edwardsi*. The color of the upperside is deep black brown, primaries sprinkled with yellow scales basally and along the costa and secondaries clothed in basal half with long yellowish hairs and also dusted with yellow; primaries with a large hyaline white quadrate spot in the cell, somewhat contracted in the middle; three small spots below the costa near apex, arranged in an oblique row; three similar spots beyond the stigma parallel to outer margin, the lowest is small and triangular, the middle one very large and quadrate, the upper one smaller and quadrate or round; stigma faint, narrow, black, extending obliquely from the base of vein 3 to vein 1; fringes white, slightly checkered. Secondaries with a small white spot in the cell and a slightly bent submarginal row of three white spots, the upper one largest and apparently composed of two confluent spots. Beneath, primaries as above, shaded apically with blue-gray scaling, the lowest spot of the outer row almost obscured by a whitish cloud, the others as distinct as on the upper side; secondaries heavily suffused with blue gray, almost unicolorous, with a curved basal row of three whitish spots and a complete outer row, parallel to the outer margin of which the spots corresponding to those of the upper side are largest. Expanse 30-35 mm. ♀ similar to ♂ but rather larger.

Type ♂ Redington, Ariz. Coll. Barnes. Paratypes, 3 ♂ S. Ariz. (Poling).

Type ♀ Babaquivera Mts., Ariz. Paratypes, 2 ♀ S. Arizona (Poling); Babaquivera Mts., Ariz.

This species is figured by Wright as *cestus* (l. c. Pl. XXXII, Fig. 482).

A. LOAMMI Whit.

This species is placed by Dyar in the genus *Lcrodea* Scud. characterized by lack of stigma in ♂; as the ♂'s show a narrow, distinct but rather broken stigma we should be inclined to place the species in *Atrytonopsis* G. & S. along with *hianna* Scud.

A. OSYKA Edw.

This species has evidently been confused with *fusca* G. & R. by Dyar. It was described (Tr. Am. Ent. Soc. I, 288) from 1 ♂ 2 ♀ from the vicinity of New Orleans. These three specimens are pres-

ent in the Edwards' Collection labelled 'Louisiana'; the ♂ is a very worn specimen and is without doubt referable to *vestris* Bdv. the head showing distinct yellow hairs and the stigma being similar; the ♀'s belong to other species, one being *eufala* Edw. and the other possibly a worn *brettus*. We would hold the name to the ♂ type, *osyka* thus becoming a synonym of *vestris* Bdv.

MEGISTIAS FUSCA G. & R.

Godman & Salvin state (Biologia Vol. II, p. 571) that this species falls into the genus *Megistias* G. & S. Florida specimens are generally quite immaculate but Texas ones show a tendency to faint post-discal spots on primaries, especially in the ♀.

LERODEA ARABUS Edw.

Arabus is placed by Dyar in the genus *Stomyles* which has a double stigma; our ♂ specimen shows no trace of a stigma and we would place it in *Lerodea* along with *eufala* Edw. Judging by the figure (Biol. Cent. Am. III, Pl. 95, Figs. 19/20) *dysaulus* G. & S., if not the same species, is extremely close to *arabus*.

GENUS AMBLYCIRTES Scud.

Godman & Salvin and Dyar separate the genus *Stomyles* Scud. from *Amblycirtes* on the strength of the shape of the male stigma; in *Stomyles* it is said to be divided, one portion extending along the cubital vein between Cu_1 and Cu_2 and forming an acute angle with the other portion extending along Cu_2 (vein 2) from the base outwards; in *Amblycirtes* the stigma is said to be undivided. As a matter of fact the stigma in *vialis*, the type of *Amblycirtes*, shows distinct scaling along the basal portion of vein Cu_2 but as the angle formed with the cubital vein is more or less filled with modified scales this is not so apparent as in *textor*, the type of *Stomyles*, where the angle is left open and the scaling extends further along the vein; the type of stigma is on the whole essentially the same and as there is no other apparent structural difference we would hardly advocate retaining both genera, especially as Godman & Salvin note that the ♂ sexual organs are of the same type in both groups. If any species should be separated off it is *nanno* Edw., which has shorter 3rd joint of palpi and a distinct undivided stigma extending below vein Cu_2 but as the type of maculation is very similar to that of the other members of the group we prefer to retain it here for the present; *oslari* Skin. and

simius Edw. must be placed elsewhere for reasons already stated, the remaining species forming a rather compact group, readily distinguished superficially by the checkered fringes.

A. CELIA Skin.

According to a specimen in the Edwards' Collection from Texas labelled *eos* Edw. *celia* will become a synonym of *eos*; the description of *eos*, however, reads rather like that of *meridionalis* Dyar and it will be necessary to examine the type of *eos*, which should be at Cambridge, to determine the exact identity of the species.

A. QUINQUEMACULA Skin.

This proves, on an examination of the type, to be a worn specimen of *Amblycirtes comus* Edw.; the fringes being missing, the species at first sight presents a somewhat different appearance.

MASTOR OSLARI Skin.

Dyar includes this species in *Amblycirtes* Scud. but from the shape of the sex mark and the short 3rd joint of the palpi it would seem for the present best referred to *Mastor*. Superficially it differs from the *Amblycirtes* and *Stomyles* species in lacking the checkered fringes which appear to be quite characteristic and point to a correlation of structure and pattern so often noted in the Diurnals.

PLATE IV

- Fig. 1. *Papilio americanus* *Koll.* ♀ Palmerlee, Ariz.
Fig. 2. *Papilio alaska* *Scud.* ♂ Rampart House, Alaska.
Fig. 3. *Papilio glaucus canadensis* *R. & J.* ♂ Chatanika, Alaska.
Fig. 4. *Papilio glaucus canadensis* *R. & J.* ♂, underside.

PLATE IV

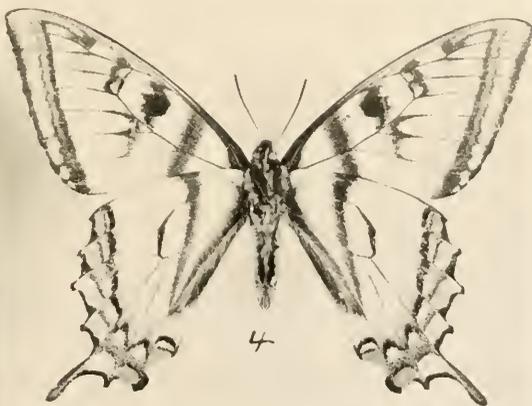
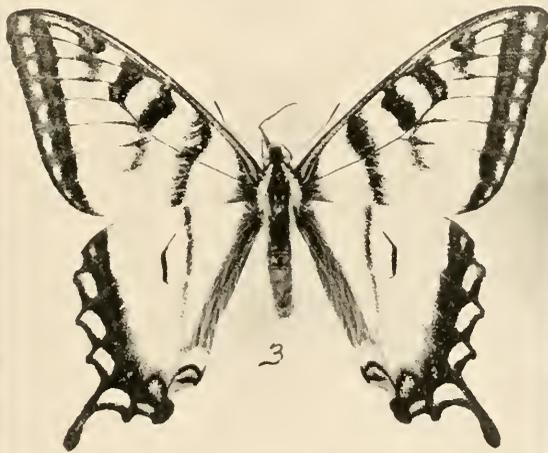
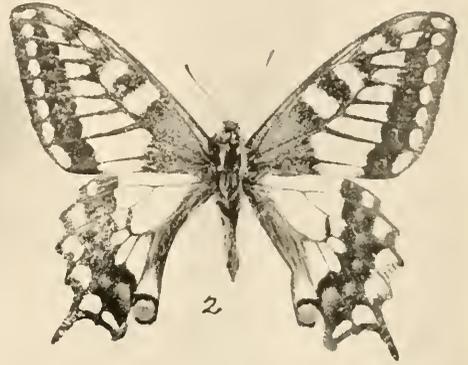


PLATE V

- Fig. 1. *Parnassius smintheus hermodur Hy. Edw.* ♂ Silverton, Colo.
Fig. 2. *Parnassius smintheus hermodur Hy. Edw.* ♂ Silverton, Colo.
Fig. 3. *Parnassius smintheus hermodur Hy. Edw.* ♀ Silverton, Colo.
Fig. 4. *P. smintheus hermodur ab. nigerrima Verity* ♀ Silverton, Colo.
Fig. 5. *Parnassius smintheus sayi Edw.* ♂ Provo, Utah.
Fig. 6. *Parnassius smintheus sayi Edw.* ♀ Provo, Utah.
Fig. 7. *Eurymus christina form gigantea Stkr.* ♂ Chatanika, Alaska.
Fig. 8. *Eurymus christina form gigantea Stkr.* ♀ Chatanika, Alaska.
Fig. 9. *Eurymus christina form gigantea Stkr.* ♂, underside.

PLATE V

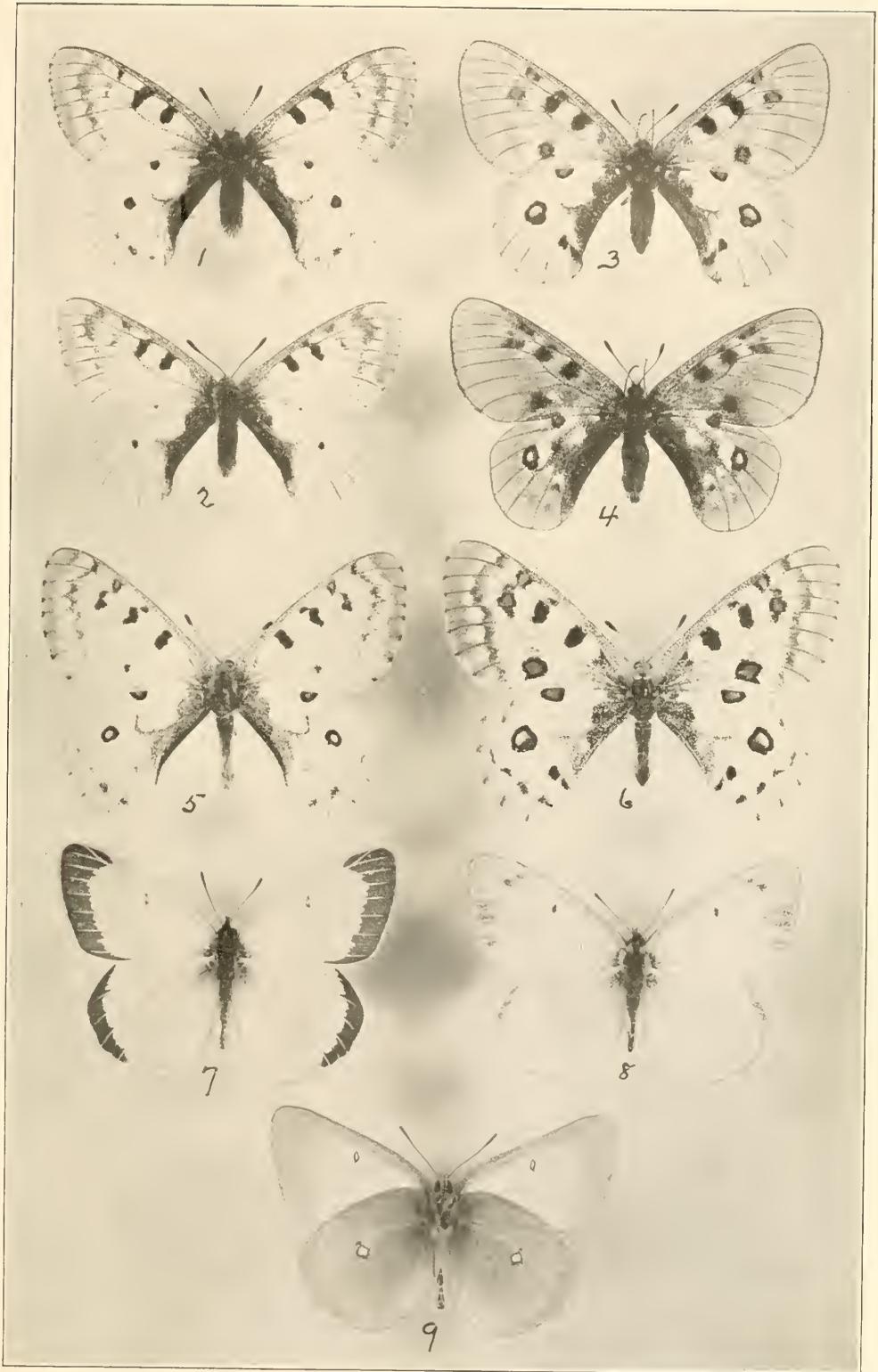


PLATE VI

- Fig. 1. *Pieris napi pseudonapi* B. & McD. Type, ♂ Silverton, Colo.
Fig. 2. *Pieris napi pseudonapi* B. & McD. Type, ♀ Silverton, Colo.
Fig. 3. *Pieris napi pseudonapi* B. & McD. Paratype, ♀ Silverton, Colo.
Fig. 4. *Pieris napi pallidissima* B. & McD. Type, ♂ Provo, Utah.
Fig. 5. *Pieris napi pallidissima* B. & McD. Type, ♀ Provo, Utah.
Fig. 6. *Pieris napi arctica* Verity. ♂ Chatanika, Alaska.
Fig. 7. *Pieris napi arctica* Verity. ♀ Chatanika, Alaska.
Fig. 8. *Pieris napi hulda* Edw. ♀ Pribilof Is., Alaska.
Fig. 9. *Pieris napi hulda* Edw. ♂, underside Pribilof Is., Alaska.
Fig. 10. *Pieris napi pallidissima* B. & McD. ♂, underside Provo, Utah.

PLATE VI

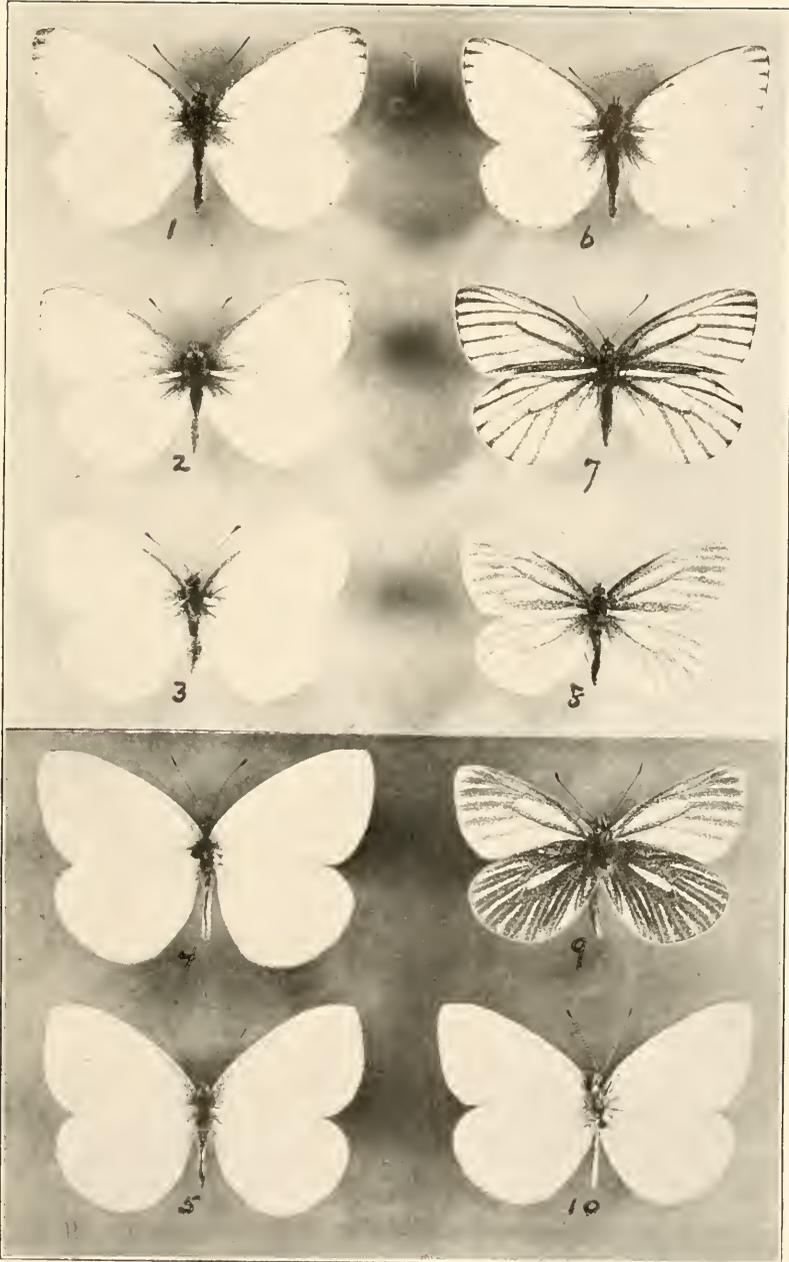


PLATE VII

- Fig. 1. *Pieris napi frigida* *Scud.* ♂ Newfoundland.
Fig. 2. *Pieris napi frigida* *Scud.* ♀ Newfoundland.
Fig. 3. *Eurymus eurytheme kootenai* *Cockle* ♂ Okanagan Falls, B. C.
(May 9).
Fig. 4. *Eurymus eurytheme kootenai* *Cockle* ♀ Okanagan Falls, B. C.
(May 20).
Fig. 5. *Eurymus eurytheme kootenai* *Cockle* ♂, underside Atlin, B. C.
(Aug.).
Fig. 6. *Eurymus pelidne labradorensis* *Scud.* ♂ Hopedale, Labr.
Fig. 7. *Eurymus pelidne minisni* *Bcan* ♂ Laggan, Alta.
Fig. 8. *Eurymus pelidne skinneri* *Barnes* Type, ♂ Yellowstone Pk., Wyo.
Fig. 9. *Eurymus occidentalis barbara* *Hy. Edw.* ♂ Santa Rosa, Calif.

PLATE VII

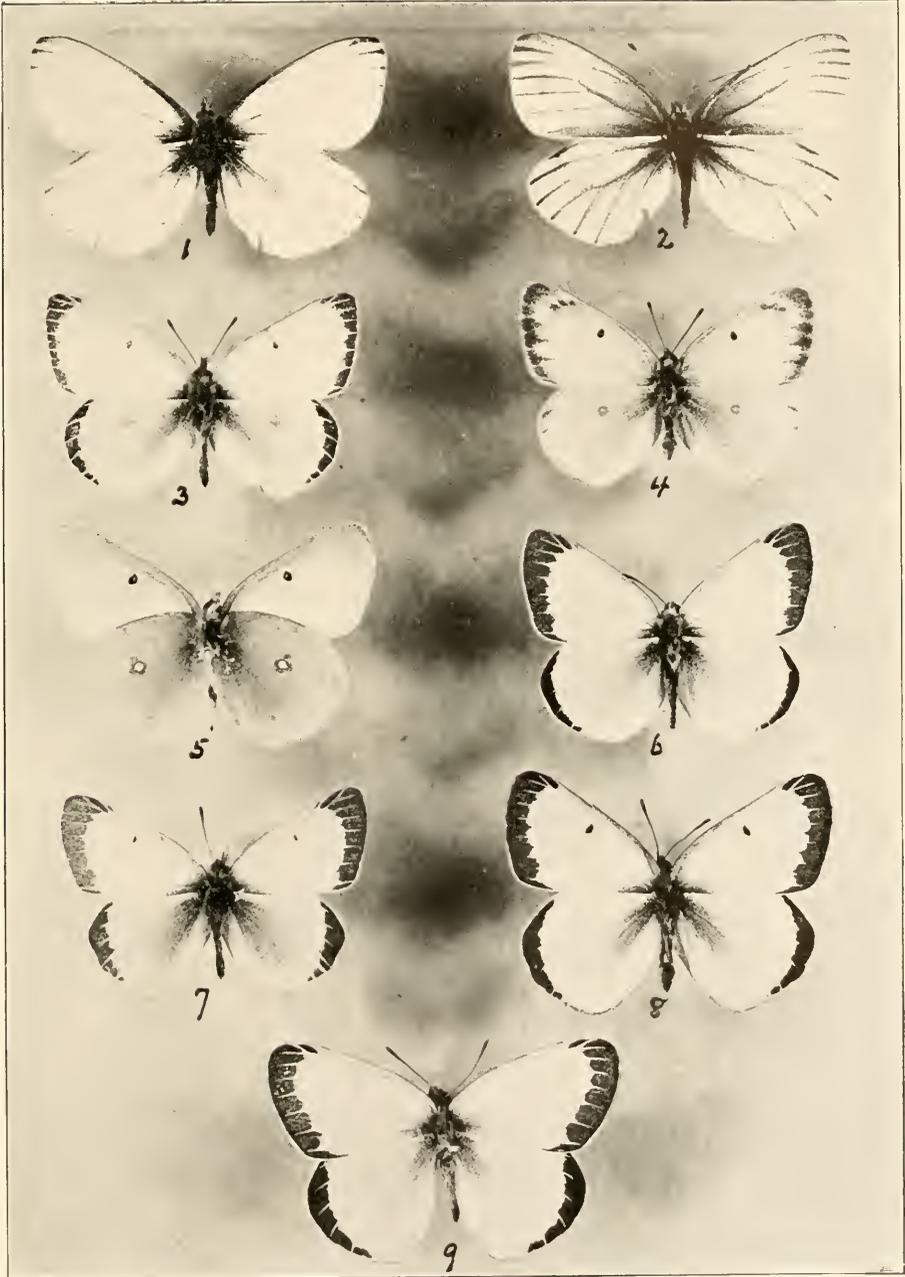


PLATE VIII

- Fig. 1. *Cercyonis silvestris* *Edw.* ♂ Marin Co., Calif.
Fig. 2. *Cercyonis silvestris* *Edw.* ♀ Marin Co., Calif.
Fig. 3. *Cercyonis silvestris* *Edw.* ♂, underside.
Fig. 4. *Cercyonis silvestris paulus* *Edw.* ♂ Tulare Co., Calif.
Fig. 5. *Cercyonis oetus* *Bdv.* ♂ Nevada Co., Calif.
Fig. 6. *Cercyonis oetus* *Bdv.* ♀ Nevada Co., Calif.
Fig. 7. *Cercyonis oetus* *Bdv.* ♂, underside.
Fig. 8. *Libythea carinenta ab. larvata* *Stkr.* ♀ San Benito, Texas.
Fig. 9. *Atrytonopsis edwardsi* *B. & McD.* Paratype, ♂ S. Arizona.
Fig. 10. *Atrytonopsis edwardsi* *B. & McD.* Paratype, ♀ S. Arizona.

PLATE VIII

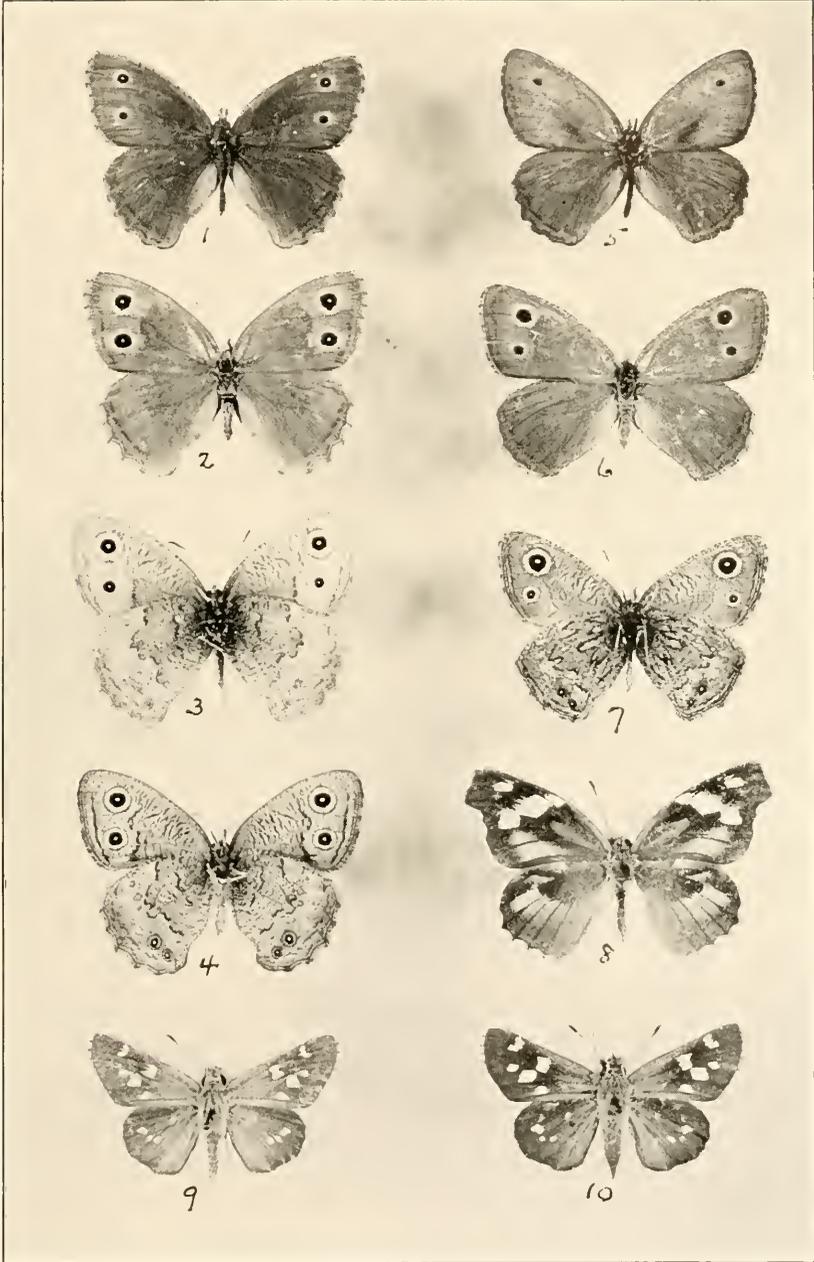


PLATE IX

- Fig. 1. *Argynnis nausicaa* *Edw.* ♂ Senator, Ariz.
Fig. 2. *Argynnis aphrodite columbia* *Hy. Edw.* ♂ Nepigon, Ont.
Fig. 3. *Argynnis chitone* *Edw.* ♂ S. Utah.
Fig. 4. *Argynnis chitone* *Edw.* ♂, underside.
Fig. 5. *Junonia coenia* *Hbn.* ♀ Long Is., N. Y.
Fig. 6. *Junonia genoveva* *Cram.* ♀ Miami, Fla.
Fig. 7. *Basilarchia arthemis rubrofasciata* *B. & McD.* Paratype, ♂ Cartwright, Man.

PLATE IX

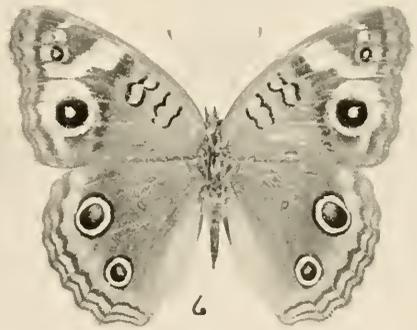


PLATE X

- Fig. 1. *Argynnis montivaga* Behr. ♂ Truckee, Calif.
Fig. 2. *Argynnis mormonia* Bdv. ♂ Mineral King, Calif.
Fig. 3. *Euphydryas rubicunda* Hy. Edw. ♂ Calif.
Fig. 4. *Melitaea minuta* Edw. ♀, underside Kerrville, Texas.
Fig. 5. *Melitaea thekla* Edw. ♂, underside Redington, Ariz.
Fig. 6. *Melitaea bolli* Edw. ♂, underside San Benito, Texas.
Fig. 7. *Melitaea minuta* Edw. ♂ Kerrville, Texas.
Fig. 8. *Melitaea nubigena* Behr ♂ Tuolumne Meadows, Calif.
Fig. 9. *Melitaea nubigena* Behr ♂, underside.
Fig. 10. *Melitaea nubigena* Behr ♂ Tuolumne Meadows, Calif.
Fig. 11. *Melitaea callina* Bdv. ♂ Kerrville, Texas.
Fig. 12. *Strymon auretorum* spadix Hy. Edw. ♂, underside Loma Linda,
Calif.
Fig. 13. *Hesperia xanthus* Edw. ♂ Silverton, Colo.
Fig. 14. *Hesperia macdunnoughi* Oberth. ♂ Redington, Ariz.

PLATE X

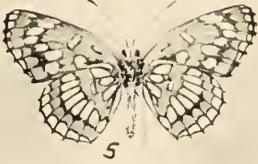
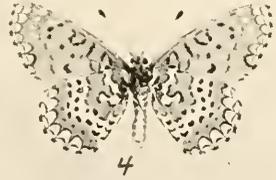
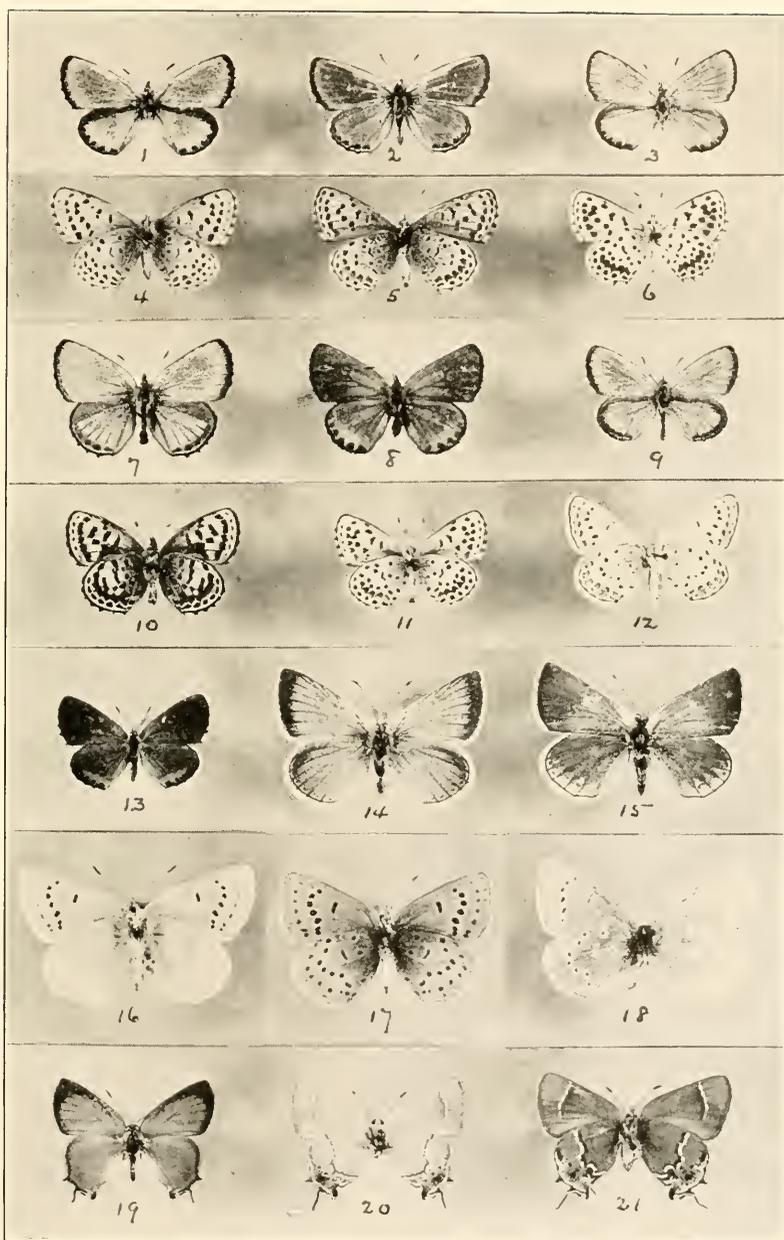


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CONTRIBUTIONS
TO THE
NATURAL HISTORY
OF THE
LEPIDOPTERA
OF
NORTH AMERICA

VOL. III
No. 3

SYNONYMIC NOTES ON NORTH AMERICAN
HETEROCERA

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DECATUR, ILL.
THE REVIEW PRESS
DECEMBER 14, 1916

Published
Under the Patronage
of
MISS JESSIE D. GILLET
Elkhart, Ill.

INTRODUCTION

The following notes are the result of an extended trip made by Dr. McDunnough in the early months of 1916 through the museums of the East for the purpose of studying type specimens and establishing their identity. We would take this opportunity of extending our hearty thanks to the curators of the various museums visited for their invariable courtesy and kindness in offering every facility possible in connection with our work.

SYNONYMIC NOTES ON NORTH AMERICAN
HETEROCERA
SATURNIIDAE

COLORADIA PANDORA Blake.

Dr. Dyar after sinking *lois* Dyar to *doris* Barnes proposed the name *loiperda* (Proc. Wash. Ent. Soc. XIV, 155) for what he considered a form of *pandora* without pink shading on the secondaries. We have compared material with the types of both *pandora* at Philadelphia and *loiperda* in the National Museum and find them practically identical, the ♀ type of *pandora* showing scarcely a trace of pink. Personally we do not believe that this pink shading on the secondaries has any specific value whatever; in series before us from a single locality individuals are found with heavy pink shading and others with not a trace of the same, but otherwise identical. In any case whatever stress may or may not be laid upon this feature, *loiperda* will sink to *pandora* as both represent the same form.

ARCTIIDAE
LITHOSIINAE

ILLICE UNIFASCIA G. & R.

We have been unable to locate the types of this species which was described from specimens from Florida and Texas. Fortunately the figure given by Grote is distinctly good (Tr. Am. Ent. Soc. II, Pl. II, Fig. 63) and the species can be definitely identified as that one with a rather broad yellow band crossing primaries, this band being somewhat dilated at costal and inner margins and joined to the base of wing along inner margin by an evenly broad yellow band; the ♂'s are practically similar to the ♀'s (the figure being that of a ♀) and are typical members of the genus *Illice*, the inner margin of the secondaries *not* possessing a projecting tuft of hairs at the anal angle. We mention this fact because *tenuifascia* Harv., which has commonly been called a variety of *unifascia*, appears, if our identification be correct, to possess such a tuft in the ♂ sex and falls properly into the genus *Ozodania* Dyar. The type of *tenuifascia* appears to be lost; the species was described from Bosque Co., Texas, and briefly characterized as being a little larger than *unifascia* with a narrower yellow

band at times broken in the middle; we have a series before us from various South Texas localities and also from N. Carolina which shows a distinctly narrower band than in *unifascia* without much dilation at costal or inner margins; we think therefore that the identification is reasonable sure and would refer *tenuifascia* to the *Ozodania* group as a good species; the ♂ genitalia are quite distinct from those of *unifascia*.

ARCTIINAE

APANTESIS NEVADENSIS G. & R.

The synonymy of this species as given in Dyar's list needs considerable revision. In the first place *shastaensis* French must be entirely removed from this association and be sunk as a synonym of *ornata* Pack; in the Upper Sacramento Valley, the region from which *shastaensis* was described, the only species of *Apantesis* known to occur is the typical form of *ornata* without the white lines on the veins of primaries or with only traces of the same; our own collecting experience in this region showed this species to be common and San Francisco collectors who have spent many summers there assured us that no other species was known from that locality. Although the type has been destroyed, the figure given by French (Can. Ent. XXI, 162) of the type ♀ shows pretty clearly that the reference to *ornata* is correct.

Typical *nevadensis*, the types of which seem to be lost, has an entirely black thorax, but specimens with the usual striped thorax appear to be just as common; the secondaries are of a delicate pale pink in the ♂; *behri* Stretch appears correctly placed as a synonym.

Incorrupta Hy. Edw., listed as a variety, must sink to *geneura* Stkr. The types of the former, as given by Hy. Edwards, were 1 ♂ from Dalles, Oreg. and 3 ♀ from Prescott, Ariz.; an examination of the Hy. Edwards' Collection showed us that the three supposed ♀'s were ♂'s and one of these specimens bears the type label; it agrees almost exactly with the type ♂ of *geneura* Stkr. which we have examined in the Field Museum. The name will apply to the larger race with bright reddish secondaries common in Arizona and evidently extending northward into Colorado.

Sulphurica Neum. (*ochracea* Neum.) is simply an aberration of *geneura* with yellow secondaries instead of pink; such forms occur sparingly in all the *Apantesis* species.

Elongata Stretch, the type of which is in the Neumoegen Collection, has nothing to do with *sulphurica* but is very possibly a yellow winged form of *superba* Stretch which in our opinion must also be removed from association with *nevadensis* and placed as a British Columbia form of *blakei* Grt.

A. BLAKEI Grt.

The type of this species is at Philadelphia; it represents a rather small form, apparently typical about Denver, Colo.; we believe that *superba* Stretch may prove to be a race of this species and that *elongata* Stretch and *diecki* Neum. should be associated closely with *superba*. It would not surprise us at all if *williamsi* Dodge and its various races also proved to be forms of *blakei*; in a series before us from Glenwood Spgs., Colo., there are specimens which certainly show affinities in both directions. Usually *williamsi* can be separated easily by the fact that the transverse white lines of the primaries do not cross the white streak in the fold as is usual in *nevadensis* and *blakei* but our Glenwood Spgs. series, which certainly seems to represent but one species, has specimens of both types. For the present, however, until careful breeding can be done the two may be kept separate.

We should also keep *bolanderi* Stretch separate from *blakei*; it was described from Mt. Shasta, Calif., and it seems a risky proceeding to sink as synonyms species from two such widely separated localities; we have never seen any authentic specimens of *bolanderi* nor do we know if the types are in existence.

A. WILLIAMSII Dodge.

We have never seen anything that would just match Dodge's figure which seems to be that of a ♀; it is possible that *determinata* Neum. is merely the ♂; it is usually considered to be the form with the hind-wings greatly obscured by black but, although one of the types of *determinata* is such a specimen, the original description clearly points to the more normal form with the central area pink and the name must be restricted to the type in the Neumoegen Collection that bears out this description.

NOCTUIDAE
AGROTINAE

CHLOROCLEPTRIA FELICITATA Sm.

We find on examining the type that this species is the same as the one we described recently as *C. imperialis*, which name will become a synonym. We think the reference to *Chlorocleptria* instead of *Rhodophora* is more correct as the species apparently shows greater affinity to *simplex* than to *florida*.

POROSAGROTIS TEXANA Grt.

The types, ♂ and ♀, are at Philadelphia; Grote's figure of the ♀ type is rather crude, especially with regard to the s. t. black patches which are far too greatly emphasized; a comparison however between this figure and the ♀ type shows without much doubt that this specimen actually served as the original for the drawing. The ♀ bears a label '*Agrotis segetum* N. A.' and neither specimen shows anything to prove that they came from Texas as stated in the original description. We can see nothing that would separate the two types of *texana* from the European *segetum* and believe that some error has been made regarding the locality and that *texana* should be dropped from our lists as a synonym of the common European *segetum*.

Obesula Sm., at present listed as a synonym, is quite distinct as an examination of the single ♂ type from Montana in the National Museum showed us. The species bears some resemblance to a large *siccata* but is distinct; besides the type we have seen no other specimens of this species and must accept temporarily Smith's reference of the species to *Porosagrotis*. Hampson's figure (Pl. 61, Fig. 2) of the type of *obesula* is good.

AGROTIS CINEREICOLLIS Grt.

An examination of the type of this species in the Hy. Edwards' Collection proves it to be synonymous with *congrua* Sm., the maculation of the latter type being only slightly fainter than in that of *cinereicollis*. As Mr. Wolley-Dod has already noted (Ent. News, 1913, p. 360) *vocalis* Grt. is another form of the same species, the name *cinereicollis* having priority; *vocalis* may be held as a name for the Central Rocky Mt. race with *invenusta* Grt. a dark colored form from New Mexico, and *planifrons* Sm. a rather similar race from the Canadian Rockies. We figured a typical *congrua* under the name *vocalis*

in our Contributions Vol. I, No. 4, Pl. V, Fig. 1. The synonymy will stand

- cinereicollis* Grt.
- pallidicollis* Grt.
- congrua* Sm.
- a* *vocalis* Grt.
- form invenusta* Grt.
- b* *planifrons* Sm.

EPIPSILIA OKAKENSIS Pack. (Pl. XIII, Fig. 5).

An examination of the type ♀ in Cambridge proves that this species is the same as *cinerea* Staud. which name has priority; in a long series before us from Okak, Labrador great variability in color and markings is shown, but the proximity of the t. p. and s. t. lines is a good distinguishing mark of the species as compared with *tecta* Hbn. (*carnea* Auct.) which also occurs sparingly in the same region and can be readily separated by the genitalia as pointed out by A.

Dampf (Berl. Ent. Zeitschr, 1909, LIV. 128); *roosta* Sm. described from Alaska proves to be a form of *tecta*, rather brighter colored than any we have seen from Labrador. We give figures of both *tecta* (Pl. XIII, Fig. 4) and *cinerea* which should illustrate the points of distinction.

MESOGONA OLIVATA Harv.

Through the kindness of Sir Geo. Hampson, who has examined the type in the British Museum at our request we are able to state that the tibiae of this species are spined and that it falls into the genus *Mesogona* (*Pseudoglaca*), the name *olivata* having priority over *blanda* Grt.

HADENINAE

SCOTOGRAMMA INCONCINNA Sm.

According to the type in the National Museum Hampson's figure (Cat. Phal. Brit. Mus. Pl. 80, Fig. 1) is entirely erroneous. Our notes say that the species is rather closely related to *oregonica* in maculation, the hind-wings showing a distinctly paler inner area and broad darker outer border. We think it should be removed from *Lasionycta* and placed again in *Scotogramma* as employed by Hampson.

POLIA UMBROSA Sm.

The types in the National Museum are 2 ♀'s, one from Colorado, the other from Arizona. As we are not quite certain that these represent a single species, we would propose restricting the type to the Colorado ♀.

POLIA OCCLUNA Sm. (Pl. XII, Fig. 5).

This is a synonym, along with *Perigea latens* Sm., of *alfkeni* Grt.; the species seems best placed in *Polia* along with *nipana* Sm. and *montara* Sm. all three species being characterized by very minutely haired eyes, the hairs being very easily overlooked. We figure a typical specimen from S. Arizona.

POLIA RECTILINEA Sm. (Pl. XII, Fig. 7).

The only types we have found of this species are 2 ♀'s from Vancouver Is. in the National Museum; these are not identical and it is probable that one of them represents a species described by Smith in his paper on *olivacea* and its allies. We would restrict the name *rectilinea* to the type with rigidly oblique t. p. line and considerable olive-green suffusion above the anal angle but without pink shading. We figure a fairly typical ♀ from the type locality.

ERIOPYGA SERRATA Sm.

An examination of the type of this species shows that we had misidentified the species; the true *serrata* is the species redescribed by ourselves as *dubiosa* and figured in our Contributions, Vol. II (3) Pl. V, Fig. 1. The Arizona form, characterized by smaller reniform and greater distance between it and the t. p. line, as figured by Hampson and ourselves (l. c. Vol. I (4) Pl. II, Fig. 17) under *serrata* Sm., is really without a name and we therefore propose for it the name *JOCOSA*, the type from Redington, Ariz., being the specimen figured by ourselves as mentioned above.

BOROLIA TEXANA Morr.

We have seen the type specimens of this species at Cambridge; they have nothing to do with *phragmatidicola* of which Morrison made *texana* a variety, but are in reality the same species as that described a year later by Grote as *ligata* from the same general locality. Grote remarked in the original description that *ligata* possibly might be *texana* and we are now in a position to verify the truth of this statement. We are not sure that *extincta* Gn. from Florida is the

same species, as listed by Hampson; it may at least represent a good racial form but our material is too scanty to decide at present.

CUCULLIINAE

EUROS PROPRIUS Hy. Edw. (Pl. XIV, Fig. 2).

This species is extremely close to the one described later by the same author as *Herrichia cervina* and for which Hampson creates the genus *Protophona*; this genus will fall to *Euros* Hy. Edw. and it is quite possible that *cervina* may prove to be only a form of *proprius* but an examination of the type of the former in the British Museum will be necessary before we can decide this question. We figure typical *proprius*.

CUCULLIA ARIBAC Barnes.

We had considered this species identical with *strigata* Schaus, but on a recent comparison of the two ♂ types we find that the latter species is considerably darker on both wings and is we think *arizona* Sm. and not *aribac* Barnes, which latter species we figured in our Contributions Vol. I, No. 4, Pl. VI, Fig. 15.

ONCOCNEMIS DESERTA Sm.

An examination of the type of this species in the Hy. Edwards Collection showed that it possessed a tibial claw which has been overlooked by Smith when he drew up the description; the species must therefore be removed from *Homohadena* and placed in *Oncocnemis* next to *punctilinea* Hamp. to which it is very closely allied.

ONCOCNEMIS CHANDLERI Grt.

The species was described in Buff. Bull. I, 107 from several specimens taken in Colorado by Mr. Mead and is excellently figured on Pl. III, Fig. 9 of the same volume. Hampson based his determination of *chandleri* on a specimen marked 'type' in the British Museum which was evidently the aberrant specimen mentioned by Grote in the original description in which the blackish hind border of secondaries 'does not contrast greatly with the rest of the wing', and which is really a specimen of the species described later by Smith as *colorado* as an examination of the specimen in the British Museum proved to us. In view of Grote's figure, which is unmistakable, and according to the existing rules of nomenclature we do not believe that Hampson's action in holding the name *chandleri* to this so-called type and

redescribing the true *chandleri* as *poliochroa* will be valid; the only course open to us seems to be to sink *poliochroa* to *chandleri* and leave *colorado* Sm. for the other closely allied species.

HOMOHADENA INCONSTANS Grt. (Pl. XIII, Fig. 10).

An examination of the ♂ and ♀ types of this species in the Neumoegen Collection showed that they represented two distinct species. The type ♀ had no tibial claw, a rather ochreous collar, with chocolate front and pronounced streaks on the veins; the type ♂ from Prescott, Ariz., showed only faint streaks on the veins and a very marked contrast on the collar between a deep chocolate brown lower portion and a whitish upper portion; the fore tibiae were missing, but as Grote placed the species in *Oncoctenemis* originally we may presume the existence of a claw. The ♂ we believe to be what we described recently as *Oncoctenemis astrigata* from Utah and figured in Contributions Vol. I, No. 5, Pl. II, Fig. 4; we have also a ♂ from White Mts., Arizona. The name *inconstans* must therefore be restricted to the species represented by the ♀ type which will fall into *Homohadena* close to *incomitata* Harv; we figure a ♂ taken in Yavapai Co., Ariz., by Mr. Buchholz.

EUTOLYPE DEPILIS Grt.

The species was described from a single ♀ from Columbus, Ohio, which is now in the Neumoegen Collection; following the description of *depilis* Grote mentions a ♀ from Texas (Belfrage), close to *depilis*, which possibly represents a distinct species. Later Smith, associating the name *depilis* with this Texan ♀ which Grote had labelled *depilis*, described as *bombyciformis* what was actually the true *depilis*. We have seen the types of both *depilis* Grt. and *bombyciformis* Sm. and they represent to us a single species. Hampson figures a Texan ♀ under *depilis* which certainly looks distinct and may prove to be an unnamed species, but we have no material from this locality before us; the typical form is well figured by Holland (Moth Book Pl. 21, Fig. 13).

PARASTICHTIS INSIPIDA Stkr. (Pl. XIV, Fig. 1).

This species proves on an examination of the type to be the same as *inops* Grt. which has priority; we are a little in doubt as to the correct position of the species but for the present it can remain as placed by Hampson; we figure a ♀ from Omaha, Nebr.

PARASTICHTIS (ORTHOSIA) FORNICA Sm.

This species appears, after a careful examination of the type to be nothing but a rather undersized *purpurea* Grt.; the color is pinkish but in respect to color *purpurea* is a most variable species.

ACRONYCTINAE

LUPERINA RELICINA Morr. (Pl. XIII, Fig. 6).

An examination of the type material showed us that *migrata* Sm. is the same species as *relicina* Morr. We think that Smith's reference of the species to *Luperina* should be followed rather than that of Hampson who places it in *Septis* (*Parastichtis*); the maculation and color of both primaries and secondaries point to a close relation with *burgessi*. We figure a Cotype of *migrata* from New Jersey.

PERIGEA LUCETTA Sm.

This species, which, according to Hampson, is the same as *roxana* Druce from Mexico, we imagine should be excluded from our N. American lists; the locality is given as Colorado (Barnes) but the probability is that the specimen came with other material from a former New York dealer who was very inaccurate in labelling his specimens and had included a Mexican specimen in error.

NAMANGANA TAPETA Sm.

This species, described as an *Hadena* from a single ♂ from Coconut Grove, Fla., is placed by Hampson in *Oligia*. We recently saw the type in the National Museum and find the species is so close to *Namangana continens* Hy. Edw. from Arizona that if it were not for the widely different type localities we should be strongly inclined to believe that both names referred to a single species. For the present and until more material from Florida is available they may at least be regarded as geographical races.

CERMA OLIVACEA Sm. (Pl. XII, Fig. 6).

The type must be restricted to the Colorado ♂ in the National Museum, the California type specimen in the same collection is very worn and not the same species but probably *fascia* Sm. or *cuerva* Barnes. We figure typical *olivacea* as thus restricted.

ACRONYCTA FRIGIDA Sm. (Pl. XIII, Figs. 1, 2).

The type is a ♂ in the National Museum labelled Alameda Co., Calif.; the type of *pacifica* Sm. is a ♂ in the Hy. Edwards' Collection

labelled 'Calif. No. 9615'. These two types represent but a single species and unfortunately *pacifica*, the much more appropriate name, must sink as a synonym. A bred series before us from Alameda Co., Calif., shows that considerable variability occurs in the distinctness of the orbicular and reniform which may or may not be outlined in black. It is quite possible that the ♀ cotype of *frigida* in the Smith Collection should be referred to *felina* Grt. as it is labelled 'Sierra Nevadas', also the specimen from Truckee received from Prof. French which has probably been destroyed by *Anthrenus* larvae. *Felina* is evidently a high altitude species distinguished by its heavier gray scaling on primaries and of which *cyanescens* Hamp. is probably the northern form and *turpis* Sm., *metra* Sm., and *amicora* Sm. various Rocky Mt. races of rather dubious value. Our figures show typical ♂ and ♀ of *frigida* and a ♀ of *felina* (Pl. XIII, Fig. 3).

A. ARIOCH Stkr.

The type specimen of this species, described ostensibly from New Orleans seems to be nothing but a slightly suffused specimen of the common European *megacephala*; there was presumably some error in labelling or else the specimen was brought over in the pupal state with shrubs or fodder. In any case we see no reason for retaining the name on our N. American list.

ARZAMA OBLIQUA Wlk.

In the summer of 1915 we received pupae of an *Arzama* species from the vicinity of Newark, N. J., sent by Mr. H. Brehme of that city. The resulting series of specimens showed certain constant points of difference as compared with *obliqua* Wlk. which led us to suspect that an undescribed species had been unearthed. Again this summer (1916) Mr. Brehme sent us further specimens as well as two pairs of typical *obliqua* taken in a slightly different locality near Newark. It seems fairly evident that owing probably to certain local conditions (which we must leave to Newark collectors to investigate) that a rather well defined race or species has developed for which we would propose the name ARZAMA BREHMEI in honor of its discoverer.

The type of maculation is essentially the same as in its ally *obliqua* but the general color of the primaries is much deeper brown, the basal area less strikingly white and the median shade is always well defined whereas in *obliqua* it is very faint and often entirely lacking; the shape of the primaries is rather chunkier and less pointed at the apex in both

sexes. The secondaries are also much deeper smoky brown than in *obliqua* and show very little of the ruddy tinge found in the latter species, especially in bred specimens. The size is considerably smaller, the ♂'s averaging 38 mm. and the ♀'s 47 mm. as compared with 45 mm. and 53 mm. respectively for *obliqua*.

Our type series consists of 6 ♂ and 6 ♀, one pair of which we figure (Pl. XII, Figs. 1, 2) as well as a pair of *obliqua* (Figs. 3, 4) from Long Island, N. Y., for the sake of comparison. Cotypes (2 ♂ 2 ♀) are in the collection of Mr. Brehme.

NOCLOA PALLENS Tepper. (Pl. XIII, Fig. 9).

This species was placed by Smith in the genus *Aedophron* Led. although at the time he stated that it differed in having no claws on the front tibiae. It was characterized as possessing heavy wooly thoracic vestiture, unspined tibiae and a conical frontal projection. Tepper's description (Tr. Am. Ent. Soc. X, 215/16) states that 'the wings are dirty white with a narrow smoky median band and a fine dark t. p. line; the secondaries are of a uniform pale color.' Judging by this description and the structural characters given we believe that *pallens* can be none other than a rather worn specimen of *nesaea* Sm., placed by Hampson in the genus *Nocloa* Sm. which is characterized by conical frontal protuberance and unspined tibiae without claws; fresh specimens of *nesaea* are olive green but worn and faded ones are a dirty white color just as Tepper states; the median band agrees and in some specimens a fine dark t. p. line (which is really the outer border of a pale line in fresh specimens) is faintly visible. The type of *pallens* should be in the Tepper Collection, but a list of types we have received from the Michigan Agricultural College makes no mention of this so it is possibly destroyed. *Pallens* is a desert species, described originally from S. Calif., but extending north on the eastern side of the Sierras as far as Pyramid Lake, Nevada and possibly even into Eastern Oregon. We figure a ♀ from the borders of the Mohave desert.

RODRIGUESIA ORNATA Ottol.

We have carefully examined the type in the National Museum and find that in maculation, squamation, and structure it is an exact match of *Chalcopasta howardi* with the exception of the palpi which are strongly upturned and entirely different to those of *howardi*. Although we could find no trace of glue or shellac we strongly incline to the

opinion that the head has been neatly glued on the specimen in question, as we cannot believe that two species could resemble each other so exactly in every detail except the palpi. It would be necessary for the specimen to be relaxed to prove our contention and we must leave this to one of the curators of the Museum. Until it is proved to the contrary we believe we are justified in assuming that the head is that of another species and in sinking *ornata* to *howardi*.

STIRIA HUTSONI Sm. (Pl. XIV, Fig. 3).

We cannot separate this from *fuliginosa* Sm. after a comparison of the types in the Smith Collection. The series of both species vary in coloration, good specimens being greenish and worn specimens tending towards brown; the maculation is identical. We figure a ♀ from Prescott, Arizona.

ERASTRIINAE

TARACHIDIA NEOMEXICANA Sm.

The type, a ♂ from Texas (Belgrave) in the National Museum, proves to be a form of *candefacta* Hbn. rather paler than many of our specimens from the northern States but quite close to Hubner's figure; this form seems to predominate in the south and may prove either racial or seasonal.

EREBINAE

SYNEDA FACETA Hy. Edw. (Pl. XIII, Figs. 7, 8).

The type in New York is a ♀ *not* a ♂ as stated in the original description and the name will fall to *capticola* Wlk. (*media* Morr.) both of which names apply to the ♂ sex of the same species which shows a prominent whitish median area. We figure a pair from Florida.

HYPENINAE

HYAMIA PUNCTIPENNIS Grt.

This species is identical with *Isogona acuna* Barnes and the name *punctipennis* will have priority. The generic reference to *Isogona* seems correct; the species certainly falls into *Parora* Sm. which we fail to separate from *Isogona*. The species was figured in our 'Contributions' Vol. I, No. 4, Pl. XII, Fig. 22.

RENIA RESTRICTALIS Grt. (Pl. XII, Fig. 8).

After an examination of the type ♂ at Philadelphia and a comparison with the type of *larvalis* Grt. we believe it to be merely a

rather small specimen of the latter species; the narrow constricted reniform and the even brown color of both types point to this association; *sobrialis* Wlk. has a rather broader, shorter reniform and less even coloration. Smith has figured the type of *restrictalis* in his revision of the Deltoids (Pl. 7, Fig. 1) but the details of maculation do not show well; we figure a ♂ agreeing with the type.

RENIA CENTRALIS Grt.

The type at Philadelphia is the ♂ of the same species as that described later by Grote from the ♀ sex as *plenilinealis*. Both names (and presumably also *alutalis* Grt., the type of which we could not find at Philadelphia) fall before *factiosalis* Wlk.

A type of *centralis* in the British Museum is very worn and possibly not the same species as the ♂ type in Philadelphia which is a good specimen and easily recognized; we would restrict the type therefore to this specimen at Philadelphia. Smith has given fairly recognizable figures of the species on Pl. VI of his Deltoid revision; we cannot separate *tilosalis* Sm. described in Jour. N. Y. Ent. Soc. XVII, 70, 1909, and of which we possess cotypes, from *factiosalis*.

GEOMETRIDAE HEMITHEINAE

RACHEOSPILA OBLIQUA Hlst.

We think the species should be transferred to the above genus rather than be left in *Nemoria* as the palpi in the ♀ are decidedly long; Mr. Prout to whom we suggested the change, concurred with the suggestion, stating that *obliqua* was unknown to him at the time of the revision in the Gen. Insectorum. We are not sure but that *obliqua* and *bellonaria* may represent seasonal forms; the type ♂ of *obliqua* in the Hulst Coll. is rather small and *without* discal dots, whereas *bellonaria* has distinct discal dots and is larger; all the Colorado material before us of the former type is dated August, whereas the specimens of the latter form were captured in May and June which would point to either a double brood or a distinct species. More material than we possess will be necessary to decide the question.

R. LOUISA Hlst.

The ♀ type in the Hulst Collection is not the same species as the ♂ type in the National Museum, being a specimen of *hulstiana* Dyar; this would account for Hulst's misidentification mentioned by Dr.

Dyar in his description of *hulstiana* (Proc. Ent. Soc. Wash, IV, 437). The type of *louisa* must be restricted to the N. Museum specimen.

R. RUBROMARGINARIA Pack.

After examining the type at Cambridge we doubt the reference of this species to *extremaria* Wlk.; Packard's figure of the type is good and we would call attention to the lack of the discal spot and the heaviness of the white lines; Walker's description of *extremaria* mentions discal spots, but makes no particular note regarding the breadth of the cross lines. More material from Quebec is wanted to determine the variability of *rubromarginaria*.

NEMORIA BRUNNEARIA Pack.

The species was described from 2 ♀'s although Packard in his description mentions three localities. The type ♀ from W. Va. is in Cambridge, Riley's specimen from Missouri in the National Museum. The species however does *not* equal *biflata* Wlk. according to our notes on Walker's type and a colored figure of same before us; Packard's figure is distinctly good and shows the broken red marginal line and slightly checkered fringe; some specimens in our series from New Brighton, Pa. show a very decided green tinge overlaid with scattered reddish scales which makes us wonder if fresh specimens may not always show this coloration. *Biflata* will probably prove the same as *bistriaria* Hbn., both types having been presumably taken in the same general region, i. e. Georgia; it is a larger, browner species without the red fringe line.

N. FESTARIA Hlst.

The species was described from 1 ♂ and 5 ♀ from 'Cal.' and 'Ariz.' and the types were stated to be in Coll. Hy. Edwards, Neumoegen, and Hulst. In the Hulst Collection is a single ♂ type from Arizona which is *arizonaria* Grt. pure and simple and does *not* at all agree with Hulst's characterization of *festaria* which calls for 'pink fringes and a narrow margin of red on the wings'. In the Hy. Edwards' Collection is another ♂ type from San Francisco, Calif. which seems to be *pistaccaria* Pack. In the Neumoegen Coll. are 1 ♂ and 1 ♀ which differ from both of the preceding 'types'; the ♂ has no locality label, the ♀ is labelled 'Ariz.'; these agree well with the description, with the exception that the fringe is not entirely pink but merely dotted with pink at the ends of the veins.

In view of the above facts we believe that the type should be restricted to the ♀ from Arizona in the Neumoegen Collection. At the time we had no material with us that agreed with this type, but if our identification from our notes is correct, the species should be placed next to *Racheospila rubrolinearia* Pack. to which it bears a close resemblance.

CHLOROCHLAMYS VIRIDIPALLENS Hlst.

The species was described from Colorado and Arizona; in the Hulst Collection is a ♂ type from Colorado, in the Neumoegen Coll. a ♀ type from Arizona, this latter being a specimen of *volantaria* Pears. The ♂ type, which should hold the name, is also very close to *volantaria* but is a little larger and the hind wing seems paler and immaculate as far as can be determined from the poor and faded condition of the specimen; the fore wings show traces of a post-median line as in *volantaria*. The hind tibiae of the type are wanting but we think there is no doubt that the species is a *Chlorochlamys* and eventually when fresh material from Colorado is forthcoming, it may prove identical with *volantaria*.

MEROCHLORA GRAEFIARIA Hlst. (Pl. XV, Fig. 17).

An examination of the structure of the type ♀ in the Neumoegen Collection has convinced us that this species is identical with that described by Mr. Prout (Gen. Insect. Geom. Hemith. p. 222) as *Merochlora eutrappes*; the type is worn and faded, the green having become a dirty white, but the position of the single white line on the primaries is the same and the structure is identical, the two pairs of spurs on the hind tibiae and the strongly anastomosed vein C on the secondaries being very characteristic. A second ♀ type in the Tepper Collection in the Michigan Agricultural College at Lansing, Mich., is in rather better condition and bears out the above reference. We figure a ♂ from Stockton, Utah.

OOSPILA LESTERARIA Grossb.

The type ♂ in Coll. Barnes has only a single pair of spurs on the hind tibiae and distinct abdominal dorsal tufts and will therefore fall into a group quite distinct from *Racheospila* in which genus it was placed by the author. Until more material and both sexes are available we place it provisionally in *Oospila* Warr. as it very evidently belongs in the small group of genera centering around this genus.

The species was figured in our Contributions Vol. I, No. 4, Pl. 23, Fig. 11.

ACIDALIINAE

COSYMBIA UMATILLARIA Stkr.

The species, described under *Anisodes*, and at present listed under *Cosymbia*, proves, on an examination of the type ♂ in Coll. Strecker at Chicago, to be *Glena cognataria* Hbn.

ACIDALIA ANCELLATA Hlst. (Pl. XV, Fig. 18).

There seems to have been some mix-up in the types of this species and those of *A. fuscata* Hlst. The former species was ostensibly described from 2 ♂ 3 ♀ from Sierra Nevada Mts., Calif., and Arizona; in the Hulst Coll. the only type present is a ♂ from Hot Springs, New Mexico, which is certainly spurious; in the Neumoegen Coll. is another spurious ♂ type from the same locality but also a ♂ type from Arizona which is in our opinion the one that should hold the name, thus restricting the type locality to Arizona which would not alter the usual conception of the species. *A. fuscata* was described as a variety of *quinquelincaria* Pack. from "1 ♂ 1 ♀ Arizona, Coll. Neumoegen and Hulst"; the Neumoegen Coll. contains 1 ♂ (not ♀) type from Summit, Sierra Nev., Calif., and the Hulst Coll. another ♂ type from the same locality, both agreeing with the meagre description in being dull gray with the maculation very similar to that of *quinquelincaria*; it would almost seem as if Hulst had separated out his Sierra Nevada specimens from *ancellata* after the description was written but had forgotten to change the text and then placed the erroneous locality of Arizona in his description of *fuscata*; as the 'type' of this latter species in the Hulst collection does not contradict Hulst's diagnosis we think it would be wise to consider this the true type and the species an inhabitant of the High Sierras. It differs from *quinquelincaria* in the more rounded secondaries, the grayer color and the straighter submarginal line of primaries, being much closer to the Colorado *luteolata* in everything except color. We figure a typical *ancellata* ♂ from Colorado and also a specimen of our conception of *fuscata* (Pl. XV, Fig. 12) from Lake Tahoe, Calif.

ACIDALIA PERSIMILIS Hlst.

After seeing the types in the Hulst and Neumoegen Collections we are forced to the conclusion that the species is the same as Packard's *quadrilineata*.

ACIDALIA CALIFORNIARIA Pack.

A study of Packard's types at Cambridge, Mass., of both this species and *pacificaria* has convinced us that the two names represent a single species but that in all probability the association with *sideraria* Gn. is incorrect. Both of Packard's forms show strongly haired palpi and would fall into Prout's genus *Holarctias* along with *rubrolinearia* Pack. and *sentinaria* Hbn.; *rubrolinearia* is probably correctly placed as a synonym of *magnetaria* Gn. as Guenée mentions the hairy nature of the head (Tête concolore, très velue). We are not sure of the identity of *sideraria* Gn. from the description but there is a species extending apparently through the same region of California and very similar in color and design to *californiaria* Pack. in which the palpi are normal, showing very few traces of long hairs; for the present, in lack of any definite knowledge of Guenée's type, which should be in the Oberthur collection, we apply the name *sideraria* to this species. Apart from the less hairy palpi it may be distinguished by its rather larger size, a tendency to ruddy fringes and a rather more waved and more distinct subterminal dark line; rubbed specimens however are extremely puzzling to locate. We are also not certain as to whether *californiaria* may not prove to be merely a color form of *magnetaria* Gn.; for the present we hold them distinct.

XYSTROTA SUAVATA Hlst.

This species proves to be very close to *Xystrota roseicosta* B. & McD. from S. Texas; the two will probably represent races of one species; *suavata* has an unbroken terminal line and the s. t. line seems rather more regular than in our species. Both show a double areole which would place them outside of *Acidalia* or *Ptychopoda*; for the present they may remain in *Xystrota* Hlst.

PTYCHOPODA LACTEOLA Lint. (Pl. XIV, Fig. 16).

An examination of the type in the National Museum shows that this is the same species as *P. pallida* Hlst and the name will have priority over Hulst's name. We figure a specimen from Kerrville, Texas.

PTYCHOPODA ROTUNDOPENNATA Pack. (Pl. XV, Fig. 6).

The type from Brunswick, Me., is in the Cambridge Museum and proves the species to be the same as that described by Hulst under the name of *Eois hanhami* from Winnipeg, Man.; the types of this

latter species are in the Hulst and Neumoegen Collections respectively. We figure a Calgary ♂.

PTYCHOPODA DEMISSARIA Hbn.

The synonymy of this species as given in Dyar's list is quite inaccurate; *ferrugata* Pack. is probably correctly listed as a synonym; the species was described from specimens from Mass., Ala., and Texas, but the type should be restricted to the specimen figured (Pl. 10, Fig. 39) which is in the Cambridge Collection labelled merely '505' but most probably the Mass. specimen; *russata* Hlst. from N. Y. is quite synonymous with this and both seem to fit in well with Hubner's figure of *demissaria* the type of which was therefore probably from the N. Atlantic States.

Inclusaria Wlk. should probably be held to the Florida race which, judging from a few specimens before us, seems to differ somewhat from the northern *demissaria*.

Bonifata Hlst. (Pl. XIV, Fig. 17) has nothing to do with this species; the type in the Neumoegen Collection from Arizona is a rather large specimen of *ptelearia* Riley, Hulst's name taking priority. We figure a large and well marked ♀ from Arizona.

Eremiata Hlst., from Arizona, the type being in Brooklyn, is in our opinion a distinct species from *demissaria* although closely allied; the even ruddy color with obsolescent lines easily separates it.

Flavescens Hlst., held at present as a separate species, looked to us, after a careful examination of the type in Rutgers College Coll., to be merely a faded or discolored specimen of *eremiata*; the course of the t. p. line was the same and there were traces of the characteristic dark red costal margin visible.

PTYCHOPODA DELICATA Hlst.

This will fall before *bonifata* Hlst. (*ptelearia* Riley); the species seems widely distributed over the whole southwestern portion of the United States.

LARENTIINAE

NYCTOBIA VERNATA Pack.

The type in the Packard Collection from Brunswick, Me. proves to be a worn specimen of *Cladara atroliturata* Wlk.; there is however another type in the Boston Society Coll. from Brookline, Mass. (Shurtleff) which is *anguilineata* G. & R. so the name may be held to this

specimen without disturbing the synonymy. In any case *vernata* becomes a synonym.

LYGRIS ATRIFASCIATA Hlst. (Pl. XIII, Fig. 17).

This species has already been removed from the synonymy of *Mesoleuca immanata*, where it is listed by Dyar, by Grossbeck (Tr. Am. Ent. Soc. XXXIII, 338) who places it in *Eustroma*; the species was described from a single ♀ from California and if we have correctly identified it from our notes on the type, the ♂ sex is without a hair pencil on the underside of fore wings. The species is very apt to be confused with *nubilata* Pack. but the central broad black fascia is more prominent and its inner margin, while irregular, does not show the prominent tooth in the cell which characterizes *nubilata* (*vide* Packard's figure Pl. VIII, Fig. 46); on the hind wings the median line is nearer the base of the wing and more sharply angled, forming practically a right angle, and the species is much more unicolorous smoky without the sprinkling of white or yellow scales found in *nubilata*; the abdomen is unspotted whilst in *nubilata* there is a row of subdorsal black spots; it would seem best placed in *Lygris* being one of the few species of this genus without the hair pencil. Judging by the description Warren has redescribed it from Colorado as *Epirrhoe delimitata*. It is apparently wide spread as we have it from California, Arizona, Utah, and Colorado (all from high altitudes). With regard to *semiatrata* Hlst., listed as a synonym of *nubilata*, we would remark that the species was described from 4 specimens from Colorado but the type in the Hulst Collection is labelled 'Washington Terr.' and is therefore spurious; while it is possible that *semiatrata* should rather be associated with *atrifasciata* than with *nubilata* we believe that there would be no harm in leaving it in its present association until the true type can be discovered. We figure a ♂ of *atrifasciata* from Truckee, Calif.

LYGRIS SPECIOSA Hlst.

This appears to us to be nothing but an aberration of *L. xyliina* in which the antemedian yellowish band is broader than usual, encroaching on the space occupied by the dark median band. With regard to *xyliina* we might say that the type in the Hulst Collection is a ♂ from New York, to which we would restrict the name, making the form from the Eastern States the nymotypical one.

HYDRIOMENA ELISATA Stkr.

The type specimen cannot be distinguished from the common European *Ortholitha bipunctaria* to which in fact Strecker compares it. We imagine there has been an error in labelling the specimen and that the name should be dropped from our lists.

HYDRIOMENA SIMILARIS Hlst.

This species has been generally totally misidentified owing to a grave error on the part of Dr. Hulst; *similaris* was described from specimens taken in Colorado by Mr. Graef and the true types (1 ♂, 1 ♀) are in the Brooklyn Inst. Collection along with a spurious 'type' from Maine. In the Hulst Collection the type is labelled 'Nevada' and it is from this spurious type that the identifications of the species have doubtless been made, for it represents a species remarkably close to *ruberata* Frey, in fact so close that we have never been able to separate the two satisfactorily. The types in Brooklyn are entirely different and bear out the original description excellently which certainly cannot be said to be true of Hulst's specimen; *similaris* proves according to these true types to be the same species as that described later by Mr. Swett under the name *glenwoodata* and this latter name must therefore unfortunately become a synonym. The species was figured in our Contributions Vol. I, No. 4, Pl. 14, Fig. 24.

XANTHORHOE NEMORELLA Hlst.

The California specimen mentioned by Hulst in the description of the above species is a ♀ from Sauzalito (Jan.) according to the Hulst collection; it is, however, a worn specimen of some *Hydriomena* species and has nothing to do with the other types from Aleutian Is., Alaska to which the name should be held.

XANTHORHOE ILLOCATA Hlst.

According to the Hulst Collection the type series seems to have been mixed as there are two distinct species under this name, one being a *Dysstroma* close to *glacialis* as far as can be told, and the other, represented by a single specimen of which only the fore wings are present and these rubbed, being a *Xanthorhoe* and apparently the same as *nemorella* Hlst., it would seem that the type should be restricted to this specimen as it fits in much better with the original diagnosis than do the others; a similar ♂ is in the Neumoegen Collection.

CAMPTOGRAMMA NEOMEXICANA Hlst.

The type should be restricted to the ♀ from Las Cruces, N. Mexico in the Hulst Collection; various spurious types from Texas are in both this collection and that of the Brooklyn Institute. The species was described from specimens from N. Mexico, Colorado, and Florida, but in view of the name we think the type should be restricted as above mentioned; the other types we could not find in any case.

EUPHYIA GRANDIOSA Hlst.

The type of this species must be considered to be the ♀ in the National Museum, No. 3927 which evidently served for the original description; the type in the Hulst Coll. (probably the specimen mentioned in a note below the description) is an ordinary dark olivaceous *implicata* Gn. of the form described by Packard as *multilincata*; the National Museum specimen is larger, of a rather pinkish color generally and will probably represent an Arizona race at least.

EUPITHECIA MISTURATA Hlst. (Pl. XIV, Fig. 6).

The species was described from specimens from Soda Spgs., Calif., and Hot Spgs., N. Mex., and a type from each of these localities is in the Hulst Collection; as it is very probable that they do not belong to one species, the New Mexico specimen being possibly referable to *huachuca* Grossb., we would designate the type of *misturata* as the Soda Spgs., Calif., specimen in the Hulst Collection labelled 'Type'. We figure a specimen from Shasta Retreat (about 1 mile from the type locality) where Dr. McDunnough found it very plentiful in 1915.

EUPITHECIA PACKARDATA Taylor.

The name *packardata* was proposed by Taylor (C. Ent. XL, 277) to supplant *geminata* Pack. which was erroneously stated to be preoccupied by *Eupithecia geminata* G. & R. As a matter of fact *geminata* G. & R. was described (Proc. Ent. Soc. Phil. VI, 29) under the genus *Larentia* and only at a later date wrongly transferred by the authors (Ann. N. Y. Lyc. N. H. VIII, 459) to the genus *Eupithecia*, its proper place being in the genus *Cladara* Hulst.

The name *geminata* Pack. will therefore be perfectly valid in the genus *Eupithecia* and will supplant *packardata* Tayl. if Dr. Taylor be correct in his limitation of the name to the ♀ type as being a species distinct from the ♂ type which according to him falls to *coagulata* Gn. We

have no knowledge on this subject at present but believe the best plan will be to follow Taylor until we hear to the contrary. The specimen mentioned by Taylor as having been labelled 'type, *packardata*', in his collection is before us and agrees with a specimen which we have compared with the type of *meritata* Pears, in New York so that this name will also fall.

GEOMETRINAE

MELLILLA INEXTRICATA Wlk.

We have already noted (Cont. II, p. 206) that the general conception of this species was erroneous; it now transpires that the species described by Hulst as *Diastictis floridensis* is a synonym of *inextricata*; the type is a ♀ from Florida in the Hulst Collection.

DREPANULATRIX (DEILINIA) CALIFORNIARIA Pack.

This species, described as *Tephrosia californiaria* in Proc. Bost. Soc. N. H. XIII, 388, has been placed in Dyar's list as a synonym of *Alcis imitata* Wlk. with which it has absolutely no similarity. It is well figured by Packard in his Monograph on Plate XI, Fig. 15, and is undoubtedly a *Deilinia* as an examination of the type in Cambridge showed us; it is closely related to *ferruginosaria* Pack., which has already been correctly referred to *Deilinia* by Grossbeck (Jour. N. Y. Ent. Soc. XX, 290) and we should not be surprised if, in spite of Packard's statement, they proved sexes of one species. Unfortunately the type of this latter species seems to be lost and besides the description we have only the very poor figure published in Proc. Bost. Soc. Vol. XVI, Pl. I, Fig. 21. The species seems to be distinct from *celataria* Hlst.

D. LITARIA Hlst. (Pl. XIII, Fig. 14).

The species was described from 2 ♂'s from Colorado and the description particularly mentions the fuscous hind wings with a submarginal row of black spots. The specimen marked 'type' in the Hulst Coll. is very worn but distinctly contradicts this statement, the hind wings being apparently whitish and immaculate—in fact the specimen will probably prove to be a form of *falcataria* Pack. In the Neumoegen Coll. however is a 'Type' from Colorado which fits the description excellently and we propose that this be considered the true type. It is the same species as that described later by Hulst as *Deilinia fumosa* and this latter name will fall. It is possible that the

type labels of *litaria* and *electa* have become interchanged in the Hulst Collection as the specimen labelled 'type *electa*' agrees with the description of *litaria* and *vice versa*. Grossbeck is probably correct in sinking *electa* to *falcataria* Pack. We figure what we consider to be the true *litaria* from Truckee, Calif.

D. INDURATA Dyar.

The type in the National Museum is from Placer Co., Calif.; it is undoubtedly the same species as *celataria* Hlst. and almost an exact match of the type of *Lozogramma mercedulata* Stkr. according to a specimen compared for us with the type by the late J. H. Grossbeck.

D. HULSTI Dyar. (Pl. XIII, Fig. 13).

Dr. Dyar, in his very brief characterization of *Catopyrrha hulsti* (Proc. Wash. Ent. Soc. VI, 226) has neglected to state the locality and sex of his type specimen. The type in the National Museum is a ♂ from Los Angeles Co., Calif., and is the same species as that described later by Grossbeck as *Deilinia lenitaria*, a very pardonable error on the part of the latter author in view of the above facts. We figure a ♂ cotype of *lenitaria*.

D. HELENA Hlst.

This species, described under *Diastictis* from a single ♀ proves to be merely a rather aberrant form of *liberaria* Wlk. (*lintneraria* Pack.), very similar to the ♀ figured by Packard on Plate IX, Fig. 37 of the Monograph; this specimen is still in the Packard Collection, but the other types of *lintneraria* we could not find at Cambridge.

D. BEHRENSARIA Hlst.

The species was described from a number of specimens from California, Nevada, and Arizona; the 'types', 2 ♂'s, in the Hulst Collection are labelled respectively 'Col.' and 'Rossland' and are therefore spurious although possibly the first may be an error for 'Cal.'. A type from Soda Spgs., Calif., is in the Neumoegen Collection and we propose to restrict the type to this specimen as the locality is one in which Behrens did a good deal of collecting and we may therefore presume the specimen was one of the type lot.

PHASIANE (MACARIA) LAPITARIA Stkr.

This proves to be a synonym of *sublacteolata* Hlst.

P. CONARATA Grossb. (Pl. XII, Fig. 4).

We fail to separate this species from *colorata* Grt. the types of which are in the Brooklyn Inst. Both show a rather ruddy coloration on the primaries and fairly heavy terminal dark shades on the underside of both wings. *Parcata* Grossb. (Fig. 5) is very closely allied but may usually be distinguished at once by the prominent discal spot on the secondaries. We figure ♂'s of both species from Redington, Arizona.

P. DELECTATA Hlst. (Pl. XIV, Fig. 9).

The species was described from 1 ♂ from Colorado and this specimen is in the Neumoegen Coll., the type in the Hulst Coll. from Arizona being spurious. We doubt greatly if this should be made synonymous with *muscaria* Gn. which from the description seems to be closely allied to *respersata* Hlst., which occurs in California as well as Colorado; Boisduval (1869, Lep. de la Cal. p. 91) lists *muscaria* as having been taken by Lorquin so it is probable the types came from the region of Placer Co., Calif. It is to be sincerely hoped that M. Oberthur will continue publishing figures of Guenée's Geometrid types so that we can definitely establish their identity. We figure a ♀ from Colorado which agrees with the type of *delectata*.

P. PALLIDATA Pack.

Listed at present in the synonymy of *californiata* Pack. the species proves distinct and very close to *parcata* Grossb.; the type in the Cambridge Mus. is a ♀ and is the species figured by ourselves (Cont. II (3) Pl. VI, Figs. 10-12) doubtfully as *parcata*.

P. SUBACUTA Hlst. (Pl. XIV, Fig. 10).

This species was described under *Diastictis* from specimens from Colorado and Nevada and as a ♂ specimen is mentioned in the description we should suppose that the ♂ antennae were pectinate. The only types we have been able to discover however were 1 ♀ from Colorado in the Hulst Coll. and 1 ♀ from Nevada in the Neumoegen Coll.; the former is the same as *respersata* Hlst. and the latter from our notes would also appear to agree. Apart from the supposed pectinate ♂ antennae the original description fits excellently with these specimens and we believe the only course open is to limit the type to the specimen in the Hulst Coll. and presuppose an error on Hulst's part regarding the ♂ antennae; in this case *subacuta* becomes a syn-

onym of *respersata* only differing in lacking the black spot opposite the cell beyond t. p. line which is a variable feature in the series before us. *Teucaria* Stkr., described from Seattle, Wash., is a large form of the same species which occurs also on Vancouver Is., B. C. We figure a typical ♀ *respersata* (Fig. 10) from Colorado and also a ♂ of *teucaria* (Pl. XIII, Fig. 18) from Vancouver Is.

P. HEBETATA Hlst. (Pl. XIV, Fig. 7).

The species was described from 2 ♀ from Colo. and the only type we could locate was a very worn ♀ in the Hulst Coll. too rubbed for accurate identification; from the description, which mentions a broad pale s. t. line, we should judge that *hebetata* was a rather immaculate form of Grossbeck's *decorata*, our series from Stockton, Utah, showing great variability. The very similar species from Arizona with less sinuate t. p. line and apparently no white s. t. line, which has often been called *hebetata*, is *yavapai* Grossb. We imagine from the description that *sinuata* Warr. (Nov. Zool. XI, 561, 1904) will be one of the species of this group but without a knowledge of the type specimen it is almost impossible to place; in any case, if we are at all correct in our association, the name *sinuata* cannot be used as it is preoccupied by *sinuata* Pack. (1874). We figure typical ♀'s of both *decorata* (Fig. 7) and *yavapai* (Fig. 8).

P. EXCURVATA Pack. (Pl. XIV, Figs. 13, 14).

The type of this species, a ♂ from the Rocky Mts. (Grote) is in the Cambridge Mus. Coll. and proves the species to be the same as *spodopterata* Hlst., over which it takes priority. The type of this latter species in the Hulst Coll. is a Colorado ♀ whilst in the Neumoen Coll. is a ♀ from California, both representing the same species. *Cinereola* Hlst., described from Colorado under *Diastictis* is, according to the type ♀ from Glenwood Spgs., Colo., in the Hulst Coll., a rather poorly marked specimen of this same species; in the ♀ sex, judging by our series, the t. p. line tends to bend slightly inward at costa instead of continuing parallel to the outer margin as in the ♂. *Orillata* Wlk. of which *excurvata* has heretofore been considered a synonym is a smaller species with more strongly curved and usually heavier t. p. line; *curvata* Grt. (*cruciata* Grt.) represents this species in the west and is scarcely separable even as a race. We figure a ♂ and ♀ of *excurvata* from Glenwood Spgs., Colorado.

P. AUCILLARIA Stkr.

This species, described from a single ♀ from Florida appears to be identical with *ordinata* Wlk., described from a specimen from the Milne Coll., locality unknown; most of the N. Am. specimens in this collection however came from Georgia and if we presume that this was the case with the type of *ordinata* the two type localities would be practically identical.

MACARIA GRASSATA Hlst.

The species was described from a specimen from Colorado but the 'type' in the Hulst Coll. is labelled Florida; under *praeatomata* Haw. is a specimen labelled 'Colo.' which may be the true type; the two are identical and neither from the description nor from the 'type' specimen can we separate *grassata* from *praeatomata*.

M. SIMULATA Hlst.

Described from 2 ♂ in the Graef and Hulst Coll., no locality given; in the Hulst Coll. the 'type' is a ♀ from Arizona and in the Graef Coll. we found a ♂ type from Texas; this latter being probably the true type; the species, as already noted, is apparently the same as *punctolineata* Pack.

GENUS DIASTICTIS Hbn.

This genus, as used by Meyrick and Hulst, is preoccupied by *Diastictis* Hbn. in the *Pyralidae* (1818, Zutr. Ex. Schmet. p. 21). The next valid name is apparently *Itame* Hbn. (Verz. p. 299) of which the *wauaria* group is the typical section.

DIASTICTIS ELLA Hlst.

The type is a ♀ from Washington State and is probably referable to *Deilinia* but we are not prepared to say to which species as the specimen appears rather aberrant.

D. QUADRILINEARIA Pack. (Pl. XIV, Fig. 11).

This species has been placed as a synonym of *bitactata* Wlk. but quite erroneously; the type in the Packard Coll., which agrees excellently with the description, proves the species to be the same as that described later by Hulst under the name *inquinaria*. It is common all through the Sierra Nevadas. We figure a ♂ specimen from San Bernardino Mts., Calif.

D. OLIVALIS Hlst.

According to the type in the National Museum the species appears to us to be the same as *argillacearia* Pack. which is very doubtfully the same as *inceptaria* Wlk.

D. MINUTA Hlst.

The type must be restricted to the ♀ in the Neumoegen Coll. from Arizona; the so-called type ♀ in the Hulst Coll. from Texas does not agree with Hulst's description, the discal spots being mere dots and not ringlets as stated and the specimen probably being a small *pallidata* Pack. *Minuta* would seem best placed in *Phasiane* near *infimata* Gn. the ♂ antennae being merely ciliate and not pectinate.

D. SUBFALCATA Hlst. (Pl. XV, Fig. 11).

The species was described from three ♀'s from Colorado and a difference in color between the specimens is mentioned in the description; the gray specimen to which Hulst refers is in his collection and is probably a ♀ of *coloradensis* Hlst.; another ♀ type from Platte Canyon, Colo., (which will hold the name), is much yellower and falls into the *occiduaria* group, in fact we should not be surprised if it proved to be the ♀ of that species which we do not definitely know; a third type of *subfalcata*, similar to the true type is in the Neumoegen Collection. We figure a ♀ from Utah which agrees with these latter types.

HOMOCHLODES FAMULATA Hlst.

The species described under the above name proves on an examination of the type ♀ in the Hulst Coll. to be a melanic aberration of *Eufidonia notataria* Wlk., the wings being deep brown with a wavy white s. t. line; the prominent discal dot very readily establishes the relationship.

GLAUCINA ESCARIA Grt.

After a careful study of the types in the Brooklyn Inst. we are not at all certain that the ♂ and ♀ types represent the same species; Grote in his description referred to the ♂ as smaller and darker and this is true, the hind wings especially being evenly fuscous and showing beneath no trace of a dark border as found in the ♀. The ♀ is, we think, the species described later by Dr. Dyar as *erroraria*, the type ♀ in the National Museum bearing the locality label 'Hot Spg. Arizona'. The name *escaria*, in case the differences prove specific,

must be held by the δ type in Brooklyn. We have not yet seen any δ 's that could be definitely determined as *erroraria* so that it is of course still possible that the differences noted above are sexual and not specific.

COENOCHARIS OBSCURA Grossb.

The name will be held by the type δ in Coll. Barnes from S. Arizona (Poling); of the 3 Cotypes in the Am. Museum of Natural History two are *interruptaria* Grt. and the other we think is *ochrofuscaria* Grt.; the type δ seems to show certain points of distinction from the type ♀ of *ochrofuscaria* but this may of course, when long series are obtainable, prove merely sexual.

C. MACDUNNOUGHII Grossb.

The ♀ type of this species before us proves to have a claw on the fore-tibia and will fall into the genus *Glaucina*.

CHESIADODES BIDISATA Dyar.

This species proves to be identical with *Gabriola minima* Hlst.; the type is rather dark but there is a specimen exactly similar under *minima* in the National Museum Collection.

CLEORA AETHALODARIA Dyar.

This species has been referred by Grossbeck as a synonym of *inconspicua* Hlst.; the types in the National Museum are rather rubbed and consequently difficult to place definitely; it seemed to us as if the δ was a specimen of *xrightiarium* and the ♀ of *inconspicua*; in any case the name will fall.

C. FULIGINARIA Hlst.

This appears to be a melanic aberration; the maculation is almost entirely lost in the general smoky color of both wings so that it is a little difficult to say to which species it should be referred; *indicataria* Wlk. would seem to be the most likely species.

C. MURICOLOR Hlst.

This appears to be merely another synonym of *Glena cognataria* Hbn. a species which has certainly come in for an undue amount of attention from the various authors of our Geometrid names.

C. LALLATA Hlst. (Pl. XIII, Fig. 12).

The type must be restricted to the δ in the Hulst Coll. from S. Francisco Mts., Arizona, the ♀ type in the Neumoegen Coll. from

Prescott, Ariz., being referable to *lixaria* Grt.; the specimen from Senator, Arizona, we have not seen. *Lallata* is very similar to *lixaria* but the median shade of primaries is nearly straight and not prominently angled as in *lixaria* (Pl. XIII, Fig. 11), the t. a. line is irregularly bulging in its central portion and not slightly incurved as in the latter species and the s. t. line is distinctly more dentate. We figure typical ♀'s of both species.

C. RUFARIA Grt. (Pl. XIII, Figs. 15, 16).

The single ♀ type of this species in the Neumoegen Coll. is identical in maculation with the ♀ type of *obliquaria* Grt. in the same collection; the specimen is very worn and this probably accounts for its rather reddish tinge; we believe the name should sink to *obliquaria*. We figure a ♂ and ♀ from Redington, Arizona, to show the sexual differences.

C. LURIDULA Hlst.

The type ♀ from Florida appears to be a large ♀ of *Glennacognataria* Hbn. It is worn and without maculation but the peculiar color and sprinkling of dark dots above and below make its reference to this species fairly obvious.

C. MAESTOSA Hlst.

The type ♂ in the Nat. Museum, a worn specimen, is apparently referable to *indicataria* Wlk. but is rather more suffused with blackish than Walker's type specimen, according to a specimen before us compared with this latter type. Hulst is doubtful as to whether the specimen came from 'Ia.' or 'Ga.' but inclines to think it is Iowa; after examining the written label we personally would be in favor of Georgia as the type locality and this is further corroborated by presumable Florida specimens before us which are closer to Hulst's type than Northern ones which represent typical *indicataria*. The wings of the type show yellow markings on the veins subterminally, the abdomen extends well beyond the hind wings and the antennae are strongly bipectinate, all points which render the reference of *maestosa* to *indicataria* Wlk. fairly certain; in any case *flaria* Wlk. described from Florida and listed as a synonym of *indicataria* would take precedence over *maestosa* if a name for the southern form should be necessary.

C. VELLIVOLATA Hlst.

The species was described from a single ♀ from Florida which is in the Neumoegen Coll.; the ♂ type in the Hulst Collection is spurious although probably the same species.

PHIGALIA NEVADARIA Hlst.

The ♂ type of this species from Colorado is in the Hulst Coll.; apart from being slightly smaller and darker we cannot separate it from *titea* of which it appears to be a mere race. A ♂ type from Nevada is in the Neumoegen Coll. but is too worn and stained to place accurately.

NEOTERPES EPHELIDARIA Hlst.

The ♂ and ♀ types were stated to have been taken in Nevada; the ♂ type in the Hulst Coll. is labelled Colorado and therefore presumably spurious although agreeing with the description; a ♂ type from Nevada is in the Neumoegen Coll. but has a prominent t. p. line contrary to the description; a ♀ type from Nevada is in the Hulst Coll. but this is a *macularia* form.

ELLOPIA LAETA Hlst.

The ♂ type in the Hulst Coll. proves to be a very small specimen of what we described later as *flavilincaria*; the description is misleading in stating that the outer line is angled below the costa for as a matter of fact it is straight or only very slightly rounded; as however the rest of the description fits the specimen and the locality is correct we presume the 'type' must be considered authentic and sink our name accordingly; the species was figured in our Contributions Vol. II (3) Pl. VIII, Figs. 1 and 3.

E. LUGUBROSA Hlst.

This species, described from Rossland B. C., was referred by Hulst to *fervidaria* as a possible variety. After examining the types we think the form should be associated with *fiscellaria*; apart from a slightly smokier color it cannot be separated from the ordinary Eastern specimens; the name for the present at least may be held for the western race; it is possible *johnsoni* Swett may prove identical but we do not know this form.

PLAGODIS ARROGARIA Hlst. (Pl. XIV, Fig. 12).

It would be well to restrict the type of this species to the ♂ from N. Y. in the Hulst Coll.; types are also in the Graef and Neumoegen Collections but that in the latter is probably not the same species. *Arrogaria* is characterized by a distinct discal dot with a general lack

of definite lines on the forewings; occasionally a t. p. line is visible and then it is evenly rounded below costa and not oblique as in *fervidaria* H. S. (*emargataria* Gn.). We figure a ♂ from Decatur, Ill. which shows the t. p. line fairly distinctly.

GONODONTIS APICIARIA Pack.

There are apparently two species involved in the types of this species in the Packard Coll. The ♂ type from Hyde Pk., Boston agrees with the figure in the Monograph (Pl. 12, Fig. 9) and will hold the name; 2 ♀ types from Maine and Salem, Mass. appear to belong to *warneri* Harv. *Apiciaria* has a distinctly excavated margin of hind wings in contradistinction to *warneri* in which it is nearly evenly rounded.

EUCHLAENA NOVELLATA Hlst. (Pl. XIV, Figs. 4, 5).

This species has been placed by Hulst in Dyar's list under *Sabulodes* but we query the correctness of the reference; the types, 1 ♂ and 1 ♀, are stated to be in the Neumoegen and Tepper Coll. A ♀ type is in the former collection which agrees excellently with the description but we have no record of any type in the Tepper Coll. and doubt if Hulst really had a ♂ before him; there is another so-called ♀ type from Prescott, Ariz. in the Hulst Coll. which may or may not have been one of the original specimens; we think it well to limit the name to the type ♀ in the Neumoegen Coll. which proves to be the other sex of what is at present listed as *Therina cavillaria* Hlst. described from a single ♂ specimen from Arizona, the latter name having priority; regarding the generic position we are in doubt until a thorough revision of the group has been made but the species strongly suggests *Euchlaena sesquilinearia* Grt. (Pl. XIV, Fig. 3) from which indeed it only differs in its smaller size and lighter color, being freer from speckles; the faint hair line beyond the t. p. line is quite characteristic of both species which may eventually prove to be seasonal forms; in any case they may be placed next to each other in our lists for the present. We figure a ♂ and ♀ of *cavillaria* from Palmerlee, Arizona and a typical ♂ of *sesquilinearia* from Redington, Arizona.

EUCHLAENA ARGILLARIA Hlst.

The so-called ♂ type in the Hulst Coll. is spurious, being labelled 'Calif.', whereas the description calls for Arizona as type locality; the true type is in the Neumoegen Coll. along with another spurious type

from California. These California specimens appear very closely related to *galbanaria* Hlst. the type ♀ of which is in the Hulst Coll.; the true *argillaria* is grayer in color, with more prominent discal dot and stronger angle in t. p. line below costa.

SYNTAXIS JUBARARIA Hlst. (Pl. XIV, Fig. 1).

The ♀ type from Washington State is well figured in Holland's Moth Book (Pl. 45, Fig. 20); the species described later as *pallulata* Hlst. (Fig. 2), which is the type of the genus *Synaxis*, is possibly an aberrant form of the ♂. A long series before us from Vancouver Is., B. C. shows great variability in color and markings; the ♀'s are usually quite reddish, the ♂'s paler, often quite pale ochreous with the cross lines heavily bordered with black or the median space filled with darker scaling, this latter being typical *pallulata*; we figure ♂'s of both forms from Vancouver Island.

PERNE MELLITULARIA Hlst. (Pl. XV, Figs. 7, 8).

Hulst based this name in part on Packard's description in the Monograph of *parallelia* and his Figs. 42 and 43, Pl. XII, claiming that the name *parallelia* must be restricted to Fig. 42 as two species were involved. He had however without doubt misidentified *parallelia* for he makes it synonymous with *excelsa* Stkr. (Ent. Am. I 202) a species from Colorado and Arizona with *nonpectinate* antennae in the ♀ whereas Packard in the Monograph claims *pectinate* antennae for both sexes. The original description of *parallelia* is poor, as Hulst states, but if we combine the fact that the type specimen came from Behrens (Proc. Bost. Soc. N. H. XVI, 38) with the statement in the Monograph under *parallelia* (p. 551) that Packard had two specimens from Behrens taken at Sauzalito, it is probable that the type locality for *parallelia* is Sauzalito, *i. e.* the vicinity of San Francisco Bay; the species is probably double brooded on the coast as we have specimens from Oakland taken in May and September.

Hulst gives Arizona, California, and Nevada as type localities for *mellitularia*, describing the species from 5 ♂ 3 ♀ in the collections of Tepper, Hy. Edwards, and Hulst. Of these type specimens all we could find were 1 ♀ from Summit, Sierra Nevada, Calif. in the Hulst Collection and 2 ♀'s from the same locality in the Hy. Edwards' Collection; the other specimens may have been removed from the series later by Hulst as not being conspecific or they may have been destroyed; at all events we think it wise that the 'Type'

should be restricted to the ♀ in the Hulst Coll. This ♀ is extremely close to the presumable type in the Packard Collection of *parallelia* which agrees well with Fig. 42 of the Monograph but in view of the difference in type localities we think there are probably distinctions enough to warrant the retention of the names for at least racial forms; *mellitularia* will however, we believe, fall to *placerraria* Gn. described from a specimen taken by Lorquin, the type being figured by Oberthur in Études de Lep. Comp. Fasc. VI, Pl. 156, Fig. 1510. These forms or races may be distinguished from the closely allied *subpunctata* Hlst. by the presence of a bent median line on the underside of secondaries which is practically lacking in *subpunctata*; this latter species is also more heavily sprinkled with purplish or reddish scales and is apparently confined to the more southerly regions of California, being common around San Diego. We figure a ♂ and ♀ from Oakland, Calif. captured May 28th of what we consider to be *parallelia* Pack. We further figure a ♀ (Fig. 13) from Lake Tahoe of *placerraria* (*mellitularia*) taken in July and a ♂ of *subpunctata* (Fig. 14) from San Diego, Calif.

CABERODES MAJORARIA Gn.

M. Oberthur has figured the type of this species in Études de Lep. Comp. Fasc. VI, Pl. 157, No. 1522 and mentions in the text (p. 288) that this does not at all agree with Packard's figure of *majoraria* in the Monograph (Pl. XII, Fig. 32). According to the figure *majoraria* is a synonym of *confusaria*, having the t. p. line angled below costa just as in this species; this will leave *majoraria* of Packard without a name; it is a larger, heavier species with scalloped outer margin of secondaries and t. p. line of primaries slightly rounded outwardly below costa but not angled as in *confusaria*; it is also further removed from the apex of the wing, slightly incurved below cell and often followed by a dark shade as in Packard's figure; the underside of both wings is sprinkled with yellow scales. The species hardly appears to be correctly located in *Caberodes* and the emarginate nature of the secondaries suggests *Euchlaena* to our mind. We propose the name *IRRARIA* for the species, the type ♂ in Coll. Barnes having been captured at Chicago, Ill. (Kwiat); there are Co-types in the collection from New Brighton, Pa., and Cartwright, Man.

SABULODES DYARI Grossb. (Pl. XV, Figs. 9, 10, 15, 16).

This species, described from a single ♂ specimen from the Huachuca Mts., Ariz., originally from the Barnes' Coll., we cannot separate from *arizonata* Tayl. As is usual in the group there is considerable variation in the ground color and that of the cross lines and in some specimens of our series heavy black subterminal blotches are found; the type of maculation, size, and wing shape are the same however in both. We should not be surprised if *ligata* Grossb. should also prove a synonym; one of the types is before us, a very rubbed specimen, and we have recently examined the other type in the National Museum; *ligata* (Pl. XV, Fig. 15) is a little larger, slightly more sprinkled with black dots and the t. a. line shows slight irregularity of outline (not rigidly straight as in *arizonata*); our dated material would however rather point to its being the first generation of *arizonata*, our specimens being captured in April and May whilst the dates for *arizonata* (*dyari*) range through August and September. The form of *arizonata* with black subterminal spots has been generally passing as *Eugonobapta ochreata* Hlst. but we think incorrectly so, as this latter species, while probably a *Sabulodes*, shows a distinct and sharp angle in t. p. line below costa. We figure typical *arizonata* and *ligata* and also a couple of specimens showing the subterminal blotches in varying degrees of intensity; all the specimens are from Palmerlee, Arizona.

PYRALIDAE PYRAUSTINAE

GLAPHYRIA SALUTALIS Hlst.

The type of this species, a single ♂ from Oregon, is in the Rutgers' Coll. and seems distinct, at least racially, from *eripalis* Grt. which shows a much deeper brown color on both wings. *Ochrallis* Haim., described from Denver, Colo., of which we have a Co-type before us, is however a synonym of *salutalis*.

BLEPHAROMASTIX ACUTANGULALIS Snell.

This name, according to Snellen's figure (1875 Tijd. v. Ent. Pl. XI, Fig. 11) will have priority over *santatalis* B. & McD., described from Brownsville, Texas.

LOXOSTEGE PERGILVALIS Hlst.

The species was described from 3 ♀'s from Arizona; the only ♀ type from this locality that we could find is in the Hy. Edwards' Coll. In the Hulst Coll. the type is labelled 'Colorado' and in the Neumoegen Coll. the type, while labelled 'Arizona', is a ♂. The type therefore must be restricted to the specimen in the Edwards' Coll. The name falls before *coloradensis* G. & R. as listed by Dyar.

L. LULUALIS Hlst.

The species was described from 2 ♂'s from Calif. and Anticosti Is. respectively; the California Type is in the Hy. Edwards' Coll. labelled 'Soda Spgs.' and is the same as *anartalis* Grt.; the Anticosti type is in the Hulst Coll. and is not exactly the same, lacking the white s. t. banding of primaries and having less black at the base of secondaries; the name should be held to this latter type which is probably at least a good racial form.

NOCTUELIA BUBUBATTALIS Hlst.

The species described by ourselves as *N. tectalis* will sink to *bububattalis*; the type from Colorado seems to have rather darker hind wings than our Arizona *tektalis* so it is possible that two races may be involved but we have seen no Colorado material other than the type. *Tectalis* was figured in our Contributions Vol. II (6), Pl. II, Fig. 10.

CRAMBINAE

C. CARPENTERELLUS Pack. (Pl. XIV, Fig. 18).

After an examination of the type series of this species we are forced to the conclusion that *oslarellus* Haim. must become a synonym. Packard's figure of *carpenterellus* (Rep. Hayd. Sur. Pl. I, Fig. 1) is rather crude, the angles in the white streak being too accentuated, due probably to the rubbed condition of Packard's specimens; the statement that the hind wings are white is also misleading; they are distinctly smoky just as Haimbach claims for *oslarellus* of which species we have one of the Co-types before us from the Kearfott Coll. We figure a ♂ from Denver, Colorado (Oslar).

EPIPASCHIINAE

EPIPASCHIA INTERRUPTELLA Rag. (Pl. XIV, Fig. 15).

Apart from the dimensions given the description of this species fits in so exactly with that of *dentilineella* Hlst. that we believe the two

names are synonyms and that the expanse of 33 mm. given in the original description is possibly a printer's error for 23 mm. The type localities coincide, the species being apparently quite common and wide spread in Southern Arizona; it is therefore extremely probable that Morrison, who supplied Ragonot with his Arizona material, would have captured this species on one of his trips. Unfortunately the type of *interruptella* seems to have been lost or destroyed; it was the only one of the Ragonot types we could not find in his collection in the Paris Museum. We figure a ♂ from Redington, Arizona.

ONEIDA LUNULALIS Hlst.

In the original description Hulst gives the type locality as 'Colorado'; later in his revision of the Epipaschids (Ent. Am. V, 64) he only records the species from Canada and N. Y.; the type ♀ in the Hulst Coll. is labelled 'Canada' and there is another type ♀ in the Neumoegen Coll. without definite locality labelled 'Cook 6/25/86'. Both these types agree well with the description and in view of the fact that later Hulst himself described the true Colorado species as *luniferella* we believe we are justified in assuming that he was guilty of some error of transcription for we greatly doubt if *lunulalis* is found in Colorado at all, being apparently an Eastern species. It would seem best under the existing circumstances to accept the ♀ from Canada in the Hulst Coll. as being a true type. In several other instances we have noted discrepancies in this family between the localities given in the descriptions and the labels on the so-called 'types' and when we remember that Hulst had the atrocious habit of labelling specimens long after the original description had appeared with the word 'type', (apparently in the sense of 'typical') the difficulty of discriminating between the true and the false types is greatly increased and often made impossible by these further blunders of transcription.

TETRALOPHA NEPHELOTELLA Hlst.

This is another instance of a discrepancy between the locality given in both the description and the revision, *viz.* 'Penn.' and that found on the ♀ type in the Hulst Coll. which is Blanco Co., Texas. This specimen gives evidence of having been denuded on the under side in order that the venation should be examined, it also agrees in venation with Hulst's characterization of the genus *Loma*, created for *nephelotella*, and finally corresponds well in both sex and maculation with the original description. We think therefore that the type

is probably authentic but has at some time or other received an incorrect locality label. *Clemensalis* Dyar is a synonym and the form is apparently an aberrational one of *asperatella* Clem. as placed by Dr. Dyar.

T. APLASTELLA Hlst.

The species was described and made the type of the genus *Tioga* Hlst. neither type locality, sex, nor number of specimens being given but apparently only ♀'s serving for the original description. In the revision (Ent. Am. V, 69) Hulst has both sexes and gives Texas (April) as locality; the only 'Type' we could locate is a ♀ in the Hulst Coll. labelled 'Colo.' which has been examined for venation and appears to agree with the characterization of *Tioga* except that 6 of primaries is *not* stalked with 7-9; the specimen looks like *asperatella* Clem. but in view of the inadequate description and the great discrepancy of labels we cannot decide as to whether the specimen is an authentic type or not.

PHYCITINAE

MYELOIS OBNUPSELLA Hlst.

The localities given in the original description are Canada and Florida; the ♂ Type in the Hulst Coll. is from Canada and we think the name should be held to this type as the Florida specimen is not to be found and in any case it is doubtful if it would be conspecific. The species seems common in Manitoba as we have a series from Aweme (Criddle); the figure in Ragonot's Monograph (Pl. 50, Fig. 7) is quite erroneous, the wings being too broad and short and showing no trace of a transverse white band about $\frac{1}{3}$ from base of primaries which is generally more or less distinct; according to Ragonot's figure of *subtetricella* (Pl. V, Fig. 9), *obnupsella* must be very close, if not identical, with Ragonot's species. A 'type' of *obnupsella* in the Neumoegen Coll. is not a *Myelois* at all but *Vitula edmandsi* Pack.

M. TEXANELLA Hlst.

This species and *dulciella* Hlst. do not belong in the genus *Myelois* as vein 2 of secondaries is quite close to the angle of cell; they are very closely related to each other according to the types in the Hulst Coll. and would appear best placed for the present in the genus *Tacoma*; we have however seen no ♂ of *texanella* and our notes on the types leave us rather in doubt as to whether the type of *dulciella* is a ♂ or ♀.

M. LEUCOPHAEELLA Hlst.

In the Hulst Coll. the type ♀ of this species besides the type label bears simply a label 'Gillette' but agrees well with the original description; it is not a *Myelois* at all but *Meroptera unicolorella* Hlst.; the type was stated to have been captured in Iowa which is a locality in which *unicorella* will doubtless occur and we therefore think it is correct to assume that the specimen in the Hulst Coll. is the true type and sink the name to *unicorella*.

M. BISTRATELLA Hlst.

The species was described from 2 specimens from Washington, D. C.; the type in the Hulst Coll. bears a label 'Iowa' which may have been misplaced from the type of the preceding species; the specimen certainly does not correspond with the description of *leucophaecella* but agrees excellently with that of *bistriatella* so we consider that it would be wise to assume that there has been an interchange of locality labels rather than of type labels. Judging by Ragonot's figure of *bilineatella* (Pl. V, Fig. 10) and the figure published later of *bistriatella* (Pl. 50, Fig. 9) the two are correctly listed as synonyms. *Immundella* Hlst., described from Texas, appears to us however to be a good species and not another synonym.

ACROBASIS HEBESCELLA Hlst.

The type in the Rutgers' Coll. is a ♀ from N. J. the label reading 'on oak, Jersey, Pines, VI, 23'; the specimen is in hopeless condition and impossible to identify accurately; the specimen mentioned in the description from Texas is also in the collection but not labelled type; it is also very worn. Until the species has been bred from oak in N. Jersey it will be impossible to definitely fix the identity of *hebescella*; we doubt if Dr. Dyar's identification is correct for the specimens mentioned in his revision (Proc. Ent. Soc. Wash., X, 44) were bred from pecan; as Hulst very clearly associated the name in his description with an oak feeding species we should be greatly surprised if these pecan feeders proved identical.

A. FRUCTETELLA Hlst.

This species was described from 4 ♀'s from Arizona and Texas; we have been unable to locate the Arizona types but there is a ♀ Type from Blanco Co., Texas in the Hulst Coll. and another from the same locality in the Neumoegen Coll. to which we would restrict the

name and which we have matched exactly with a ♀ from Kerrville, Texas; ♂'s of the species before us show that *fructetella* must be referred to the genus *Salebria* and is the same species as *S. rectistri-gella* Dyar which sinks as a synonym.

A. TENUELLA B. & McD.

This name will fall before *slossonella* Hlst. described in the genus *Salebria*; the species is an *Acrobasis*.

MINEOLA RUBESCENTELLA Hlst.

This cannot be left in the genus *Mineola* as vein 2 of the hind wings is close to the angle of the cell; without a ♂ however it is impossible to correctly place it. For the present it may be placed in *Nephopteryx*.

ULOPHORA BRUNNEELLA Dyar.

This proves to be a synonym of *Dioryctria clarioralis* Wlk. described from Florida.

MONOPTILOTA PERGRATIALIS Hlst.

This species, described as a *Nephopteryx* from Fla., proves to be the same species as that described later from the ♂ sex as *nubilella* Hlst. and for which the genus *Monoptilota* was created; the type ♂ of *nubilella* is also from Florida; Hulst also gives Maryland and Alabama as type localities but we could not find these specimens.

PINIPESTIS UMBRIPENNIS Hlst.

The type ♂ from Colorado is in the Hulst Coll. and is the same species as that described later by Dr. Dyar as *Ortholepis gillettella*; on account of the heavy scale tuft at the base of the ♂ antennae and the scale ridge on the fore wings the species seems to us best placed in the genus *Trascula* Hlst.; it has considerable affinity to *finitella* Wlk.

GENUS TACOMA Hlst.

Dr. Dyar has already noted (Proc. Ent. Soc. Wash. VI, 112) that the original characterization of this genus calls for '♂ antennae simple' whereas in the revision a tuft of scales on the ♂ antennae is mentioned; unfortunately, without examining the generic type (*feriella* Hlst.), Dr. Dyar has accepted the latter statement as correct whereas *feriella*, if our identification from the type be correct, bears out the original diagnosis, what Hulst probably took for a scale tuft

being an enlargement of the basal antennal joint which is scaled; *nyssacolella* Dyar and *subtinctella* Rag. must be removed from *Tacomia* and may be placed temporarily in the genus *Nephopteryx*.

AMBESA BUSCKELLA Dyar.

The species falls as a synonym of *Glyptocera consobrinella* Zell.

NEPHOPTERYX MODESTELLA Hlst.

The ♂ type in the Hulst Coll. is a specimen from Newton Highlands, Mass. (Barnes) and is merely a very worn *ovalis* Pack., the latter name having priority.

NEPH. FURFURELLA Hlst.

The species was described from 2 ♂ 2 ♀ from Florida and Texas; the type in the Hulst Coll. is a ♀ labelled Florida and a similar one is in the Neumoegen Coll.; a ♂ from Texas stands under the same name but has no type label. The species is not a *Nephopteryx* but an *Elasmopalpus* and the same as that described later by Hulst as *floridellus*; all the types we have seen are conspecific but the name should be held to the specimen in the Hulst Coll.

NEPH. RHYPODELLA Hlst.

The original description calls for a single ♂ from Oregon as type; in his revision Hulst gives an entirely different description, making *curvatella* Rag. a synonym and mentioning Illinois as locality; in the Hulst Coll. is a ♀ 'type' with no locality label (merely 'No. 42') which appears to agree (it is worn) with the description of the revision and with Ragonot's figure of *curvatella* pretty well, but which certainly does not fit the original description. What the true *rhypodella* may be we are unable to say; probably material from Oregon will one day solve the mystery; in any case we would separate *curvatella* Rag. as a good species; the type, judging from the Monograph, came from California and we have a good series before us from that state which agrees with Hulst's spurious type of *rhypodella* and which is probably the true *curvatella*.

SALEBRIA TRIPLAGIELLA Dyar.

In the National Museum this is placed as a synonym of *Laodamia fusca* Haw. and apparently correctly so; it will at least be a synonym of *moestella* Wlk. described from Northern Canada.

S. ALICULELLA Hlst.

The type of this species must be restricted to the specimens in the Hulst Coll., the types in the Neumoegen and Hy. Edwards' Collections belonging to the closely allied *furciferella* Dyar which has the round discal spot jointed by a black streak to the t. a. line.

S. BIFASCIELLA Hlst.

This species and *nogalesella* Dyar are extremely closely related; apart from the fact that the hind wings of *bifasciella* are slightly deeper in color we can point to no feature that would separate them; breeding will be necessary to show whether we are dealing with good species or slight varietal forms of one species.

S. LACTEELLA Hlst.

The single ♀ type of this species seems to be a better preserved specimen of what Hulst had previously described as *Nephoptyx gilvibasella* from a worn ♀; the type localities of both species are given as Cent. Texas and both types are in the Hulst Coll.

S. ODIOSELLA Hlst.

With regard to the type specimen of this species we are again met with one of those puzzles which must be credited to the inaccuracies of Dr. Hulst. The original description calls for a ♂ from Colorado as type, Hulst's revision states that Texas is the type locality and the ♂ type in the Hulst Coll. bears a label 'Blanco Co., Texas'; it agrees excellently with the original description so we see no reason for not regarding it as type, but cannot say which locality is correct as we have no specimens of the species which seems closely related to *bakerella* Dyar.

S. CARNEELLA Hlst.

New Mexico is given as the type locality for the species but this is changed by Dr. Hulst in the revision to Maine and Massachusetts with a doubtful N. Mex. ♀ associated; the type in the Hulst Coll. bears no label but appears to agree with the description; we have two specimens from Manitoba and imagine the localities given in the revision are therefore more likely to be correct than the one originally cited.

S. SEMIOBSCURELLA Hlst.

This species has been generally confused with *Meroptera pravella* Grt. and in the Hulst Coll. most of the specimens under this latter

name belong to *semiobscura*; the two species are very much alike but apparently the stalking of vein 10 of primaries with 8 and 9 is constant in *pravella* and is a good means of separation in doubtful cases; the stalking of veins 4 and 5 on primaries does not always hold. We think Packard is correct in describing the larva of *pravella* as feeding on willow as his material came from Brunswick, Me. and Maine is the type locality for *pravella*. Riley's citation of sumach as the food plant (Rag. Mon. Phy., p. 315) is due to a misidentification; he probably had bred *semiobscura*, the larva of which is a sumach feeder, occurring in two generations; we have a bred series before us from larvae collected around Decatur. *Pravella* is apparently a more northern species, our only specimens (all ♀'s) having been received from Hymers, Ont.

M. DELASSALIS Hlst.

The original ♀ type came from Nevada according to the description; later, in the revision, Hulst added specimens from Colo., N. Mex., and Ariz. and one of these later specimens from N. Mexico labelled 'type' is responsible for our usual conception of the species; unfortunately the ♀ from Nevada which is also present and labelled 'type' in the Hulst Coll. proves to be a worn specimen of what Hulst later described as *purpurella*; in the true *delassalis* the t. a. line is quite distinct in the lower portion being white and angled, heavily bordered with black; the t. p. line is very close to the outer margin; in the other species, which probably will now bear the name *fernaldi* Rag., the t. a. line is practically obscured by a heavy black band and the t. p. line is further from outer margin; the veins in the outer portion of the wing are slightly striate with black and the ground color is orange-ochreous not reddish-ocher.

MEGASIS CINCTELLA Hlst.

The type ♀ in the National Museum is worn and has only a single palpus this being covered with mould and so distorted that examination is very difficult. According to the venation we should be inclined to place the species in *Passadena* Hlst.; it agrees in having vein 2 of secondaries close to angle of cell and 3 stalked with 4 and 5 which are on a very long stalk; on primaries 4 and 5 are short stalked, 10 appearing to be short stalked with 8 and 9, in this respect differing from the type of *Passadena*. The species certainly has no

resemblance to a *Megasia* and until more material of both sexes is available would seem best referred as above.

ELASMOPALPUS MELANELLUS Hlst.

The type, a ♀ labelled 'Florida (April)', is in the Hulst Coll. The species is the same as *Tlascala finitella* Wlk. and Hulst's name sinks. Another similar type from Miami, Fla. (Slosson) is in the Neumoegen Coll.

ANORISTIA OLIVELLA Hlst.

The type of this species, a ♀, from Needles, Calif., is a frightfully worn and stained specimen of *Ragonotia dotalis* Hlst. which name has priority.

PYLA PALLIDELLA Dyar.

The species, as we have long suspected, is a synonym of *Lipographis leoninella* Pack.; it is so placed in the National Museum.

MELITARA JUNCTOLINEELLA Hlst.

The name must be restricted to the ♂ type in the Hulst Coll. from Texas; the ♀ types from Colorado in the Hulst and Neumoegen Collections are probably *dentata* Grt.

YOSEMITIA GRACIELLA Hlst.

In the original description the type locality is stated as Colorado, but the revision gives Texas and the specimen marked 'type' in the Hulst Coll. is labelled 'Blanco Co., Tex.' The localities given in Hulst's paper containing the description of *graciella* (Ent. Am. III, 129) seem to be frequently quite inaccurate so that we see no reason, the specimen agreeing with the description, for not accepting it as a type.

YOSEMITIA MYSIELLA Dyar.

The name must be restricted to the Stockton, Utah specimens which include the type ♂; we doubt if the Arizona specimens (of which we possess several co-types) belong to the same species; the ♂ antennae of *mysiella* are strongly ciliate. *Pallidipennella* Hlst., at present placed in the *Ancrastiinae*, falls close to *mysiella*; the group is a puzzling one and needs careful study to determine the species involved.

YOSEMITIA MACULICULA Dyar.

This seems to us to be merely a small, poorly marked specimen of *Zophodia stigmella* Dyar; we have a long series from San Diego the specimens varying greatly in size and distinctness of maculation but representing apparently a single species.

HOMOEOSOMA IMPRESSALE Hlst.

The original description calls for a single ♂ from Nevada as Type; Hulst's revision states 'Colorado' as type locality and in the Hulst Coll. there are ♂ and ♀ 'types' labelled 'Colorado' neither agreeing well with the original description nor with one another. Typical *impressale* is easily identified from the description and has a rather well-defined t. a. black band composed of two more or less confluent spots; the so-called types do not show this but belong to the rather immaculate form (equally common apparently) with only the black discal dots present; although probably conspecific we do not think either of the specimens can be accepted as the true type.

H. ELECTELLUM Hlst.

The original description called attention to the variation shown in the type specimens in size and coloration and this is borne out by the two type specimens from Blanco Co., Texas in the Hulst Coll., one, the ♂, being small (17 mm) and a good match for what we described later from Florida as *differtellum*, the other, a ♀, much larger (23 mm) and rather more ochreous tinted; the difference is scarcely sexual as we have both sexes of both forms before us in long series; it may however be seasonal as we note that our small specimens were taken mostly in early spring or late fall whilst the large ones occur in summer; Ragonot's name *texanellum*, judging by the description and figure, would apply to the early brood with *differtellum* B. & McD. as a synonym, whilst *electellum* may be used *in sens. strict.* for the large summer form.

PLATE XII

- Fig. 1. *Arzama brehmei* B. & McD. Type, ♂ New Jersey.
Fig. 2. *Arzama brehmei* B. & McD. Type, ♀ New Jersey.
Fig. 3. *Arzama obliqua* Wlk. ♂ Long Is., N. Y.
Fig. 4. *Arzama obliqua* Wlk. ♀ Long Is., N. Y.
Fig. 5. *Polia alfkeni* Grt. ♂ S. Arizona.
Fig. 6. *Cerma olivacea* Sm. ♂ Glenwood Spgs., Colo.
Fig. 7. *Polia rectilinea* Sm. ♀ Vancouver Is., B. C.
Fig. 8. *Renia restrictalis* Grt. (larvalis Grt.) ♂.

PLATE XII

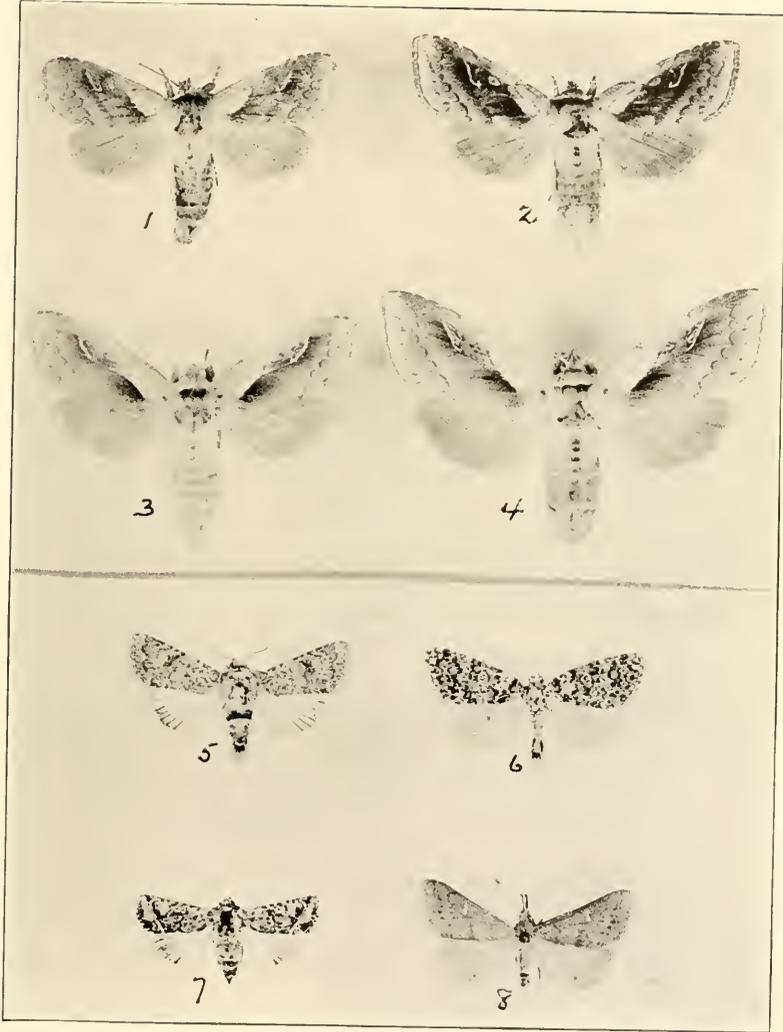


PLATE XIII

- Fig. 1. *Acronycta frigida* Sm. (*pacifica* Sm.) ♂ Alameda Co., Calif.
 Fig. 2. *Acronycta frigida* Sm. (*pacifica* Sm.) ♀ Alameda Co., Calif.
 Fig. 3. *Acronycta felina* Grt. ♂ Truckee, Calif.
 Fig. 4. *Epipsilia tecta* Hbn. ♂ Okak, Labr.
 Fig. 5. *Epipsilia cinerea* Staud. ♂ Okak, Labr.
 Fig. 6. *Luperina relicina* Morr. (*migrata* Sm.) ♀ New Jersey.
 Fig. 7. *Drasteria capticola* Wlk. (*faceta* Hy. Edw.) ♂ Stemper, Fla.
 Fig. 8. *Drasteria capticola* Wlk. (*faceta* Hy. Edw.) ♀ Stemper, Fla.
 Fig. 9. *Nocloa pallens* Tepp. (*nesaea* Sm.) ♂ Palm Spgs., Calif.
 Fig. 10. *Homohadena inconstans* Grt. ♂ Yavapai Co., Ariz.
 Fig. 11. *Cleora lixaria* Grt. ♂ Tucson, Ariz.
 Fig. 12. *Cleora lallata* Hlst. ♂ White Mts., Ariz.
 Fig. 13. *Drepanulatrix hulsti* Dyar (*lenitaria* Grossb.) ♂ San Diego, Calif.
 Fig. 14. *Drepanulatrix litaria* Hlst. (*fumosa* Hlst.) ♂ Truckee, Calif.
 Fig. 15. *Cleora obliquaria* Grt. (*rufaria* Grt.) ♂ Redington, Ariz.
 Fig. 16. *Cleora obliquaria* Grt. (*rufaria* Grt.) ♀ Redington, Ariz.
 Fig. 17. *Lygris atrifasciata* Hlst. ♂ Truckee, Calif.
 Fig. 18. *Phasiane teucaria* Stkr. ♂ Vanc. Is., B. C.

PLATE XIII

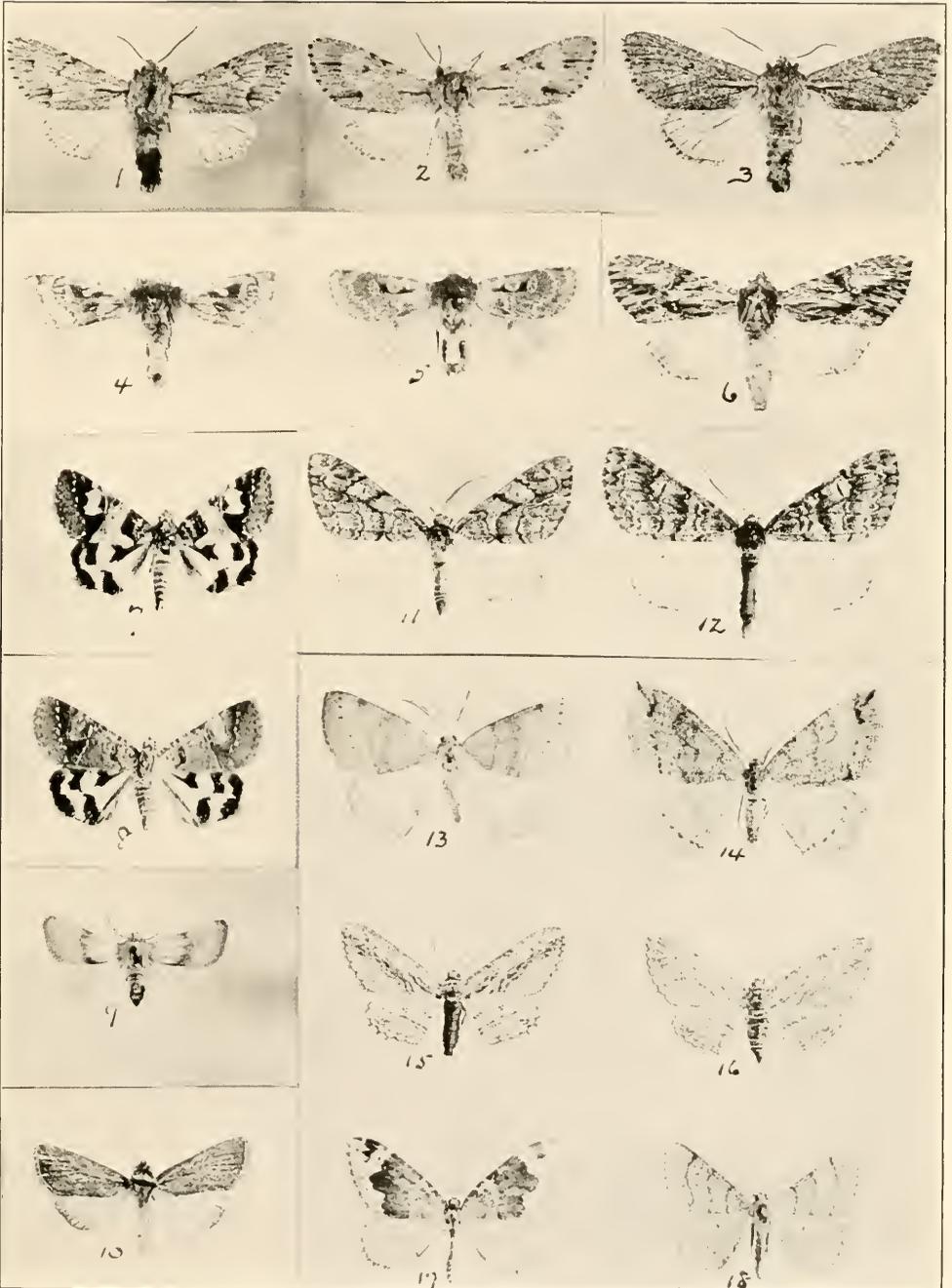


PLATE XIV

- Fig. 1. *Parastichtis inops* Grt. (*insipida* Stkr.) ♀ Omaha, Nebr.
 Fig. 2. *Euros proprius* Hy. Edw. ♀ Plumas Co., Calif.
 Fig. 3. *Stiria fuliginosa* Sm. (*hutsoni* Sm.) ♀ Prescott, Ariz.
 Fig. 4. *Phasiane colorata* Grt. (*conarata* Grossb.) ♂ Redington, Ariz.
 Fig. 5. *Phasiane parcata* Grossb. ♂ Redington, Ariz.
 Fig. 6. *Eupithecia misturata* Hlst. ♂ Siskiyou Co., Calif.
 Fig. 7. *Phasiane decorata* Grossb. ♀ Vineyard, Utah.
 Fig. 8. *Phasiane yavapai* Grossb. ♀ Palmerlee, Ariz.
 Fig. 9. *Phasiane delectata* Hlst. ♀ Colo.
 Fig. 10. *Phasiane respersata* Hlst. ♀ Durango, Colo.
 Fig. 11. *Itame quadrilinearia* Pack. (*inquinaria* Hlst.) ♂ Camp Baldy, Calif.
 Fig. 12. *Plagodis arrogaria* Hlst. ♂ Decatur, Ill.
 Fig. 13. *Phasiane excurvata* Pack. (*spodopterata* Hlst.) ♂ Glenwood Spgs.,
 Colo.
 Fig. 14. *Phasiane excurvata* Pack. (*spodopterata* Hlst.) ♀ Glenwood Spgs.,
 Colo.
 Fig. 15. *Jocara interruptella* Rag. (*dentilineella* Hlst.) ♂ Redington, Ariz.
 Fig. 16. *Ptychopoda lacteola* Lint. ♀ Kerrville, Texas.
 Fig. 17. *Ptychopoda bonifata* Hlst. (*ptelearia* Riley) Palmerlee, Ariz.
 Fig. 18. *Crambus carpenterellus* Pack. ♂ Denver, Colo.

PLATE XIV

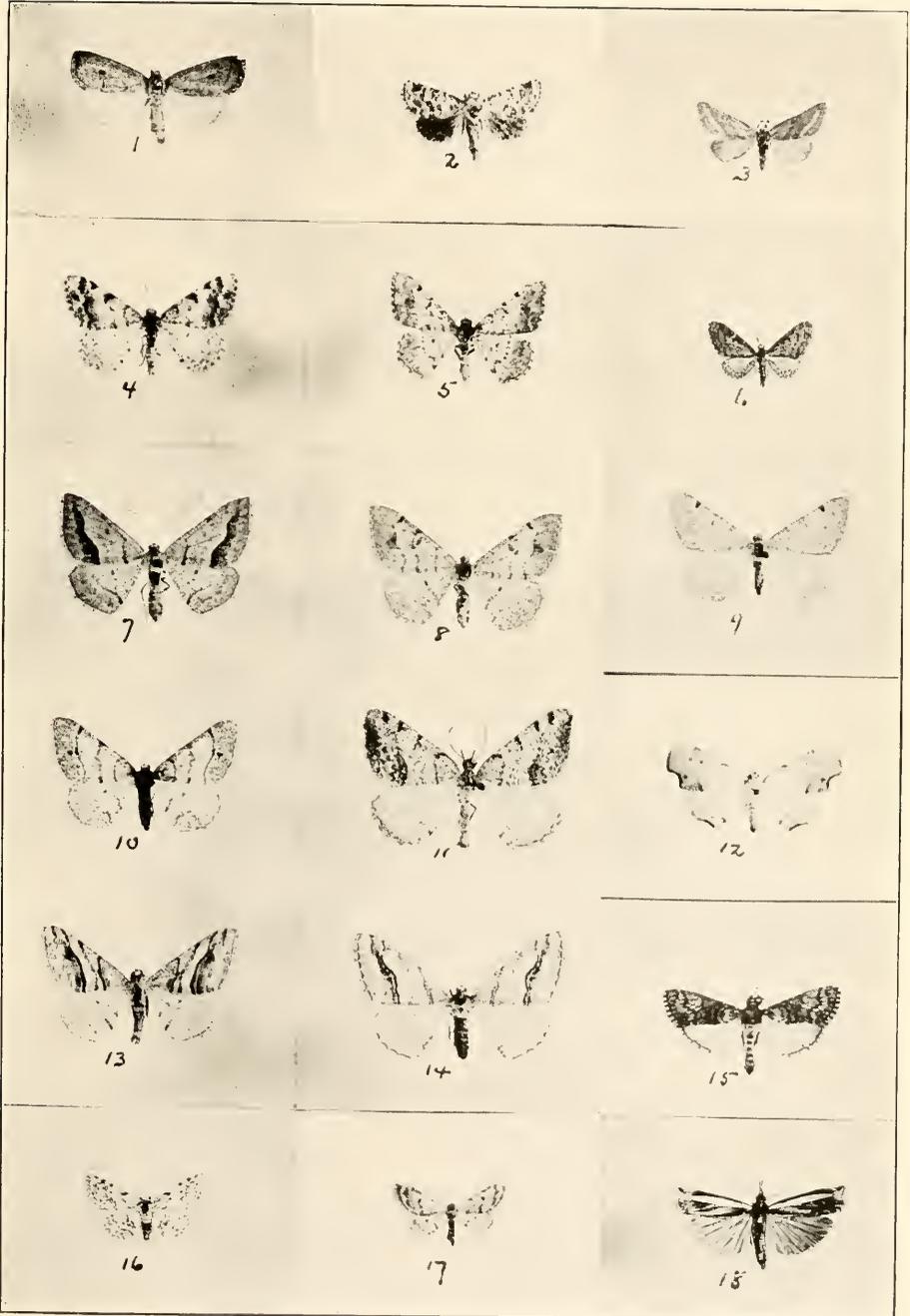
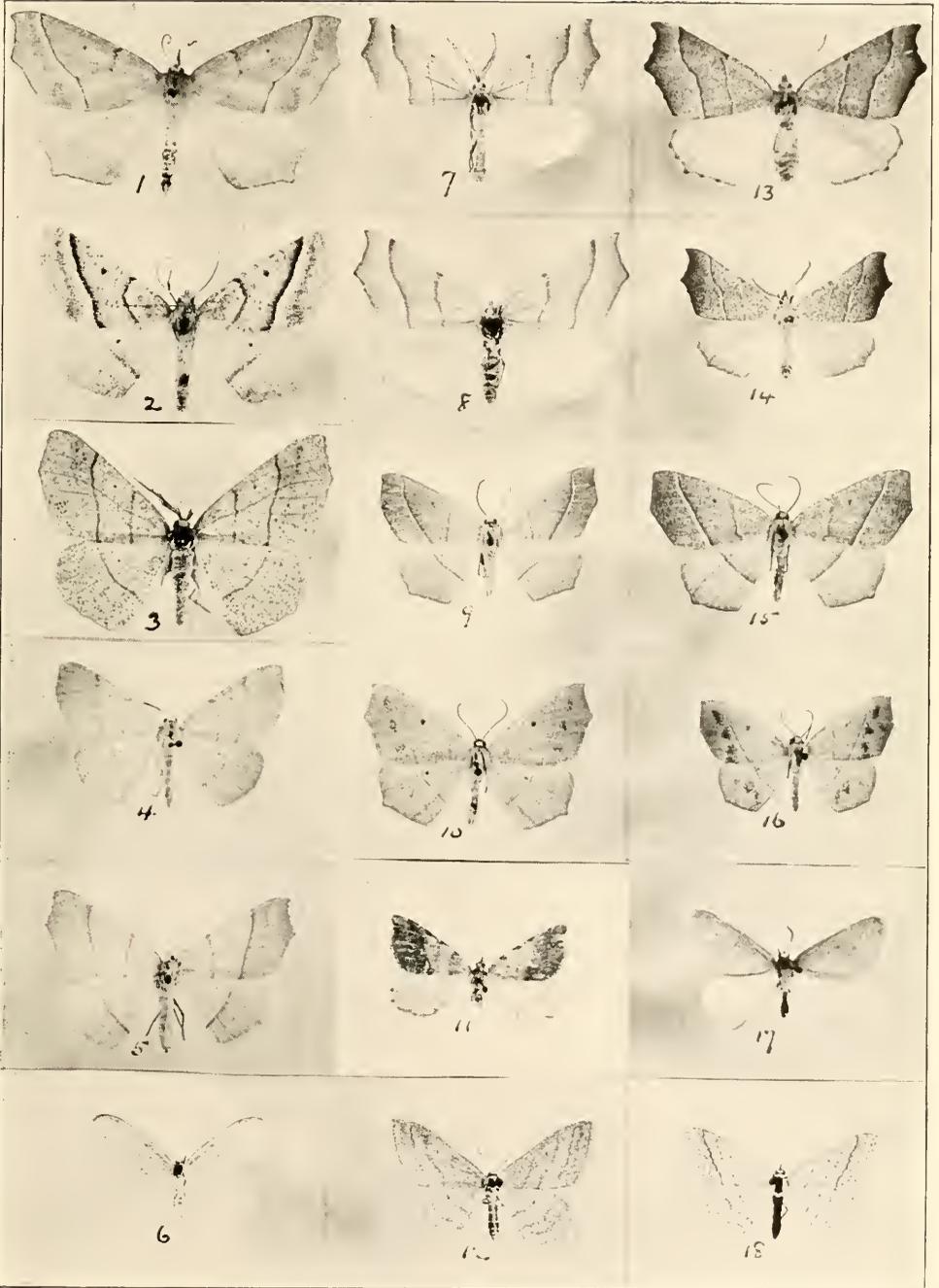


PLATE XV

- Fig. 1. *Synaxis jubararia* *Hlst.* ♂ Vancouver Is., B. C.
 Fig. 2. *Synaxis pallulata* *Hlst.* ♂ Vancouver Is., B. C.
 Fig. 3. *Euchlaena sesquilinearia* *Grt.* ♂ Redington, Ariz.
 Fig. 4. *Euchlaena cavillaria* *Hlst.* (*novellata* *Hlst.*) ♂ Palmerlee, Ariz.
 Fig. 5. *Euchlaena cavillaria* *Hlst.* ♀ Palmerlee, Ariz.
 Fig. 6. *Ptychopoda rotundopennata* *Pack.* (*hanhami* *Hlst.*) ♂ Calgary,
 Alta.
 Fig. 7. *Pherne parallelia* *Pack.* ♂ Oakland, Calif.
 Fig. 8. *Pherne placeraria* *Gn.* ♀ Lake Tahoe, Calif.
 Fig. 9. *Sabulodes arizonata* *Tayl.* (*dyari* *Grossb.*) ♂ Palmerlee, Ariz.
 Fig. 10. *Sabulodes arizonata* *Tayl.* ♂ *var.* Palmerlee, Ariz.
 Fig. 11. *Itame subfalcata* *Hlst.* ♀ Vineyard, Utah.
 Fig. 12. *Acidalia fuscata* *Hlst.* ♂ Lake Tahoe, Calif.
 Fig. 13. *Pherne parallelia* *Pack.* ♀ Oakland, Calif.
 Fig. 14. *Pherne subpunctata* *Hlst.* ♂ San Diego, Calif.
 Fig. 15. *Sabulodes ligata* *Grossb.* ♂ Palmerlee, Ariz.
 Fig. 16. *Sabulodes arizonata* *Tayl.* ♂ *var.* Palmerlee, Ariz.
 Fig. 17. *Merochlora graefiaria* *Hlst.* (*eutrappes* *Prout*) ♂ Stockton, Utah.
 Fig. 18. *Acidalia ancillata* *Hlst.* ♂ Colo.

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CONTRIBUTIONS
TO THE
NATURAL HISTORY
OF THE
LEPIDOPTERA
OF
NORTH AMERICA

VOL. III
No. 4

FURTHER NOTES ON PHILOTES BAT-
TOIDES AND ITS ALLIES

REMARKS ON GROSSBECK'S LIST OF
FLORIDA LEPIDOPTERA

NEW SPECIES AND VARIETIES OF
GEOMETRIDAE

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DECATUR, ILL.
THE REVIEW PRESS
MARCH 10, 1917

Published
Under the Patronage
of
MISS JESSIE D. GILLET
Elkhart, Ill.

FURTHER NOTES ON PHILOTES BATTOIDES AND ITS ALLIES

Since the publication of our notes on this species in 'Contributions' Vol. III, No. 2, p. 116 we have continued our investigations and have arrived at a much better comprehension of the species forming the group, their distribution and their racial forms; we offer the following paper therefore with a view to assisting students in correctly identifying their material.

Dealing first of all with *P. battoides* Behr we would point out that we were in error in our previous notes in citing the type locality as the headwaters of the Tuolumne River; it was at the headwaters of the San Joaquin River that the type specimens were captured, a locality somewhat further south than the first mentioned one although in the same general region; our specimens from Mineral King, Tulare Co. were therefore taken very close to the type locality and we consider that we are justified, in view of the fact that the types are destroyed, in considering these specimens as typical; our figures on Pl. XI, Figs. 7, 8, 10 of the work already quoted will represent then the nimitypical form.

We have already referred to the δ genitalia as being very distinctive and as forming an excellent means—and in some cases, as we will show later, practically the only means—of distinguishing *battoides* from *enoptes* and its close allies. These genitalia we now figure (Pl. XVII, Fig. 3): the tegumen with its high lateral cheeks and absence of the dorsal portion together with the presence of stout falces or hooks springing from the lower portion of the cheeks and meeting medially above the penis at once show the species to belong to the typical Lycaenid group of 'blues'; the valvae or claspers with their strong bifid dorsal prong and their flat rounded ventral portion with two strong spines on its dorsal margin are very characteristic for the species; we might point out that there is considerable variability with regard to these two spines; a single specimen may have one clasper of the normal form whereas in the other the spines may have coalesced or the inner one be wanting; on the whole however the type is very constant and we can point to nothing in the genitalia (except the smaller size as is natural) whereby our recently described race *bernardino* (Pl. XVII, Fig. 4) can be distinguished from the typical form.

In our former article we mentioned specimens taken by Dr. McDunnough at Crater Lake, Oregon; a careful study of a long series convinces us that we are dealing with a good race distinguished in the ♂ sex by the fact that the black border to both wings is much broader, at times occupying almost the outer half of secondaries; in both sexes on the underside of the secondaries the extradiscal curved row of spots is much further removed from the orange band and its bordering black line, the spots themselves being slightly less quadrate and the ground color of the wing of a rather greener hue. For this race we propose the name *OREGONENSIS*, our types being a long series captured in the last two weeks of July. Our figures of this race, (Pl. XVI, Figs. 1-3) when compared with those of typical *battoides* already mentioned, should facilitate the identification of this form.

In the lower mountain valleys of Northern and possibly Central California we were greatly surprised to find another form of *battoides* which is so similar in the maculation of the underside to *enoptes* that if it were not for the striking difference in genitalia we would be utterly unable to separate the two. The spots on the underside of secondaries are greatly reduced in size and the orange submarginal band is more or less broken into lunules, the terminal dark line is also reduced in width to a fine hair-line; on the upper side of the ♂'s the black border is moderately broad and the fringes of the secondaries white, uncheckered; above the anal angle of secondaries is a slight orange shading in our types and this, when present, should distinguish the form from *enoptes*; otherwise recourse must be had to the genitalia. The ♀ shows a rather more extended orange band on upper side of secondaries than is found in *enoptes*. We propose the name *INTERMEDIA* for this race, our types (Pl. XVI, Figs. 4-6) being 2 ♂'s and 1 ♀ from Shasta Co., Calif. (presumably the vicinity of Castella in the Upper Sacramento Valley) captured in the third week in July; we have several other specimens before us merely labelled 'California'.

In our article already referred to we expressed doubt that *battoides* occurred East of the Sierra Nevada Mts.; we have however, discovered that a race exists in the Rocky Mts. very similar to *intermedia* but with rather broader dark borders on upper side in ♂ sex and very prominent orange shading at anal angle of secondaries; the underside is browner in ground color with the spots larger than in *intermedia* and well ringed with white, the orange band is more continuous and there is a diffuse smoky shade on primaries subterminally above the outer

angle which at times shows ruddy tints; we have before us 3 ♂'s from Salida, Colo. (July 1-7), 1 ♂ labelled Colorado and 1 ♂ taken in Southern Utah by Dr. Barnes; for this race we propose the name *CENTRALIS*, making the above mentioned specimens types and figuring them on Pl. XVI, Figs. 7, 8.

Turning to *P. enoptes* Bdv. we now offer a figure of the ♂ genitalia (Pl. XVII, Fig. 1) which shows at a glance the wide difference which exists between it and *P. battoides*. The tegumen is of essentially the same general type but the Valvae are much closer to the *Glaucopsyche* type than we find in *battoides*, possessing none of the complicated armature found in this species; they are broad, flat and simple, curving upward distally, the broad distal margin being furnished with a row of small teeth ending ventrally in a single strong spine below which is a rather deep excavation. The types of *enoptes* have been figured by M. Oberthur (Etudes de Lep. Comp. IX, Pt. 1 Pl. 237, Figs. 1948/9); we have specimens exactly matching these types from Truckee, Calif.; our series from Mineral King, Calif., specimens of which are figured in our Contributions Vol. III, Pl. XI, Figs. 1 and 4, differ in their slightly paler ground color on underside but are otherwise identical.

A further study of the genitalia (Pl. XVII, Fig. 2) of *glaucon* Edw., which we have already discussed and figured in the above mentioned paper, convinces us that this is merely a racial form of *enoptes* with rather heavier orange band on underside of secondaries and tendency to slight orange shading at outer angle of primaries.

Our species *P. rita* from Arizona we have already figured and now give figures of the genitalia (Pl. XVII, Figs. 5, 7) showing the close relationship to *glaucon* from which it differs among other details in the much greater length of the terminal spine on the claspers.

We have discovered an undescribed species, apparently confined to certain mountainous districts of Utah, which has probably gone under the name of *glaucon* but which, if our conception of this form be correct, is specifically distinct. The upper side of the ♂ is very similar to that of *glaucon* but there is prominent orange shading at anal angle of secondaries above the dark border; the under side is paler with the black spots of secondaries much smaller in size; on the primaries there is a broad submarginal orange band narrowing towards apex of wing and not quite attaining costa, this is bordered inwardly by narrow dark streaks; on the secondaries there is a subterminal row

of orange lunules, narrowly separated by the veins and, except below costa, showing none or only faint traces of black internal border. The ♀ is dark brown and has the subterminal orange band of secondaries continued on primaries for half the length of the outer margin. We propose the name *SPALDINGI* for this species in honor of the collector, Mr. Tom Spalding of Provo, Utah; our types are 2 ♂, 1 ♀ from Provo, Utah (Aug. 1-7), 1 ♂ from Silver Lake, Utah (July 24-30) and 1 ♂ (very large) from Stockton, Utah, the latter in the collection of Mr. Spalding; we figure the species on Pl. XVI, Figs. 9-11. The ♂ genitalia (Pl. XVII, Fig. 6) differ from those of *enoptes* in having the Valvae much more flattened in their proximal portion and the distal margin furnished with spines which gradually increase in size from the dorsal to the ventral angle.

In conclusion we offer the following resumé of the grouping of these species:

- | | |
|--------------------------------------------------|-----------------------------------------|
| 1) <i>P. battoides</i> <i>Bchr.</i> | High Sierras, Calif. |
| <i>a</i> <i>bernardino</i> <i>B. & McD.</i> | S. Bernardino & S. Jacinto Mts., Calif. |
| <i>b</i> <i>intermedia</i> <i>B. & McD.</i> | N. Calif. |
| <i>c</i> <i>oregonensis</i> <i>B. & McD.</i> | Crater Lake, Ore. |
| <i>d</i> <i>centralis</i> <i>B. & McD.</i> | Rocky Mts. of Colo. and Utah. |
| 2) <i>P. enoptes</i> <i>Bdv.</i> | California. |
| <i>a</i> <i>glaucon</i> <i>Edw.</i> | Great Basin & Rocky Mt. region. |
| 3) <i>P. spaldingi</i> <i>B. & McD.</i> | Utah. |
| 4) <i>P. rita</i> <i>B. & McD.</i> | Arizona. |

A FEW REMARKS ON GROSSBECK'S LIST OF
FLORIDA LEPIDOPTERA WITH
DESCRIPTIONS OF
NEW SPECIES

We have received with much pleasure a copy of the Lepidoptera of Florida by our lamented friend J. A. Grossbeck, published in Bull. Am. Mus. N. H. 1917, XXXVIII, pp. 1-147. As we are directly or indirectly responsible for the determinations of a number of the species listed the following notes on a few of them, based on our present more extended knowledge, may be of interest:

SPHIDA OBLIQUA Wlk. (p. 60).

The determination of this species was made before the publication of *S. anoa* Dyar and the records should be removed to this latter name as it is probable that *obliqua* does not occur in the south. Our records are not, however, from Ft. Myers and Chokoloskee but from Ft. Meade and Miami, the latter being the type locality for *anoa*.

CAPNODES PUNCTIVENA Sm. (p. 77).

This species is a synonym of *rufnans* Gn.; it occurs in two well marked forms—with and without white dots on the cross lines—the form without white dots being *discrpta* Wlk. according to Sir Geo. Hampson (*in litt.*).

Chokoloskee, Fla. may be added to the list of localities.

RACHEOSPILA LIXARIA Gn. (p. 86).

Judging by our material as named and referred to by Mr. Grossbeck we doubt very much if he has correctly identified Guenee's species. According to the descriptions *lixaria* Gn. and *catachloa* Hulst must be very similar; they both have a *crenulate or dentate* post-median line, a *red line* at base of fringe, the fringe *checkered with red* and the abdomen with white *diamond patches* bordered with red. We have not seen the type of *catachloa* which is with Mrs. Slosson but we accept the specimen identified for us by Mr. Grossbeck as presumably correct; we sent a specimen of this species to Mr. L. B. Prout to compare with the type of *inclusaria* in the British Museum and he returned it with the note '*inclusaria* has stronger palpus, less regularly rounded hind

wings, smoother green color (our specimen was rubbed) larger cell-dots, more definite lines, vertex more narrowly red'; assuming therefore, that *inclusaria* Wlk. is a synonym of *lixaria* Gn. as given by Mr. Prout in the Genera Insectorum, *Hemitheinae* p. 103 it would seem that we have two closely allied species in *lixaria* and *catachloa*; we have not satisfactorily identified the former as yet but have two worn specimens without label but presumably from Florida which fit in fairly well with the above description except that the postmedian line is only slightly wavy and not regularly crenulate. More material for study is much needed in this group.

RACHEOSPILA EXTREMARIA Wlk. (p. 87).

Again we must question the correctness of Mr. Grossbeck's identifications, at least so far as our material is concerned. *Extremaria* was described (1861, Cat. Lep. B. M. XXII, 584) from an unknown locality and we have already (Cont. III, No. 3, 170) expressed the opinion that *rubromarginaria* Pack. is distinct from this species. Mr. L. B. Prout was kind enough to draw up for us a description from the unique ♀ type in the British Museum which we cannot do better than quote here in full: 'Face and vertex green strongly mixed with red, a white fillet between antennae; palpus short and slender, third joint slender, exposed, but not elongate (hardly a *Racheospila*); lines extremely vague, the postmedian apparently waved but not crenulate; no red terminal line; fringe pink with very narrow pale line at base; abdomen lost.'

The pinkish fringes without any red marginal line to wing seem characteristic; we have a single specimen from Hastings, Fla. (March) which we doubtfully refer here but took no material corresponding to the above description on our Florida trip; the reference to material from us under *rubrolinearia* Pack. is also an error, possibly a repetition from the preceding species; we doubt greatly the occurrence of *rubrolinearia* in Florida.

As the specimens on which Mr. Grossbeck based his identifications of *lixaria* and *extremaria* appear to be unnamed we offer the following descriptions:

RACHEOSPILA ABDOMINARIA sp. nov.

Palpi very short in both sexes, rather appressed and upturned, reddish; front reddish, centrally green with lower portion near base of palpi showing traces of a white line and with two white dots below base of antennae; broad white fillet between antennae bordered at base of collar with reddish; thorax

and abdomen green, latter whitish on last two segments and with a broad dorsal creamy line tending to broaden slightly on central segments but with no red bordering; wings green, sprinkled with whitish and with small but distinct dark discal dots; a faint, white, curved, slightly irregular antemedian line on both wings; a similar postmedian line, in general parallel to outer margin; costa of primaries narrowly white, outer margin of both wings with distinct red line, scarcely broken by minute white dots on the veins; fringes with a distinct yellow tinge, unicolorous except at apex of primaries which is tinged with reddish. Beneath whitish green with faint discal dots, red terminal line and fringes as above, abdomen and legs whitish, fore tibiae tinged with red. Expanse ♂ 18 mm., ♀ 24 mm.

HABITAT: ♂, Stemper, Fla. (Aug.); ♀, Fort Myers, Fla. (Apr. 16-23). 3 ♂, 1 ♀. Types, Coll. Barnes.

The short palpi, ochreous line on abdomen and red terminal line with uncheckered fringes should distinguish this form; the secondaries have the outer margin gently rounded with no angle at vein 4 but a rather sharp anal angle. The ♂ antennae are narrowly bipectinate and the hind tibiae possess a hair pencil.

RACHEOSPILA ASSOCIARIA sp. nov.

♀. Palpi rather long, upturned and projecting well beyond head, reddish; front rubbed, apparently reddish; white fillet between antennae bordered posteriorly narrowly with reddish; thorax and abdomen green, latter white on the sides and with a broad creamy dorsal stripe; wings green sprinkled with white and with very faint dark discal dots; faint white antemedian and postmedian lines much as in preceding species, but the outer slightly more angled on secondaries; costa of primaries whitish; red terminal line more distinctly interrupted by white dots than in preceding species; fringes rubbed but apparently white; secondaries with a rather distinct angle on outer margin at vein 4. Beneath pale whitish green, immaculate except red terminal line and pale costa of primaries. Expanse 25 mm.

HABITAT: Ft. Myers, Fla. (Apr. 16-23). 1 ♀. Type, Coll. Barnes.

The much longer palpi in ♀ separate the species from the preceding with which it has great similarity; the more angled secondaries and fainter discal dots are also points of distinction.

EOIS DAVISI Grossbeck. (p. 90) (Pl. XVIII. Fig. 5).

The ♀ specimen from Everglade (Apr.) mentioned in the description is in the Barnes Collection; it was returned to us labelled '*suavata* Hulst?'; we have placed a Paratype label on it and figure it on Pl. XVIII, Fig. 5. The remaining types are probably in the Davis collection, possibly under the label *suavata*; in the records for this latter species given on p. 92 we imagine the last two should be omitted as they undoubtedly refer to *davisi*.

MACARIA MACULIFASCIA Hlst. (*aucillaria* Stkr.) (p. 94).

The records of Everglade and Chokoloskee are apparently given in error; in any case we imagine that *aucillaria* Stkr. is better referred to *ordinata* Wlk. than to *maculifascia* Hlst., a species described from Dakota; there is a note to this effect in our Contributions Vol. III, No. 3, p. 182.

TALLULA ATRIFASCIALIS Hlst. (p. 128).

This species is confined as far as we know to Texas; the species listed as *atrifascialis* from Florida is distinct and seemingly without a name. We describe it as follows:

TALLULA WATSONI sp. nov. (Pl. XVIII, Fig. 6).

Primaries dull whitish gray sprinkled with brown atoms; costa at base dark brown (in *atrifascialis* (Pl. XVIII, Fig. 7) there is an additional dark dot below the costal streak); t. a. line well out, pale, almost rigidly oblique with slight angle inward on vein 1, preceded by broad brown band of practically even width throughout (in *atrifascialis* the t. a. line has a sharp outward angle below cell and the preceding brown band is much contracted below costa); t. p. line white, subparallel to outer margin, bulging and slightly dentate in central portion followed by a dark diffuse apical shade; a terminal dark dotted line. Secondaries whitish hyaline at base, shading into dark smoky outwardly. Beneath smoky, paler above inner margin of secondaries. Expanse ♂ 13 mm., ♀ 16 mm.

HABITAT: Stemper, Fla. (July). 3 ♂, 5 ♀. Types, Coll. Barnes.

We take pleasure in naming this species after Mr. F. E. Watson of the American Museum of Nat. History.

TETRALOPHA ROBUSTELLA Zell. (p. 128).

The specimens mentioned as being bred at Lakeland prove to be referable to *slossoni* Hulst and not to *robustella* Zell.; the former species, although described from Florida, has been omitted from Grossbeck's list.

MINEOLA NEBULELLA Riley (p. 129).

This record is erroneous; the species bred from *Cratægus* at Lakeland which was doubtfully referred to *nebullella* cannot, it seems to us now after a careful study of Riley's description and figure (4th Mo. Rept. p. 42), be this species which is apparently a rather unicolorous form with different disposition of the discal dots, and possibly not related at all to *indigenella*. Dyar's reference of *nebullella* to *Acrobasis* can also not hold as we are fairly certain that the specimens on which

he based this reference are really *juglandis* Le Baron, possibly part of the type lot; *juglandis* therefore should be transferred to *Acrobasis* and will probably take priority over *palliolella* Rag. The Florida species is seemingly without a name and we append the following description:

MINEOLA GROSSBECKI sp. nov. (Pl. XVIII, Fig. 3).

Smaller than *M. indigenella* Zell.; head and thorax deep ruddy-purple; primaries with maculation much as in *indigenella* (which we figure on Pl. XVIII, Fig. 4) but much more suffused with deep ruddy-purple leaving a sharply defined triangular whitish subbasal area, the apex resting on inner margin and a similar colored costo-median area including the geminate discal spot; except for the dark patch on costa marking its inception the t. a. line is practically lost in the purple shading; the t. p. line is more distinct being bordered outwardly by a faint white hair line, the terminal area is paler in apical half of wing with distinct black dotted terminal line; secondaries deep smoky; fringes on both wings pale smoky, deeper basally. Expanse 16 mm.

HABITAT: Lakeland, Fla. (May). 1 ♂, 2 ♀. Types, Coll. Barnes.

ACROBASIS COMPTONIELLA Hlst. (p. 129).

The receipt of a good bred series of the true *comptoniella* (Pl. XVIII, Fig. 2) convinces us that the Florida specimens bred from *Myrica* and listed as *comptoniella* are distinct; besides being considerably smaller in size they are much more suffused with white with better defined maculation. We append the following description:

ACROBASIS MYRICELLA sp. nov. (Pl. XVIII, Fig. 1).

Basal joint of antennae distinctly tinged with white; head and thorax deep gray, more or less tinged with ruddy purple; primaries with basal area light gray, slightly sprinkled with black and shaded at extreme base with ruddy purple; t. a. line white, rounded outwardly, bordered inwardly by a ruddy band extending basad to the perpendicular dark scale tuft, outwardly with a large triangular dark costal patch continued as a narrow line to inner margin; median area light gray more or less obscured above inner margin and upward along t. p. line by dark shading; two distinct dark discal dots; t. p. line pale, distinct, bulging centrally, bordered inwardly by a dark line and outwardly by a ruddy band more or less suffused with smoky; terminal area gray, sprinkled with black and with black terminal dotted line. Secondaries deep smoky. Beneath unicolorous smoky. Expanse 17 mm.

HABITAT: Ft. Myers, Fla. (May). 3 ♂, 8 ♀. Types, Coll. Barnes.

MEROPTERA PRAVELLA Grt. (p. 130).

This record was based on 3 ♀'s which further examination convinces us would be better referred to *Salebria subfuscella* Rag. or *S. semiobscurella* Hlst.; further details may be found in our note in 'Cont. Vol. III, No. 3, p. 197'; *pravella* scarcely occurs in Florida.

NEPHOPTERYX CRATAEGELLA sp. nov. (Pl. XVIII, Fig. 8).

Included among our specimens of *Mineola grossbecki* and evidently bred from a larva found on the same bush with those of this latter species, we discovered a single ♂ specimen of an apparently undescribed *Nephoptyx* species which we characterize as follows:

Scale tuft of ♂ antennae small; head and thorax purplish gray; primaries light purplish-gray sprinkled with black; base of wing shaded with deep purple brown; t. a. line whitish, strongly bent outward to middle of inner margin, preceded on inner margin by a broad liver-brown patch extending almost to costa and with a triangular dark costal patch outwardly continued to inner margin as narrow line; median area bisected by a diagonal shade line from costa at inception of t. p. line to inner margin at t. a. line beyond which this area is deep liver-brown; geminate discal dots, the lower on edge of dark shade; t. p. line pale, slightly bulging and dentate in central portion, angled outwardly at inner margin, followed by a broad liver-brown shade; terminal area grayish with terminal dark dots. Secondaries deep smoky, paler basally; fringes smoky at base with pale basal line, paler in outer half. Expanse 16 mm.

HABITAT: Lakeland, Fla. (May). 1 ♂. Type, Coll. Barnes.

The type of maculation is somewhat similar to that of *ovalis* Pack.

DOLICORRHINIA PLANATELLA Grossb. (p. 131).

We fear that this species must be referred to *Ocala dryadella* Hlst. with which Mr. Grossbeck evidently was unacquainted; the description fits exactly a ♂ in our collection which has been compared with Hulst's type at Rutgers; the pencil-tufted maxillary palpi (the chief point of distinction from the genus *Dolichorrhinia*) are concealed generally in a groove of the labial palpi and were probably not noticed by Mr. Grossbeck at the time; an examination of the type specimen will be necessary however to confirm our reference.

DIVIANA EUDORIELLA Rag. (p. 132).

Our record for this species was erroneous and the specimens on which it was based should be referred to *Palatka nymphæella* Hlst.; Mr. Grossbeck has unfortunately redescribed this in his list as *Diviana verecuntella* which name will fall into the synonymy.

PEORIA APPROXIMELLA. Wlk.

Our record under this name must be transferred to Grossbeck's new species *Calera albicostella*; the generic position is doubtful, half of our series (7 ♂'s) showing veins 3 and 4 of secondaries on a very long stalk, the others having vein 4 entirely coalescing with vein 3.

OLETHREUTES ANDROMEDANA. (p. 137).

This species, misspelt *andromediana* by Grossbeck, has never been published; it was bred by ourselves from larvae on an *Andromeda* species, specimens being given at the time to Mr. Grossbeck and others sent later to Mr. Kearfott (together with specimens of all species of *Tortricidae* captured on the trip) for identification; we never succeeded in securing the return of these specimens and they doubtless passed later along with the whole Kearfott collection into the hands of the American Museum. As it is practically certain that no description of the species will ever be published by Mr. Kearfott we believe we are justified, in order to validate the name, in appending the distinguishing characteristics of the species. It is very closely related to *rosaochreana* Kft. being of the same general rosy color and type of maculation; the yellow basal area along inner margin is not so extended, being defined outwardly by a distinctly broader pale rosy band bordered on each side by a white line; the dark ruddy area beyond the outer white line which in *rosaochreana* forms a single large irregularly quadrate patch with outer edge very strongly excavated, is in *andromedana* broken into two patches, the upper one being narrowly oblong and decumbent, the lower irregularly triangular and resting with its blunt apex on outer third of inner margin, both patches outlined in white. The remainder of the maculation is as in *rosaochreana* of which we have three Co-types before us. The specimens of *andromedana* before us consist of 2 ♂, 4 ♀ all bred from *Andromeda* at Ft. Myers, Fla. in April.

NEW SPECIES AND VARIETIES OF GEOMETRIDAE

HEMITHEINAE

RACHEOSPILA GLAUCOMARGINARIA sp. nov.

♂ antennae shortly pectinate; ♂ palpi moderately short, upturned, reddish laterally, ochreous inwardly and basally, ♀ palpi considerably longer; front reddish; white interantennal fillet bordered posteriorly with reddish; thorax, pectus and abdomen green, latter with large ochreous spots on basal, third and fourth segments bordered with purplish-red; wings green, costa of primaries narrowly white; faint, rounded and slightly waved white antemedian line on primaries; a rather rigidly upright white postmedian line; no discal mark. Secondaries with curved antemedian line rather near base of wing, distinct white discal dash and slightly crenulate postmedian line bent rather abruptly at vein 3; fringes on both wings distinctly ochreous, shaded slightly at apex of primaries with pinkish. Beneath pale green, costa at base slightly tinged with ruddy; markings of upper side faintly visible; fringes as above. Expanse 30 mm.

HABITAT: ♂, Laguna Beach, Calif.; ♀, Palo Alto, Calif. (May) (Barnes). 1 ♂, 1 ♀. Coll. Barnes.

We have had the worn ♀ in the collection for a long time; the recent receipt of a ♂ in better condition in some material which we received from Dr. L. O. Howard for identification tempts us to describe the species as we can find no name which would fit it. The yellowish fringes and large spots on abdomen are quite distinctive; the white discal streak on secondaries seems to separate the species from others found in this locality.

LARENTIINAE

STAMNODES TOPAZATA APICATA var. nov. (Pl. XX, Fig. 6).

Typical *topazata*, (Pl. XX, Fig. 5) described from Utah (probably Silver Lake) is an inhabitant of the Rocky Mountain region; a race from Hymers, Ont. which we figured as *topazata* in our Contributions Vol. 1 (4) Pl. 25, Fig. 12 appears to differ constantly in the much greater breadth of the black border of primaries at the apex of wing. There is generally in both forms a faint orange hair line on this black area at costa and the distance from this line to the inner margin of apical black space is in typical *topazata* about 1 mm. whereas in our Hymers specimens it is fully 2 mm. Typical *topazata* further shows a tendency for the costal dark spots to be continued across the wings

fully or partially by dark lines whilst our five Hymers specimens show no trace of this; the orange of the upper side is very bright and the purple-brown of the under side very deep. We propose the above name for this Hymers race and have marked as type the ♂ specimen figured as mentioned. Paratypes are 3 ♂, 1 ♀ all from Hymers (Apr. 24-30, May 1-7).

Type and paratypes in Coll. Barnes.

TRICHODESIA ALBOVITTATA TENUIFASCIATA var. nov. (Pl. XXII, Fig. 7).

Four specimens before us from Spirit Lake, Idaho have the white band of primaries much narrower (1 mm. in width) than in the typical Eastern forms (Pl. XXII, Fig. 8); the secondaries are immaculate black and the fringes on underside seem constantly dark with the exception of the apex of both wings and the termen of primaries whilst in the Eastern race the secondaries usually (although not always so) are checkered with white. We have similar specimens from Glacier Nat. Park, Montana, whilst specimens from Wellington, B. C. appear to agree with the Eastern form. Apparently we are dealing with a race inhabiting the Northwestern States for which we propose the above name.

♂ Type and 3 ♂ Paratypes from Spirit Lake, Idaho (July 1-7) in Coll. Barnes.

TRIPHOSA BIPECTINATA sp. nov. (Pl. XIX, Fig. 6).

Palpi upturned to about level of front; antennae in ♂ bipectinate; thorax and primaries light shiny gray-brown, the latter crossed by numerous darker undulate lines; basal and median areas darker than the remainder of wing; post-median area with the cross lines merely marked by dots and slight arrow marks on the veins. Secondaries rather uniform smoky with faint traces of the lines of primaries; outer margin of both wings faintly crenulate and marked by dots on each side of the veins. Beneath smoky with scarcely a trace of the maculation of the upper side showing through. Expanse 35 mm.

HABITAT: Palmerlee, Ariz. 2 ♂. Types, Coll. Barnes.

Our Paratype shows the median area considerably darker than in the Holotype, forming a dark band across an otherwise immaculate brown wing; the species, which is rather difficult to describe, should be readily recognizable from the figure; apparently it is closely related to *Monotaxis semipectinata* Hlst., differing however in the longer upturned palpi and in the bipectinate ♂ antennae. We are rather doubtful as to the correct generic reference, but the biangulate nature of the discal veins on secondaries and the general type of maculation would

seem to associate it with the *Triphosa* group; the single hind tibia left on the specimens is very long, with two pairs of spurs and bent or curved in a peculiar manner which may or may not be normal.

LYGRIS (NEOLEXIA) XYLINA SERRATARIA var. nov. (Pl. XXI, Fig. 9).

In a previous paper we had restricted the type of *xylina* Hlst. to the ♂ from New York in the Hulst Collection; this specimen has strongly pectinate antennae. In a series of 4 ♂'s and 1 ♀ before us from the vicinity of Ottawa, Ont. (Meach Lake, Que.), collected by Mr. C. H. Young in July and received by us with the Taylor Collection, the antennae in the ♂'s show very short pectinations, in fact they can scarcely be termed more than strong serrations. The type of maculation is distinctly the same as in typical *xylina* with brown median band and basal area, the antemedian and submarginal areas being tinged with yellowish; on the secondaries the postmedian dark line is very distinct, sharply dentate and scarcely at all shaded outwardly with white. In view of the distinct difference in the ♂ antennae we believe the form worthy of a name and propose using SERRATARIA. For the form found in the vicinity of Calgary, Alta. in which the ♂ antennae are rather intermediate between *serrataria* and *xylina* in the length of the pectinations and which shows a purplish tinge to the median band the name *speciosa* Hlst. may apparently be used although the name is based on a rather aberrant specimen with reduced median band; at the time we referred *speciosa* as an aberration of *xylina* we had overlooked the structure of the ♂ antennae.

THERA GEORGII BENESIGNATA var. nov. (Pl. XIX, Fig. 3).

Georgii Hlst. was described from specimens from California, Nevada, Washington, and Vancouver Is., B. C. The type in the Hulst Collection is from Nevada and we would propose restricting the name to this form which is the one found commonly all through the Sierras (Pl. XIX, Fig. 4), being rather unicolorous smoky with the brown median and basal bands poorly defined. The form found in Vancouver Island is in general larger and much paler, the ground color of primaries being at times almost white and the median and basal brown areas contrasting strongly with the remainder of the wing; we propose the above name for this race; the type ♂ is from Wellington, B. C. (July 28, 1905) and the type ♀ from the same locality (Sept. 12, 1903); we have besides 4 ♂ and 4 ♀ Paratypes from this locality and from Duncans, B. C.

THERA LATENS sp. nov. (Pl. XIX, Fig. 5).

Primaries with the pale ground color rather heavily sprinkled with brownish scaling; a broadly geminate subbasal black line, inclined obliquely outwardly below costa and forming a prominent angle in the cell, the included space (about 1 mm. in width) being browner than the basal and antemedian areas; antemedian line blackish, in general parallel to subbasal line with a sharp angle in cell just above origin of vein 2; this line is followed at some distance by a smoky parallel shade line, the included space being quite dark brown; the central median space is paler and contains a distinct discal dot; postmedian line dark, in general parallel to antemedian line and not approaching it at inner margin as in *constricta* Pack., forming a prominent blunt angle opposite cell, preceded by a shade line similar to that following antemedian line; subterminal space pale; s. t. line white, strongly crenulate and preceded by a brown shade. Secondaries very pale smoky with faint traces of a discal dot and bent median and subterminal dark lines. Beneath pale brownish with the maculation of the upper side repeated in a very faint way. Expanse 28 mm.

HABITAT: ♂, Colorado (Bruce); ♀, Golden, Colo. 2 ♂, 2 ♀. Types, Coll. Barnes.

This species is closely allied to *otisi* Dyar but the general ground color is much browner and the sub-basal band seems more prominently angled below costa, although long series may prove this feature to be inconstant in which case *latens* will probably be better considered as a race of *otisi* than a good species.

DYSSTROMA TRUNCATA Hufn.

The receipt of a good deal of material recently in this difficult group has necessitated a rather intensive study of the ♂ genitalia on our part; Mr. Pierce in his *Genitalia of the British Noctuidae* p. 65, Pl. XL, has given the distinguishing features of *truncata* Huf. and *citrata* Fabr. (*immanata* Haw.); the easiest means of differentiation is found in the Cornuti of the Aedoeagus which in *truncata* constitute a narrow, elongate group of fine spines whereas in *citrata* they form a broad, less elongate group of stout spines, the aedoeagus itself being correspondingly stouter and chunkier; we might further note that the Anellus lobes which are thumb-shaped are broader and stumpier in *truncata*, being on a distinctly shorter pedicel, and the long hairs with which they are clothed are coarser toward the base on the inner side. Using the genitalia as a means of separation we found that we have *truncata* distributed more or less generally through the whole of Northern North America and in high altitudes of Colorado and California; we found however nothing distinctive enough in the genitalia

to warrant a separation of the N. American from the European form of which we made several slides.

Walkerata Pears. described as a separate species (Can. Ent. XLI, 119), is without much doubt a form of *truncata*; we saw the types last year in New York and since then through the kindness of Mr. F. Watson of the American Museum of Natural History have received excellent photographs of both ♂ and ♀ types; it is a form with the median band dark bluish-gray, more or less suffused with white in central area, and bounded on either side by bands varying from pale yellow to deep orange. We have almost exactly matched the ♂ type with a specimen from Calgary, Alta. which we figure (Pl. XXI, Fig. 7); we have very similar specimens from Colorado and the vicinity of Lake Tahoe, California as well as from the southern Alaskan Coast (Pl. XXI, Fig. 8); the form is probably related to *schneideri* Sanb. from Northern Europe.

In the White Mts. N. H. (Bretton Woods) Dr. McDunnough took a small series of almost typical *truncata* in the latter half of July (Pl. XXI, Figs. 1, 2); ova secured from a ♀ hatched in ten days, the larvae fed up until about half-grown and then prepared to hibernate; we were unsuccessful in bringing any to maturity but the larval history is an additional proof, if needed, that we are dealing with *truncata* and not *citrata* which hibernates in the egg stage. We also figure a specimen of *citrata* from the same locality for comparison (Pl. XXI, Fig. 3).

Suspectata Moesch. from Labrador will, we believe, prove to be a form or race of *truncata* judging by the description; in spite of Moeschler's assertion (1884, Verh. Z. B. Ges. Wien, p. 302) that his *suspectata* is identical with *brunneata* Pack. we fail to see how this can be possible; the description of *suspectata* does not fit in at all with Packard's figure of *brunneata*, the size alone of the former (35 mm.) emphasizing its distinctness; *brunneata* will probably prove to be a good species, nearer possibly to *kasloata* Tayl. than to *truncata*.

Judging by the description *traversata* Kell. (not *transversata* as listed), described as a *Hydriomena*, from Petosky, Mich. (Bull. Buff. Soc. V, 45) will fall into this group but without a knowledge of the type it is impossible to definitely place it.

There is a large race occurring in the Puget Sound and Vancouver Island region which we had thought to be new; Mr. Swett, however, has identified this for us as *mullcolata* Hlst. and after a study of the

description we are inclined to agree with him; the description (Brook. Bull. IV, 27) is not very clear and type locality is given as Colorado; we have a note saying that the type in the Hulst Collection is labelled 'Washington' which on the face of it would seem to indicate a spurious type; if however we take into consideration Hulst's well-known inaccuracy and the fact that H. K. Morrison collected in Washington State in 1880, the year previous to the description, it may very well be that this specimen is a true type and correctly labelled; it remains for some-one to compare it with the original description to see if it fits it accurately in which latter case we see no reason for not considering it the type. For the present we shall follow Mr. Swett in applying the name *mulleolata* to this race which apparently occurs in two generations as we have seen material captured in June and have in our collection a series taken by the Rev. G. Taylor at Gabriola Is. in August, a pair of which we figure (Pl. XXI, Figs. 4, 5).

The large size and ruddy claret-brown color readily distinguish this race; we have three very similar specimens from Ketchikan, Alaska, taken along with numerous specimens of the form *walkerata* Pears. in July; the secondaries however are very deep smoky. The type of δ genitalia (Pl. XXX, Fig. 1) is distinctly that of *truncata* with possibly a very slight augmentation of the number of spines in the Cornuti as compared with specimens from Europe; on the slides the genitalia can at once be separated, even with the naked eye, from those of *citrata* forms (Pl. XXX, Fig. 2) which also occur in numbers on Vancouver Island.

Since writing the above notes and while our own article was in press Mr. Swett's paper on the genus *Dysstroma* has appeared in the Canadian Entomologist (1917, 49 p. 64). Recently on finding that we were both working independently on the same subject we exchanged views and specimens and we believe in consequence that Mr. Swett has considerably modified his point of view as expressed in this paper and now concedes the presence of *truncata* (or at least a race of the same) in North America. Personally we are firmly convinced of its occurrence here and, as already stated, can see no reason for not considering *mulleolata* Hlst. to be a Western race of this species; Mr. Swett's statement regarding the genitalia is not at all clear or convincing; he mentions longer 'terminal spines' but leaves one to guess as to just what he means by the term, no explanation being given as to whether these 'spines' occur on the Aedoeagus, the Uncus or the

Valvae; our own investigations on this form (of which we have made five or six slides) have shown that it so closely resembles both European *truncata* and that found in the Eastern States as to be inseparable on genitalia alone. We figure (Pl. XXI, Fig. 6) the form *ochrofuscaria* Swett, expressing the hope that that portion of the description which states 'a large reddish brown *costal* spot at the *anal angle*' may be laid to the door of the printer rather than the author; Mr. Swett compares this form to *rufibrunnea* Warren of which we know nothing; it would seem to us to be a further development of the form *centumnotata* Schulze of *truncata* as figured in Seitz Pal. Macrolep. IV, Pl. 8k and we are surprised that this resemblance did not lead Mr. Swett at the time to suspect the presence of *truncata* in this country; apparently Mr. Swett has laid too great stress on the sharp angulation of the postmedian line on underside of secondaries as a distinguishing feature between *truncata* and *citrata*; as a matter of fact all our N. American forms or races of *truncata* show a rather sharper angulation than is usual in the European species but as they also show the irregularity in outline of this same line opposite the cell and the tendency to form whitish subterminal spots on the upper side beyond this line—as may be seen by a reference to our figures—their affinity to *truncata* (apart from genitalia) is to our mind clearly shown.

X. FERRUGATA INFUMATA var. nov. (Pl. XIX, Figs. 7, 8).

A series of specimens taken by Dr. McDunnough at Crater Lake, Oregon (July 16-23) on moist hillsides a little below the rim of the lake differs considerably from Eastern specimens of *ferrugata* (Ottawa, Ont.; New Brighton, Pa.) (Pl. XIX, Fig. 9); in size they are considerably larger and are also much duller in coloration due to a general smoky suffusion which causes the dull purplish median band to stand out much less prominently than in typical *ferrugata* or its form *unidentaria*; the two black subapical spots are also less distinct and tend to suffuse into each other forming a single, diffuse, smoky patch; the secondaries are dark with the numerous cross-lines well defined. For this race, which is probably confined to the higher altitudes of the Sierras, we propose the above name and have marked as Types and Paratypes 2 ♂, 2 ♀, in Coll. Barnes.

SPARGANIA ILLUSTRATA sp. nov. (Pl. XX, Figs. 7, 8).

Primaries dull olive green, more or less unicolorous from base of wing to post median line, this area crossed by six equidistant, faint, dark lines, wavy

and rather strongly bent outward below costa, the fifth line just preceding the prominent discal spot; between the 3d and 5th lines traces of a paler band, scarcely visible except at costa and divided by the 4th line; postmedian line which forms the outer boundary of this darker area irregularly dentate with rather prominent teeth below veins 3, 4 and 7, inclined obliquely outwardly from costa to vein 4, then inwardly oblique to slightly beyond middle of inner margin; beyond the postmedian line the color of the wing is decidedly paler, mixed with grayish, with the exception of a costo-apical patch of the same color as the basal area; two wavy dark lines, more or less parallel to postmedian line, cross the subterminal area; a pale s. t. line, scarcely visible except where it crosses the dark apical patch; fringes smoky, slightly checkered. Secondaries unicolorous orange-yellow with more or less distinct dark terminal line. Beneath primaries tinged with orange with the maculation of the upper side slightly visible and with a small, dark costal blotch at inception of postmedian line; secondaries as above without the terminal dark line. Expanse 25 mm.

HABITAT: Palmerlee, Ariz. 3 ♂, 3 ♀. Types, Coll. Barnes.

This species has probably been confused in collections with *aurata* Grt. (*daira* Druce) (Pl. XX, Fig. 9) with which it is very similar in general type of maculation, differing however in the much more sombre coloring with none of the pale basal area characteristic of *aurata*. The ♀'s of *illustrata* are generally paler in terminal area and better marked than the ♂'s. We figure the types of *illustrata* as well as a ♂ of *aurata* from Redington, Ariz.

SPARGANIA MAGNOLIATA RUPTATA var. nov. (Pl. XIX, Fig. 1).

Typical *magnoliata* Gn. is a form of the Eastern States and Canada, having apparently as synonyms *incommodata* Wlk., *placidata* Wlk., *siczacata* Wlk. and *cumatilis* G. & R. On the northern Pacific Coast it is represented by *pernotata* Hlst. (Pl. XIX, Fig. 2) described from Alaska and extending southward to Vancouver Is., B. C.; this form is larger and generally duller in coloration. In California at lower levels we find the race *quadripunctata* Pack. which as far as can be told from the poor type specimen in the Cambridge Mus. Coll. is very similar to *pernotata* but smaller and generally brighter in color, the green of the primaries being less tinged with gray. We have two ♀'s from Deer Park Spgs. in the Lake Tahoe region of the Sierra Nevadas which seem to represent a high altitude form characterized by the prominent white subterminal band with only traces of a central line, the white color breaking through the dark terminal area between veins 3 and 4 and touching the outer margin; the hind wings are considerably paler than in *pernotata*. This may represent a good species but for the present we prefer to consider it a race for which we propose the name

RUPTATA; we figure the type ♀ as well as a specimen of *pernotata* for comparison.

MESOLEUCA GRATULATA LATIALBATA var. nov. (Pl. XXII, Fig. 11).

Typical *gratulata* (Pl. XXII, Fig. 10) has the median white band strongly constricted centrally below the cell due to an outward bulge in the dark basal area and a strong inward bend below vein 4 of the outer dark area. In three ♂ specimens before us from Plumas Co., Calif. this median white band is of much more even width throughout; the basal area forms only a slight projection below the cell and the outer bounding line is bent in far less than in the typical form, being quite far removed from the bases of both veins 2 and 3. Our specimens being all absolutely constant in this respect we believe that we are dealing with a good racial form for which we propose the name LATIALBATA. We figure specimens of both forms for comparison.

EPIRRHOE PLEBECULATA VIVIDA var. nov. (Pl. XX, Figs. 1, 2).

After a careful reading of Guenee's description there is little doubt in our minds that *plebeculata*, based on a single ♂ from California, is the same species as that described later by Packard from a single ♀ from Nevada as *rubrosuffusata* although it is quite probably that Packard's name may be held for a racial form with redder secondaries. According to the description the secondaries of *plebeculata* are pale yellow; in a bred series from Alameda Co., Calif. (Pl. XX, Fig. 3, 4) before us the color varies from pale dull yellow to dull brick color, the general effect of the whole coloration of the wings being dull and faded. In specimens from Vancouver Is., B. C. the coloration is much more vivid and contrasted, the tint of the secondaries being a bright orange-yellow with generally rather well-defined maculation; for this northern race we propose the name of VIVIDA and have made 4 ♂'s and 2 ♀'s from Wellington and Goldstream B. C. types, a pair of which we figure.

ZENOPHLEPS OBSCURATA INFUMATA var. nov. (Pl. XIX, Fig. 11).

Typical *obscurata* (Pl. XIX, Fig. 10) was described from material from Siskiyou Co., Calif. and is found throughout the Sierras at moderate altitudes; it is characterized by pale yellow subterminal and terminal shading. In Arizona we meet with a race which is much darker in color, the cross bands being deeper brown and the terminal area suffused with smoky with only traces of the yellow tints of the nimo-

typical form, for this race we propose the name *INFUMATA*, the types being 8 ♂'s and 3 ♀'s from Palmerlee, Cochise Co., Arizona in Coll. Barnes.

GEOMETRINAE

HELIOMATA FULLIOLA sp. nov. (Pl. XX, Fig. 9).

Primaries brown crossed by a white band of even width throughout, bent inward at costa; the dark terminal area is crossed by two parallel metallic lines and there are a few scattered metallic scales in the basal dark portion; costal portion of white band tinged with yellowish; secondaries much as primaries with the white band broader leaving only a small basal dark space. Beneath as on upper side with the coloration rather duller. Expanse 20 mm.

HABITAT: Redington, Ariz. 1 ♀. Type, Coll. Barnes.

Very similar to *infulata* Grt. but with the band of primaries paler and unbroken and the basal dark space on secondaries narrower, more as in *cycladata* Grt.

DREPANULATRIX HULSTI CARNEOLATA var. nov. (Pl. XXVIII, Figs. 5, 6).

Typical *hulsti* Dyar (*lenitaria* Grossb.) is the form found in southern California and ranges in color from red-brown through reddish-purple to deep purple with the cross-lines, especially the median and subterminal ones rather heavily marked in black; we figured a typical specimen in our Contributions Vol. III, Pl. XIII, Fig. 13. In Arizona we meet with a smaller form (32 mm.) in which the markings are more or less obsolete, especially in the ♀'s, with the exception of the discal dot and the costal portion of the subterminal dots; the color is also much paler varying from deep to pale flesh-color much as in *cervinicolor* Hlst.; the secondaries show less terminal sprinkling than in the type form. We propose the name *CARNEOLATA* for this race which possibly represents a seasonal form as well, all our dated material having been captured in August and September whereas our typical series is dated May. The types of *carneolata* are 2 ♂'s and 5 ♀'s from Redington, Ariz., and Santa Catalina Mts., Pinal Co., Ariz.

PHASIANE TRIVIATA sp. nov. (Pl. XXIII, Fig. 1).

Primaries dull purplish-gray, faintly black-sprinkled, with three prominent oblique black blotches on costa giving rise to the usual lines which are faint and at times obsolescent; t. a. line arising from the outer edge of a rectangular costal blotch one-third out from base, fine, inwardly oblique; median shade well marked by costal blotch but otherwise obscure, diffuse, irregular, crossing a small

discal dot; t. p. line marked at costa by a strong triangular blotch, the apex of which is strongly bent upward and drawn out to a point just above vein 6 where it forms a sharp angle and proceeds as a fine slightly waved line parallel to the outer margin of wing; terminal area somewhat deeper in shade than remainder of wing; fringes smoky with pale basal line; secondaries similar to primaries in color with faint discal dot and traces of a curved postmedian line and fairly well checkered fringes. Beneath primaries smoky, somewhat white-sprinkled in median area, secondaries whitish, heavily and finely sprinkled with smoky brown and with small black discal dot; fringes as above. Expanse 22-25 mm.

HABITAT: Chiricahua Mts., Arizona (Aug.); Paradise, Ariz.; Huachuca Mts., Ariz. 3 ♂, 4 ♀. Types, Coll. Barnes.

Belongs in the *californiata* group, but is distinguished from this species by the strongly bent t. p. line at costa without any thickening at vein 4 or subterminal blotches. The ♀'s show a broad darker marginal area on the underside with paler, heavily sprinkled basal region. Some ♂'s show a paler median area sprinkled over with dark speckles giving a much more contrasted effect than in the normal form; in the ♀'s at times the whole basal area to t. p. line is whitish; the species also occurs at Jemez Spgs., N. Mex.

PHASIANE DISLOCARIA MALEFACTARIA var. nov. (Pl. XXIII, Figs. 2, 3).

Typical *dislocaria*, described from Waco, Texas, is characterized by its rather deep smoky-brown color with prominent ochreous veins and distinct cross-lines on secondaries besides the three lines on primaries; the pectinate ♂ antennae led Hulst to place the species in *Alcis* but we imagine its real affinities are with the *respersata* group of what Hulst calls *Sciagraphia* but for which we prefer the generic term *Phasiane*. We have a race from Arizona in which the ground color is much paler, varying from dark to very light gray, with the yellow veining less prominent and a tendency in the lines to become obsolete on the primaries; on the secondaries the lines are entirely lacking. We propose the name MALEFACTARIA for this race, our types being 1 ♂, 1 ♀ from Paradise, Cochise Co., Arizona; we have also 3 ♂'s from Redington, Ariz. and Babaquivera Mts., Ariz. which we have made Paratypes.

PHASIANE (SCIAGRAPHIA) PONDEROSA sp. nov. (Pl. XXIII, Figs. 7, 8)

Primaries rather even dark gray crossed by two heavy black lines; t. a. line almost perpendicular, slightly bent inward toward inner margin; t. p. line bent outward below costa, at times angled rather sharply, then strongly sinuate

to inner margin with an occasional slight incurve opposite cell, bordered on both sides by a faint yellowish hair-line; a large but faint oval discal ringlet and a faint whitish diffuse s. t. line; secondaries faintly scalloped, whitish, heavily sprinkled with smoky with a large faint discal ringlet and traces, especially at anal margin, of a dark median line angled above vein 4; the s. t. line of primaries is faintly repeated; a very faint broken terminal dark line on both wings; fringes concolorous, at times slightly checkered. Beneath primaries whitish, sprinkled with smoky and distinctly tinged with light brown along costa and at apex; secondaries rather paler with dark sprinkles and the veins distinctly outlined in light brown; prominent discal ringlets on both wings and terminal broken dark line; fringes of primaries slightly checkered. Expanse 29 mm.

HABITAT: ♂'s, Cartwright, Man. (June 14, July 24); ♀'s, Aweme, Man. (June 20), Calgary, Alta. (June 16). 2 ♂, 2 ♀. Types, Coll. Barnes.

This species is closely allied to *hcbetata* Hlst. and *decorata* Grossb. differing in the larger discal ringlet and lack of pinkish shading bordering t. p. line on upper side and by the more prominent brown shading on underside. As described above the typical form has the cross lines extremely black and heavy; another form (Pl. XXIII, Fig. 9) is before us in which the cross-lines are much fainter and tend to become obsolescent, especially in the ♀'s; we propose for this the name *DEMACULATA* and the types are 3 ♂'s from Calgary, Alta. (May 11, July 1, July 5) and 3 ♀'s from Calgary, Alta. (July 1), Banff, Alta. (July 1) and Field, B. C. (July 2) all in Collection Barnes.

PHASIANE SEPTEMBERATA sp. nov. (Pl. XXIII, Fig. 4).

Palpi and antennae tinged with ochreous; thorax deep gray; primaries rather an even deep gray, at times irrorate with white in the median area, crossed by two black subparallel lines which are often almost obsolete; t. a. line bent slightly outward at costa, then inwardly oblique; t. p. line with a bend or bulge opposite cell, otherwise straight in its general course; a faint dark discal dot and terminal broken line; fringes concolorous, with a pale median line. Secondaries paler gray deepening outwardly and sprinkled with black and white scaling along anal margin; faint traces above anal angle of a postmedian line, terminal line and fringes as on primaries. Beneath primaries rather even dark gray with whitish sprinkling in median area; secondaries whitish strongly peppered with smoky brown and with usually a small discal dot; veins faintly outlined in ochreous. Expanse 22-25 mm.

HABITAT: Paradise, Cochise Co., Ariz. (Sept., Oct.) 4 ♂, 4 ♀. Types, Coll. Barnes.

Closely allied to *excurvata* Pack. (*spodoptera* Hlst.) but smaller, more even in color and without the dark shades beyond the t. p. line.

ITAME (DIASCTICTIS) EXTEMPORATA sp. nov. (Pl. XXIII, Fig. 10).

Thorax and primaries dull purplish gray, the latter tinged with reddish in terminal area except at apex of wing; t. a. line bent below costa where it is quite distinct, then faint and upright to inner margin; median line arising from a prominent quadrate black brown patch on costa, then broad but faint and rigidly perpendicular to inner margin; t. p. line arising from a still larger black brown blotch, angled outward below costa, faint and bent inward toward median line below cell, slightly accentuated by dots on the veins and followed by a diffuse smoky shade except at costa; s. t. line marked by a brownish blotch at costa scarcely to be traced as a faint whitish line through the reddish terminal suffusion; very faint broken terminal line; fringes concolorous. Secondaries creamy, sprinkled with purplish especially above anal angle. Beneath very heavily sprinkled with light brownish but with no traces of maculation nor of discal dots. Expanse 29 mm.

HABITAT: ♂, Havilah, Calif. (June 8-15); ♀, Camp Baldy, S. Bernardino Mts., Calif. (June 24-30). 1 ♂, 1 ♀. Types, Coll. Barnes.

This species is very close to *quadrilincaria* Pack. (*inquinaria* Hlst.) but differs in the deeper tone of the ground color, the more prominent costal spots and the entire lack of the discal spots on the underside (our ♂ lacks them also on the upper-side but the ♀ shows a faint spot on primaries) as well as by the fact that the secondaries are much less scalloped, especially in the ♀ sex.

ITAME COORTARIA ENIGMATA var. nov. (Pl. XXIV, Fig. 2).

Coortaria Hlst. was described from 1 ♂, 2 ♀'s from Texas and the only type we have been able to locate is a ♀ in the Hulst Collection at New Brunswick which will hold the name; while the name *coortaria* has generally been applied to specimens from the Eastern and Middle States the type conclusively proves that the nymotypical form is that of the Rocky Mts; we have no material from Texas but have matched the type very closely with material from Stockton, Utah (Pl. XXIV, Fig. 1); this form is distinguished by its bright coloration with plenty of ruddy terminal suffusion, with fairly well marked reddish s. t. line and rather small and triangular costal spots; the secondaries are distinctly yellowish. In the form from the Eastern and Middle States the ground color is paler, the ruddy suffusion reduced with scarcely a trace of the s. t. line, the costal spots larger and more quadrate, the 4th spot (subterminal) being especially increased in size; the secondaries are also paler, being creamy not yellowish; we propose the above name for this form; our type series consists of 2 ♂'s from New Brighton, Pa., 2 ♂'s from Chicago, Ill., 2 ♀'s from

Chicago, Ill., 1 ♀, Edgebrook, Ill. (Beer) and 1 ♀, Quincy, Ill. (Poling).

ITAME (DIASTICTIS) CONFEDERATA sp. nov. (Pl. XXIV, Figs. 5, 6).

Primaries cream-colored, rather heavily sprinkled with ruddy-brown and crossed by three ruddy-brown lines, broadest on costa; t. a. line evenly and slightly concave, median line parallel to t. a. line and passing through a small black discal spot; t. p. line bluntly angled outwardly below costa, then sinuate; s. t. line merely indicated by a faint brown shading at costa and a more distinct ruddy brown diffuse spot between veins 3 and 4; faint terminal dotted line, more distinct in ♀; secondaries rather less heavily sprinkled than primaries with the t. p. line continued as a curved, smoky, rather broad line. Beneath rather yellower than above with the markings of upper side faintly repeated on primaries but very distinct on secondaries; no discal dots in ♂ but distinct ones as well as terminal dotted line in ♀ which also has the secondaries slightly angled at vein 4. Expanse 28 mm.

HABITAT: Glenwood Spgs., Colo. (July, Aug.); Durango, Colo. (July). 4 ♂, 6 ♀. Types, Coll. Barnes.

This species has been confused with *umbriferata* Hlst. due to a spurious type from Colorado in the Hulst Collection; the true *umbriferata* was described from Soda Spgs., California and is a duller, more purplish colored insect with better defined discal dots and more confluent terminal ones and, if our identification from the true type in the Hulst Coll. be correct, at once separable in the ♂ sex by the antennae, which are scarcely bipectinate but rather strongly serrate. Dr. McDunnough found the species quite common on the borders of Castle Lake, Siskiyou Co., Calif., a small lake, some 6000 ft. in altitude, situated about 8 miles north-west of Soda Spgs.; as this lake was one of the favorite hunting grounds of Behrens, from whom Hulst received his type specimen, we should not be surprised if it were captured here rather than at Soda Spgs., a small resort which Behrens made his headquarters, situated in the Upper Sacramento Valley at an altitude of about 2300 ft.; in any case Dr. McDunnough found no trace of *umbriferata* in the valleys, although he took a couple of specimens of our new species, *confederata*. We figure a pair of *umbriferata* for comparison. (Pl. XXIV, Figs. 3, 4.)

ITAME PLUMOSATA sp. nov. (Pl. XXIV, Figs. 7, 8).

♂ antennae strongly bipectinate; primaries creamy-white, sprinkled with yellow-brown, more heavily in basal and terminal areas than in median area; primaries crossed by three brown lines; t. a. line bent below costa then straight to inner margin; median line faint (sometimes obsolete) slightly bent below cell, crossing a small dark discal spot; t. p. line well-defined, sinuate, followed

by a diffuse brown shading with a smoky blotch between veins 3 and 4; distinct black terminal dots. Secondaries pale, slightly sprinkled, with traces of a bent postmedian line, a small dark discal dot and distinct terminal broken line. Beneath rather yellower than above, primaries less heavily sprinkled, with the maculation of upper side only faintly repeated except a distinct discal dot and terminal broken line; secondaries more heavily sprinkled than above with distinct discal and terminal dots, fairly well defined antemedian and postmedian curved brown lines and traces of dark subterminal shades. Expanse 27 mm.

HABITAT: Huachuca Mts., Ariz. (June, July); White Mts., Ariz.; Tucson, Ariz.; Palmerlee, Ariz. 4 ♂, 3 ♀; Provo, Utah; Eureka, Utah; Stockton, Utah. 4 ♂, 2 ♀. Types, Coll. Barnes.

This species is closely allied to the preceding but apart from the more strongly pectinate ♂ antennae, differs in the course of the t. p. line which is not angled below costa but merely sinuate; the discal dots and terminal broken lines are also much better defined.

ITAME EPIGENATA sp. nov. (Pl. XXIII, Fig. 5).

Primaries pale bluish-gray, evenly and heavily suffused with smoky-brown; a basal black dot; t. a. line blackish, strongly convex, arising from a small dark patch on costa; median line generally rather diffuse, broad, irregular and black-brown, extending generally only from costa to cubital vein, at times faintly visible to inner margin near t. p. line; closely following this and at times connected with it, forming its outer border, is an oblique black discal dash; t. p. line originating in a blackish costal patch, strongly bent outward from costa to vein 6, then angled rather sharply and parallel to outer margin to vein 4 where it curves strongly inward to inner margin two-thirds from base, accentuated on veins by black dots; a large rectangular costo-apical patch; terminal broken dark line; fringes checkered. Secondaries pale, heavily sprinkled with smoky brown, with small discal dot and almost unbroken dark terminal line. Beneath primaries suffused with smoky with only traces of gray ground color showing; along costa ochreous-brown, the maculation of upper side partially and faintly visible; secondaries much as an upper side with discal dot more distinct; both wings with distinctly checkered fringes. Expanse 27 mm.

HABITAT: Truckee, Calif. (Aug.-Oct.) 6 ♂, 3 ♀. Types, Coll. Barnes.

This species has been generally confused with *wauaria* L. (Pl. XXIII, Fig. 6) but besides being distinctly larger has the t. p. line much better developed than is found in the latter species which also is less heavily sprinkled with smoky and shows a distinct contrast between the bluish costal and basal areas and the much darker terminal area; there is also no pale ochreous costal shading in *epigenata*; we figure both forms to illustrate the differences. We would note that the occurrence of typical *wauaria* in N. America is doubtful; it may be represented by *packardaria* Moesch. from Labrador, of which form how-

ever we know nothing. Canadian specimens seem best referred to *bitactata* Wlk. which is really closer to *wauaria* than our new species is. Colorado specimens seem to agree with *epigenata*; we have several specimens bred by ourselves from larvae on a *Ribes* species found near Silverton, Colo. at an altitude of over 10,000 ft.; we have other specimens from Denver, Colo.; Eureka, Utah., and Yellowstone Park, Wyo.

ITAME (DIASTICTIS) GRAPHIDARIA SOBRIARIA var. nov. (Pl. XXIV, Fig. 9).

Hulst described *graphidaria* (Ent. Amer. II, 190) from 2 ♂, 2 ♀ from Texas and Arizona; the only types we have been able to locate are 2 ♀'s, one from Texas in the Hulst Coll., the other from Arizona in the Brooklyn Inst. Coll. We would restrict the type to the ♀ specimen in the Hulst Coll. The Arizona form shows several points of distinction from the nymotypical Texan race, of which we have a series from the vicinity of Brownsville (Pl. XXIV, Fig. 10); the primaries are more evenly sprinkled with smoky brown in the ♂'s, the median area not standing out more or less prominently as a white band; the cross-lines seem less irregular and are wider apart at the inner margin and the white s. t. line is less distinct; the secondaries are darker above and have on the underside the two cross-lines not so well developed. The ♀'s are smaller but otherwise closer to the Texan form than the ♂'s although showing in a less marked degree the same points of distinction. We propose the above name for this Arizona race and have made types of 7 ♂'s and 2 ♀'s from Redington, Arizona. We figure ♂'s of both races.

CATOPYRRHA ESPERANZA sp. nov. (Pl. XXII, Figs. 5, 6).

Palpi bright yellow tipped with purplish, front and antennal stalk purplish-pink; thorax and primaries deep olive, latter with costa at base pinkish and crossed by numerous dark striae; t. a. line faint, brownish, strongly angled below costa; median shade similar and parallel to t. a. line; t. p. line well defined, pinkish-brown, sinuate, followed by a diffuse dusky shade and two small blackish spots centered with white at inner margin. Secondaries similar in color to primaries with the t. p. line continued and with a faint antemedian, slightly waved brownish line; fringes on both wings concolorous. Beneath bright yellow, primaries with the area beyond t. p. line chocolate brown, a faint sprinkling of brown in basal area and a pinkish patch above center of inner margin; secondaries with only the submarginal area chocolate, the terminal area being yellow, a faint antemedian line as above; discal dots on all wings. Expanse 26 mm.

HABITAT: Brownsville, Texas. 1 ♂, 1 ♀. Types, Coll. Barnes.

The ♀ type has the cross-lines obsolete and the spots above inner margin larger and without white filling. It is possible that this species has been described from Mexico but we have been unable to find any description that fits it; it is close to the variety *perolivata* Hlst. but differs in the sinuate t. p. line of primaries which is distinctly curved in at costa; the same line on the underside of secondaries is straight, not crenulate as in *perolivata*. Besides the types we have two additional ♂'s, one, originally from the Hulst Coll., simply labelled Texas, the other, received from the American Entomological Co., labelled 'Florida', probably erroneously, the specimen being doubtless of Mexican origin.

SERICOSEMA VIRIDIRUFARIA INCARNATA form. ♀ nov.

The ♀'s of this species occur apparently in two color forms. The typical form has the primaries green as in the ♂ sex; in the other form for which we propose the name *INCARNATA* the primaries are a deep flesh-color crossed by the dark subterminal half-line as in the typical form. Our types are 2 ♀'s from Palmerlee, Ariz., 1 ♀ from Huachuca Mts., Ariz., and 1 ♀ from S. Arizona (Poling).

MONROA (CLEORA) INTERPUNCTATA sp. nov. (Pl. XXV, Fig. 9).

♂ antennae strongly bipectinate; palpi and front black; head between antennae whitish; thorax and abdomen gray, the latter unbanded; wings rather even smoky-gray, primaries with the cross-lines rather interrupted, black, very oblique and parallel to each other; t. a. and t. p. lines sharply angled below costa but rather indistinct in this region, median line only distinct below the cell, close to t. p. line; a faint, waved, pale s. t. line, preceded by diffuse smoky shading; terminal black dots between the veins; secondaries with a broad curved smoky antemedian line and a narrow black postmedian line, bent below costa but otherwise straight; a faint waved s. t. line preceded by a fairly distinct dark shade; terminal dark dots as on primaries. Beneath unicolorous gray-white. Expanse 31 mm.

HABITAT: Paradise, Cochise Co., Ariz.; Chiricahua Mts., Ariz. (July, Aug.), 4 ♂. Types, Coll. Barnes.

This species is closely allied to *quinquelinearia* Pack. for which species and *plumosaria* Pack. Warren has created the genus *Monroa* (Nov. Zool. XI, p. 555, 1904). Apart from the practical lack of discal dots (in one specimen very faintly visible on primaries) it may be distinguished by the terminal line being composed of dots, not continuous as in *quinquelinearia* (Pl. XXV, Fig. 8) and the lack of black banding on the abdomen. The ♂ genitalia of the two species which we figure

(Pl. XXX, Figs. 3, 4) show that we are dealing with distinct species; we would call particular attention to the armature of the Aedoeagus and the more extended spined area of the Valvae in Packard's species.

CLEORA SANCTISSIMA sp. nov. (Pl. XXV, Fig. 6).

♂. Palpi and front deep blackish, the latter paler in lower portion, head and collar gray with a black transverse line at base of antennae and another at apex of collar; thorax gray with darker metathoracic tuft, crossed mesially by a faint dark line; abdomen gray with a prominent black transverse line at base and segments dorsally banded with black; primaries pale whitish gray, sprinkled and shaded with smoky; t. a. line black, strongly bent outward at costa, then thicker and very oblique to inner margin near base of wing, preceded by a dull brownish shade line, closely approximate in lower half; t. p. line black, faint and parallel to outer margin from costa to vein 5, then prominent and inwardly oblique to middle of inner margin, preceded below the cell by a fine dark line and followed in all but costal portion by a dull brown shade; s. t. line evenly crenulate, white, shaded broadly on both sides by smoky; an oblique dark shade below apex becoming diffuse and fading away after crossing s. t. line, terminal black line accentuated by dots between the veins. Secondaries similar in color to primaries with black band at base of wing, an indistinct oblique median shade, only distinct between cell and anal margin and a distinct black postmedian line, bent below costa and then rigidly oblique followed by brown shade as on primaries; a distinct discal ringlet; s. t. line white, distinct, bordered with smoky shades, slightly irregular but not crenulate; terminal area as on primaries. Beneath whitish, sprinkled with smoky, with black discal dots on all wings and terminal line as above.

♀. Smokier in color than ♂ with faint maculation and a much more irregular t. p. line; border of secondaries strongly crenulate. Expanse 33 mm.

HABITAT: San Bernardino, Calif. (June); Loma Linda, Calif. (Sept.); Camp Baldy, S. Bern. Mts., Calif. (July) (♀). 3 ♂, 1 ♀. Types, Coll. Barnes.

Very similar to *obliquaria* Grt. but differing in the non-crenulate s. t. line of secondaries; it may possibly be merely a race of this species. It is also very close to a species which we have identified from the description as *clivinaria* Gn.; the type of this species appears to have been lost (Obert. Etudes de Lep. Comp. VII, 271), but a specimen we figure from San Bernardino Co., Calif. (Pl. XXV, Fig. 7) matches Guenée's description better than does any member of this group we know of from California. We figure the ♂ genitalia (Pl. XXX, Fig. 5) which represents a type totally distinct from that of the preceding species.

CLEORA PROFANATA sp. nov. (Pl. XXV, Fig. 3).

Front blackish, paler in lower portion; head and thorax dull gray, with blackish interantennal, prothoracic and mesothoracic transverse lines; abdomen gray with black bar on basal segment and two rows of black dots dorsally; primaries a dull smoky gray, slightly shaded with brown, lines black, rather fine, obsolete in costal portion; t. a. line strongly bent outward below costa then oblique to inner margin near base of wing with slight projections on cubital vein and vein 1, preceded by a dull brownish shade; t. p. line straight below costa with slight inward angle on vein 6 then rounded and strongly oblique to base of vein 3, forming a prominent outward bulge below vein 2 and again oblique to middle of inner margin; the t. p. line is preceded by a faint parallel median line only distinct above inner margin and followed by a dull brownish shade; s. t. line white, crenulate, shaded diffusely on both sides with smoky; a diffuse, dark, subapical, oblique shade; terminal dark line with dots between the veins. Secondaries similar in color to primaries, with black band at base of wing; an indistinct median shade-line followed by a small discal ringlet at times scarcely more than a dot; a fine oblique t. p. line tending to become wavy toward costa and followed by the same brownish shade as on primaries; s. t. line whitish, decidedly crenulate in costal half but straightening out toward anal angle; terminal waved dark line, the outer margin being quite strongly crenulate. Beneath whitish, sprinkled with smoky, especially primaries, with discal dots on all wings.

HABITAT: Glenwood Spgs., Colo. (May). 3 ♂, 1 ♀. Types, Coll. Barnes.

Very similar to the preceding and to *obliquaria* Grt. but duller in color, fainter in maculation and with a more irregular t. p. line and more crenulate margin of secondaries in ♂ sex, this sex being practically similar to the ♀ sex in wing shape and maculation in contradistinction to its allies which show considerable sexual dimorphism. The ♂ genitalia (Pl. XXX, Fig. 6) are very similar to those of the preceding species but show certain points of distinction in the length of the terminal hooks of the Valvae and the Uncus.

CLEORA (SELIDOSEMA) ANELLULA sp. nov. (Pl. XXV, Fig. 4).

Head and thorax grayish; wings dull grayish white heavily suffused and sprinkled with smoky-brown; primaries with t. a. line dark, strongly rounded outwardly from costa to cubital vein, then inwardly oblique to inner margin one fourth out with a faint tooth on vein 1; this t. a. line is preceded by a diffuse broad subparallel shade; median shade obsolete at costa, arising from an indistinct dark blotch representing the discal dot, equidistant from and subparallel to the t. a. and t. p. lines; t. p. line indistinct from costa to vein 6, apparently slightly dentate and parallel to outer margin, below vein 6 distinct, blackish, strongly bent in to base of vein 3, then subparallel to t. a. line, followed by a diffuse smoky brown shade from which it is separated above inner margin by a narrow white line; veins in subterminal area faintly marked in black; an

indistinct white crenulate s. t. line, crossed by a faint subapical smoky shade and partially defined outwardly by smoky shading; dark terminal lunules more or less joined into a line. Secondaries with a distinct discal ringlet, a rather broad and rigidly oblique antemedian line, only visible between anal margin and cubital vein; a dark postmedian line from anal margin to vein 6, oblique, with traces of an angle just below vein 6, followed by a white line and diffuse dark shade; traces of an s. t. line as on primaries; border of wing slightly crenulate and edged by a fine dark line. Beneath unicolorous glistening pale gray with traces of discal ringlets on all wings. Expanse 34 mm.

HABITAT: Jemez Spgs., N. M. (Sept. 15-30); Glenwood Spgs., Colo. (Aug., Sept.). 4 ♂, 3 ♀. Types, Coll. Barnes.

The species is very close to *excelsaria* Stkr. from Washington State, but is smaller, with finer cross-lines, more pronounced ringlet on disk and more crenulate s. t. line; the ringlet would also separate it from *anastomosaria* Grossb. which has merely a dot on the disk of secondaries. The ♂ tibiae are without hair pencils which would throw the species into the genus *Sclidosema* Hbn. as used by Hulst; we doubt greatly however the value of this hair pencil for generic separation and prefer for the present to use the genus *Cleora* in a more general sense than it was employed by Hulst. We figure the ♂ genitalia on Plate XXXI, Fig. 1.

CLEORA VERNATA sp. nov. (Pl. XXV, Fig. 5).

Thorax gray with a darker line across collar; primaries whitish, suffused with smoky brown and shaded with light brown above inner margin; t. a. line broad, smoky, strongly bent out and angled below costa, then gently oblique to inner margin one third from base of wing, preceded by a smoky subparallel shade, diverging at costa; median shade equidistant between t. a. and t. p. lines, in general parallel to t. a. line, forming an angle at the discal dot and slightly waved above inner margin; t. p. line dark, rounded below costa, then gently irregular, slightly bent in below cell and again in submedian fold, edged outwardly by a narrow whitish line, followed by a broad smoky shade, filling most of the subterminal space; s. t. line white, diffuse, irregular, most distinct in central portion where it forms several white lunules; terminal space shaded with smoky with a dark subapical oblique shade; dark crenulate terminal line. Secondaries similar in color to primaries with an oblique dark median shade, not attaining costa, followed by an elongated discal dot; t. p. line broad, blackish, rigidly oblique from inner margin to below vein 6 where it curves upward to costa, becoming obsolete; this line is bordered outwardly by a fine white line and dark shade as on primaries; s. t. line and terminal area much as on primaries. Beneath silky, whitish, with the maculation of the upper side partially visible. Expanse 32 mm.

HABITAT: Glenwood Spgs., Colo. (May 1-7). 3 ♂. Types, Coll. Barnes.

Closely allied to the preceding species and to *excelsaria* Stkr., differing in the broad smoky submarginal shade which is quite a characteristic feature of the maculation. The ♂ genitalia (Pl. XXXI, Fig. 2) are distinct.

CLEORA RUSTICARIA sp. nov. (Pl. XXIX, Fig. 9).

Primaries rather dull brown, sprinkled with whitish; t. a. line blackish, evenly rounded; median shade broad, diffuse, rounded below costa and then slightly oblique; a small discal linear streak; t. p. line dark, crenulate, the points emphasized by dots on the veins, gently curved in below vein 2; s. t. line scarcely visible as faint white line but the preceding dark shading forms more or less of a distinct broken band across wing, broadest and most distinct below costa; distinct dark terminal intravenular dots; secondaries similar to primaries in color with considerable whitish sprinkling in basal area; a broad, dark, oblique median shade; small black discal dot; t. p. line slightly crenulate, evenly rounded, bent downward at anal margin; a rather broad, subparallel, dark, subterminal shade, marking the inner shading of an almost obsolete white s. t. line; terminal dark dots. Beneath pale ochreous, silky, with slight smoky apical shades on primaries and small discal dots. Expanse 34 mm.

HABITAT: Glenwood Spgs., Colo. (June 16-23). 1 ♂, 1 ♀. Types, Coll. Barnes.

Closest in type of maculation to *nigricaria* B. & McD. but much browner in color and with the underside considerably paler. The ♂ has no hair pencils on the hind tibiae.

CLEORA (SELIDOSEMA) SATISFACTA sp. nov. (Pl. XXV, Figs. 1, 2).

Head, thorax and abdomen light purplish gray, the latter ringed with black; wings heavily and evenly sprinkled with smoky brown over a pale whitish ground, faintly tinged with purplish; primaries with t. a. line fine, dark, rounded outwardly from costa to below cell with slight outward angle on subcostal and on cubital veins, then inwardly oblique with a faint inward angle in fold and an outward one on vein 1; basal area faintly brown-shaded; a faint discal ringlet crossed by a still fainter median shade which is strongly outwardly oblique between costa and ringlet, then angled, somewhat waved and approximate to t. p. line above inner margin; t. p. line distinct, blackish, outwardly oblique from costa to vein 6 with slight inward angle below vein 7, then inwardly oblique to base of vein 3 where it is somewhat thickened, then slightly outwardly bulged across vein 1 and perpendicular to inner margin below the fold; the t. p. line is edged outwardly by a narrow white line followed by a faint diffuse brownish shade; s. t. line faint, whitish, crenulate, parallel to outer margin; secondaries with a faint oblique shade line continuing the median shade of primaries; a distinct longitudinally oval discal ringlet; postmedian line waved below costa and faint, distinct and black after vein 6, angled at the base of vein 4 and concave to inner margin; subterminal and terminal areas as on primaries. Beneath

rather shiny whitish, heavily peppered with rather darker grayish dots, otherwise immaculate. Expanse 36 mm.

HABITAT: Kaslo, B. C. (Aug. 15). 1 ♂, 1 ♀. Types, Coll. Barnes.

Very closely allied to *dejecta* Hulst and *purpuraria* B. & McD. but generally duller in color with the cross lines rather more irregular and angled.

CLEORA OCULARIA sp. nov. (Pl. XXV, Fig. 10).

Thorax gray with a dark transverse line across collar; primaries light whitish gray, peppered with blackish and shaded with light brown; t. a. line marked by a geminate smoky oblique spot on costa, a black dot on cubital vein and an oblique black dash above inner margin, as indicated its course would be strongly bent out at costa and inwardly oblique to inner margin near base of wing; median shade starting from an oblique blackish patch on costa, well rounded below costa and then inwardly oblique and close to t. p. line to inner margin, emphasized by a strong black spot on cubital vein and preceded at end of cell by a lunate smoky discal dash the ends of which touch the curves of the line, enclosing an oval white patch of ground-color resembling an ocellus; t. p. line emphasized by black dots, sinuate, with a rather strong incurve in the submedian fold, followed by a faint brownish shade; s. t. line white, dentate, preceded and followed by smoky shading; strong terminal black dots and checkered fringes. Secondaries of same color as primaries; a dark obscure median shade, a narrow discal streak, a rather distinct t. p. line, dotted on veins with black, bent below costa and then rather straight; subterminal and terminal areas as on primaries but s. t. line less dentate. Beneath primaries creamy, shaded with smoky, leaving a pale apical patch, costa spotted with ochreous and black, a large smoky discal lunule, fringes checkered in apical portion; secondaries paler with small discal streak; terminal dark line on both wings. Expanse 33 mm.

HABITAT: Colfax, Placer Co., Calif. (May); Sonoma Co., Calif.

2 ♂. Types, Coll. Barnes.

The species is allied to *perata* Swett but has less dentate t. p. line and shorter pectinations in the ♂ antennae; we can also see no hair pencil on the hind-tibiae.

AETHALOPTERA ANTICARIA FUMATA var. nov. (Pl. XXIII, Fig. 11).

We have already pointed out (Cont. II, p. 211, 1914) that the name *anticaria* Wlk. should be used for the common Eastern species generally listed as *intertexta* Wlk. or *intertextata* Wlk. (Pl. XXIII, Fig. 12); the race from Kaslo, B. C. differs from the Eastern nymotypical form in being evenly suffused with smoky-brown with the lines more or less obsolescent, the primaries showing however a very distinct black discal dot. We propose the name FUMATA for this race, our types being 6 ♂'s from Kaslo, B. C. captured on various dates in April and the beginning of May.

AMPHIDASIS COGNATARIA FORTITARIA var. nov. (Pl. XXVI, Fig. 2).

The race of *cognataria* found in Colorado beyond the divide, besides being generally somewhat larger in size is characterized by a diminution of the heavy black peppering of the nimitypical form; this is especially noticeable on the basal and median area of secondaries, the discal dot showing up very distinctly; the t. p. line of both wings is heavier than in average Eastern specimens and is bent back on the primaries from vein 5 almost to the base of vein 2 whereas in the typical form the normal course of this line is considerably further outward than the base of this vein; this feature however is not absolutely to be relied upon as Eastern specimens quite frequently occur with as strong a bend as is found in Colorado specimens. We propose the name FORTITARIA for this race, our types being 5 ♂'s and 1 ♀ from Glenwood Spgs., Colo. apparently representing two generations as the dates of capture range from June 15-Sept. 1.

AMPHIDASIS COGNATARIA FORM SWETTARIA FORM. NOV. (Pl. XXVI, Fig. 6).

Corresponding to the form *doubledayaria* of the European species *betularia* L. we have in our collection a single melanic ♂ of *cognataria* from New Brighton, Pa. in which both primaries and secondaries on both sides are entirely suffused with black, rendering the maculation, with the exception of the discal lunule, practically obsolete. We propose to name this interesting form after our friend, Mr. L. W. Swett, whose work on the *Geometridae* is too well known to need further mention.

PHAEOURA MEXICANARIA Grt. (Pl. XXVI, Fig. 1).

This species was described from a ♂ taken in Gallinas Canon, Las Vegas, N. M. by Prof. Snow; Grote also doubtfully associated a ♀ with this ♂, following the description; both ♂ and ♀ types are in the Snow Collection at Lawrence, Kansas and were recently examined by Dr. McDunnough. It is doubtful if the ♀, which is a worn specimen and difficult to place accurately, belongs to the same species as the ♂; it would be well therefore to restrict the type to the ♂ specimen. This type proves to be different to the usual conception of *mexicanaria* as distributed by Dr. Hulst; Grote in the description makes particular note of the long projecting tooth of the t. a. line in the cell and this feature is borne out by the type specimen; we have a single ♂ from Pinewood, Colo. which agrees with *mexicanaria* type

in size and maculation, but has the basal area tinged with white whereas in the type it is unicolorous brown; we imagine this is a variable feature as in *quernaria* A. & S.; we figure the specimen as typifying our conception of *mexicanaria*. For the species usually identified as *mexicanaria* a name is needed; we describe it as follows:

PHAEOURA PERFIDARIA sp. nov. (Pl. XXVI, Figs. 4, 5).

♂. Antennae strongly bipectinate, more so than in *mexicanaria*; head and thorax mixed gray and brown, the latter crossed by two black bands as in *cristifera* Hlst. and with black metathoracic tuft; primaries light olivaceous brown, shaded with whitish subterminally; t. a. line sharp, black, bent outward below costa and forming a blunt tooth in the cell, a slight inward angle on cubital vein, followed by a bulge in the fold after which the line is oblique to inner margin near base; the basal area contains some black sprinkling tending to form basal dashes in and below the cell; median area even brown with a large black discal ringlet; a faint median line curving around discal ringlet and running very close to t. p. line in lower half of wing; t. p. line black, lightly concave from costa to vein 4, then parallel to outer margin to vein 5, forming slight teeth on both veins, then strongly incurved to vein 1 where it forms a sharp angle and finally inwardly oblique to inner margin; beyond the t. p. line is whitish shading, especially in the concavities; faint traces of a whitish s. t. line parallel to outer margin preceded by a brownish shade and followed by darker shading; secondaries pale, heavily sprinkled and peppered with brown, with a large discal ringlet and a black t. p. line, angled and toothed on veins 3 and 4; terminal area much as on primaries; dark terminal line on both wings. Beneath whitish, slightly peppered with smoky and with the maculation of upper side faintly visible.

♀. Larger than ♂, with a prominent bright brown patch on thorax, and considerable bright brown shading on primaries basally, subterminally and along costa and inner margin of median area; beneath more heavily peppered than the ♂. Expanse ♂ 48 mm., ♀ 56 mm.

HABITAT: Glenwood Spgs., Colo. (May - Aug.). 6 ♂, 6 ♀. Types, Coll. Barnes.

PHAEOURA TRIARIA sp. nov. (Pl. XXVI, Fig. 3).

Thorax deep brownish; primaries with the color and maculation essentially as in the preceding species but the lines instead of being clear cut are diffuse and indistinct; the basal and median areas are covered with rather rough smoky scaling and the discal ringlet is a patch of slightly raised dark scales with a faint whitish center; the secondaries are heavily peppered with smoky brown and the maculation is of the same indistinct and rough type as on primaries. Beneath more heavily sprinkled than in *perfidaria*. Expanse 50 mm.

HABITAT: Redington, Ariz. 1 ♂. Type, Coll. Barnes.

The peculiar rough nature of the squamation and the diffuse type of maculation, besides the greater size, warrant the supposition

that we are dealing with a distinct species; our single ♂ specimen has unfortunately lost its abdomen.

PLAGODIS INTERMEDIARIA sp. nov. (Pl. XXII, Fig. 2).

Palpi ruddy purple; head, collar and fore part of thorax deep purple; rear portion of thorax and patagia orange; abdomen ochereous, tinged with purplish distally and sprinkled with black dots dorsally; primaries olivaceous-brown, suffused with purple and spotted with pale ochereous in costo-median area; base of wing suffused with purple, deepest along costa; t. a. line black-brown, broad, diffuse, in general upright with slight angle below costa, followed by umber brown shades, best defined in costal portion; a distinct but small dark discal dot; t. p. line rigid, inwardly oblique, broad, black-brown, preceded by an umber brown shade and followed by a light purple shade, paling to whitish at costa; at anal angle diffuse smoky shading and some umber brown shades above the angle of wing. Secondaries light ochereous in basal area, shading into purple-pink before the postmedian line which is blackish, faint in costal half but becoming deeper in color and broader toward anal margin, parallel to outer margin; below this line from vein 2 to just above anal angle is a second blackish line separated from t. p. line by a pale pinkish line and bordered outwardly by same color; remainder of terminal area purplish-pink, shaded with umber brown along outer margin. Beneath primaries heavily suffused with purplish and umber-brown, the latter color predominant between apex and angle of wing; apex itself and median area of costa pale ocher; cross-line of upper side defined by diffuse purplish shades; secondaries with basal two-thirds ochereous, heavily sprinkled with orange; terminal area purple bordered inwardly by a repetition of the postmedian line of upper side. Expanse 27 mm.

HABITAT: Ottawa, Ont. (May 16) (C. H. Young) 2 ♂. Types, Coll. Barnes.

This species, received by us with the Taylor Coll. appears to be intermediate between *approximaria* Dyar and *phlogosaria* Gn. The former species was described from Oregon but appears to extend through Canada to the Atlantic Coast, Eastern specimens (Pl. XXII, Fig. 1) before us being merely somewhat smaller in size than those from the West Coast. Our new species, while agreeing closely in color with *approximaria* differs in having a distinct discal dot on primaries and the postmedian line of secondaries closer to outer margin and parallel to same. From *phlogosaria* Gn., (Pl. XXII, Fig. 3) the type of which is figured by M. Oberthur in *Etudes de Lep. Comp.* VI, Pl. 158, Fig. 1532, our species differs in the much deeper purplish shading of both upper and under sides and the more diffuse nature of the cross lines; we should however not be surprised if *intermediaria* should prove to be the spring generation of *phlogosaria*, our few specimens of this latter species having been captured in July and August.

PLAGODIS KUETZINGARIA Pack.

In the Ent. News XVIII, 206, 1907, Pearsall attempts to clear up the muddle surrounding this name but we doubt if his conclusions can be accepted. In the first place our good friend Mr. Swett informs us that in all probability Packard's Monograph was published before the appearance of Grote's note in the Can. Ent. VIII, p. 112, 1876 under the heading *Eurymene kuetsingi* Grote in which he states that 'a description and the type of this purple-black species have been sent to Prof. Packard for publication in his expected monograph of the Geometrae. It is named for Mr. Kuetzing of Montreal, who found the species.' Packard's name would therefore have priority, with perhaps the permissible change of *keutzingaria* to *kuetsingaria* in order to conform with the correct spelling of the proper name. We would further note that among Packard's type specimens (6 ♂, 1 ♀) no mention is made of any specimen from Montreal although possibly the locality "New York (Grote)" may refer to this specimen. We hardly think that Grote's mention of a 'purple black' species can be said to limit the name *kuetsingaria* to the specimen figured by Packard on Pl. XIII, Fig. 51; in any case this specimen was looked upon by Packard as an aberrant form of his species and could not hold the name under existing rules of nomenclature. Hulst's action therefore in proposing the name *nigrescaria* for the species (1887, Ent. Amer. II, 212) is perfectly valid; this fact seems to have been overlooked by Pearsall who makes no mention of Hulst's name. Under these circumstances *altruaria* Pears. will become a synonym of *kuetsingaria* Pack. as figured in the Monograph Pl. XI, Fig. 44; we are in doubt as to what species Pearsall's *purpuraria* refers but judging by the description alone it, too, must be very close to *kuetsingaria*; the description would fit in excellently with Packard's figure; a study of the type should settle this question.

The arrangement of the species would stand thus:

- nigrescaria* Hlst.
- kuetsingi* Grt. (*nom. nud.*)
- kuetsingaria* Pack.
- altruaria* Pears.
- ? *purpuraria* Pears.

and a corresponding change should be made in our new Check List.

SICYA MACULARIA Harris. (Pl. XXVII, Figs. 1-10).

This species which extends through Canada and the Northern States from the Atlantic to the Pacific Coast, down the Rockies into Colorado and through the Coast Range and Sierras into S. California, has long excited our curiosity partly owing to its wide range of territory and the number of apparent races it tends to form and partly because a goodly number of names are placed in its synonymy, some of which we have felt sure could well be used for racial forms. We have recently given the matter considerable study and offer the following notes on the subject.

The type specimen of *macularia* was a ♀ from the North Shore of Lake Superior; Packard (Monograph Geom. p. 480) gives a description drawn up from this type and Harris figures the same in Agassiz's Lake Superior Pl. VII, Fig. 3, also mentioning in the text that the species occurs in Massachusetts. Packard further (l. c. p. 481) describes the Eastern ♂ and gives a good figure of same (Pl. XI, Fig. 50), his figured specimen being evidently rather larger than is usual in Eastern specimens.

Guenée renamed *macularia* Harr. on the ground that the name had been too frequently employed in the Geometers; his new name, *sublimaria*, (Hist. Nat. Insect. IX, 105) will be therefore an absolute synonym; he further described (l. c. p. 104) *truncataria* from Canada and *sofataria* from New York. M. Oberthur gives us an excellent figure of the type of *truncataria* (Études de Lep. Comp. VI, Pl. 154, Fig. 1486) which leaves no doubt but that it falls to *macularia* Harr. The type of *sofataria* should be in the British Museum but we have no note on the subject; according to the description it differs from *macularia* in having the *whole* outer area on *both* wings ruddy (rougeâtre clair) with unchecked fringes; we have seen no specimens from the Eastern States which would match this description and think the name should be held, at least as an aberrational form. In Cat. Brit. Mus. XX, pp. 120, 121, Walker described *calipusaria* from Orillia, Ont. and *agyllaria* (listed by Hulst as *argyllaria*) from St. Martin's Falls, Albany Riv. Hudson Bay; *calipusaria*, the type of which we have examined, falls to *macularia*; *agyllaria* type ♂ is somewhat larger, deeper yellow in color, peppered with purplish, with more irregular t. a. and t. p. lines and more extended terminal ruddy suffusion; we will refer to it in detail later.

Packard (Proc. Bost. Soc. N. Hist. XVI, 36) described *Sicya crocearia* from 3 ♂, 4 ♀ from California and Nevada; in the text of the description he mentions a single ♂ from California as being aberrant and a large ♀ from California as showing points of distinction from his five Nevada specimens; it is evident therefore, as he had only seven specimens before him, that the Nevada specimens must be considered typical, the type locality being probably the Eastern Slopes of the Sierras above Virginia City as Hy. Edwards, the collector, often collected in this region. In the Monograph (1. c. p. 481) he repeats his original description, figuring what we presume may be considered the type on Pl. XI, Fig. 51, although sinking the name to *macularia*; we believe the name may be held to a western race and will refer to it later.

The next name in the synonymy is *faustinaria* Stkr. (Lep. Rhop. Het. Suppl. II, p. 7) based on 3 ♀'s from Holyoke, Mass.; there seems no doubt but what this name also falls to *macularia* Harr.

The final name, *lewisi* Swett, was based on a single specimen from Mt. Wilson, Calif. We have examined this type through the kindness of Mr. Swett; it is in horrible condition, and to our mind the brown terminal areas on both sides are caused by the specimen having been singed in a flame and are certainly unnatural; the different wing shape mentioned in the description seems due to the torn condition of the apical area and does not exist in reality. As the name can be held to a racial form we will refer to it later in more detail.

Summing up we find that the nymotypical form, *macularia* Harr. (Pl. XXVII, Figs. 1, 2), will have as synonyms *sublimaria* Gn., *truncataria* Gn., *calipusaria* Wlk., and *faustinaria* Stkr. with *solfataria* Gn. in all probability as an aberrational form. This race extends from the Atlantic States through New England, Canada and the Northern States about as far west as the south-central portion of Manitoba (Cartwright). It is distinguished by the pale citron-yellow color of primaries with fringes varying from checkered to immaculate, the rather dull brownish color of the terminal suffusion not extending much above vein 4, the tendency to sexual dimorphism (the ♀ usually having the t. a. line broken into two or three dots, the t. p. line crenulate above inner margin and the terminal patch brighter), on the underside the t. p. line of secondaries is usually single and mostly indistinct except above inner margin; the ♂ genitalia (Pl. XXXI, Fig. 3) have the claspers longer than in other forms and the whole apparatus distinctly

larger than that of the following race. The northern limit of *macularia* we do not know but apparently it is somewhere about the longitude of Winnipeg, Man. as the type specimen of *agyllaria* Wlk., to which we have already referred, was taken at St. Martin's Falls, Albany River.

Agyllaria Wlk., to our mind, represents at least a good race and if the differences in the ♂ genitalia (Pl. XXXI, Fig. 4) be borne in mind may possibly prove to be a good species; its range seems to be from Hudson Bay westward to the Rockies and down these with slight modifications into Colorado; we have specimens from Calgary, Alta. (Pl. XXVII, Figs. 3, 4) which agree well with the type; besides the differences already noted we would point out that there is a distinct tendency for the t. p. line on underside of secondaries (and at times even on upper side) to become geminate much as in certain *Euchlaena* species; there is also on the basal side of the t. a. line of primaries on the inner margin a distinct ruddy or purplish spot usually present which in the nymotypical form is scarcely ever found in the ♂ sex.

In the Great Basin Region (Utah, Nevada) *agyllaria* merges into *crocearia* Pack. (Pl. XXVII, Fig. 9) in which the terminal suffusion is salmon-color and extends almost to apex, the spot on inner margin behind the t. a. line quite pronounced and the basal portion of secondaries whitish. On Vancouver Is., B. C. a very similar form is found (Pl. XXVII, Figs. 4, 5) in some ways intermediate between *agyllaria* and *crocearia* with less sexual dimorphism than in either form; we do not think however that there are sufficient grounds for proposing a name for this form, at least for the present.

In the Southern portion of California we meet with two races which differ widely from each other and also from the described forms; the one race occurs in the San Bernardino Mts., is rather small in size, averaging 24 mm. from tip to tip, of a pale yellow color, slightly lighter than in *macularia* but with the terminal suffusion heavy, purplish and sharply defined apically in both sexes by vein 4; the basal portion of costa is strongly purplish, the t. a. line usually faint but with a well-defined blotch on inner margin, the t. p. line forms a small V at apical portion of costa, the concave portion of outer margin below apex is distinctly shaded with deep purple; on the under-side of secondaries the t. p. line is broken up into dots with little or no ruddy terminal shading, although this is quite well defined on upper side; the fringes are generally strongly checkered on primaries and at anal angle of secondaries (especially in ♀) they are tinged with purplish; in the

♀ the t. p. line is distinctly crenulate and is obsolete above vein 4, being indicated by a purplish blotch on costa; this to our minds is without a doubt *lewisii* Swett, the brown terminal area mentioned in the description being due to a singed condition of the type specimen; we have a series from Camp Baldy and also from Loma Linda, a pair of which we figure (Pl. XXVII, Figs. 7, 8). The genitalia (Pl. XXXII, Fig. 5) are very similar to those of *agyllaria*.

The second race occurs around San Diego, is still smaller (22 mm.), the primaries of a sulphur yellow color, the whole terminal area and frequently a great portion of the wing being suffused with ruddy-brown or salmon-color; the secondaries on both sides are much as in the preceding form but the primaries on under side are suffused with salmon color. We propose for this race the name *LAETULA*, our types (Pl. XXVII, Fig. 10) being 8 ♂'s and 1 ♀ from San Diego, Calif. the dates of capture ranging from late May to early June with a single specimen taken the middle of August.

We figure what we consider to be typical specimens of all these forms on Plate XXVII; we also include figures of the ♂ genitalia (Pl. XXXII, Figs. 3-5) which on account of their comparative simplicity do not show good points of differentiation; possibly when a sufficient number of dissections can be made of each race distinguishing characteristics may be noted, but we would warn against putting any too great reliance on the number of spines on the Gnathos (*vide* Pierce, Genitalia of Brit. Geom. p. XX, for terminology) as this has proved variable in specimens examined which certainly belong to the same form.

SICYA PERGILVARIA sp. nov. (Pl. XXVII, Figs. 11, 12).

Thorax and primaries deep sulphur-yellow, the latter with the outer margin less produced below the apex than in *macularia*; base of costa deep orange; t. a. line practically obsolete, indicated by a purple blotch on inner margin; t. p. line fine, dark purple, oblique and subparallel to outer margin, at times slightly waved in lower portion, followed by a diffuse ruddy purple shade which in some instances suffuses the greater part of the subterminal and terminal areas, in others is confined to the immediate vicinity of the t. p. line; in a few specimens this t. p. line is almost obliterated, being indicated, as is the case of the t. a. line, by a purple patch on inner margin; the inner margin between the t. a. and t. p. lines is often, but not always, shaded with purple, there is a very faint dark discal dot and the fringes are whitish, strongly checkered with deep purple. Secondaries whitish, shaded with rosy in outer half with a faint ruddy discal dot and mere traces of a curved post-median line; fringes faintly checkered with purple. Beneath primaries rather even pale salmon-pink, rather deeper termin-

ally, with the maculation of upper side (when present) partly visible; a faintly ruddy discal dot; secondaries very pale creamy, slightly tinged with ruddy but less so than on upper side; a very faint ruddy discal dot; fringes on both wings checkered as above. Expanse 28-30 mm.

HABITAT: Camp Baldy, San. Bern. Mts., Calif. (June, July). 8 ♂, 8 ♀. Types, Coll. Barnes.

This variable species is readily distinguished from *macularia* by its deep yellow color and less prominent bulge of outer margin below apex of primaries; it flies together with *macularia levisi* which leads us to the conclusion that it is a good species and not a form of *macularia*. The ♂ genitalia (Pl. XXXII, Fig. 7) are very similar to those of *macularia*.

ELLOPIA JACULARIA sp. nov. (Pl. XXVIII, Fig. 1).

Front and fore part of thorax as well as the extreme base of primaries deep chrome-yellow; remainder of thorax and wings dull ochereous, heavily sprinkled with smoky atoms and crossed by two dark lines, accentuated on veins by blackish dots; t. a. line upright, indistinct at costa where it probably is angled, shaded inwardly with chrome-yellow; t. p. line distinct, very gently sinuate with an outward chrome yellow shade; this chrome yellow color, as well as the lines themselves, tends to become obsolete, leaving only the dark dots on the veins; outer margin of primaries scarcely angled at all at vein 4, that of secondaries rounded. Secondaries with the outer line of primaries continued as an oblique dark line, obsolete between costa and vein 6, shaded outwardly with chrome-yellow. Beneath unicolorous pale ochereous, somewhat hyaline smoky toward base of wings with light sprinkling of smoky atoms. Expanse 35-38 mm.

HABITAT: Jemez Spgs., N. Mex. (Apr.) 8 ♂. Types, Coll. Barnes.

Allied to *vittraria* Grt. but much larger and with differences in the ♂ genitalia which we figure (Pl. XXXII, Figs. 1, 2); in *jacularia* the spined area of the Aedoeagus is wanting and the asymmetrical right branch of the Furca is shorter and broader; the species is also apparently close to *axion* Druce but this latter, according to the figure in the *Biologia*, shows no black points on the veins.

ELLOPIA FERVIDARIA Hbn.

The species figured by Packard in his Monograph as *fervidaria* (Pl. XII, Fig. 3) is apparently without a name; it is not the true *fervidaria* which according to Hubner's figure (Zutr. Ex. Schm. Fig. 409) has both wings rounded and not angled at vein 4 in the ♂ sex; apart from the fact that it is rather smokier in color and shows no orange edging to the lines it very closely resembles *pultaria* Gn. (*scitata* Wlk.) the type of which is figured by M. Oberthur in *Etudes de Lep.*

Comp. VI, Pl. 156, Fig. 1509; the type locality (Georgia) would also point to this association as *scitata* Wlk., which is certainly a synonym of *pultaria*, was described from East Florida material; very possibly the two names refer to forms of one species.

For the species erroneously identified as *fervidaria* by Packard we propose the name *turbataria* and characterize as follows:

ELLOPIA TURBATARIA sp. nov. (Pl. XXVIII, Figs. 2, 3).

Head and base of collar pale orange; thorax and wings pale to dark ochereous, heavily suffused with smoky sprinkling; t. a. line dark, rounded, edged inwardly with orange; t. p. line gently sinuate, dark, edged outwardly with orange, continued as an oblique or somewhat curved line across secondaries; a dark discal dash on primaries; both wings well angled at vein 4, more prominent in ♀ sex than in ♂'s. Beneath paler than on upper side. Expanse 32-40 mm.

HABITAT: New Brighton, Pa. (Sept. Oct.) 4 ♂, 3 ♀. Types, Coll. Barnes.

This is considered by some entomologists to be a mere form of *fiscellaria* Gn.; while this is quite possible extensive breeding can alone prove the correct relationship; in any case it is readily separated from *fiscellaria* and its forms by the nonangulate nature of the t. p. line. the ♂ genitalia (Pl. XXXII, Figs. 3, 4) of the two forms are very similar; it would seem that in *turbataria* the right branch of the Furca (the only one developed) is stouter and has less spining toward its base than in *fiscellaria* but this may not hold when long series are examined.

METARRANTHIS DUARIA Gn.

Duaria Gn. has been placed in our lists, along with its allies, in the genus *Gonodontis* Hbn.; Mr. Prout has recently suggested to us that the genus *Metarranthis* Warren (Nov. Zool. I, 436) (type, *obfirmaria* Hbn.) be used in its place and we heartily concur with him after a study of the ♂ genitalia of the group and a comparison with Pierce's figure (Pl. IV) of the genitalia of *bidentata* Cl. which appears to be the type of the genus *Gonodontis* Hbn. (*Odontopera* Steph.). The two types of genitalia seem widely divergent, our *duaria* group corresponding closely to *advenaria* Hbn. which is listed by Pierce (p. 5) under the generic term *Cepphis*.

We doubt if all the species at present listed under *Gonodontis* are congeneric but have not extended our studies further than the *duaria* group which would in any case form the typical section of *Metarranthis*.

With regard to *duaria* Gn. we have long been dissatisfied with the heterogeneous mass of forms included under this name. Until M. Oberthur completes his publication of figures of Guenée's types it will always be a little difficult to determine the nymotypical form especially as the descriptions of both *duaria* and the following species *hamaria* Gn. (which both Packard and Hulst after having examined the type specimens make a synonym) are rather vague in certain directions. The name *duaria* was based on a single ♀ type from Canada (presumably Ont. or Que.), the color is given as a clear testaceous-gray (gris-testacé clair) with only a slight black sprinkling, the two cross lines of the primaries are wavy and black (ondulées noirâtres) with darker bordering shades leaving the median space clear; the ♀ which we figure on Pl. XXIX, Fig. 5 appears to us in the light of this description to be typical; the ♂, which we also figure, (Fig. 4) is very similar but rather deeper in color; the species seems to extend across the continent from the Atlantic States through Canada and the Northern States to British Columbia; we have specimens before us from the Eastern States, Penn., neighborhood of Chicago, Manitoba and Vancouver Is., B. C. According to our notes on Walker's types in the British Museum *panisaria* Wlk., *amyrisaria* Wlk., *agreasaria* Wlk., and *adustaria* Wlk., will all become synonyms of the typical form. Apart from the fact that the subterminal blotches may be absent and that the cross-lines tend to lose their wavy nature the variation in this form is not very great; the dark sprinkling over the wing is fine and evenly distributed, the basal space of primaries a rather dull purplish gray, the median space wide and rather paler, the t. p. line on both wings followed by a rather obscure broad pale purplish shade; on the underside the lines, especially the t. p., usually form purplish bands, the veins are yellow and the sprinkling is much heavier and more purplish, especially in the ♂; in both sexes the wings show a distinct angle at vein 4.

With regard to *hamaria* Gn. which, as already stated, is placed by Packard and Hulst in the synonymy of *duaria* we must confess that we have not been able to satisfactorily identify this from Guenée's description; the color is given as testaceous mixed with reddish (testacé mêlé de rougeâtre) sprinkled heavily with dark atoms and in the place of the cross-line Guenée mentions two blackish shades, wide apart on the primaries and close together, parallel and subterminal on the secondaries; from this it is evident that we are dealing with a much redder form with indistinct maculation; we imagine the second subterminal

line on the secondaries would refer to the subterminal blotches which at times are rather well defined and tend to unite to form a more or less continuous shade. We have several specimens from the Atlantic States and Canada, one of which we figure (Pl. XXIX, Fig. 6), which fit in in a general sort of way with the description, being ruddier, rather blurred in maculation and heavily sprinkled with fine dark atoms; to these we apply the name *hamaria* for the present; as we are unable with our limited material to find any point of distinction in the genitalia of these two forms we treat them as color variations of one species.

Having separated out *duaria* Gn. and its form *hamaria* Gn. from the material before us we have found that there are still two other forms which, apart from certain differences in maculation, seem to show constant, slight differences in the ♂ genitalia; for this reason we are inclined to regard them as good species and describe them herewith:

METARRANTHIS SEPTENTRIONARIA sp. nov. (Pl. XXIX, Figs. 2, 3).

Palpi, front and base of collar ruddy-brown with a whitish line between the antennae; thorax gray-brown; primaries bluish-gray, heavily and evenly sprinkled with blackish atoms; t. a. line rather broad, blackish, evenly rounded, less bent in at costa than in *duaria*, followed by a distinct light brown shade; a prominent black discal dot; t. p. line dark, slightly crenulate, especially below costa, but less so than in *duaria*, gently bulging opposite cell and preceded by a broad light brown shade which occupies most of the space between the discal dot and the line and together with the shade following the t. a. line restricts the pale portion of the median area to a small central stripe; the area beyond t. p. line is even gray, at times slightly paler next the line with traces of the customary dark blotch between veins 3 and 4 and with a faint oblique dark apical streak; fringes slightly pinkish-shaded. Secondaries with a curved dark t. p. line preceded by brown shade as on primaries; a dark discal dot; terminal area as on primaries with at times traces of dark subterminal shades; in the ♂ the wings are considerably less angulate at vein 4 than in *duaria* being intermediate in this respect between *warneri* and *duaria*; in the ♀ the wings are much as in *duaria*. Beneath the veins are yellowish, the lines of the upper side rather well-defined and the whole surface heavily sprinkled with ruddy-purple and black atoms. Expanse ♂ 31 mm., ♀ 35 mm.

HABITAT: ♂ Beulah, Man. (June 21); Aweme, Man. (May 29, June 18); ♀ Winnipeg, Man. (June). 3 ♂, 2 ♀. Types, Coll. Barnes.

Apart from the considerably smaller size this species differs from *duaria* from the fact that the median area, due to the brown shading, seems to stand out as a dark band in contrast to the paler basal and terminal areas whereas the reverse is the case in *duaria*; there is also

none of the purplish shade following the t. p. line in our new species. We will deal with the differences in the genitalia of the whole group at the close of the article; the species appears distinctly northern in its habitat and apparently intermediate between *warneri* (Pl. XIX, Fig. 1) and *duaria*.

METARRANTHIS ANGULARIA sp. nov. (Pl. XXIX, Figs. 7, 8).

Palpi, front and thorax ruddy-brown, the latter tinged with purplish; a whitish line between the antennae; wings pale ocherous, heavily and roughly sprinkled and shaded with purple and brown so that the ground color is more or less blotted out, showing, however, in the median area of primaries, the basal area to t. p. line of secondaries and indistinctly in the subterminal area; t. a. line dark, rounded, strongly bent out below costa and slightly bent inward at inner margin, preceded by a broad purplish shade, the remainder of the basal area being very heavily covered with coarse brown scaling through which the ocherous ground color only appears as minute speckles; t. p. line dark, slightly crenulate, forming a sharp angle on vein 4 and then concave to inner margin; the median space is considerably narrower than in *duaria*, contrastingly pale although sprinkled with brown atoms, these tending to coalesce and form a median brown shade line crossing the wing between the rather faint dark discal dot and the t. p. line; beyond the t. p. line a broad purple shade tends to diffuse itself over the entire terminal area leaving here and there ocherous subterminal sprinklings, more marked in worn specimens than in fresh ones; the usual dark subterminal blotch between veins 3 and 4 may be present or absent; a faint oblique dark shade; fringes deep ruddy purple. Secondaries with a distinct black discal dot and dark t. p. line sharply angled at vein 4; the basal area is ocherous, heavily sprinkled with coarse purple atoms, the area beyond t. p. line as on primaries. Beneath light ocherous heavily sprinkled with purplish-brown especially terminally, the cross lines rather vaguely defined by purplish bands. Expanse ♂ 32 mm., ♀ 40 mm.

HABITAT: ♂, Decatur, Ill. (June); New Brighton, Pa., (June 4); Pa., ♀, no locality, (probably New Brighton, Pa.) (June 3, 1900). 4 ♂, 2 ♀ Types, Coll. Barnes.

Distinguished from the ruddy forms of *duaria* by the angulate t. p. line and the narrower median space which in the type ♂ from Decatur is very much constricted; the coarseness of the sprinkles and the paler median space also give the species quite a characteristic appearance; judging by our dated material its time of flight is slightly later than that of *duaria*.

With regard to the ♂ genitalia we have examined *obfirmaria* Hbn., *warneri* Harv., *duaria* Gn. and our two new species and find that they show great similarity to one another and that it is only possible to differentiate even such well marked species as *obfirmaria* and *duaria* by slight points of difference in the structure of what Pierce has termed

the Furca (Genit. of Brit. Geom. p. XXIII) ; taking into consideration that there are always slight variations in the genitalia of one species, especially from different localities, it will be seen that with only limited material at one's disposal it is a matter of considerable difficulty to pick out distinctive features that may prove of specific value. We have made about 20 slides of the male organs in this group and have arrived at certain conclusions which we offer for what they are worth.

The two branches of the Furca are asymmetrical in the whole group, the left hand one being the longer ; in *obfirmaria* (Pl. XXXII, Fig. 5) the branches are slender, short, curving backward toward apex and ending in two short semiequal spines ; in *warneri* (Pl. XXXIII, Fig. 1) they are much stouter, the left hand one strongly bent back near apex, the inner edge of the apex of both branches being furnished with one very long spine whilst the outer edge has a short spine ; in *duaria* (Pl. XXXIII, Fig. 4) the branches are considerably longer, more slender and less bent back, the apex is rather pointed and furnished with a number of spines, 4 or 5 on smaller branch and 8-10 on longer one, the spines extending a short distance below the apex down the sides and gradually decreasing in size ; in *septentrionaria* (Pl. XXXIII, Fig. 2) the branches are shorter than in *duaria* and somewhat stouter, the apical area is spined in much the same manner but the spines seem slightly fewer in number and more restricted in their area ; finally in *angularia* (Pl. XXXIII, Fig. 3) they are as long as in *duaria* but the left branch is truncate at the apex which is encircled by a whorl of spines whilst the right branch is much as in *duaria*. We figure the genitalia of all these species and would call attention to the fact that in most instances for the sake of clarity the Coremata on the ninth segment have been removed ; they are however present in every species.

SELENIA KENTARIA gen. aest. GLAUCATA form nov. (Pl. XXII, Fig. 4).

We have recently received through the kindness of Prof. E. T. Owen of Madison, Wis., specimens of the summer generation of *kentaria* taken or bred by D. Bruce in New York State for which we propose the above name. As is the case with the summer generation *ornata* B. & McD. of *alciphearia* Wlk., *glaucata* is much smaller, of a bright yellow color with pinkish washing along costa and with the maculation finer and more delicate ; beneath, especially on the secondaries, it is more orange than yellow, with the latter crossed by a brown median line just within the lunule and with a narrow pinkish band, broadening toward anal angle, representing the shading beyond

the postmedian line which itself is obsolete. The bulging t. a. line and less rigid t. p. line on primaries distinguish it from *ornata*. Expanse 25 mm. Types are 2 ♂, 1 ♀ in Coll. Barnes.

EPIPLATYMETRA LENTIFLUATA sp. nov. (Pl. XXVII, Fig. 13).

Head, thorax and abdomen whitish; primaries dull ochereous, sprinkled slightly with purplish-brown in ♂, strongly so in ♀; t. a. line purple-brown, broad, inwardly oblique, from cell at base of vein 2 to inner margin, lacking in costal half of wing; faint traces of a discal dash, more distinct in ♀; t. p. line purple-brown, gently curved outward below costa and then almost rigidly oblique to inner margin with the mere trace of an incurve at vein 2, followed by a broad purple-brown shade only slightly lighter than the line itself, broadening toward inner margin. Secondaries pale ochereous, slightly sprinkled and with traces of a purple-brown oblique dash above anal margin representing the postmedian line. Beneath pale ochereous, more heavily sprinkled than on upper side, with maculation of primaries showing through. Expanse 34 mm.

HABITAT: S. Arizona (Poling); Redington, Ariz.; Tucson, Ariz.; Huachuca Mts., Ariz.; Palmerlee, Ariz. 5 ♂, 1 ♀. Types, Coll. Barnes.

Very close to *coloradaria* G. & R. (Pl. XXVII, Fig. 14), but with the t. p. line much less bent in below cell and with the t. a. line incomplete.

SYNAXIS JUBARARIA SERICEATA var. nov. (Pl. XXVIII, Fig. 9).

Pale silky ochereous with scarcely a trace of brown sprinkles; lines fine, reddish-brown; t. a. line perpendicular to inner margin with a slight inward bend at costa; t. p. line straight from costa to vein 4, then obliquely inwardly to inner margin two-thirds from base; median space twice as broad at costa as at inner margin; a faint discal dot; secondaries paler than primaries with only traces above inner margin of an oblique median line; discal dot scarcely visible. Beneath much as above with the lines obsolescent.

HABITAT: Glenwood Spgs., Colo. (Sept. Oct.). 1 ♂, 1 ♀. Types, Coll. Barnes.

Differs from the typical form from the West Coast in the much paler color and fainter discal dots; the course of the lines is rather different in our type specimens but this may not be constant as several specimens before us, which we consider too poor to make types, seem to show a variation in this feature. We also have two ♀'s from Truckee, Calif., which seem to belong to this species; they entirely lack the discal dots.

METANEMA EXCELSA OLIVATA var. nov. (Pl. XXVIII, Figs. 7, 8).

In typical *excelsa*, described from Pagosa Spgs., S. Colo. the color of primaries is a bright orange-red with narrow pale cross lines shaded

on their approximate sides with smoky shades; this race appears to extend southward along the borders of Arizona and New Mexico as far as the White Mts.; we have received a series of specimens from Paradise, Cochise Co., Ariz. which differ from the typical form in having the primaries a light olivaceous with a tinge of salmon-color especially in the δ 's which further show a slight dark sprinkling; the cross lines are distinct, pale ochreous with scarcely a trace of dark shading; there is also a tendency in the φ 's for them to approach each other more closely at the inner margin than in the nimitypical form; the secondaries are whitish, shading into olivaceous outwardly, with scarcely a trace of a cross line; the discal dots are small and sometimes absent, especially on secondaries. We prefer to consider this a race of *excelsa* rather than a new species and propose the name OLIVATA, our types being 3 δ 's, 7 φ 's from Paradise, Ariz. (Aug. Sept.).

SABULODES SERICEATA sp. nov. (Pl. XXVIII, Fig. 4).

Thorax and primaries pale yellowish, the latter silky and very faintly sprinkled with smoky; cross lines distinct, brown; t. a. line rather far out, curved below costa; t. p. line in general course oblique, slightly bent at costa. Secondaries paler than primaries with a faint curved postmedian line. Beneath paler than above, both wings with a dotted postmedian line which on primaries is nearer outer margin than the t. p. line of upper side except at costa. Expanse δ 31 mm., φ 35 mm.

HABITAT: Paradise, Cochise Co., Ariz. (Aug. Sept.). 1 δ , 2 φ . Types, Coll. Barnes.

The species seems allied to *matrona* Druce.

PLATE XVI

- Fig. 1. *P. battoides oregonensis* B. & McD. Type, ♂ Crater Lake, Ore.
Fig. 2. *P. battoides oregonensis* B. & McD. underside, ♂ Crater Lake,
Ore.
Fig. 3. *P. battoides oregonensis* B. & McD. Paratype, ♀ Crater Lake, Ore.
Fig. 4. *P. battoides intermedia* B. & McD. Type, ♂ Shasta Co., Calif.
Fig. 5. *P. battoides intermedia* B. & McD. underside, ♂ Shasta Co., Calif.
Fig. 6. *P. battoides intermedia* B. & McD. Type, ♀ Shasta Co., Calif.
Fig. 7. *P. battoides centralis* B. & McD. Type, ♂ Salida, Colo.
Fig. 8. *P. battoides centralis* B. & McD. underside, ♂ Salida, Colo.
Fig. 9. *Philotes spaldingi* B. & McD. Type, ♂ Provo, Utah.
Fig. 10. *Philotes spaldingi* B. & McD. underside, ♂ Provo, Utah.
Fig. 11. *Philotes spaldingi* B. & McD. Type ♀ Provo, Utah.

PLATE XVI

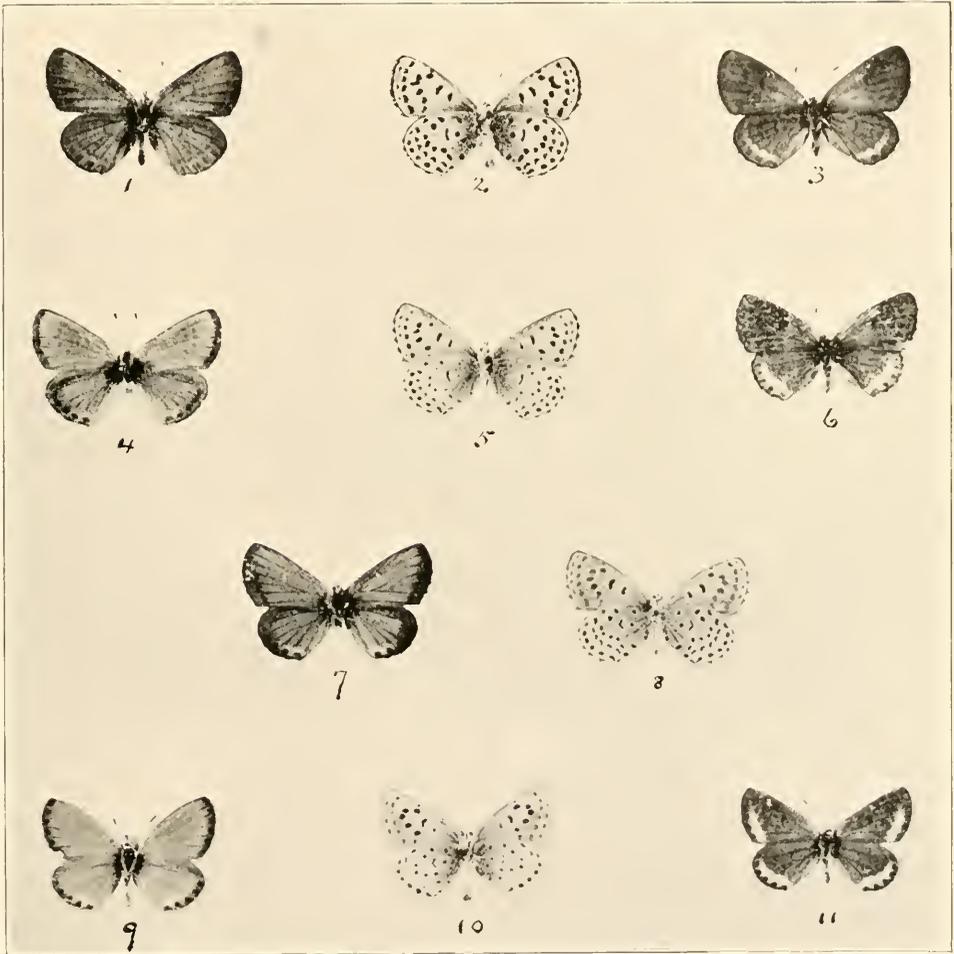


PLATE XVII

- Fig. 1. Genitalia of ♂ *P. enoptes* Bdv. (side view).
Fig. 2. Genitalia of ♂ *P. glaucon* Edw. (side view).
Fig. 3. Genitalia of ♂ *P. battoides* Behr. (rear view).
Fig. 4. Genitalia of ♂ *P. battoides bernardino* B. & McD. (rear view).
Fig. 5. Genitalia of ♂ *P. rita* B. & McD. (rear view).
Fig. 6. Genitalia of ♂ *P. spaldingi* B. & McD. (side view).
Fig. 7. Genitalia of ♂ *P. rita* B. & McD. (side view).

PLATE XVII

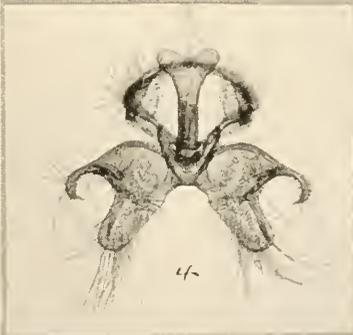
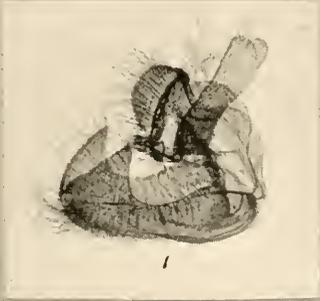


PLATE XVIII

- Fig. 1. *Acrobasis myricella* B. & McD. Type, ♂ Ft. Myers, Fla.
Fig. 2. *Acrobasis comptoniella* Hlst. ♂ East Riv., Conn.
Fig. 3. *Mineola grossbecki* B. & McD. Type, ♂ Lakeland, Fla.
Fig. 4. *Mineola indigenella* Zell. ♂ Decatur, Ill.
Fig. 5. *Xystrota davisii* Grossbeck. Paratype, ♀ Everglade, Fla.
Fig. 6. *Tallula watsoni* B. & McD. Type ♀ Stemper, Fla.
Fig. 7. *Tallula atrifascialis* Hlst. ♂ Kerrville, Texas.
Fig. 8. *Nephopteryx crataegella* B. & McD. Type, ♂ Lakeland, Fla.

PLATE XVIII

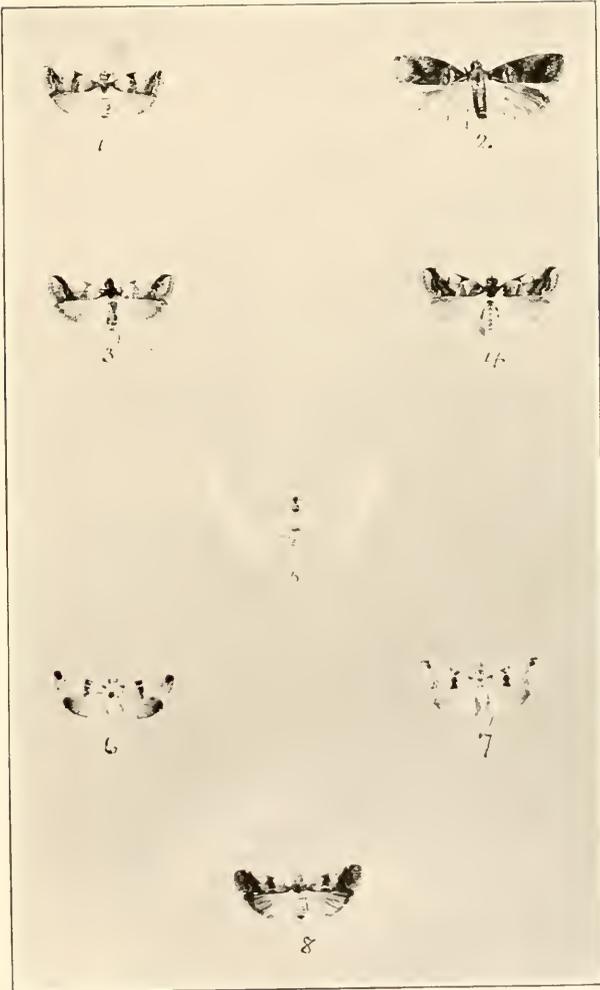


PLATE XIX

- Fig. 1. *S. magnoliata ruptata* B. & McD. Type ♀ Deer Pk. Spgs., Lake
Tahoe, Calif.
- Fig. 2. *S. magnoliata pernotata* Hlst. ♀ Wellington, B. C.
- Fig. 3. *T. georgii benesignata* B. & McD. Paratype, ♂ Wellington, B. C.
- Fig. 4. *Thera georgii* Hlst. ♂ Truckee, Calif.
- Fig. 5. *Thera latens* B. & McD. Paratype, ♂ Colo. (Bruce).
- Fig. 6. *Triphosa bipectinata* B. & McD. Type, ♂ Palmerlee, Ariz.
- Fig. 7. *X. ferrugata infumata* B. & McD. Type, ♂ Crater Lake, Ore.
- Fig. 8. *X. ferrugata infumata* B. & McD. Type, ♀ Crater Lake, Ore.
- Fig. 9. *Xanthorhoe ferrugata* Clerck ♂ New Brighton, Pa.
- Fig. 10. *Zenophleps obscurata* Hlst. ♂ S. Bern. Mts., Calif.
- Fig. 11. *Z. obscurata infumata* B. & McD. Paratype, ♂ Palmerlee, Ariz.

PLATE XIX



PLATE XX

- Fig. 1. *E. plebeculata vivida* B. & McD. Paratype, ♂ Wellington, B. C.
Fig. 2. *E. plebeculata vivida* B. & McD. Paratype, ♀ Wellington, B. C.
Fig. 3. *Epirrhoe plebeculata* Gn. ♂ Alameda Co., Calif.
Fig. 4. *Epirrhoe plebeculata* Gn. ♀ Alameda Co., Calif.
Fig. 5. *Stannodes topazata* Stkr. ♂ Colo. (Bruce).
Fig. 6. *S. topazata apicata* B. & McD. Paratype, ♂ Hymers, Ont.
Fig. 7. *Spargania illustrata* B. & McD. Paratype, ♂ Palmerlee, Ariz.
Fig. 8. *Spargania illustrata* B. & McD. Paratype, ♀ Palmerlee, Ariz.
Fig. 9. *Spargania aurata* Grt. ♀ White Mts., Ariz.

PLATE XX

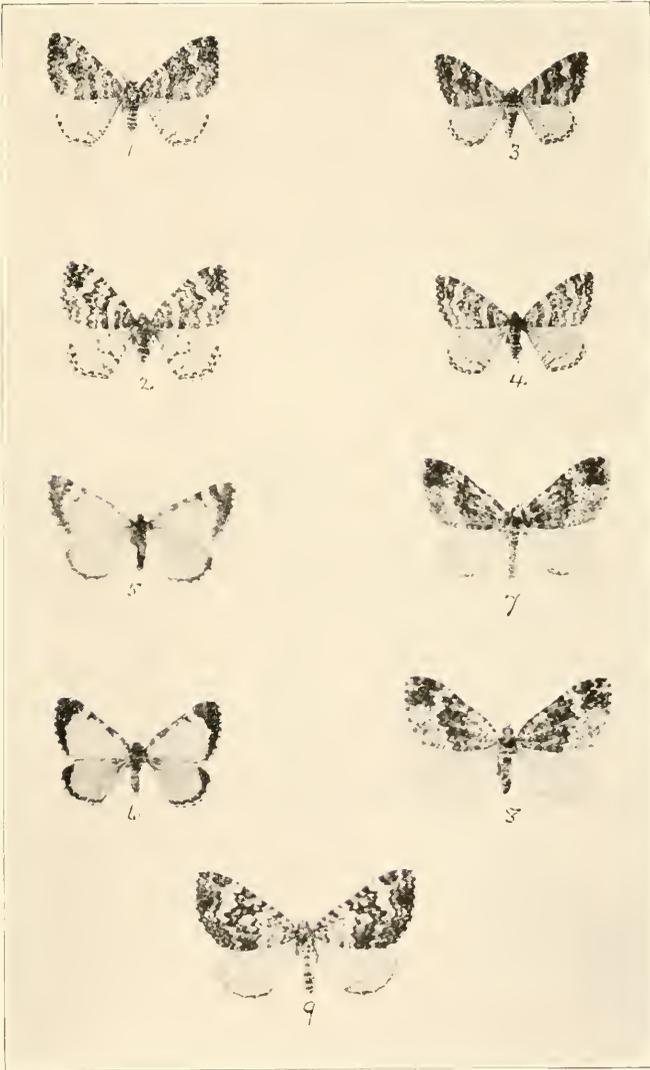


PLATE XXI

- Fig. 1. *Dystroma truncata* *Hufn.* ♂ White Mts., N. H.
Fig. 2. *Dystroma truncata* *Hufn.* ♀ White Mts., N. H.
Fig. 3. *Dystroma citrata* *Linn.* ♀ White Mts., N. H.
Fig. 4. *D. truncata mulleolata* *Hlst.* ♂ Victoria, B. C.
Fig. 5. *D. truncata mulleolata* *Hlst.* ♀ Victoria, B. C.
Fig. 6. *D. mulleolata form. ochrofuscaria* *Swett* ♀ Duncans, B. C.
Fig. 7. *D. truncata walkerata* *Pears.* ♂ Calgary, Alta.
Fig. 8. *D. truncata walkerata* *Pears.* ♀ Ketchikan, Alaska.
Fig. 9. *L. xyлина serrataria* *B. & McD.* Paratype, ♂ Meach Lake, Que.

PLATE XXI

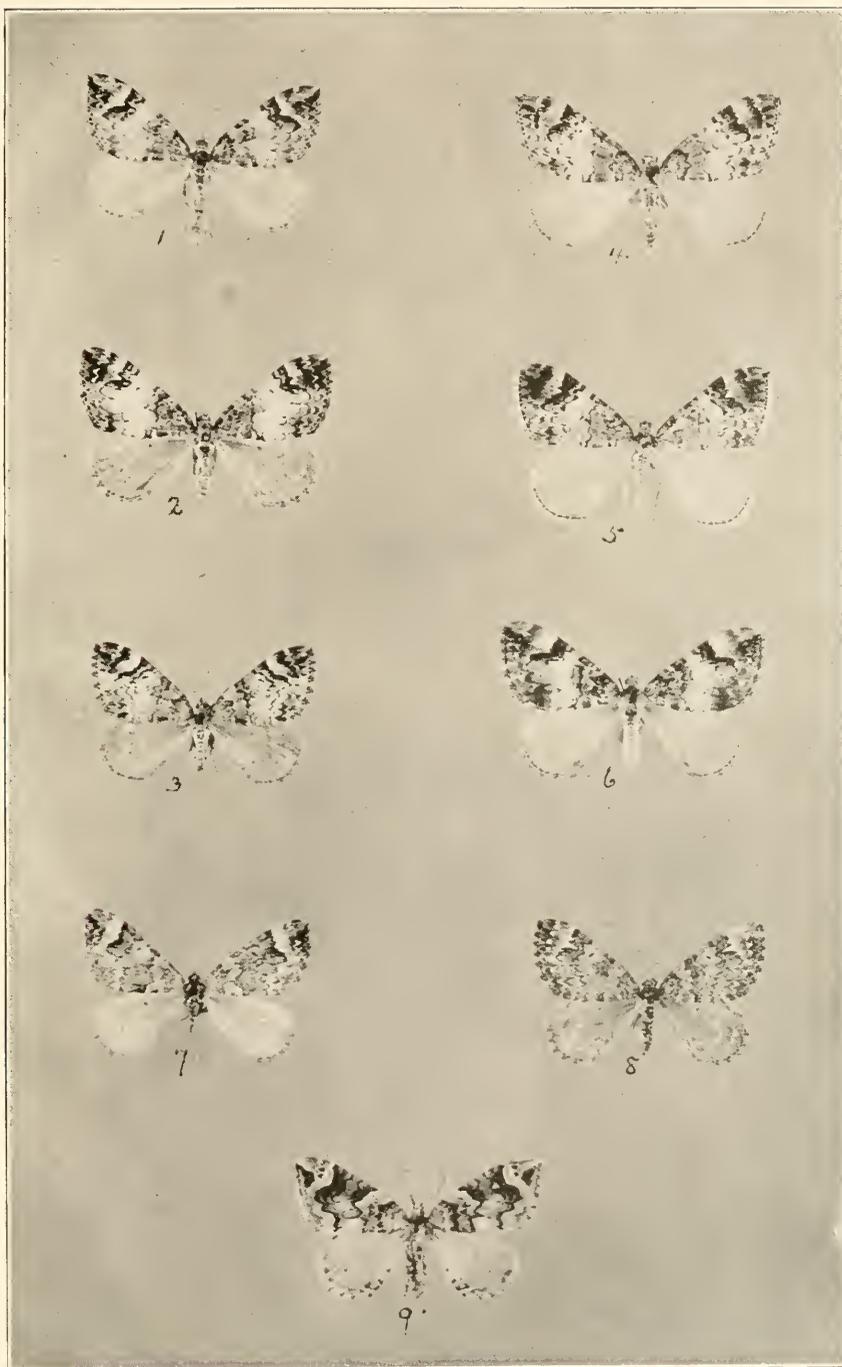


PLATE XXII

- Fig. 1. *Plagodis approximaria* Dyar ♂ McNabs' Is., N. S.
Fig. 2. *Plagodis intermediaria* B. & McD. Type, ♂ Ottawa, Can.
Fig. 3. *Plagodis phlogosaria* Gn. ♂ Meach Lake, Que.
Fig. 4. *S. kentaria* *gen. aest.* *glaucata* B. & McD. Type, ♂ N. Y. (Bruce).
Fig. 5. *Catopyrrha esperanza* B. & McD. Type, ♂ Brownsville, Tex.
Fig. 6. *Catopyrrha esperanza* B. & McD. Type, ♀ Brownsville, Tex.
Fig. 7. *T. albovittata tenuifasciata* B. & McD. Type, ♂ Spirit Lake, Idaho.
Fig. 8. *Trichodesia albovittata* Gn. ♂ New Brighton, Pa.
Fig. 9. *Heliomata fulliola* B. & McD. Type, ♂ Redington, Ariz.
Fig. 10. *Mesoleuca gratulata* Wlk. ♂ Victoria, B. C.
Fig. 11. *M. gratulata latialbata* B. & McD. Type, ♂ Plumas Co., Calif.

PLATE XXII



PLATE XXIII

- Fig. 1. *Phasiane triviata* B. & McD. Paratype, ♀ Paradise, Ariz.
Fig. 2. *P. dislocaria malefactoria* B. & McD. Type, ♂ Paradise, Ariz.
Fig. 3. *P. dislocaria malefactoria* B. & McD. Type, ♀ Paradise, Ariz.
Fig. 4. *Phasiane septemberata* B. & McD. Type, ♂ Paradise, Ariz.
Fig. 5. *Itame epigenata* B. & McD. Type, ♂ Truckee, Calif.
Fig. 6. *Itame wauaria* Linn. ♂ Petrograd, Russia.
Fig. 7. *Phasiane ponderosa* B. & McD. Type, ♂ Cartwright, Man.
Fig. 8. *Phasiane ponderosa* B. & McD. Type, ♀ Calgary, Alta.
Fig. 9. *P. ponderosa form demaculata* B. & McD. Type, ♂ Calgary, Alta.
Fig. 10. *Itame extemporata* B. & McD. Type, ♂ Havilah, Calif.
Fig. 11. *A. anticaria fumata* B. & McD. Type, ♂ Kaslo, B. C.
Fig. 12. *Aethaloptera anticaria* Wlk. ♂ New Brighton, Pa.

PLATE XXIII



PLATE XXIV

- Fig. 1. *Itame coortaria* *Hlst.* ♂ Eureka, Utah.
Fig. 2. *I. coortaria enigmata* *B. & McD.* Type, ♂ Illinois.
Fig. 3. *Itame umbriferata* *Hlst.* ♂ Siskiyou Co., Calif.
Fig. 4. *Itame umbriferata* *Hlst.* ♀ Siskiyou Co., Calif.
Fig. 5. *Itame confederata* *B. & McD.* Type, ♂ Glenwood Spgs., Colo.
Fig. 6. *Itame confederata* *B. & McD.* Type, ♀ Glenwood Spgs., Colo.
Fig. 7. *Itame plumosata* *B. & McD.* Paratype, ♂ Provo, Utah.
Fig. 8. *Itame plumosata* *B. & McD.* Paratype, ♀ Provo, Utah.
Fig. 9. *I. graphidaria sobriaria* *B. & McD.* Type, ♂ Redington, Ariz.
Fig. 10. *Itame graphidaria* *Hlst.* ♂ Brownsville, Tex.

PLATE XXIV

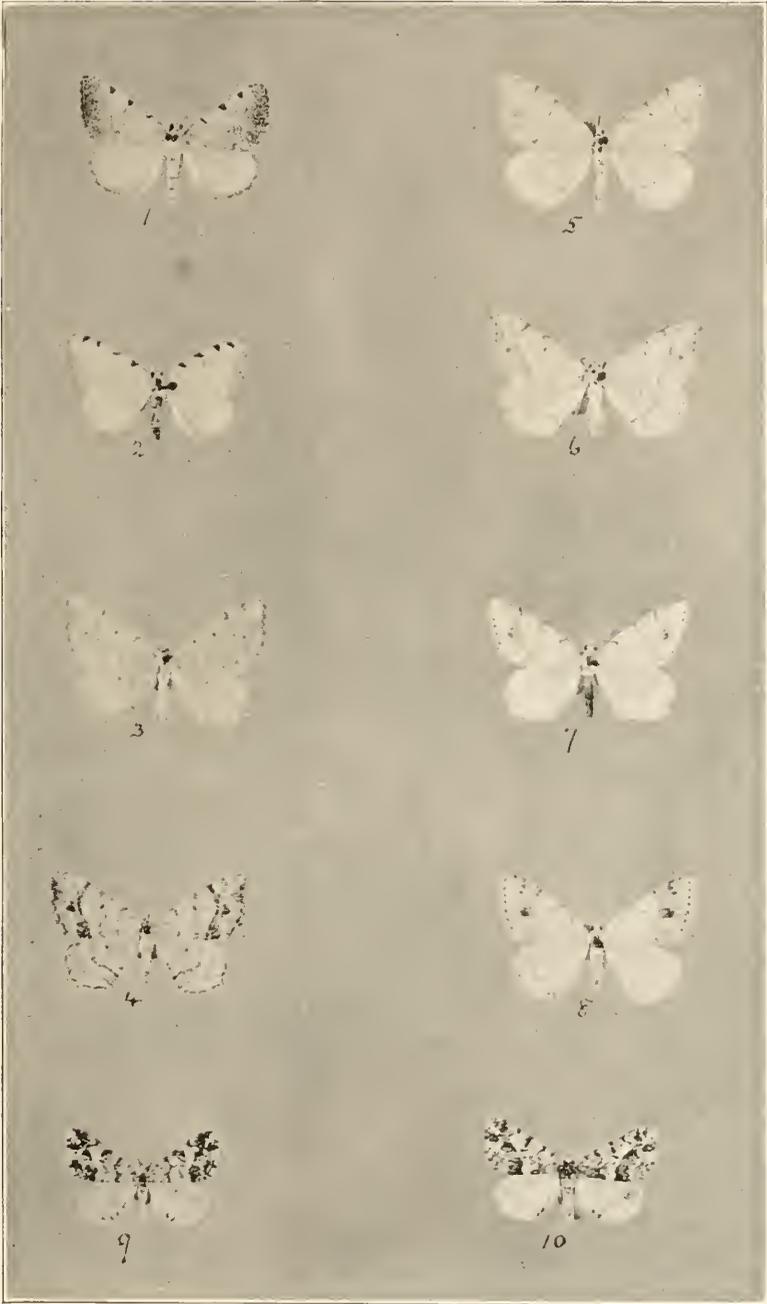


PLATE XXV

- Fig. 1. *Cleora satisfacta* B. & McD. Type, ♂ Kaslo, B. C.
Fig. 2. *Cleora satisfacta* B. & McD. Type, ♀ Kaslo, B. C.
Fig. 3. *Cleora profanata* B. & McD. Type, ♂ Glenwood Spgs., Colo.
Fig. 4. *Cleora anellula* B. & McD. Type, ♂ Jemez Spgs., N. M.
Fig. 5. *Cleora vernata* B. & McD. Type, ♂ Glenwood Spgs., Colo.
Fig. 6. *Cleora sanctissima* B. & McD. Type, ♂ S. Bernardino, Calif.
Fig. 7. *Cleora clivinaria* Gn. ♂ S. Bernardino, Calif.
Fig. 8. *Monroa quinquelinearia* Pack. ♂ Stockton, Utah.
Fig. 9. *Monroa interpunctata* B. & McD. Type, ♂ Paradise, Ariz.
Fig. 10. *Cleora ocellaria* B. & McD. Type ♂ Placer Co., Calif.

PLATE XXV

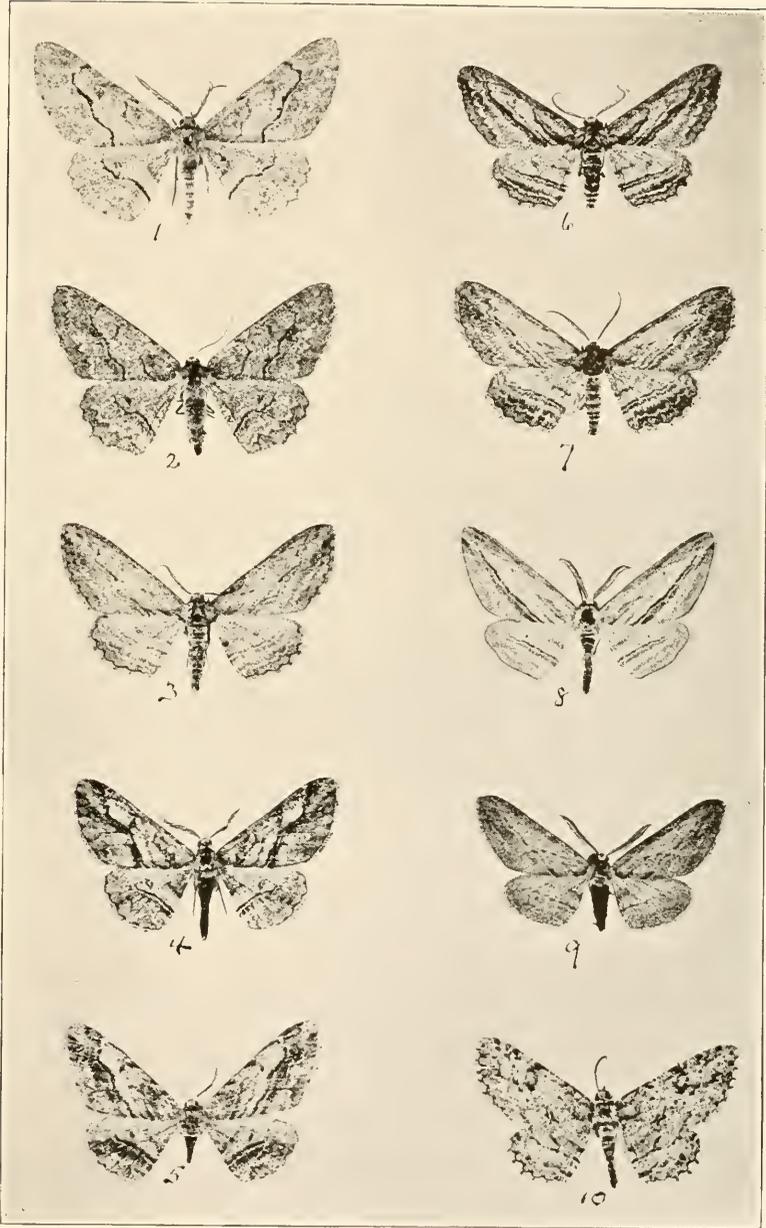


PLATE XXVI

- Fig. 1. *Phaeoura mexicanaria* Grt. ♂ Pinewood, Colo.
Fig. 2. *A. cognataria fortitaria* B. & McD. Paratype, ♂ Glenwood Sps.,
Colo.
Fig. 3. *Phaeoura triaria* B. & McD. Type, ♂ Redington, Ariz.
Fig. 4. *Phaeoura perfidaria* B. & McD. Type, ♂ Glenwood Sps., Colo.
Fig. 5. *Phaeoura perfidaria* B. & McD. Type ♀ Glenwood Sps., Colo.
Fig. 6. *A. cognataria form. swettaria* Type, ♂ New Brighton, Pa.

PLATE XXVI

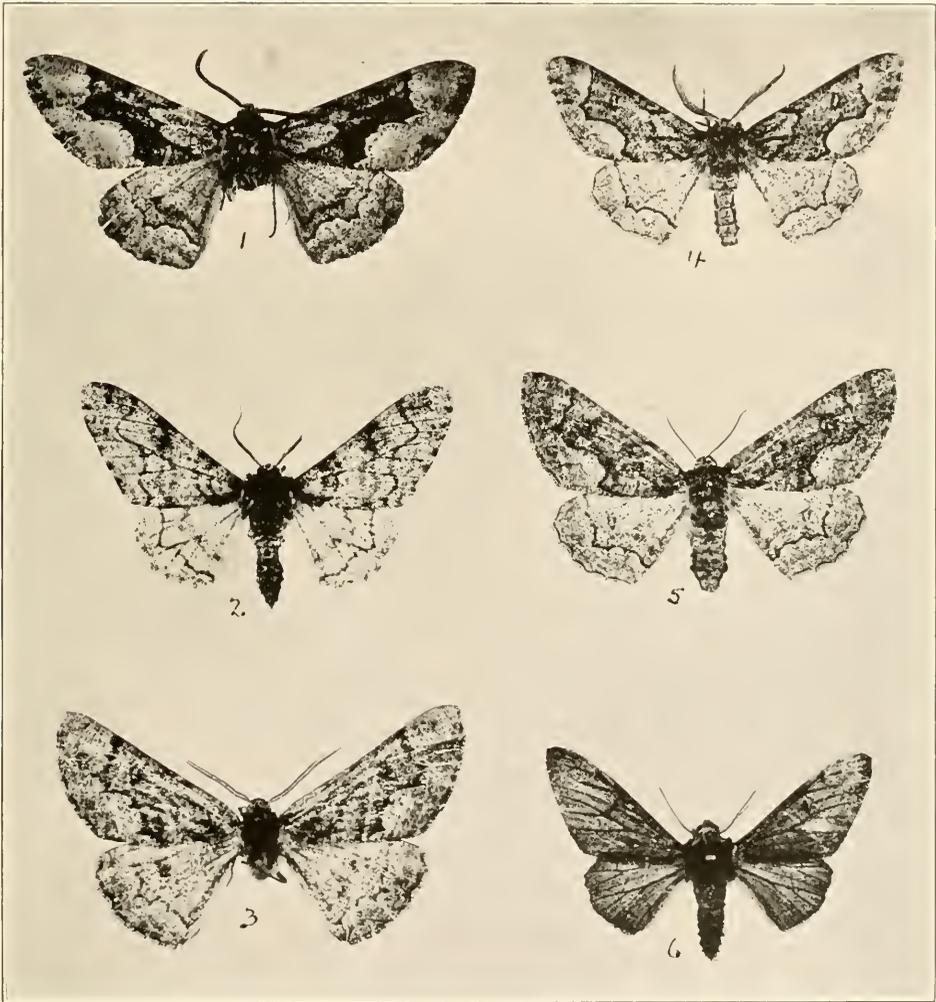


PLATE XXVII

- Fig. 1. *Sicya macularia Harris* ♂ Hymers, Ont.
Fig. 2. *Sicya macularia Harris* ♀ New Brighton, Pa.
Fig. 3. *S. macularia agyllaria Wlk.* ♂ Calgary, Alta.
Fig. 4. *S. macularia crocearia Pack.* ♂ Vancouver Is., B. C.
Fig. 5. *S. macularia crocearia Pack.* ♀ Vancouver Is., B. C.
Fig. 6. *S. macularia agyllaria Wlk.* ♀ Calgary, Alta.
Fig. 7. *S. macularia lewisi Swett* ♂ S. Bern. Mts., Calif.
Fig. 8. *S. macularia lewisi Swett* ♀ S. Bern. Mts., Calif.
Fig. 9. *S. macularia crocearia Pack.* ♂ Stockton, Utah.
Fig. 10. *S. macularia laetula B. & McD.* Paratype, ♂ S. Diego, Calif.
Fig. 11. *Sicya pergilvaria B. & McD.* Paratype, ♂ S. Bern. Mts., Calif.
Fig. 12. *Sicya pergilvaria B. & McD.* Paratype, ♀ S. Bern. Mts., Calif.
Fig. 13. *Epiplatymetra lentifluata B. & McD.* Type, ♂ S. Arizona.
Fig. 14. *Epiplatymetra coloradaria G. & R.* ♂ Durango, Colo.

PLATE XXVII



PLATE XXVIII

- Fig. 1. *Ellopia jacularia* B. & McD. Type, ♂ Jemez Spgs., N. M.
Fig. 2. *Ellopia turbataria* B. & McD. Type, ♂ New Brighton, Pa.
Fig. 3. *Ellopia turbataria* B. & McD. Paratype, ♀ New Brighton, Pa.
Fig. 4. *Sabulodes sericeata* B. & McD. Type, ♂ Paradise, Ariz.
Fig. 5. *D. hulsti carneolata* B. & McD. Type, ♂ Redington, Ariz.
Fig. 6. *D. hulsti carneolata* B. & McD. Type, ♀ S. Catalina Mts., Ariz.
Fig. 7. *M. excelsa olivata* B. & McD. Type, ♂ Paradise, Ariz.
Fig. 8. *M. excelsa olivata* B. & McD. Type, ♀ Paradise, Ariz.
Fig. 9. *S. jubararia sericeata* B. & McD. Type ♂ Glenwood Spgs., Colo.

PLATE XXVIII

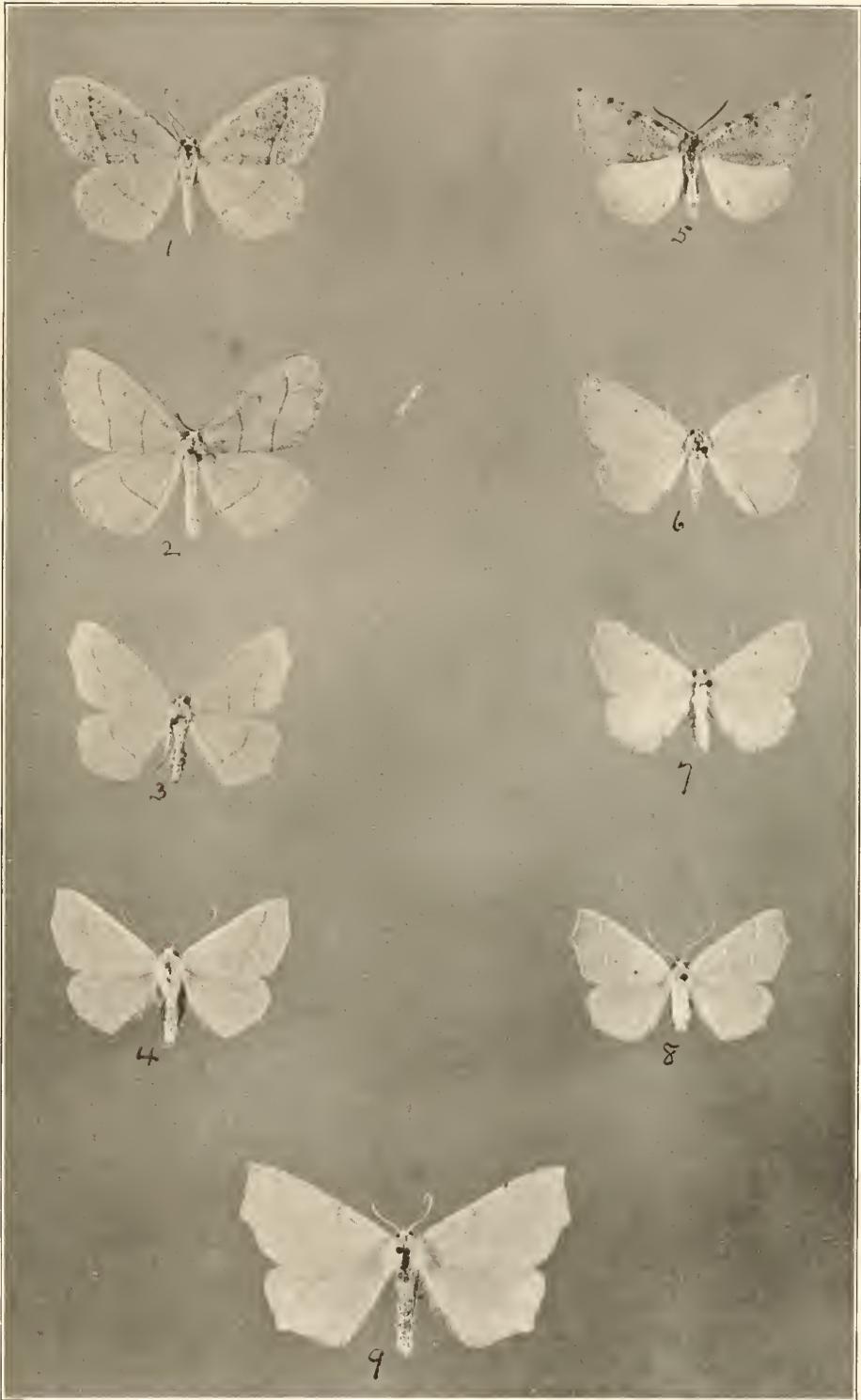


PLATE XXIX

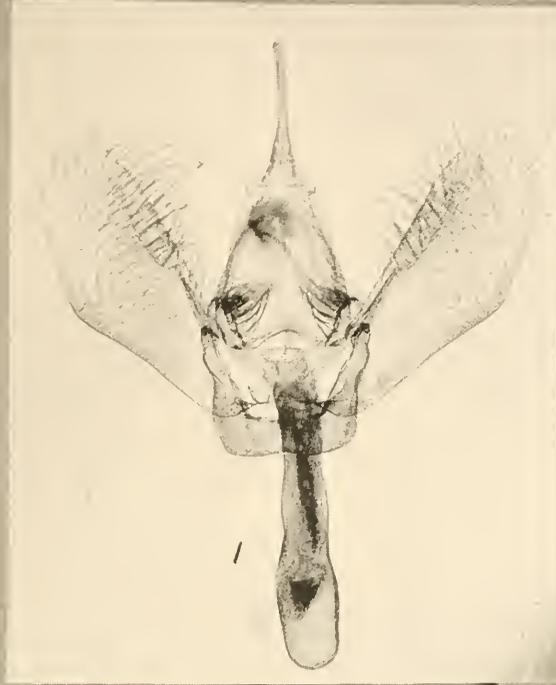
- Fig. 1. *Metarrhantis warneri* Harv. ♂ Cartwright, Man.
Fig. 2. *Metarrhantis septentrionaria* B. & McD. Type, ♂ Beulah, Man.
Fig. 3. *Metarrhantis septentrionaria* B. & McD. Type, ♀ Winnipeg, Man.
Fig. 4. *Metarrhantis duaria* Gn. ♂ New Brighton, Pa.
Fig. 5. *Metarrhantis duaria* Gn. ♀ New Brighton, Pa.
Fig. 6. *Metarrhantis duaria hamaria* Gn. ♂ Ottawa, Can.
Fig. 7. *Metarrhantis angularia* B. & McD. Type, ♂ Decatur, Ill.
Fig. 8. *Metarrhantis angularia* B. & McD. Type, ♀
Fig. 9. *Cleora rusticaria* B. & McD. Type, ♂ Glenwood Spgs., Colo.

PLATE XXIX



PLATE XXX

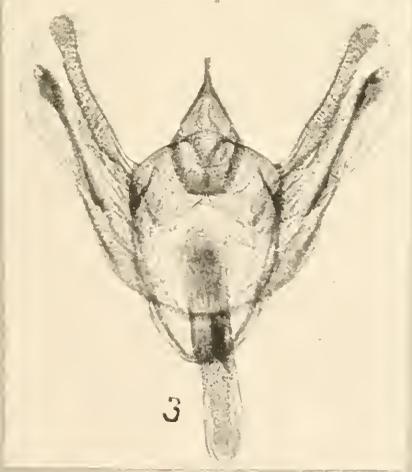
- Fig. 1. Genitalia of ♂ *D. truncata mulleolata* Hlst. Ketchikan, Alaska.
Fig. 2. Genitalia of ♂ *D. citrata* L. Ketchikan, Alaska.
Fig. 3. Genitalia of ♂ *Monroa interpunctata* B. & McD. Chiricahua Mts.,
Ariz.
Fig. 4. Genitalia of ♂ *Monroa quinquelinearia* Pack. Glenwood Spgs., Colo.
Fig. 5. Genitalia of ♂ *Cleora sanctissima* B. & McD. Loma Linda, Calif.
Fig. 6. Genitalia of ♂ *Cleora profanata* B. & McD. Glenwood Spgs., Colo.



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6

PLATE XXXI

- Fig. 1. Genitalia of ♂ *Cleora anellula* B. & McD. Glenwood Spgs., Colo.
Fig. 2. Genitalia of ♂ *Cleora vernata* B. & McD. Glenwood Spgs., Colo.
Fig. 3. Genitalia of ♂ *Sicya macularia* Harris Hymers, Ont.
Fig. 4. Genitalia of ♂ *S. macularia agyllaria* Wlk. Calgary, Alta.
Fig. 5. Genitalia of ♂ *S. macularia lewisi* Swett S. Bern. Mts., Calif.
Fig. 6. Genitalia of ♂ *Sicya pergivaria* B. & McD. S. Bern. Mts., Calif.

PLATE XXXI

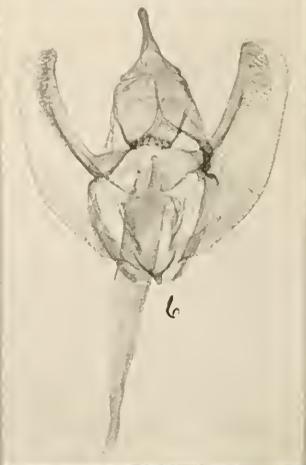
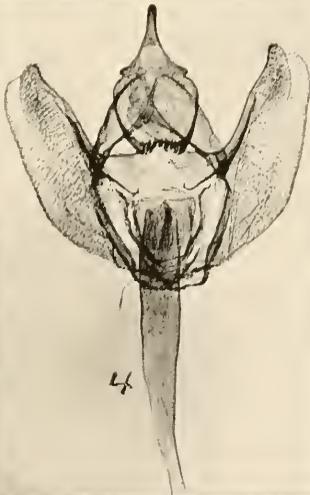
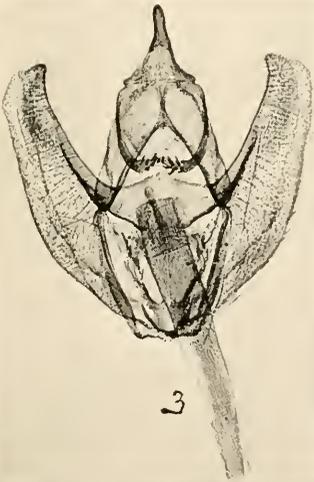
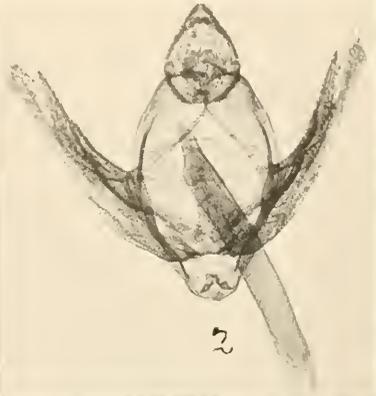
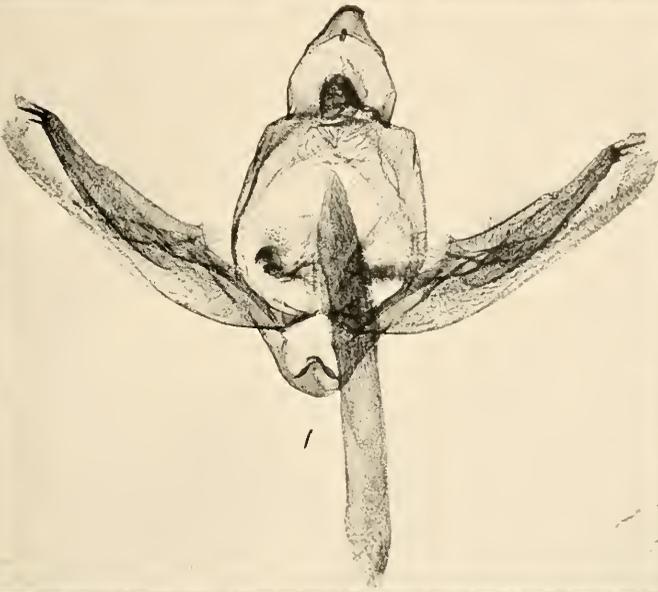


PLATE XXXII

- Fig. 1. Genitalia of ♂ *Ellopia vitraria* Grt. Colorado Spgs., Colo.
Fig. 2. Genitalia of ♂ *Ellopia jacularia* B. & McD. Jemez Spgs., N. M.
Fig. 3. Genitalia of ♂ *Ellopia flagitiaria* Gn.
Fig. 4. Genitalia of ♂ *Ellopia turbataria* B. & McD. New Brighton, Pa.
Fig. 5. Genitalia of ♂ *Metarrhantis obfirmaria* Hbn. Clarendon, N. J.



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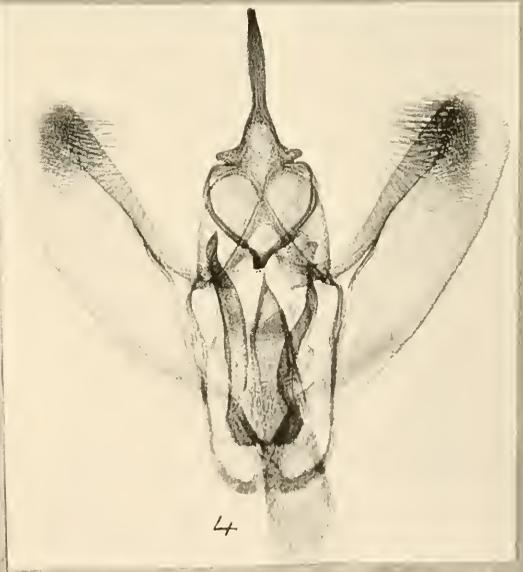
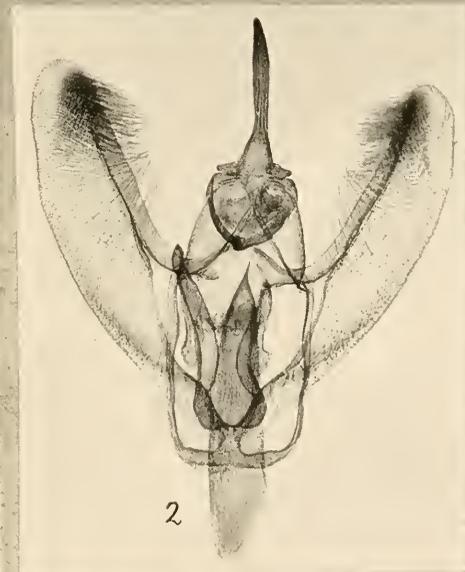
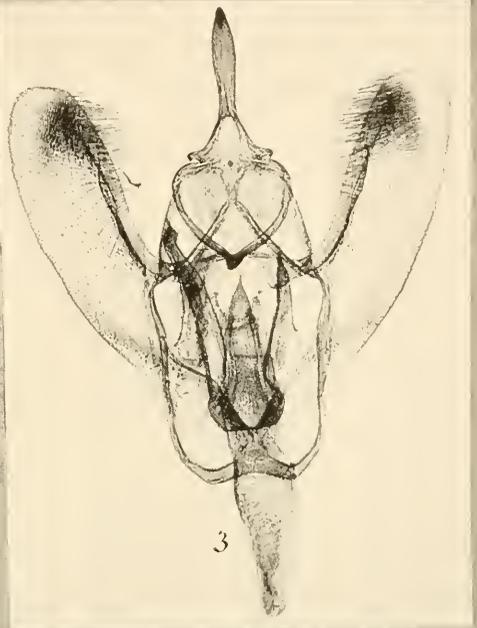
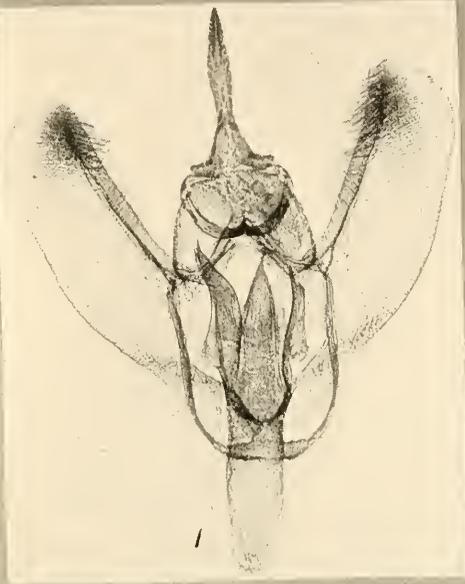


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PLATE XXXIII

- Fig. 1. Genitalia of ♂ *Metarrhantis warneri* Harv. Cartwright, Man.
Fig. 2. Genitalia of ♂ *Metarrhantis septentrionaria* B. & McD. Chicago, Ill.
Fig. 3. Genitalia of ♂ *Metarrhantis angularia* B. & McD. Decatur, Ill.
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