





L. Clarke









CONTRIBUTIONS  
TO THE  
NATURAL HISTORY  
OF THE  
**LEPIDOPTERA**  
OF  
NORTH AMERICA

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VOL. IV

No. 1

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A REVISION OF THE GENUS  
**HYDRIOMENA HBN.**

BY

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AND

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DECATUR, ILL.  
THE REVIEW PRESS  
MAY 23, 1917

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



## ADDITIONS AND CORRECTIONS TO VOLUME III

Page 18. PHYTOMETRA CURVATA B. & McD.

Sir George Hampson has called our attention to the fact that this name is probably a synonym of *Antarchaea obliquialis* Dyar described from Mexico (1912, Proc. U. S. Nat. Mus. 42, p. 80); we agree with this, but see no reason to change the generic reference, *Phytometra* Haw. in any case having priority over *Antarchaea* Hbn. if the respective types of the two genera should prove congeneric.

Page 98. CHLOSZYNE LACINIA Geyer.

Prof. T. D. A. Cockerell has called our attention to a valuable article by W. H. Edwards on this species in Can. Ent. 1893, p. 286, which we had overlooked entirely. In this article Edwards first proposes the names *nigrescens* and *rufescens* which should therefore be credited to him and not to Wright as we have done. It would also seem from the article that in New Mexico we have a meeting-point of the Texan race *adjutrix* and the Arizona race *crocalis*, a single brood of larvae producing both forms; this would appear to be a parallel case to that of *Basilarchia astyanax* and *B. arthemis* which show all manner of curious intergrades along the border line where the two forms overlap, *viz.*, Catskill Mts. and northern New York State.

Page 103, line 1—Read **RIODINIDAE**

Page 119. LYCAENA PARDALIS Behr.

Our statement that the  $\delta$  genitalia resemble those of the *arion* group of blues and that in consequence the species should be referred to the genus *Lycaena* is quite erroneous. At the time we had only a single  $\delta$  specimen which we merely examined under the binocular; the receipt recently of further specimens made it possible for us to remove the abdomen of this same specimen and prepare a microscopic slide of the genitalia; to our surprise we found them practically identical with those of *icarioides* and we can only ascribe our former serious error to a distortion of the genitalia in the dried specimen. *Pardalis* should therefore be removed from the genus *Lycaena* as it stands in

our New Check List and placed next to *icarioides* in the genus *Plcbeius* L.; it is possibly a lowland race of this species characterized by brown ground color and heavy spotting on the underside and it is quite within the bounds of probability that *maricopa* Reak. will, after all, take precedence over the name *pardalis* as the large black spots are distinctly mentioned in the original description. Our San Francisco collectors should be able to solve this problem and discover whether the ♀'s ever show any traces of blue or are constantly dark brown.

Page 128, line 28—Omit and insert:

claims to have a type ♂ from Vancouver Is. but as the species was

Page 161. EPIPSILIA OKAKENSIS Pack.

We were incorrect in stating that *okakensis* falls to *cinerca* Staud.; Sir Geo. Hampson has called our attention to the fact that while *cinerca* was diagnosed in 1861 (Stett. Ent. Zeitsch. p. 369) it was not until 1871 (Cat. Pal. Lep. p. 114) that the name *cinerca* was actually given to the Labrador form and that therefore *okakensis* Pack. has several years priority.

Page 164. HOMOHADENA INCONSTANS Grt.

Our statement that Grote originally referred this species to *Oncocnemis* was erroneous; it was described as a *Homohadena* (Can. Ent. XV, 28). This will not, however, affect the statements made in the remainder of our note.

Page 172. ACIDALIA PERSIMILIS Hlst.

On reviewing Packard's description of *quadrilineata* with a view to determining a White Mt. species captured by ourselves in 1916 at Bretton Woods, N. H., we were struck by the fact that the description did not tally well with the specimen we had recently compared with the type in the Cambridge Museum Collection and on the strength of which we had made *persimilis* Hlst. a synonym; this was particularly the case with regard to the underside which calls for a 'dark scalloped line common to both wings and situated half-way between the discal dot and outer edge.' We wrote Mr. Swett on the subject and he was kind enough to examine the types; he wrote us that of the original type series only 1 ♂ from Orono, Me., and 1 ♂ from Brunswick, Me., remain in the Packard Collection and that these represent two species, the former showing the irregular dark s. t. line on the underside, the

latter having the line straight and corresponding to Hulst's *persimilis* concerning the identity of which the original description leaves no doubt (C. Ent. XXX, 158). We had evidently compared a specimen with the Brunswick, Me., type but in view of Packard's statement in the original description we feel that the type must be restricted to the Orono, Me., specimen, the name *persimilis* Hlst. becoming valid for the other species, distinguished by its less angled secondaries and non-scalloped s. t. line, the cross-lines also being considerably more ochreous in this latter species than in *quadrilineata*; Packard's figure in the Monograph (Pl. X, Fig. 64) bears more resemblance to this latter species than to the true *quadrilineata*. We are now confronted with the problem as to which of these two species is represented by Walker's *junctaria* which we have already referred to this group (Cont. III, (1) p. 41); the description of the type ♀ is very brief, but we would note that Walker uses the term 'testaceous' as applied to the cross-lines and as he uses the same term in his description of *similaria* which we have referred to *erythemaria* Gn. (Cont. III, (1) p. 36) we get a fairly clear conception of his idea of this color; it would seem that the ♀ of *persimilis* Hlst. would match the description far better in this respect than the ♀ of *quadrilineata* for which Walker would probably have used the term 'fuscous' as applied to the lines; we believe therefore that the correct usage will be to apply *junctaria* Wlk., with *persimilis* Hlst. as a synonym, to the one species, using *quadrilineata* Pack. for the other; corresponding changes should be made in our New Check List.

Page 296. The localities for Fig. 2 and Fig. 4 should be interchanged.

## A REVISION OF THE GENUS HYDRIOMENA BASED ON THE MALE GENITALIA

Mr. L. W. Swett in his notes on this genus (1911, C. Ent. 43, p. 73; 1912, C. Ent. 44, p. 225; 1915, C. Ent. 47, pp. 9, 58) has done valuable work in separating our North American species, his subdivisions into short, moderate and long palpal groups being a distinct advance over anything heretofore attempted in the classificatory line; personally we have never favored his color-pattern scheme, it has seemed to us too artificial and we have always had the feeling that a number of his so-called forms might, on further study, prove to be good races or even species, a theory which has been amply borne out by our studies. It is greatly to be regretted that Mr. Swett's work was, as he himself states, more or less unfinished; his inability to examine and compare the  $\delta$  genitalia of the various species involved has, we fear, led him into several rather serious errors which we feel sure would have been eliminated if he had had the opportunity to work out the structural details of the genital organs.

We recently had occasion to examine the genitalia of a number of species in this group and the results were so startling that we decided to extend our investigations to all the species contained in the genus; we were primarily struck by the excellent means of separation afforded by the shape of the *Uncus* which is all the more important as, generally speaking, this portion of the genitalia may be examined under a strong lens or binocular by simply removing a few hairs with a fine brush from the dorsal portion of the anal segment; the necessity for breaking off any portion of the abdomen and the consequent mutilation of choice specimens to establish their identity is thus obviated and, while not always conclusive, the general results obtained by such an examination are eminently satisfactory, especially if taken in conjunction with the palpal length of the species in question.

In the following notes we give the result of our investigations, and would take this occasion to extend our thanks to Mr. Swett for his hearty co-operation. We are also greatly indebted to the authorities of the American Museum of Natural History for the loan of their entire material in this genus which, containing as it does several hundred

specimens from the Hy. Edwards, Grossbeck and Pearsall Collections, has proved of enormous value to us in determining the status of obscure forms.

We might note that we have found it extremely difficult to accurately identify some of the older names, notably those of Packard, on account of the types being almost invariably ♀'s and furnished with very inadequate locality labels; this, combined with the fact that several species which show an extraordinary difference in the shape of the ♂ Uncus, are superficially extremely alike, renders this group one of the most perplexing among the North American Geometridae.

We retain the palpal subdivisions as proposed by Mr. Swett and consequently in the main his sequence of species; we illustrate our conception of each species by a half-tone figure of the insect in question as well as of the ♂ genitalia; in instances where it has been impossible to make a slide we add a text-figure of the Uncus as viewed from above under a binocular microscope; we have found the shape of the Uncus remarkably constant in all species where long series have rendered it possible for us to make slides of several specimens as well as to examine the Uncus under the binocular; some slight variation is naturally present which we shall comment on under the various specific heads, but wherever we have found a marked difference we believe the above grounds justify us in treating it as of specific value.

### I. *Short Palpi Group.*

HYDRIOMENA FURCATA Thun. (Pl. I, Figs. 1-6; Pl. VII, Fig. 1).

An excellent figure of the genitalia of this European species is given by Mr. Pierce in 'The Genitalia of the British Geometridae,' Pl. 43; we have made slides of European specimens and of numerous specimens from various North American localities and find them practically identical; there is considerable variation in the length of the lateral apical points, but this is more apparent than real as these points show a tendency to curl up. The species extends along the Pacific Coast from Alaska through British Columbia, where it is common, (Vancouver Island, Kaslo, Arrowhead Lake) down the Sierra Nevada range into Central California (Siskiyou Co., Alameda Co.); it also extends down the Rockies into Colorado (Calgary, Alta.; Banff, Alta.; South Park, Colo.) and we even have single specimens from the White Mts., Arizona and Provo, Utah. The furthest point

eastward from which we have received specimens is Hymers, Ont., north of Lake Superior, but we should not be surprised if it were found through Northern Quebec and Labrador. As in Europe the species appears to be single brooded, occurring generally in July and August, although some of our Vancouver Is. material (doubtless due to the early spring) was captured in late June; a partial second brood occurs in some of the southern localities (Alameda Co., Calif.) in October; we have received small specimens from Mission San Jose, bred from larvae on willow, emerging in late October.

The North American specimens before us show either a decided reddish or else a smoky tinge; some are strongly and clearly marked as in *fuscoundata* Don. (*vide* Seitz, Palaeart. Geom. IV, Pl. 10 k), others are much suffused (*obscura* Peyer); we have seen no entirely green specimens corresponding to *sordidata* Fabr. although a few specimens from Vancouver Is. show a slight greenish tint mixed with the red. The American varieties listed by Mr. Swett under *furcata* (C. Ent. 43, p. 82) must, we believe, with the exception of *periclata* Swett be removed from this association and treated (at least partially) as good species. With regard to *periclata* Mr. Swett has examined the type specimen and informs us that the uncus is broken off but that the basal portion is rather narrow and suggests that of *furcata*; it is evidently one of the suffused forms belonging to the partial second generation to which we have already referred.

We figure several of the marked varieties of *furcata* for which we believe European names will for the present suffice; distinguishing characteristics may be found in the fourth (postmedian) dark band of primaries which is practically perpendicular to inner margin from vein 6, becoming attenuated to a mere line below vein 3 and generally distinctly crenulate on its outer edge in costal portion; the fifth dark band (subterminal) is well-removed from outer margin and strongly crenulate on outer edge; the pale spot often present in this band is situated between veins 3 and 4 and is large, diffuse and not sharply defined.

HYDRIOMENA QUINQUEFASCIATA Pack. (Pl. I, Figs. 7-9; Pl. VI, Figs. 10-11; Pl. VII, Fig. 2)

Among the slides we made of the preceding species we were surprised to find a type of Uncus differing considerably from that of *furcata*; the basal portion was much broader and the central apical area,

instead of being strongly concave, was convex with the lateral points much less sharp than in *furcata*. We were able to separate out a series of nine specimens in the Barnes Collection, using this feature in the ♂'s as the distinguishing character; of these seven were from Victoria, B. C. or its vicinity, one ♂ was from Verdi, Nevada and one ♀ from Plumas Co., Calif.; there were also five specimens in the American Museum material, all from the Hy. Edwards Collection and bearing the simple label 'California' with the exception of one ♀ from Summit, Sierra Nevada Mts. The general type of maculation of these specimens agrees so closely with that of *furcata* that it is very difficult to point to any one distinguishing characteristic except that of color; in all the specimens before us the pale areas are more or less strongly sprinkled with green, and at times heavily tinged in the median band with ruddy, some of the specimens approaching much more closely the European *sordidata* Fabr. than any of our N. American forms of *furcata*; with regard to the maculation the fourth dark band (postmedian) seems broader above the inner margin than is usually found in *furcata*; it also shows a slight inward angle on vein 3 and above this is less evenly crenulate; the submarginal band is in general slightly closer to the outer margin than in *furcata*; these points, however, may not be constant and too great stress cannot be laid on them. We sent specimens of this species to Mr. Swett along with typical *furcata* (according to genitalia) and asked him to examine Packard's types of *quinquefasciata* and *viridata* in the Cambridge Museum and see whether these names might be applicable to this new form; unfortunately both of Packard's types are ♀'s so that it is impossible to determine anything from the genitalia; however, Mr. Swett, after careful comparison, has written us that, although not absolutely identical, our species is considerably closer to the types than is typical *furcata*; he has also sent us a ♂ specimen from Guerneville, Calif., for examination which he considers to be *viridata* and the *Uncus* undoubtedly agrees with that of our form; this would correspond to our own comparisons, made however, at a time when we had not realized that there were two closely allied species. Packard's types of both species came from California (possibly the vicinity of San Francisco as they were collected by Mr. Behrens) and until material from this locality is available which can be exactly matched with the types there will always be an element of doubt as to the status of *quinquefasciata*; for the present we think it advisable to associate both the

names *quinquefasciata* and *viridata* with this species; *viridata* is almost certainly correctly applied and if it be found that the former name should be transferred to *furcata* will then be the proper one to use for this species. Through the kindness of Mr. S. Henshaw of the Cambridge Museum we have received photographs of the types of these two species which we publish on Plate VI Figs. 10, 11; the name *quinquefasciata* we apply to the form with rather clear well-defined bands comparable to the form *fuscoundata* of *furcata*; *viridata* is greener and much more suffused and indistinct in maculation and without the ruddy shades of the former form.

HYDRIOMENA ALBIFASCIATA Pack. (Pl. I, Figs. 10-15; Pl. VII, Figs. 3-4).

Even a casual glance at the Uncus of this species shows that it has nothing whatever to do with *furcata* as listed by Mr. Swett; in common with *reflata* Grt. and *cochizcata* Swett it has a conical Uncus with narrow truncate apex; the latter form shows distinctions in the penis armature from *albifasciata* and is therefore a distinct species, but the former is practically identical in genitalia and we consider that the name *reflata* can only be used in a varietal sense for the Arizona race of a species which on account of the law of priority must bear the name *albifasciata* Pack. although evidently the nimotypical form is an aberrant one.

The species is easily separable from *furcata* by the form of the postmedian band which is narrow, sharply angled inwardly at the cell and then bulging outwardly; Mr. Swett is mistaken in stating (C. Ent. XLIII, 78) that this cone-shaped projection (as he calls it) is not found in *albifasciata*, for Packard's figure of the type distinctly shows it; the pale patch in the subterminal band is smaller, whiter and is situated between veins 4 and 5 (not veins 3 and 4 as in *furcata*) with frequently a short tail crossing into the space between veins 3 and 4. As already stated the nimotypical form with white median band as figured by Packard (Monog. Pl. VIII, Fig. 34) is rare; *resecta* Swett is clearly referable to this species and represents a form suffused with ruddy; in his description Mr. Swett mentions particularly the white tailed spot in the subterminal band; the early date of capture (Feb.) also points to this species. We have before us a form from Sonoma and Alameda Cos., Calif., which appears to be much more of the normal form in California than any of those forms to which names have



already been applied; it is dull olive green, heavily suffused with smoky, the maculation being more or less lost in the dark shading, the median area is as dark as the rest of the wing, the veins in the subterminal area are tinged with ruddy and the white subterminal spot with tail is quite distinct; the average expanse is between 28 and 31 mm.; we propose for this name *PUNCTICAUDATA* our types being 3 ♂'s from Oakland, Calif., and Eldridge, Sonoma Co., Calif., (Feb.) and 2 ♀'s from Eldridge, Sonoma Co., Calif., and Alma, S. Clara Co., Calif.

There is still another race found on Vancouver Island in early spring which is much larger and more clearly marked than *puncticaudata*, of the same size as *reflata* with practically identical maculation, differing however in having the ground color a dull green (instead of gray) with slight rosy sprinklings along the veins; we propose the name *VICTORIA* for this race, our types being 3 ♂'s from Victoria, B. C. (Mar. 20) (Apr. 19 and 29) and 2 ♀'s from the same locality captured on April 12.

Typical *reflata* (syn. *abacta* Hbst.) (Pl. I, Figs. 13, 14) is a large dark gray form with well defined purple brown bands and the median area sprinkled with brown; specimens occur corresponding to *albifasciata* (with prominent white median band) and to *resecta* (suffused with ruddy) but we do not believe names are necessary for these forms; we have seen no greenish specimens of this race. The *Uncus* (Pl. VII, Fig. 4) is rather stumper with shorter apical section than in *albifasciata* but as the remainder of the genital organs are similar we regard the variation as varietal, not specific.

As far as can be judged from the material before us the species occurs in the earliest days of spring, probably hibernating as a pupa, a fact which in itself would show a specific distinctness from *furcata*; we have no record of a second generation.

*HYDRIOMENA COCHIZEATA* Swett. (Pl. II, Figs. 1-3; Pl. VII, Fig. 5).

Mr. Swett kindly sent us photographs of the two ♂ types of this species which confirmed our own identification; the species is apparently rather local as both the types and a long series in the Barnes Collection were taken at Palmerlee, Arizona, the latter during the month of February; five specimens in the Grossbeck Collection, originally from Dr. Barnes, are labelled Redington, Ariz. (Jan., Feb.)

The *Uncus* is very similar in shape to that of *reflata*; the best point of distinction in the genitalia is found in the armature of the Aedeoegus

which in *reflata* has a single stout central spine terminally whilst in *cochizeata* we find three strong spines, two lateral and one central.

The species is generally rather suffused in maculation but in specimens where the postmedian band is clear it is very characteristic, being strongly dentate below costa with two large teeth above veins 2 and 3; we find the same range of variation as is found in *albifasciata*—suffused smoky forms, suffused greenish forms, reddish forms and white-banded forms, one of the original types belonging to this latter form; we would restrict the name to the type with smoky gray suffusion over the wing and for the rather rare white-banded form, corresponding to nintotypical *albifasciata*, we propose the name *SWETTI* in honor of Mr. Swett who has named so many forms in this variable group; our types are two ♂'s from Palmerlee, Ariz.

HYDRIOMENA NUBILOFASCIATA Pack. (Pl. II, Figs. 4-8; Pl. VII, Fig. 6).

We have nothing to add to Mr. Swett's comments on this species except to present a figure of the Uncus which is rather intermediate in shape between the *furcata* and the *albifasciata* groups; as Mr. Swett points out one of the characteristic features of the species is the dark terminal band; the various color forms have been fully treated by Mr. Swett in his notes (*C. Ent.* 43, p. 79); we figure a few of the most striking forms on Plate II, Figs. 4-8.

*Banauhrata* Stkr. may possibly be a synonym of this species; we have not had the opportunity to examine the type recently, which is in very rubbed condition, but our notes would indicate that it would fall here.

The species flies in early spring; our California specimens from Sonoma and S. Diego Co. are dated February and March; we have the species also from Salem, Ore. (Mar.) and Palmerlee, Ariz. (April); Mr. Swett records it from British Columbia.

HYDRIOMENA MANZANITA Taylor. (Pl. II, Figs. 10, 11; Pl. VIII, Fig. 1).

The shape of the Uncus shows a close relationship to the preceding species, which is further borne out by the dark terminal band found in both *manzanita* and *nubilofasciata*; however, in the former species this is not prominent owing to the general dark color. We only possess

the species from British Columbia but there is a specimen in the Grossbeck Collection taken in the Santa Cruz Mts. Calif. in March. Apparently it only flies in early spring.

With this species we end those members of the short palpi group in which the Uncus is simple and more or less broad at the apex; the remaining species in the group show a bifurcate Uncus and lead over into the moderate palpi group in which the bifurcation of the Uncus is carried to a still greater degree. In this present subdivision are several apparently undescribed forms with long narrow neck to the Uncus and with each fork narrow and straight, forming together a broad V shaped opening; we commence with the description of these species.

*HYDRIOMENA TUOLUMNE* sp. nov. (Pl. II, Figs. 13, 14; Pl. VIII, Fig. 2).

Palpi very short; primaries light gray sprinkled with smoky and shaded with ruddy brown; basal space rather clear gray bordered outwardly by a dark, very oblique subbasal line extending from costa near base to just before middle of inner margin, either rigidly oblique or with a very slight incurve below cell; between this subbasal line and the antemedian line is a broad space shaded strongly with ruddy brown and crossed centrally by an oblique, broad, dark band forming slight outward angles in cell and submedian fold; the inner margin of this antemedian space is shaded with black; antemedian line narrow, wavy, dark, slightly less oblique than subbasal line, angled in the submedian fold; median space pale whitish with a slight ruddy tinge and narrow discal streak, edged outwardly by a dark postmedian line which is strongly angled inwardly in cell, bent backward between vein 4 and submedian fold narrowing the median space considerably and tending to connect with antemedian line at this point, then parallel to same to inner margin at outer angle; subterminal space shaded with ruddy brown and bordered outwardly with a broad curved purplish-black s. t. band, narrowing toward inner margin with straight outer edge; a dark apical dash below which are two parallel dark streaks, the lower extending from outer edge of s. t. band to postmedian line; terminal area pale with veins bordered on each side by short dark streaks. Secondaries pale smoky with traces of a discal dot and curved postmedian line showing through from under side. Beneath pale smoky, secondaries with discal dot and line better defined. Expanse 28-30 mm.

**HABITAT:** Tuolumne Meadows, Tuolumne Co., Calif. (Aug. 8-15) (6000 ft.); So. Fork, S. Bernardino Mts., Calif. (Grinnell). 3 ♂, 6 ♀. Types. Coll. Barnes.

This species is apparently confined to high altitudes of the Sierras; besides the type series we have a single ♀ from the Lake Tahoe dis-

trict. Our specimens are mostly rather worn but the maculation is readily distinguishable. The ruddy suffusion is quite characteristic and very constant; with the exception of the second (antemedian) and fifth (submarginal) the bands of the preceding group are reduced to lines and the maculation is very clean cut.

HYDRIOMENA EXCULPATA sp. nov. (Pl. III, Figs. 1-3; Pl. VIII, Fig. 3.)

Palpi rather longer than in the preceding species, especially in the ♀ sex; type of maculation essentially the same but wing expanse considerably greater; the subbasal line is heavy, black, oblique, often slightly rounded below costa; basal area pale gray, the space between the subbasal and antemedian lines is usually of a deep rich brown, showing only faint traces of a smoky waved antemedian band; this brown color spreads over into the central portion of the pale median space, at times very markedly (typical form); in other specimens the brown color is greatly reduced being confined to the margins of the cross-lines, the whole wing appearing grayish; the subterminal and terminal areas are strongly suffused with brown; secondaries rather dark brownish with dark discal dot and angled postmedian line. Expanse 30-34 mm.

HABITAT: Ketchikan, Alaska (May-July) 5 ♂, 5 ♀. Types. Coll. Barnes.

Our types are all of the brown-banded form and were received through the kindness of Messrs. A. N. Avinoff and B. Preston Clark; for the gray form from the same locality we propose the name *TRIBULATA*; a few specimens (mostly ♀'s) from Kaslo, B. C., Crater Lake, Oregon and Silverton, Colo. we cannot separate from these gray Alaskan specimens; it would seem as if the species extended down the Coast Range and Rocky Mts. for a considerable distance but series of both sexes from the southern localities will be necessary before deciding this point.

The shape of the Unens is very similar to that of the preceding species of which we would have considered it a race were it not for the fact that *exculpata* shows a distinct lateral tubercle or ridge at the base of the neck which is also rather broader than in *tuolumne*. The dates of capture on our species would seem to indicate a single generation extending over a considerable period of the summer.

## HYDRIOMENA HENSHAWI Swett. (Pl. II, Fig. 9; Pl. VI, Fig. 12.)

The species was unknown to us except for a photograph of the type from Nevada received through the kindness of Mr. S. Henshaw of the Cambridge Museum of Comp. Anatomy; in the material sent by the American Museum, however, we found five specimens which we think are without much doubt this species; one  $\delta$  from the Sierra Nevadas, Calif. ex Hy. Edwards Coll. is very close to the figure of type before us; 1  $\delta$  and 1  $\varphi$  from Estes Park, Colo. (June II, 18) agree structurally and except in a few minor points also in maculation; another  $\varphi$  from Hy. Edw. Coll. is simply labelled 'Colorado'. Unfortunately the abdomen of the type specimen is lost so that we have been unable to confirm our identification by comparing the structure of the Uncus; our figure, as well as our text figure of the Uncus, is that of a Placer Co. Calif. specimen which is better marked than the type. The forks of the Uncus are rather more U shaped than in the preceding species but the long narrow neck shows its close relationship. In the  $\varphi$  the palpi seem slightly longer than in the  $\delta$ . The species is apparently found only at higher altitudes in early summer.



FIG. 1

Uncus of *H. henshawi*

## HYDRIOMENA SHASTA sp. nov. (Pl. III, Fig. 4).

Palpi apparently short and rather hairy; primaries rather unicolorous dark gray with median band slightly paler, the dark areas lightly sprinkled with whitish dots; subbasal line (line 1) dark, very strongly oblique from costa to cell, then bent at almost right angles and slightly outwardly oblique to inner margin one third from base where it forms a small black patch; band 2 almost lost in the general dark color of the antemedian area which is streaked with black along inner margin; line 3 slightly wavy, in general rather evenly oblique from somewhat before middle of costa to slightly beyond middle of inner margin; median area much constricted between vein 2 and inner margin, bordered outwardly by line 4 which forms an irregular outward bulge opposite cell; band 5 (submarginal) broad but more or less lost in dark ground color, its outer edge being scalloped and faintly bordered by a pale shade; an oblique dark apical dash, extending to s. t. band; fringes long grayish. Secondaries even gray with concolorous fringes and a slightly darker terminal line. Beneath rather even dark gray with traces of small discal dots and post-median line on both wings. Expanse 25 mm



FIG. 2

Uncus of *H. shasta*

HABITAT: Mt. Shasta, Calif. (July 17) (McDunnough) 1 ♂. Type, Coll. Barnes.

The single type was captured near the timber line at an altitude of from 7000-8000 ft.; its very dark color is quite characteristic as is also the strongly bent nature of the subbasal line; the type of Uncus is that of the *perfracta-frigidata* group but as far as we can tell from the rather twisted palpi they are short rather than moderate and we place the species therefore next to *henshawii* Swett.

HYDRIOMENA IRATA Swett. (Pl. II, Figs. 12, 15; Pl. IV, Fig. 6; Pl. VIII, Fig. 4).

This is a good species and easily distinguished from *californiata*, which it superficially resembles, by the shape of the Uncus as well as by the shortness of the palpi. From the preceding group it is separated by the stouter forks of the Uncus, the included space being rather more U shaped than V shaped.

The species is apparently rather constant in coloration, judging by our series of twelve species and other twelve in the Am. Mus. material which all show distinct reddish antemedian and postmedian shading; the sub-basal line is strongly bent in the cell which serves to distinguish the species both from the preceding group and from *californiata* in which it is more or less straightly oblique. The form *niveifascia* Swett, described as a variety of *californiata* (C. Ent. 48, p. 249) properly belongs here as an examination of the Uncus of the unique ♂ type, kindly loaned us by Mr. Swett, distinctly shows; the palpi are slightly longer than usual which doubtless led to the reference but this is a somewhat variable feature in the series before us. We figure the type of this form on Pl. IV, Fig. 6.

Most of our specimens were captured in April but we have a single specimen from Duncans, Vanc. Is., B. C. taken in September which would indicate if the label is correct at least a partial second generation; we have not seen the species from other localities than Vancouver Island and the northern Pacific coast, a single ♂ in the Barnes Collection having been captured at Ketchikan, S. Alaska.

## II. *Moderate palpi group.*

The following group of three species, with which we commence the second group, *frigidata* Wlk. *perfracta* Swett, and *transfigurata* Swett, all originally described from the Eastern States or Canada, are

very closely related in the structure of the Uncus and also in general maculation. The first two species have been listed respectively as a synonym and a color form of *carulata* Fabr. (*autumnalis* Strom); this species however scarcely occurs in North America (unless possibly in Alaska) and our studies of the genitalia have shown us that the forms of the Eastern States at present listed under this name may really be readily separated into several distinct species.

The two latter of the three species mentioned are apparently quite rare and study of more material and especially of life histories may cause some change in our grouping but for the present we list each as a good species.

HYDRIOMENA FRIGIDATA Wik. (Pl. III, Figs. 12-14; Pl. VIII, Fig. 5).

The species, as already noted, is quite distinct from *carulata* Fabr.; it is a form of the early spring (April-May) and can at once be separated by its extremely dark secondaries which have the cross-line only faintly developed; the primaries are usually a deep blackish-green crossed by a rather obscure median whitish band, a characteristic of which appears to be that it shows distinct black shading below the discal streak. The Uncus is bifurcate with long narrow neck, the bifurcations forming more of a U than a V and being rather short and chunky.

A form of what we believe to be this species occurs in Manitoba and is characterized by the much whiter basal and median areas, the latter still showing, however, the blackish suffusion below discal streak; the green of the ground-color is also rather paler; we propose for this race the name MANITOBA, our types being 4 ♂, 1 ♀ from Cartwright, Man. (May 25 and 28).

The typical form appears wide-spread in the Eastern and Middle States; we have seen specimens from New York and New Jersey and have series from New Brighton, Pa. and Decatur, Ill.; there is also a single specimen in the American Museum from Blanco Co., Texas and Mr. Swett tells us that a specimen mentioned by Packard from Kentucky under *californiata* (Monog. p. 95) is probably this species.

HYDRIOMENA TRANSFIGURATA Swett. (Pl. III, Fig. 15).

Through the kindness of Mr. Swett we possess a Co-type of this species; as this is a unique specimen in our collection we have been

unable to make any dissections but as far as we can tell by an exam-



FIG. 3  
Uncus of *H. transfigurata*

ination of the Uncus under the binocular the species is closely allied to *frigidata*. We note however that the neck is rather broader and shorter, the forks of the bifurcation rather longer and there appears to be a tubercle or ridge at the base of the neck much as in *exculcata*; it seems to us therefore that we are dealing with a distinct species. The general coloration, while greenish as in *frigidata*, is much paler, the median band is broader at costa and shows no trace (in our specimen at least) of the black discal shading of *frigidata*. For further details we would refer the student to Mr. Swett's note (C. Ent. 44, 228). The species occurs in early May in Massachusetts; we incline to think that Mr. Swett's mention of New Brighton, Pa. (Merrick) as a locality (l. c. p. 228) is incorrect and that the only species occurring there is *frigidata*; the Merrick Collection (now incorporated in our own) contained no *transfigurata* but a good series of *frigidata* and any other specimens we have examined from this locality all proved to be the latter species.

HYDRIOMENA PERFRACTA Swett. (Pl. IV, Figs. 1, 2; Pl. VI, Fig. 13; Pl. VIII, Fig. 6).

As already noted the species was described as a color form of *cærulata* Fabr. (*autumnalis* Strom) although later (C. Ent. 44, p. 226) Mr. Swett suggests that *pluviata* Gn. may be the more correct name for the North American species. We entirely concur with him in this view but for the present hold *perfracta* distinct from *pluviata* as there seem to be differences in the shape of the



FIG. 4  
Uncus of *H. perfracta*

Uncus which place it very close to *transfigurata*. The species seems to be rare; besides the type which we figure (Pl. VI, Fig. 13) we have only seen a single  $\delta$  from the Catskill Mts. (type locality) in the American Museum material and another  $\delta$  in our own collection from the vicinity of Calgary, Alta. (Dod), all three specimens being practically identical in maculation and size.

We would note that while the maculation of both *perfracta* and *pluviata* is practically the same, the former species is much larger (30 mm.) than *pluviata* which averages 25 mm. in the  $\delta$  sex; the



ruddy shading on both sides of the median whitish area is very bright pinkish whereas in those specimens of *pluviata* which show a ruddy tinge the color is dull and more generally suffused over the entire wing surface. The time of flight would appear to be somewhat earlier; the Catskill Mt. specimens were captured in late May whereas *pluviata*, which is common in the same locality, judging by a long series before us from the Pearsall Collection, is at the height of its flight in mid-June, continuing into July. Finally the Uncus of *perfracta* examined under the binocular shows a narrow neck of the *frigidata* type with the forks distinctly divergent, whilst in *pluviata* the neck is more of the *carulata* type showing scarcely any contraction, with the lateral edges forming almost a straight line from apex of forks to base of neck. These differences may or may not prove specific when more material can be examined and life histories studied but for the present no great harm is done by treating the two forms as distinct species.

We have two specimens from Vancouver Island, B. C. which seem best treated as a race of this species and for which we propose the name *EXASPERATA*; they are slightly smaller than typical *perfracta* (28 mm.) and are more sharply marked, the cross-lines being heavy and distinct; the whole of the primaries is evenly suffused with a ruddy color giving the form a great similarity to *californiata* Pack. from which it may at once be separated by the shape of the Uncus (Pl. VIII, Fig. 6) which is very similar to that of *perfracta*, the forks being rather chunkier and somewhat shorter and the neck slightly thicker. Our types are 2 ♂'s, the one from Departure Bay, Vanc. Is. B. C. (July 13), the other from Wellington, B. C. (June 23) both originally collected by Rev. G. W. Taylor.

*HYDRIOMENA MARINATA* sp. nov. (Pl. VI, Fig. 6).

Palpi moderate; primaries olive-green with a very faint ruddy tinge; sub-basal line black, in general oblique with a slight incurve in the submedian fold and a faint angle at times on median vein; band 2 broad, irregular, bordered on each side by the green ground color; line 3 fine, dark, irregularly oblique; median area greenish, more or less dark shaded around cell with a fine dark discal streak narrowed considerably at inner margin; line 4 oblique at costa, angled inwardly opposite cell followed by a strong outward bulge, after which it is irregularly scalloped and inwardly oblique to inner margin; outer area unicolorous olivaceous crossed by the usual broad dark subterminal band which is connected with apex of wing by a dark streak; dark



FIG. 5

Uncus of *H. marinata*

terminal streaks on both sides of veins. Secondaries rather pale smoky white with two rather distinct postmedian parallel dark lines and a terminal dark line. Beneath much the color of secondaries above with two subterminal lines on primaries corresponding to lines 4 and 5 of upper side; secondaries with a single angled postmedian line and faint discal dot. Expanse 30 mm.

HABITAT: Type, Verdi, Nevada; Paratype, Marin Co., Calif. (Hy. Edw.)  
2 ♂. Type, Coll. Barnes; Paratype, Coll. Am. Mus. N. H.

The species is one of those obscure greenish ones which we should have been inclined to associate with *glaucata* if it had not been for its shorter palpi and the differently shaped Uncus which is very close to that of *frigidata* but considerably thicker and chunkier.

An examination of the 2 ♂ types of *chiricahuata* Swett in the Barnes Coll. shows that they belong to two distinct species; we limit the name therefore to the type from the Chiricahua Mts., Ariz., which has a very deeply bifurcate Uncus and will deal with the species in more detail later under the long palpi section; the other specimen from the Huachuca Mts., Ariz. has a type of Uncus very similar to that of the *frigidata* group and although the palpi are scarcely perceptibly shorter than those of the true *chiricahuata* we prefer to deal with it for the present in this section. Apart from the difference in the Uncus the two species are so strikingly similar that with our limited material we find it very difficult to point to any definite means of separation in maculation; the basal and median areas are rather paler in the present species, the former being rather more extended than in *chiricahuata*; the secondaries are paler basally and on the underside show no discal dot; we describe the species in detail as follows:

HYDRIOMENA ARIZONATA sp. nov. (Pl. III, Fig. 10).

Primaries gray, shaded and sprinkled with olivaceous-brown with paler basal and median spaces and heavy black cross-lines; line 1 (subbasal) strongly rounded outwardly from a point on costa near base almost to middle of inner margin; band 2 purplish, irregular, with outward angles in cell and submedian fold, shaded on both sides with brownish-gray and with a heavy black mark just beyond it on inner margin; line 3 rather line, somewhat irregularly oblique, with inward angle above inner margin; median space paler, with fine discal dot, bordered outwardly by a very irregular line (line 4) which shows a prominent inward angle opposite cell, two scallops in the interspaces of veins 2-4 and is then bent strongly backward reaching the inner margin close to line 3 and narrowing the median space between vein 2 and inner margin to half its width at costa; a very distinct submarginal purplish



FIG. 6  
Uncus of *H. arizonata*

band shaded on both sides with olivaceous-brown and crossed by the usual black subapical dashes; dark terminal dots on both sides of veins; fringes smoky with darker median line. Secondaries pale smoky at base with much heavier smoky shading terminally, a fairly distinct angled postmedian line, somewhat emphasized on the veins by dashes and separated from the darker terminal shading by a narrow pale band; fringes pale, checkered with smoky-brown. Beneath primaries pale smoky crossed by two sinuous subterminal lines and shaded with gray along costa and at apex; secondaries whitish, sprinkled lightly with smoky brown, with the postmedian line of upper side very distinct and with traces of a faint parallel subterminal line; terminal dark line on both wings; fringes pale, checkered. Expanse 27 mm

HABITAT: Palmerlee, Ariz.; Huachuca Mts., Ariz. 3 ♂. Types, Coll. Barnes.

We have two specimens before us, one a ♀ in the Barnes Coll. from Vineyard, Utah (Sept. 1), the other a ♂ from Stockton, Utah (Oct. 12) in the American Museum material ex Coll. Grossbeck which seem to represent a new species, characterized by its light gray color and pale secondaries, the underside of which is almost immaculate white; we also possess a worn and stained ♂ from Glenwood Spgs., Colo. (May 1-7) which seems to belong to the same species and may represent a spring generation. The type of *Uncus* is essentially that of the *frigidata* group. The following description is drawn up from the ♀ specimen on account of its more perfect condition; we might note however that the palpi in the ♀, owing to abrasion, give the appearance of being shorter than in the ♂ which has the palpi in good condition but the wings rather worn; there seems, however, no doubt as to the specific oneness of the two specimens.

HYDRIOMENA OBLIQUILINEA sp. nov. (Pl. III, Fig. 11).

Palpi rather short; thorax dark gray with faint ochreous tinge; primaries gray much obscured by smoky, especially in the antemedian and costal areas; maculation rather indistinct with the exception of an oblique, dark, rather broad line (line 1) extending from costa near base to inner margin about one third from base, bordered inwardly with whitish; a faint wavy median line (line 3), parallel to this first line, reaches inner margin well before inner angle, the included space being slightly darker than the basal area, and crossed by an indistinct wavy smoky band, the inner margin of wing in this area heavily streaked with blackish; the median area is defined outwardly by a dark line (line 4), shaded inwardly with white at costa and above inner margin, strongly oblique outwardly to vein 5 then indistinct but



FIG. 7  
*Uncus* of *H. obliquilinea*

apparently angled inward opposite cell and rounded outwardly across veins 4 and 3, then distinct to anal angle and decidedly crenulate, the lower portion of this median area is pale, the upper portion, especially in the broadest part opposite the cell, is shaded with smoky purple; two distinct black subapical streaks above veins 5 and 6; subterminal band defined by two pale whitish parallel lines, bent strongly outward at costa and then parallel with outer margin and close to same, ending in a small black spot just above anal angle; a broken terminal dark line; fringes dusky; secondaries whitish tinged with smoky with an indistinct postmedian line, bent inwardly on vein 2, and a prominent dark terminal line broken by a pale dot on the veins; fringes pale with a minute dark dot opposite the veins. Beneath primaries pale smoky with maculation of upper side indistinctly showing through; secondaries white; fringes as above. Expanse 26 mm.

HABITAT: ♀, Vineyard, Utah (Sept. 1); ♂, Stockton, Utah (Oct. 12).  
1 ♂, 1 ♀. Type ♂, Coll. American Museum; Type ♀, Coll. Barnes.

HYDRIOMENA MARMORATA sp. nov. (Pl. IV, Fig. 3; Pl. VIII, Fig. 7).

Among the material sent by the American Museum we found nine specimens (6 ♂, 3 ♀) all bearing the label 'Sierra Nevada, Calif. (Hy. Edwards)', which to our mind represent a distinct species for which we propose the above name, describing as follows:

Palpi moderate, tending to short rather than long, blackish; head and thorax gray, sprinkled and marked with blackish and with a strong blackish metathoracic tuft; primaries narrow, elongate, with pointed apex, dull gray marbled with reddish pink and with the usual purplish lines and bands; basal space pale gray sprinkled with black atoms, especially along inner margin, defined outwardly by line 1 which is strongly outwardly oblique from costa to cubital vein, then angled and concave, but still oblique, to inner margin somewhat before middle; band 2 broad, dark, irregular, shaded on both sides with ruddy-pink and marked with a black dash at inner margin; the inner defining line of the paler median area (line 3) not well marked; this area is narrow, sprinkled with dark gray and suffused with ruddy below the cell, with small dark discal dash; the outer defining line is irregular with a strong inward bend opposite the cell; beyond this is a broad ruddy area followed by a broad purplish gray subterminal band crossed by the usual subapical dashes; terminal area gray, sprinkled with darker gray and somewhat diffused with ruddy; veins marked terminally on both sides by blackish streaks. Secondaries rather pale smoky with more or less distinct postmedian and subterminal dark parallel lines, rather strongly angled on vein 3. Beneath smoky gray with dark discal dots and two postmedian lines on both wings, especially distinct on secondaries. Expanse 32 mm.

The types ♂ and ♀ are in the American Museum Collection along with Paratypes; through the kindness of the authorities of the Museum 2 ♂, 1 ♀ Paratypes are retained in the Barnes Collection; Mr. Swett has also recently sent us a ♂ from California which we have made a Paratype. There is a worn ♀ from Provo, Utah (July

23) amongst the Museum material which is apparently referable here and another rubbed ♀ in the Barnes Coll. from Redington, Ariz. may also possibly be found to represent a form of this species.

The species seems best placed near *perfracta* Swett; its narrow pointed wings and peculiar mottled appearance should render it easily recognizable.

We have before us several specimens from the Sierra Nevadas, Calif. which seem to represent a new species; the general appearance is strikingly close to a Western race of *ruberata* to which we will refer later but the palpi are distinctly shorter and the average size somewhat smaller. The species is related in shape of *Uncus* to the *perfracta* group but the *Uncus* has a very narrow neck and the bifurcations are short and not widely separated, resembling considerably the *Uncus* of *tuolumne*; we describe the species as follows:

HYDRIOMENA SIERRAE sp. nov. (Pl. IV, Figs. 4, 5; Pl. VIII, Fig. 8).

Primaries dull gray, sprinkled with smoky; space between lines 1 (subbasal) and 3 (antemedian) filled with dull reddish-brown through which runs a faint irregular smoky band shaded with black at inner margin; similar reddish shading beyond line 4 (postmedian); basal and median areas whitish-gray, very slightly tinged with ruddy, latter with small discal dash; line 1 (subbasal) black, thick, slightly rounded below costa and bent in somewhat in fold; line 3 rather evenly oblique, slightly waved; line 4 thick and outwardly oblique below costa, bent in opposite cell and then strongly bulging outwardly, bent backward between veins 4 and 2, forming two scallops, and parallel to line 3 from vein 2 to inner margin; subterminal band broad, smoky, slightly scalloped on both sides and bordered by a white line; apical black streak and two parallel black subapical black dashes, the lower one longer and extending across subterminal band to line 4; fringes checkered with blackish at ends of veins. Secondaries rather pale smoky with distinct discal dot and two darker lines, the one postmedian, rather sharply bent before vein 3, the other submarginal, broader and more diffuse; fringes distinctly checkered. Beneath pale smoky with distinct discal dots and postmedian and submarginal lines on both wings. Expanse 26 mm.

Types, 1 ♂, 1 ♀. Shasta Retreat, Siskiyou Co., Calif. (June 24-30) (July 1-7) (McDunnough). Paratypes, 4 ♂, 2 ♀. Cisco, Placer Co., Calif. (June), 3 ♂ and 1 ♀ being in the Collection of the American Museum.

With the above species we end the members of the moderate palpi group in which the *Uncus* is shortly bifurcate with a rather long narrow neck, the remaining members of this group form a subsection in which the bifurcations are very deep and U-shaped, thus eliminating more or

less all trace of the neck. Of this group *carulata* Fabr. (*autumnalis* Strom) is a typical member but we doubt very much if this European species can be accredited to the North American fauna as has generally been done up to the present. A very good figure of the ♂ genitalia is given by Pierce (Gen. Brit. Geom. Pl. 43), our own dissections proving the accuracy of his figure; we have found nothing among our American material to correspond with this and while it is possible that *carulata* may be found in the far north just as is the case with *Dysstroma populata* L. which occurs in Alaska, we think it advisable to drop the name for the present from our lists.

As we have already noted the name *autumnalis* has been applied in this country to a conglomeration of species for which there are valid names, given principally by older authors; we have already separated out *frigidata* Wlk. and now treat of *pluviata* Gn.

HYDRIOMENA PLUVIATA Gn. (DIVISARIA Wlk.) (Pl. IV, Figs. 7, 8; Pl. VI, Fig. 16; Pl. IX, Fig. 1).

Guenée's diagnosis of this species is sufficient to determine the form with considerable certainty; he mentions the sharper apex of primaries, the more oblique first line, the bulging of the median space in its central portion and the paler hind wings as compared with *carulata*, all of which points are found in a species which occurs commonly in the Catskill Mts., N. Y. in June and July and extends through the New England States into Maine and Canada; from our notes on the type of *divisaria* Wlk., a sketch of the Uncus kindly made for us by Mr. A. W. Baker of the Ontario Agricultural College, Guelph and a photograph of the type (Pl. VI, Fig. 16) we have little doubt that Walker's name falls as synonym to Guenée's older name. Besides the points already mentioned the species is characterized by its small size (25-27 mm.), general dull color with considerable tendency to brown or ruddy suffusion, a rather prominent incurve in the first line below the cell and a very strong inward tooth in the fourth line (post-median) in the cell, these two last features being not entirely constant.

The Uncus in shape forms a connecting link between the two groups, the forks being not so deep as in *carulata*, leaving a short broad neck visible; in a long series examined we found slight variability present in the length of the bifurcations and consequently the length of the neck, but our figure seems to be that of an average specimen.

HYDRIOMENA RENUNCIATA Wlk. (Pl. IV, Figs. 10-14; Pl. IX, Fig. 2).

There is another species which occurs in the Eastern and New England States along with *pluviata* and which has invariably been confused with the same although they are easily separated by even a superficial examination of the Uncus; for this species we believe the above name is applicable, judging by a colored figure of the type in the British Museum which we have received. It is this species which Packard figures in the Monograph on Pl. VIII, Fig. 29; it is generally rather larger than *pluviata* with broader primaries and in general maculation approaches closer to the European *carulata* than does *pluviata*; the ground color is rather dark, often quite blackish with an admixture of green shades and the whitish median band is of more even width throughout and often stands out very prominently from the darker surrounding area.

The Uncus is still more deeply bifurcate than that of *carulata* and the neck is consequently practically eliminated.

The species has apparently the same range as *pluviata*; Dr. McDunnough found it common, although somewhat worn, in the White Mts., N. H. (Bretton Woods) in mid-July and we have series before us from Northwestern Ontario (Hymers), Digby, N. S., Vermont and the Catskills Mts.

On the northern Pacific coast this species is represented by the race COLUMBIATA Tayl. (Pl. IV, Figs. 13, 14) which is rather larger and slightly more variegated in appearance, but has the same type of genitalia; we have, besides the types, a long series from Vancouver Is. and Ketchikan, Alaska.

There is a considerable tendency toward melanism in the western form, (Pl. IV, Fig. 12) especially in those occurring inland; Mr. Swett mentions this form under the name *nigrescens* Heune (C. Ent. 44, p. 228) from Saskatchewan but of course this name is not applicable; we propose therefore the name PERNIGRATA for the suffused blackish form with only traces of a paler median area, our types being 1 ♂, 2 ♀ from Glacier National Park, Montana; we have made Paratypes of 1 ♂, 1 ♀ from Skagit Basin, B. C. and 1 ♂ from Stiekeen River, B. C., the two former in the Collection of the American Museum; two very similar specimens from the Sierra Nevadas, Calif. (Hy. Edwards) are also in this collection.

HYDRIOMENA CROKERI Swett. (Pl. IV, Fig. 15; Pl. IX, Fig. 3).

We consider this a good species and not a variety of the preceding as listed by Mr. Swett; in type of genitalia it is close to *columbiata* Tayl. but apart from its yellowish-green coloration which is very constant in our series of eight specimens, it may easily be recognized by the subbasal line which is very strongly bent outward below costa, whereas in *columbiata* this line is generally quite rigidly oblique, only occasionally showing a slight bend; another feature is a tendency to show considerable whitish shading in the subterminal dark band, which when present seems quite characteristic. The Uncus also shows points of distinction, possessing a short neck and being rather intermediate in the shape of the forks between *columbiata* and *californiata*. We have a single ♀ from Salem, Oregon, our other specimens having been captured in the vicinity of Victoria, B. C., in April and May.

HYDRIOMENA MUSCATA sp. nov. (Pl. IV, Fig. 9; Pl. IX, Fig. 4).

We have three ♂ specimens from Eldridge, Sonoma Co., Calif. captured in February, which, on account of the similarity of Uncus and the fact that the subterminal band shows white shading, may prove to be a southern race of *crokeri*; as however the general appearance is quite different we treat it for the present as a distinct species. The primaries are dark mossy green, crossed by the usual dark bands and with the median area whitish, strongly narrowed toward inner margin and with slight ruddy shading in the fold; the subbasal line is bent below costa much as in *crokeri*; line 3, bordering the median area inwardly, is rather rigidly oblique, being only slightly waved; the subterminal band shows traces of white shading which in one specimen has spread so as to obliterate entirely the central portion of the band. Our types in the Barnes Collection are the three specimens already mentioned.

HYDRIOMENA CALIFORNIATA Pack. (Pl. V, Figs. 1, 2; Pl. X, Fig. 2).

On a recent visit to the Cambridge Museum of Comp. Anatomy we were unable definitely to locate Packard's type of this species which was a specimen from California (Behrens), no sex being mentioned; Mr. Swett at the time told us that it appeared to have been lost and after a careful study of the original description we both agreed to accept his identification of the species (C. Ent. 44, p. 229) as correct. Since then he has written us that he has discovered the type in an old



box of Peabody Academy material, that it is a  $\delta$  marked 'Behrens, 13' and that it does not alter our conception of the species.

We might note that Packard in his Monograph (where he hopelessly confused several species under the name *californiata*) states that the specimen figured on Pl. VIII, Fig. 30 is the normal form, another specimen being figured as *californiata* on Pl. VIII, Fig. 33; these two specimens differ considerably in the shape of the subbasal line which in Fig. 30 shows a rather strong bend, in Fig. 33 on the contrary being rigidly oblique; the original description is rather ambiguous on this point. Packard merely stating 'an oblique black line finely and acutely pointed on the median vein goes obliquely outwards.' Our conception of the species is rather that of the latter figure, which was evidently a small  $\delta$ , Fig. 30 to our mind being closer to *irata* Swett in some ways than to our notion of *californiata*.

Apart from this one point, which in our series seems in any case somewhat variable, we find nothing in either of the figures that would cause us to alter our previous determination of the species.

We have a long series from various localities on Vancouver Is. B. C. where it appears to be common but have seen no Californian material; some of the  $\text{♀}$ 's are rather difficult to separate from those of *columbiata* Tayl. but usually in the former species band 2 is less elbowed outwardly below the costa and line 4 (postmedian) more deeply excavated opposite the cell; generally the characteristic ruddy tinge of the antemedian and subterminal areas is sufficient to identify the species. The palpi are quite long in the  $\text{♀}$  sex, in some specimens being only very slightly shorter than in *rubrata* which falls into the following section.

The Uncus is very characteristic, the forks being deep, very stout and more bent inward apically than in the preceding species.

The species occurs on Vancouver Is. in June in contradistinction to *irata* which is an early spring species (April); our earliest date for *californiata* is May 23d, our latest July 20th; *columbiata* appears to be intermediate in time of emergence between the two, our few specimens from Vancouver Island having been taken in May.

With the preceding species we end the second main group; the following section, consisting of the long palpi species, may be subdivided, according to the shape of the Uncus, into several secondary

groups, each of which seems to bear more relation to one of the preceding groups than to the other subdivisions of its own section.

The first subdivision shows in the shape of the Uncus great affinity to *californiata* Pack., in fact the palpi themselves are only slightly longer than we find in *californiata* ♀'s and the species might almost as well be placed in the preceding section.

Our ♂ material in this group is very limited and we do not feel at all sure but that with more material and better knowledge of the type specimens some of our conclusions may have to be altered; however we give our opinions for what they may be worth and trust that those more favorably situated with regard to material than we are will be spurred on to test the correctness of these conclusions.

### III. *Long Palpi Group.*

HYDRIGMENA BISTRIOLOATA Zell. (Pl. V, Figs. 3, 4; Pl. IX, Fig. 5).

The type of this species is a ♀ in the Zeller Collection in the British Museum; according to Zeller, Packard and Swett (Can. Ent. 47, p. 59) there is in the Cambridge Museum a ♀ (not a ♂) which may be possibly considered a Paratype as it bears a yellow label indicating that it had been examined by Zeller; Packard figures a specimen from St. Louis, Mo., which he had compared with this latter specimen and found to agree (Mon. Geom. p. 95, Pl. VIII, Fig. 32).



FIG. 8  
Uncus of *H. bistriolata*

We have a single ♂ from Decatur, Ill., which agrees well with Packard's figure and which we imagine therefore may be referred to this species; it shows only a faint tinge of green on the pale areas whereas typical *bistriolata* is strongly suffused with this color, but a series would probably show considerable variation in this respect. We figure the Uncus, drawn after an examination under the binocular, our material not permitting of any slides being made; Mr. Swett has kindly sent us a sketch of the Uncus of two ♂'s in the Cambridge Museum from Dallas, Tex. (Boll.), probably part of the type lot, which agrees with our figure so that we imagine our identification is fairly certain; it will be seen that the fork is very deep and strongly U shaped, each branch being thickened and slightly bent inward toward apex; it would seem to be a further development of the *californiata* type. The species has only been taken in

early spring; Mr. Swett mentions March for the Texan specimens and our specimen was taken in early April along with *frigidata* Wlk.

In our Contributions Vol. II, p. 204 we referred to some Colorado specimens, identified for us by Mr. Swett as *bistriolata*, as being distinct from this species; an examination of the ♂ *Uncus* of these Colorado specimens shows however no point of difference from that of our Decatur specimen; it would seem therefore that Mr. Swett was correct and that we were in error in calling these a distinct species; they do, however, represent a distinct race characterized by the entire lack of green shading, the deeper brown color of the antemedian band and the paler color of the secondaries; the basal and median areas of primaries are also considerably suffused with light gray scaling. We propose the name *MODESTATATA* for this race, our types being 2 ♂, 2 ♀ from Glenwood Spgs., Colo. captured in April and May, one of the ♀ Paratypes being in the American Museum Collection.

*HYDRIOMENA CHIRICAHUATA* Swett. (Pl. V, Fig. 5).

As previously stated the type must be limited to the ♂ specimen from the Chiricahua Mts., Ariz. The type of *Uncus* is distinctly that of *bistriolata*, in fact, apart from the smaller size, which is only natural, we can see no difference in the structure of this organ in the two species; it may be, therefore, that *chiricahuata* is merely a small Arizona race of the preceding species but for the present it may be kept separate until more is known about its life history and time of appearance; apart from the type we have seen three ♂ specimens from Palmerlee, Ariz., all undated, and 2 ♀'s from Yavapai Co., Ariz. (July 2) and Prescott, Ariz. (Sept. 9) which seem referable here; 1 ♂ and 2 ♀'s are in the American Museum material ex Coll. Grossbeck.

*HYDRIOMENA RUBERATA* Freyer. (Pl. V, Figs. 6-9; Pl. IX, Figs. 6, 7).

The species occurs quite commonly in the New England States and extends Westward through Canada to the Rocky Mts.; we have series from Manitoba and Alberta which show, besides the typical form as figured by Seitz (Macro. Pal. IV, Pl. 10k) also the form *variegata* Prout; it is probably that the other European forms also occur as noted by Mr. Swett (C. Ent. 47, p. 61). We have no record of the occurrence of the species in British Columbia, although we have a single ♀ labelled Easton, Wash.

The *Uncus* is strongly bifurcate with a rather narrow short neck but with very stout forks which broaden apically giving a very characteristic appearance; Mr. Pierce has figured the genitalia (Gen. Brit. Geom. Pl. 43) and specimens from North America which we have examined agree well with his figure; there is some slight variation in the width of the neck which at times may be very narrow; the depth of the forks is also somewhat variable.

On the East and West slopes of the central Sierra Nevada Mts. (Verdi, Nevada; Cisco, Placer Co., Calif.) we meet with a race of *ruberata* which has generally gone under the name *similaris* Hlst. but this name, as we have already had occasion to point out (Contr. III. p. 176), has been erroneously applied. This race, (Pl. V, Figs. 6, 9) besides being somewhat smaller, is generally duller and more washed-out in color, the whole of the primaries having a suffused grayish appearance without the sharp definition of the typical form; the forks of the *Uncus* (Pl. IX, Fig. 7) are rather variable but in general are less swollen apically than in Eastern specimens and show a tendency to keep close together, making the open V quite narrow. We propose for this race the name *NEVADAE*, our types being 7 ♂, 6 ♀ from Verdi, Nevada (June). 2 ♂. 3 ♀ Paratypes being in the American Museum Collection. The race shows the same varietal tendencies which we find in the *nimotypical* form. We have seen additional specimens, rather better marked from Cisco, Placer Co., Calif.

The two following species, *glaucata* Pack. and *edenata* Swett, have caused us a great deal of trouble with regard to their correct identification owing to the fact that the Holotypes of both species are ♀'s whilst the type of maculation is extraordinarily similar; for a considerable time we considered that the two names represented races of a single species which extends more or less along the whole Pacific Coast; the recent receipt of a pair of specimens from the San Gabriel Mts., Calif. in which the ♂ *Uncus* is of an entirely different type to that of our so-called *glaucata* whilst the general maculation is astoundingly close has convinced us that we are certainly dealing with two species, but has also left us in great doubt as to how to apply the names correctly; our present usage is therefore more or less tentative and caused by a desire not to augment the confusion already existing by adding new names which may later prove to be synonyms; we

imagine that a careful study of the types will settle the question but until we are in a position to do this on a future visit to the New York and Cambridge Museums the matter must remain in abeyance.

HYDRIOMENA GLAUCATA Pack. (Pl. VI, Fig. 4.)

The unique type ♀ from California is figured in the Proc. Bost. Soc. N. Hist. Pl. I, Fig. 6, but owing to the rather worn nature of the specimen and the poor reproduction this figure is not very satisfactory as a means of absolute identification; we believe, however that Mr. Swett is correct in stating (C. Ent. 47, p. 63) that the type exists in the Hy. Edwards Collection in the New York Museum, but we cannot agree with his statements (C. Ent. 47, p. 62) that it is a green form of *ruberata*; we examined this specimen a year ago and thought at the time we had matched it with a series of specimens taken



FIG. 9  
Uncus of *H. glaucata*

in Sonoma Co. in February, such as we figure on Pl. III, Figs. 5-7, and which in the type of *Uncus* corresponds to what we treat in this paper as *edenata* Swett; as however we were unaware at the time of the existence of two species with closely allied maculation we feel that our comparison will need careful revision before we can consider that *glaucata* and *edenata* represent forms or races of a single species.

As already stated we prefer for the present to apply the name *glaucata* tentatively to the species of which we possess 1 ♂, 1 ♀ from the San Gabriel Mts. Calif. captured June 29th by V. L. Clemence and received by us from Mr. F. Grinnell Jr.; we figure the ♀ which matches Packard's figure pretty well, being in general however rather darker (which may be due to the freshness of the specimen) but showing the greenish shade as mentioned in the description. The ♂ *Uncus* has a short, moderately narrow neck and very long wide-spreading forks, being closer to *crockeri* and *muscata* in this respect than to any other species we know of, but of course differing widely from these two in length of palpi and general maculation.

HYDRIOMENA EDENATA Swett. (Pl. III, Figs. 5-9; Pl. VI, Figs. 5, 7, 14; Pl. X, Fig. 1).

The Holotype of this species is a ♀ from Eden Valley, Monterey Co., Calif. in the Cambridge Museum ex Coll. Swett (*vide* C. Ent. 47,

p. 59) and through the kindness of Mr. S. Henshaw we are able to give a figure of this type on Pl. VI, Fig. 14; the  $\delta$  specimen from Monterey Co. ex Coll. Grossbeck, mentioned in the original description is in the American Museum and Mr. F. Watson the Curator has sent us a sketch of the Uncus which corresponds with that figured by us on Pl. X, Fig. 1. As may be seen by a reference to this figure it is very different from that of the preceding species, the neck being rather long and narrow, the forks narrow, compressed laterally at apex and bent downward with a small terminal hook which is quite characteristic; the depth of the bifurcation varies somewhat but it is usually about equal to the length of the neck.

If this  $\delta$  is conspecific with the  $\text{♀}$  type, which it is impossible for us to determine at the present moment, our identification may be regarded as fairly safe; the species appears to be rather wide-spread in apparently two generations along the whole Pacific Coast from San Diego to Vancouver Is., B. C. The typical form is without green shades, the antemedian area being shaded with warm brown; it occurs ostensibly in June and our figure (Pl. III, Fig. 8) of a  $\delta$  from Monterey Co. we regard as fairly typical; we have other specimens, rather deeper in shade, taken in June in San Diego Co. Wright has recently applied to two forms of this species from San Diego (Ent. News, XXVII, p. 460) the names *olivata* and *pallidata*; we are able through the kindness of Mr. Swett to figure Co-types of these forms (Pl. VI, Figs. 5, 7) which appear, according to the shape of the Uncus, to be correctly associated with *cdenata*; these Co-types before us were captured in February and March which would point to an early spring generation; this is corroborated by a series from Sonoma Co. in our collection, captured also in February, three specimens of which we figure on Pl. III, Figs. 5-7; as already stated we were inclined to consider these as referable to *glaucata* but if our present conception of *glaucata* prove to be correct they will probably represent a good race of *cdenata* agreeing as they do in the structure of the Uncus.

Mr. Swett mentions (C. Ent. 47, p. 60) a large Vancouver Is. form as belonging to *cdenata*; we have before us 1  $\delta$ , 3  $\text{♀}$  of this form, captured in March and April, 1  $\text{♀}$ , which we figure, showing considerable green tinges, the other three specimens being largely brown with pale basal and median areas. There is nothing in the structure of the Uncus to separate these B. C. specimens from those of Sonoma,

Monterey and San Diego Cos. but as their large size (38 mm. in both sexes) is apparently constant we believe we are justified in proposing to use the racial name *GRANDIS*, our types being 1 ♂ from Duncans, B. C. (Mch. 24-30) and 3 ♀'s from Victoria, B. C. (Apr. 8, 13, 16) 1 ♀, Paratype (Victoria, Apr. 13) being in the American Museum Collection.

We have before us two specimens from Arizona which we discovered mixed up with a race of *speciosata* to which we will refer later; in the ♂ sex the Uncus is enormously forked with a long thin neck, quite distinctive from any other species we know. We describe it as follows.

*HYDRIOMENA FURCULOIDES* sp. nov. (Pl. V. Fig. 15).

Palpi long, thin, purple-brown tipped with ochreous; head and thorax pale greenish-yellow, the latter with two black spots on prothorax and one at base of primaries; metathoracic tuft tipped with black, abdomen ochreous. Primaries

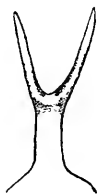


FIG. 10

Uncus of *H. furculoides*

pale greenish-white suffused with purplish-brown and crossed by bands of this color; line 1 (subbasal) fine, bent strongly outward just below costa, then perpendicular to inner margin forming a right angle in the cell with a slight inward bend in submedian fold; band 2 starting from a large costal patch, then rather indistinct and more or less fused with the following band owing to dark scaling in central area of wing; band 3 (antemedian) bent outward below costa, then rather straight and perpendicular to inner margin; median space pale, slightly sprinkled with dark scales and with a dark streak above vein 4; line 4 (postmedian) bent out below costa, then jagged and toothed to vein 4 below which it is more or less obsolete as a fine line close to the subterminal band; subterminal space similar in color to median area; subterminal band broad, with irregular edges, approaching close to outer margin at vein 3; terminal area with very broad purplish streaks on the veins which mostly connect with the subterminal band, leaving only small terminal patches of the pale ground-color visible and a costal patch of same color just beyond s. t. band below which is the usual black streak; fringes pale ochreous, dotted with brown at ends of veins. Secondaries pale smoky with traces of a discal dot and somewhat crenulate postmedian line. Beneath whitish with maculation of upper side partially visible; secondaries with distinct discal dot and rather sharply angled postmedian line. Expanse 30mm.

**HABITAT:** ♂ Redington, Ariz.; ♀ Tucson, Ariz. 1 ♂. Types. Coll. Barnes.

The preceding species ends the division of the long-palpi group with bifurcate Uncus; the following species have a simple narrow pointed Uncus and show great similarity in general type of genitalia to the *albifasciata* group of short-palpi species where we imagine their real relationship will be found to exist.

HYDRIOMENA SPECIOSATA Pack. (Pl. V, Figs. 11-14; Pl. X, Fig. 3).

We have nothing further to add to Mr. Swett's treatment of this species (C. Ent. 47, p. 9) which is readily recognizable; the Uncus is short with a moderately broad base and the Aedoeagus is armed with a bunch of long spines.

We have before us a small series of specimens from Arizona which appears to be a race of this species; in general color they approach closer to the form *taylori* Swett than to the typical form, one of the ♀'s however showing a considerable amount of green; the race is characterized by the reduction of the cross bands 4 and 5 (post-median and subterminal); the former is closer to the latter than is usually found in the typical form, leaving the median space broader; it is also rather evenly dentate or crenulate, especially below the costa, a feature which occasionally is found in the type form but which is usually hidden in the broad blotches. The Uncus has the basal portion rather less broad, the whole organ gradually and evenly tapering, whereas in the type form the broad base is rather sharply separated from the narrow apical section; the spines on the Aedoeagus seem to show a different arrangement but this may not be constant in a series of slides. We propose for this race the name *MOROSATA*, our types being 5 ♂, 3 ♀ from Redington, Arizona, one of the former in the Collection of the American Museum.

HYDRIOMENA BARNESATA Swett. (Pl. V, Fig. 10; Pl. X, Fig. 5).

The type of genitalia shows that this species is correctly placed next to *speciosata*; the narrow portion of the Uncus is considerably longer than in *speciosata* and the armature of the Aedoeagus consists of a small patch of minute spines, otherwise the genitalia are very similar. The species seems to be widely distributed in Southern Arizona; we have it from various localities in Cochise Co., from the White Mts. and also from Ft. Wingate, N. Mexico, all our dated material having been taken in June or July.



HYDRIOMENA REGULATA Pearsall. (Pl. VI, Fig. 15).

We do not know this species but have received through the kindness of the authorities of the American Museum photographs of the types, one of which we publish; Mr. Watson informs us that these types are two ♀'s, not ♂'s as stated in the original description. Judging by the photographs the species must be intermediate between *similaris* Hlst. and the Arizona race of *speciosata*, differing from both apparently in the maculation of the basal portion of the abdomen; on account of the obscure maculation it is rather difficult to place from a study of the figure alone and we must await the receipt of more material before definitely deciding its position.

HYDRIOMENA SIMILARIS Hlst. (*glenwoodata* Swett.) (Pl. VI, Figs. I, 2; Pl. X, Fig. 4).

The type of genitalia shows that the species should be associated with *speciosata* rather than placed in the moderate palpi group; the Uncus is considerably broader than in either of the two preceding species and is merely bluntly pointed, not tapering to a fine point; the Aedoeagus is very heavily armed with spines and hooks and the proximal portion is drawn out to a rather lengthy point, a quite unique feature in the group.

Our recently described species, *terminipunctata*, proves to be a race of this species, characterized by its much paler color and better defined markings as well as by the strong whitish terminal streaks of secondaries which in the typical form are merely very faintly indicated.

We have the type form from Colorado (Glenwood Spgs.), New Mexico (Jemez Spgs.) and Arizona (Pinal Mts.) taken in June and July; the race *terminipunctata* from Stockton, Utah.

HYDRIOMENA CYRIADES Druce. (Pl. VI, Fig. 8).

We have already recorded what appears to be this species from Tucson, Ariz. (Contr. III, p. 23); if our identification be correct the species will fall into this group the Uncus being pointed much as in *speciosata*.

The remaining three species show no very close relationship to any of the preceding groups; as they are all found in Arizona it is probable that their affinities will be with Mexican species rather than with the more northern forms. In *mediocutata* the palpi are decidedly

short; in the other two species they are moderately long but shorter than in *speciosata*.

HYDRIOMENA MEDIODENTATA B. & Mc.D. (Pl. VI, Fig. 3).

This obscure species has the basal portion of the Uncus rather broad with two stout curved hooks, broadening apically, projecting downward from its under surface. Apart from the ♀ type and the single ♂ specimen mentioned in Contr. III, 22, we have seen no other specimens of the species.



FIG. 11

Uncus of *H. mediodontata*

HYDRIOMENA COSTIPUNCTATA B. & Mc.D.

This species has nothing whatever to do with *speciosata* as suggested by Mr. Swett (C. Ent. 47, p. 10); the Uncus, as may be seen from our drawing, is of a totally different shape. We have seen no material other than the types; our figure (Contr. I, (5) Pl. II, Fig. 14) should render the species easily recognizable.



FIG. 12

Uncus of *H. costipunctata*

HYDRIOMENA MAGNIFICATA Tayl. (Pl. VI, Fig. 9).

Apart from the type specimen we have two specimens in the Collection from Palmerlee, Ariz. (April) one of them, which we figure, exceptionally perfect; the Uncus is very long and spoon-shaped.



FIG. 13

Uncus of *H. magnificata*

In conclusion we offer the following arrangement of the species of this group to supplant that of our Check List.

Genus HYDRIOMENA Hbn.

- \* 1 *furcata* Thun.
- clutata* Hbn.
- form fuscoundata* Don.
- form periclata* Swett.

- 2 quinquefasciata *Pack.*  
*form viridata Pack.*
- 3 albifasciata *Pack.*  
*form resecta Swett.*  
*form puncticaudata B. & McD.*  
*a victoria B. & McD.*  
*b reflata Grt.*  
*abacta Hlst.*
- 4 cochizeata *Swett.*  
*form swetti B. & McD.*
- 5 nubilofasciata *Pack.*  
*?banavahrata Strkr.*  
*form raptata Swett.*  
*form cupidata Swett.*  
*form cumulata Swett.*  
*form vulnerata Swett.*  
*form sparsimacula Hlst.*  
*?a scalata W'arr.*
- 6 manzanita *Tayl.*
- 7 tuolumne *B. & McD.*
- 8 exculpata *B. & McD.*  
*form tribulata B. & McD.*
- 9 henshawi *Swett.*
- 10 shasta *B. & McD.*
- 11 irata *Swett.*  
*form niveifascia Swett.*
- \*\* 12 frigidata *Wlk.*  
*form manitoba B. & McD.*
- 13 transfigurata *Swett.*
- 14 perfracta *Swett.*  
*a exasperata B. & McD.*
- 15 marinata *B. & McD.*
- 16 arizonata *B. & McD.*
- 17 obliquilinea *B. & McD.*
- 18 marmorata *B. & McD.*
- 19 sierrae *B. & McD.*
- 20 pluviata *Gn.*  
*divisaria Wlk.*

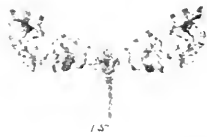
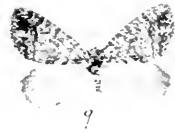
- 21 renunciata *Wlk.*  
*a columbiata Tayl.*  
*form pernigrata B. & McD.*
- 22 crokeri *Swett.*
- 23 muscata *B. & McD.*
- 24 californiata *Pack.*
- \*\*\* 25 bistriolata *Zell.*  
*a modestata B. & McD.*
- 26 chiricahuata *Swett.*
- 27 ruberata *Frey.*  
*form variegata Prout.*  
*a nevadae B. & McD.*
- 28 furculoides *B. & McD.*
- 29 glaucata *Pack.*
- 30 edenata *Swett.*  
*a olivata H'gt.*  
*form pallidata H'gt.*  
*b grandis B. & McD.*
- 31 speciosata *Pack.*  
*form agassizi Swett.*  
*form taylori Swett.*  
*form ameliata Swett.*  
*a morosata B. & McD.*
- 32 barnesata *Swett.*
- 33 regulata *Pears.*
- 34 similis *Hlst.*  
*glenwoodata Swett.*  
*a terminipunctata B. & McD.*
- 35 cyriades *Druc.*
- 36 mediodentata *B. & McD.*
- 37 costipunctata *B. & McD.*
- 38 magnificata *Tayl.*



## PLATE I

- Fig. 1. *H. furcata* *Thun.* ♂ Duncans, Vanc. Is., B. C.  
 Fig. 2. *H. furcata* *Thun.* ♀ Wellington, B. C.  
 Fig. 3. *H. furcata* *Thun.* (dark form) ♂ Duncans, Vanc. Is., B. C.  
 Fig. 4. *H. furcata* *Thun.* ♂ Hymers, Ont.  
 Fig. 5. *H. furcata* *Thun.* ♂ Calgary, Alta.  
 Fig. 6. *H. furcata* *Thun.* (dark form) ♂ Shasta Retreat, Siskiyou Co.,  
 Calif.  
 Fig. 7. *H. quinquefasciata* *Pack.* ♂ Victoria, B. C.  
 Fig. 8. *H. quinquefasciata* *Pack.* ♀ Victoria, B. C.  
 Fig. 9. *H. quinquefasciata form viridata* *Pack.* ♂ Victoria, B. C.  
 Fig. 10. *H. albifasciata* *Pack.* ♂ San Gabriel Mts., Calif.  
 Fig. 11. *H. albifasciata form puncticaudata* *B. & McD.* ♂, Paratype  
 Sonoma Co., Calif.  
 Fig. 12. *H. albifasciata victoria* *B. & McD.* ♂, Type Victoria, B. C.  
 Fig. 13. *H. albifasciata reflata* *Grt.* ♂ Palmerlee, Ariz.  
 Fig. 14. *H. albifasciata reflata* *Grt.* (banded form) ♂ Palmerlee, Ariz.  
 Fig. 15. *H. albifasciata victoria* *B. & McD.* ♀, Paratype Victoria, B. C.

PLATE I









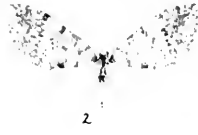
## PLATE II

- Fig. 1. *H. cochizeata Swett* ♂ Palmerlee, Ariz.  
Fig. 2. *H. cochizeata Swett* ♀ Palmerlee, Ariz.  
Fig. 3. *H. cochizeata form swetti B. & McD.* ♂, Type Palmerlee, Ariz.  
Fig. 4. *H. nubilofasciata Pack.* ♂ Sonoma Co., Calif.  
Fig. 5. *H. nubilofasciata Pack.* ♀ Sonoma Co., Calif.  
Fig. 6. *H. nubilofasciata form cumulata Swett* ♂ San Gabriel Mts., Calif.  
Fig. 7. *H. nubilofasciata form vulnerata Swett* ♂ Oakland, Calif.  
Fig. 8. *H. nubilofasciata form vulnerata Swett* ♀ Sonoma Co., Calif.  
Fig. 9. *H. henshawi Swett* ♂ Deer Park, Placer Co., Calif.  
Fig. 10. *H. manzanita Tayl.* ♂ Duncans, Vanc. Is., B. C.  
Fig. 11. *H. manzanita Tayl.* ♀ Duncans, Vanc. Is., B. C.  
Fig. 12. *H. irata Swett* ♂ Victoria, B. C.  
Fig. 13. *H. tuolumne B. & McD.* ♂, Paratype S. Bernardino Mts., Calif.  
Fig. 14. *H. tuolumne B. & McD.* ♀, Type Tuolumne Meadows, Calif.  
Fig. 15. *H. irata Swett* ♀ Wellington, B. C.

PLATE II



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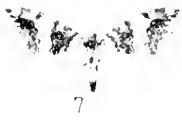
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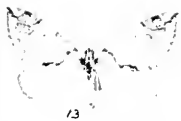
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## PLATE III

- Fig. 1. *H. exculpata* *B. & McD.* ♂, Type Ketchikan, Alaska.  
Fig. 2. *H. exculpata* *B. & McD.* ♀, Type Ketchikan, Alaska.  
Fig. 3. *H. exculpata form tribulata* *B. & McD.* ♀, Type Ketchikan,  
Alaska.  
Fig. 4. *H. shasta* *B. & McD.* ♂, Type Mt. Shasta, Calif.  
Fig. 5. *H. edenata* *Swett* (?) ♂ Sonoma Co., Calif.  
Fig. 6. *H. edenata* *Swett* (?) ♂ Sonoma Co., Calif.  
Fig. 7. *H. edenata* *Swett* (?) ♀ Sonoma Co., Calif.  
Fig. 8. *H. edenata* *Swett* ♂ Monterey Co., Calif.  
Fig. 9. *H. edenata grandis* *B. & McD.* ♀, Type Victoria, B. C.  
Fig. 10. *H. arizonata* *B. & McD.* ♂, Type Palmerlee, Ariz.  
Fig. 11. *H. obliquilinea* *B. & McD.* ♀ Type Vineyard, Utah.  
Fig. 12. *H. frigidata* *Wlk.* ♂ Decatur, Ill.  
Fig. 13. *H. frigidata manitoba* *B. & McD.* ♂, Type Cartwright, Man.  
Fig. 14. *H. frigidata manitoba* *B. & McD.* ♀, Type Cartwright, Man.  
Fig. 15. *H. transfigurata* *Swett* ♂, Paratype Cohasset, Mass.

PLATE III





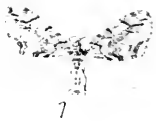




## PLATE IV

- Fig. 1. *H. perfracta Swett* ♂ Calgary, Alta.  
 Fig. 2. *H. perfracta exasperata B. & McD.* ♂, Type Departure Bay,  
 Vanc. Is., B. C.  
 Fig. 3. *H. marmorata B. & McD.* ♂, Type (Coll. Am. Mus.) Sierra  
 Nevada Mts., Calif.  
 Fig. 4. *H. sierrae B. & McD.* ♂, Type Shasta Retreat, Siskiyou Co.,  
 Calif.  
 Fig. 5. *H. sierrae B. & McD.* ♀, Type Shasta Retreat, Siskiyou Co.,  
 Calif.  
 Fig. 6. *H. irata form niveifascia Swett* ♂, Type (Coll. Swett) Vanc. Is.,  
 B. C.  
 Fig. 7. *H. pluviata Gn.* ♂ Catskill Mts., N.Y.  
 Fig. 8. *H. pluviata Gn.* ♀ Catskill Mts., N.Y.  
 Fig. 9. *H. muscata B. & McD.* ♂, Type Sonoma Co., Calif.  
 Fig. 10. *H. renunciata Wlk.* ♂ Bretton Woods, N. H.  
 Fig. 11. *H. renunciata Wlk.* ♀ Bretton Woods, N. H.  
 Fig. 12. *H. columbiata form pennigrata* ♂, Type Glacier Park, Mont.  
 Fig. 13. *H. renunciata columbiata Tayl.* ♂, Type Wellington, B. C.  
 Fig. 14. *H. renunciata columbiata Tayl.* ♀ Ketchikan, Alaska.  
 Fig. 15. *H. crokeri Swett* ♀ Victoria, B. C.

PLATE IV



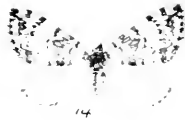
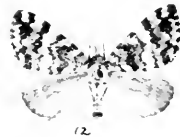




## PLATE V

- Fig. 1. *H. californiata* Pack. ♂ Wellington, B. C.  
 Fig. 2. *H. californiata* Pack. ♀ Duncans, Vanc. Is., B. C.  
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 Fig. 5. *H. chiricahuata* Swett ♂ Palmerlee, Ariz.  
 Fig. 6. *H. ruberata nevadae* B. & McD. ♂, Type Verdi, Nev.  
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## PLATE VI

- Fig. 1. *H. similis* *Hlst.* ♂ Jemez Spgs., N. M.  
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PLATE VII



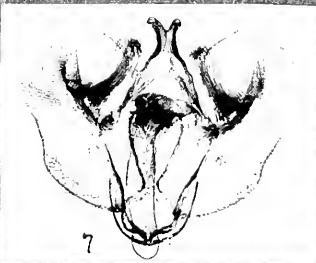
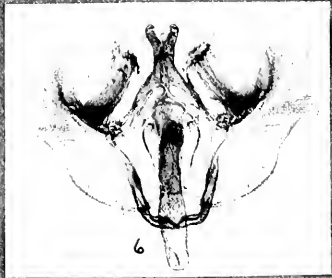
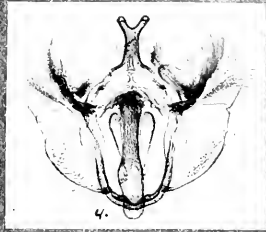
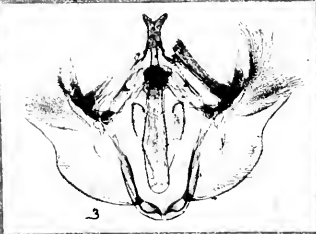
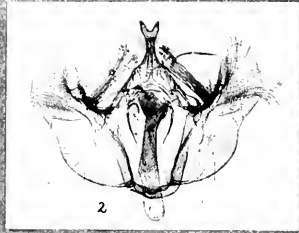






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Fig. 8. Male Genitalia of *H. sierrae* B. & McD. Cisco, Placer Co., Calif.

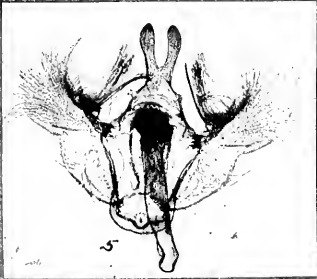
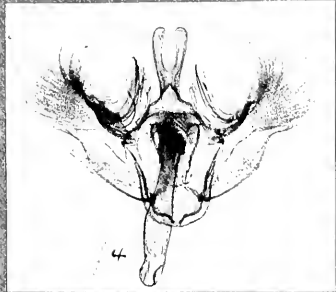
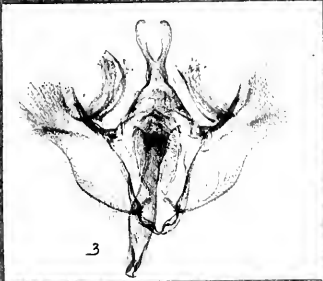
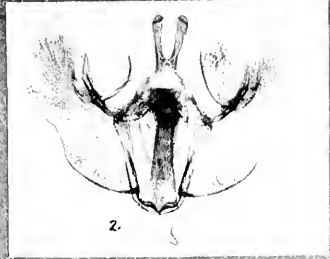






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CONTRIBUTIONS  
TO THE  
NATURAL HISTORY  
OF THE  
**LEPIDOPTERA**  
OF  
NORTH AMERICA

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VOL. IV  
No. 2

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NOTES AND NEW SPECIES

BY  
WILLIAM BARNES, S. B., M. D.  
AND  
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DECATUR, ILL.  
THE REVIEW PRESS  
MAY 15, 1918

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



## NOTES AND NEW SPECIES

## PAPILIONIDAE

## PAPILIO TROILUS ILIONEUS A. &amp; S.

A study of Abbot's figures of this species (1797, Lep. Ins. Ga. Pl. II) inclines us to the belief that the specimen figured in the upper left-hand corner on which the text practically bases the name *ilioneus* is that of the southern race to which the name *texanus* Ehr. has been generally applied. We would call attention to the large marginal spots extending to the costa of primaries and preceded by a partial row of yellow spots and also to the broad extent of the greenish area on secondaries both of which features are characteristics of the southern race. The description of *troilus* apparently applies to the northern form and certainly Cramer's figure (Pap. Exot., III, pl. 207, B. C.) does, so that by using the name *troilus* for this northern form the name *ilioneus* A. & S. becomes applicable for the southern race with *texanus* Ehr. as a synonym.

## PARNASSIUS CLODIUS Men.

The synonymy of this species must be changed somewhat from the conception given in our Check List. *Menetriesi* Hy. Edw. has been listed by both Dyar and Skinner as published in 1878; the species was published in Pac. Coast Lep. No. 22 with the date of Dec. 18th, 1876; as these articles were issued as separates before the completion of the whole volume of the Proc. Calif. Acad. of Science (*vide* Strecker, Cat. Lep. N. Am., 1878, p. 225) it is reasonable to suppose that No. 22 appeared early in 1877 at least a month or so before the publication of W. H. Edwards' Catalogue of Diurnal Lepidoptera which probably did not appear much before April, 1877, as it is reviewed in the Can. Ent. for May of that year. On page 12 of this catalogue Edwards lists *menetriesi* Hy. Edw. and later in the work mentions several others of Hy. Edwards' new species from the same paper so that it is evident that the article in question was known to him before the issuing of his Catalogue. The name *baldur* proposed by him in this catalogue for the figures 1-4 of Plate IV, Vol. I of his Butterflies of N. America is therefore antedated by *menetriesi* Hy. Edw. According to the description the name *menetriesi* is based on specimens in which both sexes

are very *similar* in maculation; the type localities mentioned are several places in the general vicinity of Lake Tahoe, Calif. (Edw., Behr) and Mt. Nebo, Utah (Putnam); judging by series before us the Utah form is more or less constant, i. e.  $\delta$ 's and  $\text{♀}$ 's closely resemble each other, but in the Sierra Nevadas of California it is only rarely that we find a  $\text{♀}$  which is not much more heavily marked than the  $\delta$ ; for this reason we would restrict the name *menetriesi* Hy. Edw. to the  $\text{♀}$  from Utah, this type, ex Coll. Am. Mus., being figured by Skinner in Ent. News XXVII, p. 216, Pl. XII, Fig. 3. If this be done the name *baldur* Edw. with *lusca* Stichel as a synonym will be applicable to the Sierra Nevada race of smaller size than typical *clodius* and with reduced ocelli on the secondaries; Edwards' figure 2 is exactly the same thing as *lusca* Stichel, having the lower ocellus reduced to a black dot.

The synonymy will then stand

<i>clodius Men.</i>	Coast Range of Calif.
<i>a claudianus Stichel</i>	Wash.; Vanc. Is.
<i>ab. altaurus Dyar</i>	Idaho
<i>b gallatinus Stich.</i>	Mont.
<i>c baldur Edw.</i>	Sierra Nevadas, Calif.
<i>lusca Stich.</i>	
<i>ab. lorquini Oberth.</i>	
<i>d menetriesi Hy. Edw.</i>	Utah.
<i>ab. immaculata Skin.</i>	

The race *gallatinus* Stich., is unknown to us; it is based on the  $\delta$  and  $\text{♀}$  figures of *clodius* in Elrod's Butterflies of Montana (p. 16, fig. 15) and differs in having in the  $\delta$  sex the spot on inner margin of primaries joined to the costal spots by a black band; this is probably an individual aberration, the form otherwise being intermediate between *claudianus* and *menetriesi*.

## PIERIDAE

## PIERIS NAPI FRIGIDA Scud.

In our Contributions Vol. III, p. 58, we referred to this race as the spring form of *acadica* Edw. and figured our conception of *frigida* on Pl. VII, Figs. 1, 2. This identification was based on two Labrador specimens in the Scudder Collection, evidently the 2 ♂'s mentioned by W. H. Edwards in his article on *P. napi* (1881, Pap. I, pp. 92/3) and with which our figured specimen (fig. 1) agreed exactly.

A recent visit to Cambridge, combined with a careful study of Scudder's original description and the discovery in the main collection of a specimen under the name *frigida* labelled "Labrador, Packard", has led us to the conviction that the 2 ♂'s in the Scudder collection cannot be considered as types or as even typical of *frigida*.

Scudder's original description was drawn up ostensibly from 2 ♂'s and 2 ♀'s collected on Caribou Is. Straits of Belle Isle by Prof. A. S. Packard; it is therefore reasonable to suppose that the specimen labelled "Labrador, Packard" in the main Cambridge Collection is at least one of the type lot, especially as it agrees far better with Scudder's rather vague description than do the 2 ♂'s in the Scudder collection which further show no evidence on the label of having been received from Packard. This Packard specimen is labelled ♂ but seemed to us to be a ♀ although the abdomen is so badly crushed that with a low power lens (the only one available) it was impossible to definitely determine the sex.

A study of the original description has shown several points of discrepancy between the text and the so-called *frigida* specimens of the Scudder collection; in the first place the under surface of the wings is given as "dirty-white, tinted with very pale greenish yellow" whereas Scudder's ♂'s and our series from Newfoundland show a rather brilliant yellow coloration on secondaries and at apex of primaries; they further show on upper side of primaries considerable apical dark suffusion, (usually more so than in our figured ♂) and the ♀'s have the two subterminal round spots of primaries fairly well developed; none of these latter points are mentioned in the description and indeed the fact that Scudder compares *frigida* to *oleracea*

would presuppose the absence of these characters unless specially mentioned.

Packard's Labrador ♀ on the other hand bears out excellently the characters given by Scudder; the underside is worn but is, as stated, dirty white with a yellowish tinge; we imagine fresher specimens will show a coloration much as in typical *oleracca*. The bases of the wings above are heavily black-shaded, the veins are also partially outlined in black at outer margin and there is considerable smoky suffusion on the wing causing that "green appearance" mentioned by Scudder and suggesting a *bryoniae* form without the two black subterminal round spots. Scudder lays a good deal of stress in his description on wing-shape of secondaries as compared with *oleracca* and the fact that the black costal edge of primaries extends in *frigida* further around the outer margin but we must confess these are points of which we can make nothing from a specific standpoint.

In the light of the above remarks we believe we are justified in accepting the single ♀ labelled "Labrador, Packard" as a type (or at least as typical) of *frigida* Scud., the other three original specimens having apparently vanished from Scudder's ken before 1881 and been replaced by the 2 ♂'s mentioned by him to Mr. W. H. Edwards on this date (Pap. I, p. 93) which seemingly also served for the erroneous description of *frigida* given in the Butt. New Eng. Vol. II, p. 1193.

The acceptance of this type of *frigida* will somewhat alter the conception of the race and make it much closer to *oleracca* Harr. and *pseudonapi* B. & McD. with possibly *borealis* Grt. as a synonym. We must await material from Labrador before definitely placing it but would note that Verity's figure (Rhop. Pal. Pl. XXXII, Fig. 8) probably approaches the true *frigida* very closely, although the secondaries in this figure appear rather too yellow; in the light of this figure we believe his remarks on p. 333 to be entirely correct.

#### PIERIS NAPI MARGINALIS Scud.

The original description of this race calls for a ♂ type from the Gulf of Georgia and a ♀ specimen from Crescent City, Calif., stating that "males and females are alike in their markings." These specimens, collected by Prof. Agassiz, are in the Cambridge Museum; the so-called ♀ from Crescent City proves to be a ♂ which accounts for the extraordinary statement as to the similarity of the sexes; the ♂ is simply labelled "Washington Terr., Agassiz" and was presum-

ably taken at Port Townsend, at which locality Agassiz collected most of his material labelled "Gulf of Georgia." These two types bear out completely our remarks on the race in our Contributions Vol. III (2) p. 58 and make it a mystery how Scudder could ever have later referred the form to *rapae*. Our remarks on *pallida* Scud. in the same article are also substantiated by the types which still exist in the Cambridge Museum.

For some reason or other *iberidis* Bdv. (1869, Lep. Cal. p. 39) has been omitted from all our recent catalogues and lists; the ♀ type is figured by Verity (Rhop. Pal. Pl. XXXII, Fig. 43) and proves the species to be an exact synonym of *castoria* Reak. *Resedac* Bdv. at present listed as a further synonym was based on a yellowish-colored specimen stated by Boisduval to be a ♀ but figured by Verity as a ♂ (l. c. Pl. XXXIII, fig. 3); we believe the name should supplant *flava* Edw., based on a yellowish ♀ of *pallida* from Washington State; the difference between the forms *pallida* from northern Washington and B. C. and *castoria* from Middle California, consisting as it does in the presence of a dark subterminal spot on primaries in the ♂ of the latter race, is so slight and apparently so inconstant that we believe one name for the yellow form of both these so-called races will suffice; this yellow form also, we might note, occurs in the spring races, *marginalis* and *venosa*.

#### EURYMUS OCCIDENTALIS Scud.

This species has caused entomologists a good deal of perplexity; it was originally described (1861, Proc. Bost. Soc. N. H. p. 109) from 2 ♂, 3 ♀, Gulf of Georgia (Agassiz); Fort Simpson, British America (W. H. Edwards). Hagen later (1882, Proc. Bost. Soc. N. H. p. 164) gives further details concerning these types and we find that of the five original specimens 1 ♂ and 2 ♀ collected by Agassiz near Port Townsend, Wash., on the Gulf of Georgia (thus giving a definite locality for Agassiz's material labelled "Gulf of Georgia") were in the Cambridge Museum and that the other ♂ and ♀ from Fort Simpson were presumably in the W. H. Edwards' Collection. We have recently examined the types in Cambridge and concur absolutely with Dr. Hagen (l. c. p. 164) in referring the ♀'s to the white form of *eurytheme* Bdv.; the single ♂ specimen comes extremely close to a specimen of *chrysomelas* Hy. Edw. from California labelled by Edwards himself and presumably the specimen referred to by Hagen on

p. 170 of his article; it agrees in size, width of dark border, and the fact that the dark suffusion on secondaries extends over a considerable portion of the wing. Henry Edwards, basing his knowledge of *occidentalis* Scud. on the types in the W. H. Edwards' Collection from Mackenzie River, (*vide* Pac. Coast Lep. p. 125) considered *chrysomelas* a distinct species; just what species these Edwards' specimens represent it is hard to say and we have no further note on the specimens except that they exist at Pittsburg in the Carnegie Museum; if however Edwards' figures of *occidentalis* (Butt. N. Am. I. Colias, VII, figs. 1-4) are drawn up from these types then they certainly, as Hagen says (l. c. p. 165) represent something quite different from the  $\delta$  type in Cambridge and do not agree well with Scudder's original description, notably in the small amount of black suffusion on secondaries of  $\delta$ ; Scudder distinctly states that "grayish scales are scattered over nearly the whole wing, more profuse at base"; the interior margin of the black terminal band also does not coincide with Scudder's figure (l. c. p. 107) nor is the color of the underside of secondaries deep enough yellow; judging from the mere figures we should suggest that Edwards'  $\delta$  *occidentalis* comes very close to some Calgary specimens of *interior* before us whilst his  $\text{♀}$  is probably referable to a yellow form of *christina* Edw. In view of the discrepancies which exist between Edwards' figures of *occidentalis* (presumably based on his knowledge of the species from his Mackenzie river types) and the original description we believe we are justified in restricting the type of this species to the  $\delta$  specimen in Cambridge from Port Townsend, Gulf of Georgia (Agassiz) which fully agrees with Scudder's diagnosis; the exact relationship between *occidentalis* and *chrysomelas* will have to be left for discussion until such a time as good series of *occidentalis* in both sexes are available from Port Townsend; we might note that the Vancouver Is. form which we have been inclined to associate with this name (1916, Contr. III, (2) pp. 67, 68) is slightly smaller than Scudder's type but otherwise close in general maculation and habitus.

#### EURYMUS INTERIOR Scud.

Dr. Hagen has already given full details regarding the types of this species (l. c. p. 159); the type at Cambridge is labelled "Rapids of Saskatchewan" and other specimens bear the label "Portage." The

types of *laurentina* from Cape Breton Is. (Thaxter), also in the Cambridge Museum, are considerably smaller than those of *interior* and show a rather broader black border; they appear to represent a slightly modified racial form of *interior*.

EUREMA LISA Bdv. & Lec.

In Dyar's list and in our own Check List, following Godman and Salvin (Biol. Cent. Am. Rhop., II, 162), this species has been made a synonym of *euterpe* Men. (1832, Bull. Soc. Imp. Nat. Mosc. 199); this is probably due to the fact that these authors have accepted the date of the title page (1833) of the Lep. Am. Sept. as that of the whole work whereas this work was issued in parts commencing in 1829 (*vide* Hagen. Bibl. Ent. p. 64). Scudder in the introduction to his Historical Sketch (p. 98) states that he has taken the dates of those of Boisduval's works which appeared in "livraisons" from the official literary bulletin published at that time in Paris and that they can be relied on for accuracy; as he gives the date of the genus *Xanthidia* as 1829-30 and also mentions the genus *Callidryas* (which appeared a number of pages later) under the same date we may conclude that the name *lisa* (Lep. Am. Sept. p. 55) dates at the latest from 1830 and therefore has priority over *euterpe* Men.

## SATYRIDAE

## Genus OENEIS.

Our grouping of the species of this genus in our Check List was more or less tentative, especially in the *oeno-semidea* group; in general we adhered to W. H. Edwards' arrangement as expressed in J. B. Smith's list of 1903, but we felt that considerable study was necessary before arriving at any definite conclusion. Recently we have worked over the ♂ genitalia of the above mentioned group, in connection with a careful study of Elwes and Edwards' most excellent revision of the genus (1893, Trans. Ent. Soc. Lond. IV, 457) and are glad to be able to state that our own dissections fully agree with the figures of the ♂ claspers given in the above work.

The species which has caused the most trouble to identify correctly is *oeno* Bdv., described apparently from Russian Lapland in the Icones (1833, p. 196, Pl. 39, Figs. 4-6) although specimens from Siberia and Labrador are also mentioned; Moeschler, (1863, Wien, Ent. Mon. VII, 201), Scudder (1865, Proc. Ent. Soc. Phil. V, 13) and Edwards (Butt. N. Am. III, *Chionobas*, VII) have all treated this species in great detail and all have expressed different opinions as to its identity; Elwes has omitted the species in his paper as unknown to him as he states later (1894, Can. Ent. XXVI, 133). After a careful study of Boisduval's figures and text we have concluded that Scudder's determination satisfies the requirements best and propose adopting it until an examination of Boisduval's type specimens (which should be in the Oberthur collection) is possible; according to this identification *oeno* Bdv. takes priority over *crambis* Freyer. Elwes, after a study of the type specimens and their genital structure makes *subhyalina* Curt. and *assimilis* Butl. also synonymous with *crambis* which very unjustly calls down the wrath of W. H. Edwards (1894, C. Ent. XXVI, 55) who refuses to accept the evidence of the genitalia as of any value and casts doubts on the authenticity of the type specimen of *subhyalina* ex Coll. Oberthur. In both this paper and in Volume III of his Butterflies of N. Am. (*Chionobas* VII) Edwards very emphatically associates *oeno* and *assimilis* with a Colorado form which Elwes had already shown to be quite distinct in genitalia from the types of *assimilis* and *subhyalina* and very closely approached to *semidea*. We can see



no adequate reason, after summing up the evidence on both sides, for not accepting Elwes and Edwards' reference and this course has seemingly been followed by Seitz's *Macrolepidoptera of the World* in both the Palaearctic and Nearctic volumes. On the face of it *oeno* Bdv. (1832-33) would seem to have the priority; Scudder (Ilist. Sketch, 140) gives the date of publication for the genus *Chionobas* (proposed in the *Icones*) as probably late in 1832; *subhyalina* Curt. was published in 1835 and the other names much later. Whether typical *oeno* and *crambis* (Northern European forms) occur in this country we do not know; the common form in Labrador is that figured by Edwards as *crambis* (Butt. III, *Chionobas* VI); for the present until good series of Arctic material are available we would list the species as follows:

*oeno* Bdv.

*crambis* Frey.

*a subhyalina* Curt.

*b assimilis* Butl.

*Katahdin* Newc. from Maine is very closely related to the Labrador *oeno* in genitalia and will probably prove to be a race of this species; *pcartiae* Edw. (if our identification of a single specimen from the Arctic Coast Plains in Coll. Barnes be correct) is also very close in the shape of the claspers but the underside of the primaries is much darker than in *oeno* and it may be kept separate until more material is available.

*Brucci* Edw. also belongs in this group but the apical portion of the clasper is more slender than in either *katahdin* or *oeno*.

*Semidea* Say and *bcani* Elwes belong to a group distinct from the *oeno* group and with them must be associated the Colorado form figured by Edwards erroneously as *oeno* (Butt. III *Chionobas*, Pl. VII, Figs. 1-4) which Elwes shows (l. c. Pl. XV, Fig. 9) to have a form of clasper closely related to that of *semidea* but with fewer and larger teeth on the apical dorsal portion; as this character is quite constant in a long series before us we see no reason for not regarding it as of specific value especially as the form is easily separated from *semidea* by the general yellower appearance of the underside. As there is apparently no name available we describe the species as follows:

OENEIS LUCILLA sp. nov. (Pl. XI, Figs. 16-18).

Palpi black, fringed with white on dorsal side; antennal knob ruddy brown; upper side of wings dull immaculate brown in ♂ with faint traces of a broad

diffuse sex mark in and below the cell of primaries and with the maculation of underside of secondaries more or less visible above; in ♀ often tinged with yellowish with an occasional blind ocellus in the interspace between veins 5 and 6; fringes white, checkered with brown. Beneath primaries in ♂ slightly paler than above, marbled with whitish toward apex and often with a small white-centered ocellus subterminally between veins 5 and 6 which in the ♀ is followed at times by similar ocelli in the interspaces between veins 2 and 3, and 3 and 4; the ♀ usually also shows a distinct yellowish tinge over the whole underside of the wings; secondaries heavily marbled with blackish intermingled slightly with whitish streaks much as in *scnidca* but considerably paler and yellower; the black curved median band is generally almost lost in the heavy striations but its outer edge is faintly defined by the paler subterminal shading; a small anal ocellus is often present preceded by a curved row of small obsolescent ochreous spots; terminal diffuse dark patches mingled with whitish; fringes checkered. Expanse 41 mm.

HABITAT: Hall Valley, Colo. (July). 6 ♂, 6 ♀. Types, Coll. Barnes.

*Daura* Stkr. (not *dauria* as generally listed) is only known by the single ♀ type specimen from Arizona in the Field Museum, Chicago; it should probably be associated with *chryxus* but until a series is available its status is problematic.

We figure the ♂ genitalia of the various species involved in the above notes as far as possible on Plate XXV.

## NYMPHALIDAE

BRENTHIS HELENA INGENS var. nov. (Pl. XI, Figs 5, 6).

In the Yellowstone Park there occurs a race of *helena* distinguished by its large size from the typical Colorado form (Pl. XI, Fig. 7); this latter averages 38 mm. wing expanse whilst the present form exceeds 40 mm.; on the underside the basal area of secondaries is a distinct leathery brown color without any purplish shades, the basal and median rows of spots show no trace of silver, being pale yellow and in the latter row the spot opposite the cell is generally much less prolonged distally than we usually find in the nymotypical form; the spot between veins 1 and 2 shows also strong tendency to be cut completely in two by the black defining lines; the marginal spots are large and faintly silvered. Our type series consists of 4 ♂'s and 6 ♀'s, two of the latter from Sheridan, Idaho; three of the Paratypes are in the Collection of Prof. E. T. Owen of Madison, Wis.

EUPHYDRYAS MAGDALENA sp. nov. (Pl. XI, Figs. 1-4).

♂ Primaries black; cell with a yellow triangular spot at base, another, large, quadrate in middle and three conjoined ones at the distal end, all bordered with black and separated from each other by leathery brown spots; beyond the cell is a curved row of leathery brown spots, the costal one being narrow and yellow and preceding this row on inner margin is a large quadrate yellow spot; a curved subterminal row of round yellow spots, well separated from each other and from the other rows by the black ground color; two terminal rows of small leathery brown spots, the inner one lunulate and more or less tinged with yellow. Secondaries with three postmedian rows of spots, the middle one being largely yellow, the other two leathery brown; a median row of yellow oblong spots considerably tinged with brown and separated from a yellow patch at end of cell by a leathery brown area which at times extends upward to costa; a yellow spot near base of cell and another above anal margin; fringes checkered. Beneath primaries leathery brown, the yellow spots in cell of upper side only faintly repeated but the defining black lines distinct; two subterminal rows of large pale yellow lunules separated from each other by a heavy black line extend across the apical half of wing, bordered inwardly and outwardly by black lines; below vein 3 they become indistinct and more or less lost in the reddish brown ground color; secondaries with the usual subbasal and median rows of spots which are pale yellow, heavily black-bordered and more or less connected by a yellow discal patch; a row of large submarginal lunules bordered heavily with black and preceded by round spots of a leathery brown

color more or less surrounded by pale yellow; terminal and basal areas leathery brown the latter shaded with yellow.

♀. Similar to ♂ in maculation but rather paler and showing a tendency for all the rows of spots on secondaries above to become brown. Expanse ♂ 32 mm.; ♀ 36 mm.

HABITAT: White Mts., Ariz. 6 ♂, 6 ♀. Types, Coll. Barnes.

The species belongs in the *anicia-maria* group and may prove to be a race of either one of these forms; from *anicia* it is easily separated by the much paler shade of the underside ground-color which lacks all the red tints; from both forms it differs in the sharply defined and black-bordered submarginal lunules on primaries above vein 3; the secondaries show a very clean-cut maculation of a decided checker-board pattern, due to the sharp black defining lines of the various bands. There is considerable variation in the color and distinctness of the red and yellow bands of upperside as is usual in this group; a rather larger and brighter colored form of what is seemingly this species, approaching very close to *maria* on the upper side, occurs in the vicinity of Pagosa Springs, Colo., but further study of more material and especially of life-histories will be necessary before the range of each species can be determined or indeed before we can tell whether we are dealing with good species or mere races; for the present we are content to differentiate the form *magdalena* which is readily recognizable and, to judge by about forty specimens before us, runs quite true to type, at least in its type locality.

MELITAEA HOFFMANNI SEGREGATA var. nov. (Pl. XI, Figs. 8-10).

Typical *hoffmanni* as figured by Holland, Butt. Book Pl. 17, Fig. 13, is distinguished by the post-discal area on primaries being largely pale orange with the three bands of spots ill-defined and not well separated by black lines; on the secondaries the three bands of orange spots are large and distinct, the inner one being pale yellowish and composed of large oblong spots, especially in the ♀ (*vide* Pl. XI, Figs. 11, 12).

In a series of specimens from Crater Lake, Oregon, we note a decided deepening of the orange color, combined with an extension of the extradiscal black areas, the bands of spots being better defined on the primaries, especially in the ♀, on the secondaries the middle row of the three extradiscal rows tends toward obsolescence and the inner one is reduced in size. On the under side of secondaries the

black edging to the rows of spots is very heavy and black spots are usually visible in the submarginal orange row much as in *palla*. Occasional specimens approach the typical form in maculation but the normal form in this region is the dark one which seems worthy of the racial name we have proposed above; our types are 6 ♂'s and 4 ♀'s from Crater Lake, Oregon, 6500 ft. (July 24-31).

MELITAEA FLAVULA sp. nov. (Pl. XI, Figs. 14, 15).

We have had in the collection for a long time a series of a *Melitaea* from the Rocky Mt. region which has perplexed us greatly to place correctly and seemingly has caused others an equal amount of trouble as it has come to us labelled *acastus*, *palla* and even *gabbi*; from the typical form of all these species it differs and would seem to be intermediate between *acastus* and *palla*, approaching very close to the Colorado form of the latter species. *Acastus* (Pl. XI, Fig. 13) is a large species, rather pale orange-brown on the upper side and especially characterized by the pale creamy, almost white banding on the underside of secondaries with a light leathery-brown basal area and heavy black border lines; typical *palla* from California is deep reddish-brown on the upper side, intermingled with a considerable amount of black; on the underside the secondaries have the banding very pale yellow with very deep leathery brown basal area and rather heavy black bordering lines; we have Colorado specimens from the vicinity of Denver and Manitou which match up very well with Californian specimens; Wright's figures of these two species (Butt. W. Coast, Pl. XIX, Figs. 175, 176) show the distinctions fairly well although the color has not been very accurately reproduced.

Our new form is rather smaller in wing expanse than either of the allied species, averaging 35 mm.; in the color and maculation of the upper side it is almost the exact counterpart of *acastus* with possibly a slightly greater amount of black in the marginal area; the underside of the secondaries is (as is usual in the group) the most characteristic portion, the pale banding being a very decided yellow, slightly deeper than in *palla*, whilst the leathery brown basal and terminal area is much paler than we find in the nimitypical Californian form; combined with this is the very fine nature of the black bordering lines, especially those of the broad median yellow band; the orange band of spots preceding the large yellow marginal lunules is rather reduced, leaving considerable of the yellow color visible, being in this

respect more like *acastus* than *palla*. With the exception of two specimens our type series of 13 ♂'s bears no more explicit labelling than the state label "Colorado", having been probably collected by D. Bruce; these two specimens are labelled respectively Glenwood Spgs., Colo., and Hall Valley, Colo. We have the species further from Utah (Provo, Salt Lake) and also from the Yellowstone Park Region. The form may prove to be a race of *palla* and with sufficient material from known localities connecting links may be found with the Colorado specimens already mentioned from Denver and Manitou; for the present, however, we see no harm in treating it as a separate species.

## RIODINIDAE

*APODEMIA MORMO DESERTI* var. nov. (Pl. XII, Figs. 1, 2).

We have 3 specimens from La Puerta Valley before us which are distinctive enough to warrant a racial name. The head, patagia and abdomen are partially clothed with pale yellow hairs, primaries from base to postmedian band of white spots pale orange (except at inner margin) with the usual white black-bordered discal spots; beyond this postmedian band the wing is deep gray-brown with a very prominent subterminal row of white spots; secondaries deep gray-brown, slightly tinged at base with orange with the white spots of primaries repeated, the subterminal ones being particularly well-developed; beneath much as in the type form. This is probably a desert race easily distinguished from the type form (Pl. XII, Figs. 3, 4) by its pale coloration and large white subterminal spots; it is slightly smaller in size, the ♂ being 22 mm. and the ♀ 25 mm. in expanse. Our types (1 ♂, 2 ♀) were received from Mr. G. Field of San Diego who captured them on July 11th in La Puerta Valley, S. Calif.; we have similar specimens from Palm Springs, Riverside Co., Calif., on the borders of the Mohave Desert.

*APODEMIA MULTIPLAGA* Schaus. (Pl. XII, Fig. 14).

This species, described from Mexico (1902, Proc. U. S. N. M. XXIV, 404) must be added to our N. Am. Lists; we have a specimen from San Benito, Texas, captured during the latter half of June.

Genus *CALEPHELIS* G. & R.

We have been greatly puzzled by a species from San Benito, Texas, of which we have a good series and for which we can find no valid name.

It differs from *nemesis* Edw. (*australis* Edw.), (Pl. XII, Figs. 8-10) which also occurs in the same locality, by the fact that in *both* sexes the primaries are equally rounded, not sharply pointed in the ♂ sex as we find in *nemesis*; the ♀'s are difficult to separate, but apart from the greater depth of the brown ground-color above they may be generally fairly readily distinguished by the fact that the outer row of black basal dots is much closer to the postmedian silver line

than we find in *nemesis*, resembling in this respect *virginiensis* Gray; from this latter species, however, with which it also agrees in size and wing shape, it is readily separated by the fringes which in *virginiensis* (Pl. XII, Figs. 11-13) are entirely dusky whilst in our Texan species they are checkered with white at apex and inner angle of primaries; the ground color is a much deeper, duller brown and the black row of dots on the underside to which we have already referred is indistinctly geminate whilst in *virginiensis* it is single and very sharply defined. The species can hardly be *laverna* G. & S. which is differentiated from *virginiensis* by the more pointed primaries, nothing, however being said concerning the fringes; as Stichel (Gen. Insect. Riod. p. 161) makes it a race of *virginiensis* we presume the fringes are similar in both forms. We cannot, either, make it coincide with *nilus* Feld. or *argyroclonus* Butl. which Stichel separates apparently in his preliminary remarks (1910, Berl. Ent. Zeitsch. LV, pp. 17, 18) and in the revision proper (l. c. p. 162) treats as synonyms, giving Texas as one of the localities, possibly in error; certainly Goldman and Salvin's figures of *argyroclonus* (Biol. Cent. Am. Rhop. III, Pl. 44, Figs. 5, 6) do not apply to our species.

We propose therefore the name *CALEPHELIS PERDITALIS* (Pl. XII, Figs. 5-7) for this species, our type series (6 ♂, 6 ♀) having been captured at San Benito, Texas, in the latter portion of July; we have also specimens from Brownsville, taken in October, which would indicate at least two generations yearly. We offer the following key to the N. American species of this puzzling group:

- A Size large, over one inch.....*borcalis* G. & R.
- A' Size small, less than one inch
  - B Fringes entirely dusky.....*virginiensis* Gray
  - B' Fringes checkered at apex with white
    - C Primaries of ♂ rounded as in ♀...*perditalis* B. & McD.
    - C' Primaries of ♂ more pointed than in ♀.....  
*nemesis* Edw. (*australis* Edw.)



## LYCAENIDAE

## PHILOTES GLAUCON Edw.

In our notes on this very puzzling group we have twice referred to this species; in Contr. III, (2) 117 we observed that the types were not to be found in the W. H. Edwards' Collection but that a ♂ and ♀ specimen existed in the Hy. Edwards' Collection in the American Museum which we believed to be typical; specimens from Utah which we had compared with these and which to us at the time seemed identical we figured on Pl. XI, Figs. 2, 5, and later after a study of the genitalia (Contr. III, (4), 215) we referred *glaucon* as the Great Basin race of *enoptes*.

On our latest visit to New York, realizing from our recent studies of the group that there were forms with *battoides*-like genitalia which superficially could scarcely be definitely separated from *enoptes*, we examined the genitalia of the ♂ specimen which is labelled *Lyc. glaucon* Edw. in Hy. Edwards' handwriting and found to our chagrin that the genitalia were those of *battoides* and not of *enoptes* and that, if this specimen was typical of the true *glaucon*, our notes were in need of considerable revision.

The first point to be decided was naturally as to whether this ♂ specimen was typical of *glaucon*; as we have already remarked, the species was described in 1871 from 2 ♂, 1 ♀ taken in Nevada and sent by Hy. Edwards, the description of the ♂ being fairly lengthy, of the ♀ merely a few lines, the underside being dismissed with the words "as on male". The specimen in question bears three labels besides the name label, the first is a small printed label "Nevada", the second a circular one with written number "251", and the third the American Museum's Accession label "No. 6122. Coll. Hy. Edwards". In Hy. Edwards' original Catalogue of his Collection which is in possession of the Museum and the necessary portions of which Mr. F. E. Watson has kindly transcribed for us, the number "251" is apparently used for several specimens referred to as *L. battoides* and taken in 1868-9 in June by W. T. Eaves in Storey Co. and Bear Valley; Storey Co. is in Nevada and contains Virginia City, the Bear Valley mentioned being probably a valley of that name in the vicinity of Lake Tahoe, Calif.; evidently therefore our ♂ specimen in question, as it

bears the label "Nevada", was taken in the hills around Virginia City, Nevada in 1868 or 1869 and could very well have been one of the type lot from which the description in 1871 was made; comparing it with the description it agreed excellently in every particular except that the fulvous suffusion on underside of primaries on the two submarginal spots above the anal angle was not present and this, judging from our series of some of the other forms, is a variable feature; we would note that the fulvous spots on upperside of secondaries are present, also the broad submarginal fulvous band on underside with a median row of heavy spots as on primaries as mentioned in the original description, and finally that it is distinctly allied to *L. battoides* Behr as stated by W. H. Edwards.

As regards the ♀ specimen in the collection under this name it is probable that it was captured at a much later date than 1871 as it bears a label "7116" and this number is included in a supplementary catalogue which we believe only contained the most recent acquisitions to the collection; in any case, it is one of those unfortunate intermediates which it is almost impossible to place exactly and has the median row on underside of secondaries composed of very small spots which rather contradicts the original description. While the ♂ specimen cannot be considered as a type, we do think that we are justified in calling it typical and until further evidence to the contrary can be produced it will represent our idea of the species. This specimen, which was kindly loaned to us by the Museum authorities, we have compared with the various races in our collection and find it most closely approached to *centralis* B. & McD. although not exact, this latter race showing more smoky suffusion above anal angle of primaries on underside and having a deeper ground color. Roughly speaking *battoides* Bdv. with its race *oregonensis* B. & McD. may be separated from *glaucon* Edw. with its forms *intermedia* B. & McD. and *centralis* B. & McD. by the heavy black basal fringe line on underside; the genitalia of all of these forms seem similar and it will be a question for field workers to solve as to whether we are dealing with two species or merely races of a single one; our series of the forms with narrow fringe line is quite limited but we doubt if this will prove a constant means of separation when more material is available and personally we incline to the view that *glaucon* and its related forms are merely low altitude races of *battoides* which is typically a race of the highest

Sierras; the southern race, *bernardino* B. & McD. may be readily recognized by its smaller size and whiter underside.

For the form with *cnoptes*-like genitalia which we have been erroneously calling *glaucon* and which we figured in our Contributions, Pl. XI, Figs. 2, 5, a new name will be needed and we propose using *ANCILLA*; the form is so similar to the true *glaucon* in maculation as to render our misidentification almost excusable; we can point to no obvious specific differences although there is a tendency, especially in the ♀, towards a rather rougher squamation on the underside and a thickening of the black basal fringe line; the ♂'s show only traces of fulvous on upper side of secondaries; we regard it as a race of *cnoptes* from which it may be distinguished by the continuous fulvous band on the underside of secondaries which in typical *cnoptes* is always broken into small spots; the black spots are also heavier. Our type specimens are a series of 6 ♂, 4 ♀ from Eureka, Utah (July 1-7) two of which are figured as *glaucon* on the above mentioned plate; we also possess numerous specimens from other localities in Utah and Colorado.

We cannot agree with Mr. R. C. Williams that *glaucon* Edw. is the same species as our *spaldingi* (Ent. News XXIX, 101); Edwards in his description of the underside of the secondaries of *glaucon* distinctly states that a *broad orange stripe* occupies the space between the two submarginal rows of spots; this does not at all apply to *spaldingi* in which the red area is reduced to crescent-shaped spots and the inner row of spots is almost lacking; the median row of spots is also not pronounced enough to fit in well with Edwards' diagnosis.

## HESPERIIDAE

## PAMPHILA HORUS Edw.

This species was placed in our List next to *Lerema accius* A. & S. following the generally accepted idea. A recent examination of the type ♀ in the Cambridge Museum shows that it has nothing in common with this species; the stout antennal club with short point at once separates it generically from *accius* which has a rather slender club with long bent point. *Horus* would seem to be best associated, therefore, with the *Pamphila* group of genera but until the receipt of a ♂ specimen its exact position is doubtful. The type is a rather large, almost unicolorous brown, specimen, as large as a good-sized *attalus* or *leonardus* ♀, and may be a melanic form of some well-known species; the only traces of maculation are semihyaline subterminal spots in the interspaces of veins 2 and 3, and 3 and 4 on the underside and the usual small costal spots, all of which are however very obscure.

## ATRYTONE KUMSKAKA Scud.

This species, described in 1887 (C. Ent. XIX, 45), has been omitted from our list and indeed from all recent lists except Skinner's Supplement to the Diurnal Catalogue; it is based on specimens from Denison, Iowa, misidentified as *conspicua* Edw. by Scudder in his paper in Tr. Chicago Acad. Sci. I, 336, on Iowa butterflies. Judging by the description the species must be very close to *byssus* Edw. which, however, we only know from Florida; the ♂ genitalia of this species, viewed superficially, also shows a close resemblance to Scudder's figure of this organ; material from Iowa, however, is much to be desired in order to definitely establish the identity and relationship of this species.

## SATURNIIDAE

HEMILEUCA ELECTRA CLIO var. nov. (Pl. XIII, Figs. 1, 2).

As compared with typical *electra* from the San Diego region this Arizona race differs as follows: the thorax and patagia are black, the latter bordered with pale yellowish (in *electra* this whole area is covered with mixed black and pale yellow hairs); with the exception of the pale median band enclosing the reniform the whole of the primaries are black (in *electra* there are two whitish basal streaks and considerable pale subterminal markings); the median pale band is much as in typical *electra* but the central pale lunule in the round black spot is rather narrower than usual. The secondaries are a rich deep brick-red much more heavily scaled and deeper in color than in *electra*, the ♀ before us showing considerable blackish suffusion beyond the discal mark; in our ♂ specimen this mark is merely a round black patch without pale central dash, in the ♀ a narrow pale central streak is present. Beneath the color is much deeper than in the typical form and the pale abdominal rings are narrower. Expanse ♂ 52 mm.; ♀ 63 mm.

HABITAT: Kingman, Ariz. (Oct.) 1 ♂, 1 ♀. Types, Coll. Barnes.

## ARCTIIDAE LITHOSIINAE

GENUS *ILLICE* Wlk.

The species of this genus offer in the ♂ genitalia excellent points of differentiation which can in most cases be seen without removing the abdomens as the sexual organs protrude; we have made no slides of these organs but an examination of the claspers under a lens is sufficient to show that there are several distinct types, a study of which clearly proves that our present arrangement is faulty.

We have already (Contr. III, (3), 157) separated *tcuifascia* Harv. from *unifascia* G. & R., placing the former in the genus *Ozodania* Dyar which at least serves to call attention to the protruding tuft of hair in the ♂ along the anal margin of the secondaries; with the types of both these species undiscoverable there is of course the possibility of an error of determination on our part, but we have made our determinations fit as closely as possible the rather inadequate original descriptions and must leave the matter standing as it is for the present.

The clasper of *unifascia* is strongly bifurcate, showing a long dorsal and a similar ventral prong; we have a series of a form from the vicinity of Brownsville, Texas, which shows the same type of clasper but differs in maculation in having the transverse band broken into a small triangular costal spot and a similar larger one on inner margin, the apices tending to meet in the center of the wing; an ochreous streak along inner margin as in *unifascia*; the ochreous portions are rather paler than in *unifascia* and the pink of the secondaries inclined toward flesh-color with generally a distinct dark costo-apical spot; the ♀'s are rather smaller as a general rule and show a greater tendency to have the band complete. As the form is quite readily recognizable and in order to distinguish it from similar forms of *tcuifascia* we propose for it the name of *RUPTIFASCIA* (Pl. XIV, Fig. 5), considering it for the present as a race of *unifascia* (Fig. 4); our types are 8 ♂ and 5 ♀ from Brownsville and San Benito, Texas, captured on various dates from March to June, probably indicating several generations.

*Kentuckiensis* Dyar we do not know; it was described (1904, Proc. Ent. Soc. Wash., VI, 198) as a broad-banded form of *unifascia* and as such we leave it.

*Perrosca* Dyar, (l. c. p. 198) (Pl. XIV, Fig. 7) also described as a variety of *unifascia*, is a good species; the clasper is broad at the base, narrowing suddenly into a long slender prong bent inwards towards the apex and touching that of the opposite side; *angelus* Dyar, (Pl. XIV, Fig. 8) described as a good species, (l. c. p. 198) has a very similar type of clasper and may prove to be a racial form, although easily separable on maculation with its entirely ochreous thorax and broad band on basal two-thirds of inner margin.

*Barnesi* Dyar (Pl. XIV, Fig. 10) is a good species and not a form of *unifascia*; the clasper has a broad basal portion similar to that of *perrosca* but instead of being produced into a long slender point it shows a long prong arising from its dorsal margin and bent sharply downward with a short tooth on the inner margin of the prong near the base; the species occurs in two color forms; the typical form has pink secondaries; for a rather rarer form with yellow secondaries we propose the name *FLAVULA*, our types being 3 ♂ and 1 ♀ from Glenwood Spgs., Colo.

We have 4 specimens before us from Texas (no further locality on label) which superficially in size and maculation bear a close resemblance to *angelus* but which show a type of clasper very similar to *barnesi*; the thorax is entirely yellow, the primaries have a broad yellow band along inner margin and a transverse yellow postmedian band considerably narrowed in central portion; the secondaries are pink with a smoky patch at apex descending to about the center of the outer margin; there is a slight trace of sexual hairs along the anal margin in the ♂ but scarcely sufficient to warrant placing the species in *Ozodania*; we propose the name *PICTA* (Pl. XIV, Fig. 11) for this species, which is probably confused in collections with *unifascia*, although considerably larger in size; our types are 1 ♂, 3 ♀ received at various times from older collections which accounts for the lack of data on the label.

According to the form of the claspers we believe *libromacula* Dyar (Pl. XIV, Fig. 6) must be considered a good species and not a form of *dorsimacula* (Pl. XIV, Fig. 12) as placed in our List; in *libromacula* the distal end of the clasper is evenly long and narrow,

ending in a slight knob with a few bristles; in *dorsinacula* the end of the clasper is decidedly spoon-shaped and terminated by a distinct spine approaching in this respect *faustinula* Bdv., the clasper of which seems to have an identical shape; *ncxa* Bdv., which Williams claims (1905, Ent. News, XVI, 257) to be merely a form of *faustinula* has a decidedly different form of clasper, more allied to that of *liberomacula* but with the narrow distal end shorter and the base broader. Stretch's figures (Zyg. Bomb. N. Am., Pl. 2, Figs. 10, 11) should serve to readily distinguish *ncxa* and *faustinula* and we can only conjecture that Williams either collected unknowingly the larvae of both species which possibly show no particularly distinctive features or else that his identifications of Boisduval's species were incorrectly made.

A form of *liberomacula* which is seemingly commoner than the type form and which is distinguished by the presence of a white streak above the inner margin from the base to the postmedian white spot, is without a name; we propose for this form the name *BASIJUNCTA* (Pl. XIV, Fig. 9), our type series being numerous specimens from San Diego, Calif.

## ARCTIINAE

*EUBAPHE LAETA* Guer.

The figure given of this species (Icon. Reg. Anim. Ins. Pl. 88, Fig. 6) would seem to point to the typical form as being the southern one, common in Florida, characterized by small size and considerable brown shades in the color of the primaries; the northern race we had separated in our List under the name *rubropicta* Pack. based on a specimen from Rangeley, Me.; we have, however, recently seen the type of *treata* Grt. in the Cambridge Museum Coll. and believe that this name will take priority over Packard's, based as it is on a Massachusetts specimen. We could not find the type of *rubropicta* at Cambridge but judging by material before us from Maine the two names are synonymous. The northern race is larger and the primaries show much more of a gray tint than we find in the typical form; the race extends westward to northern Illinois and Manitoba.

*EUBAPHE FRAGILIS* Stkr. (Pl. XIV, Fig. 13).

An examination of the type of this species in the Field Museum, Chicago, shows that it agrees structurally (length of palpi) with *immaculata* Reak. and probably is merely the Colorado race of this



species; some of our Colorado material can hardly be separated from Eastern specimens. The species which has been generally going under the name of *fragilis* has much shorter palpi and we believe is a Colorado race of *costata* Stretch from Texas, distinguished by the flesh colored primaries instead of the mouse gray found in typical *costata*; due to this color the scarlet costa and discal spot are much less noticeable, the latter in fact being at times quite lacking; the secondaries are only slightly deeper in color than the primaries so that the whole insect has a much more unicolorous appearance than *costata*.

As this form is apparently quite constant we propose for it the racial name *COSTATA PALLIPENNIS* (Pl. XIV, Fig. 14), our types being a series of specimens from Glenwood Spgs., Colo. (July).

#### DIACRISIA VAGANS Bdv.

The synonymy of this species is considerably involved and although a number of authors have attempted to elucidate the matter, each seems to have arrived at a separate conclusion. *Vagans* was described by Boisduval in 1852 (Ann. Soc. Ent. Fr. X, 322) as follows: "Size of the largest specimens of *fuliginosa*. Primaries and thorax yellowish-gray. Secondaries black with the fringe broadly yellowish-gray. Abdomen blackish-gray. Beneath the four wings are yellowish gray with a black lunule on the disk of each. ♂ Antennae rather strongly pectinated." The type locality was given as Northern California.

In 1855 in Bull. Soc. Ent. Fr. III, 32, the name *rufula* is given by Boisduval to a series from California which he intended to describe and which is here very briefly characterized as having "the primaries of a ruddy-brown with a blackish discal spot and transverse streak (raie transverse); the secondaries are blackish with ruddy-brown fringe; the body is without spots, reddish like the primaries."

Later in 1869 (Lep. de la Calif. pp. 79-80) Boisduval goes into further details regarding these two species, giving the size of *rufula* as equal to that of *mendica* and calling attention to the great variability in color in both sexes of both species; he quotes Lorquin as stating that the larvae are different and separates the two species on the strength of a bent extradiscal line on primaries in *rufula* which is lacking in *vagans*.

In the meantime Packard (1864, Proc. Ent. Soc. Phil. III, 123) had described his *punctata* in his Synopsis of the Bombycidae of North

America. Stretch in 1874 (Zyg. & Bomb. N. Am. p. 192) sinks both *rufula* and *punctata* to *vagans*, calling attention to the fact that larvae producing ♂'s are differently colored from those producing ♀'s and proving that Boisduval's characteristic point of distinction for *rufula* will not hold good in a bred series; he errs in quoting Boisduval as saying the size of *vagans* is that of "very small specimens of *fuliginosa*"; Boisduval uses the words "plus grands" in this connection.

On the strength of Stretch's synonymy Hy. Edwards described (1874, Pac. Coast Lep. 27) *Spilosoma pteridis* from Vancouver Island as new but later (l. c. p. 43) states that he and Stretch had come to the conclusion that *pteridis* was a synonym of *vagans* Bdv. which was after all distinct from the Central Californian *rufula* Bdv. (*punctata* Pack.)

A recent examination of the type specimens shows that *pteridis* Hy. Edw. is exactly the same thing as *danbyi* Neum. described from Victoria, B. C. (1893, Ent. News, IV, 141) as a variety of *rubra* Neum. which still further involves the synonymy as *rubra* has been listed as a good species by both Hampson and Dyar and also in our recent list; after studying the types we can see nothing except color whereby to separate *rubra* and *danbyi* and believe they are correctly listed as forms or races; however, *pteridis* Hy. Edw. must certainly take priority and if Hy. Edwards' conclusions be followed then the correct name for this species would be *vagans* Bdv. This is a matter impossible to be determined by us without a knowledge of the actual type specimens, presumably with M. Oberthur in Rennes, France. The size given by Boisduval for *vagans* rather contradicts Edwards' theory as *pteridis* is much smaller than the largest *fuliginosa*; judging by descriptions alone we incline to think that *vagans* was originally based on rather dark immaculate ♂'s and *rufula* on a ♀ of one and the same species and that later (1869) Boisduval, having received more specimens, tried to divide them up between his two so-called species with rather indifferent success as he himself states they may be mere varieties of one species and again makes no mention of the quite obvious difference in size to be found between *pteridis* and *rufula*. For the present therefore we shall follow Stretch in listing *vagans* Bdv. *rufula* Bdv. and *punctata* Pack. as referring to a single species which we figure on Pl. XIV, Figs. 1 and 3.

In March, 1881, Hy. Edwards gives the name *proba* (Pap. I, 39) to the mountain form of *vagans* (*punctata*) distinguished by "having the secondaries always concolorous with the primaries in both sexes and by the maculate band being more broken up into spots." In Oct., 1881, Butler, misidentifying the ♀ *vagans* as *rubra* Neum. described as a new species under the name *walsinghami* a single red ♀ from Rogue (not Rouge as given) River, S. Oregon; our own collecting experience in the Shasta region of Northern California proves conclusively that *walsinghami* is nothing more than the ♀ of *proba* Hy. Edw.; the race, as stated by Hy. Edwards, seems perfectly constant, the ♂'s (Pl. XIV, Fig. 2) being dull ochreous with more or less black spotting on both wings and the ♀'s (Pl. XIV, Fig. 17) rather bright crimson with very little black on secondaries.

*Kasloa* Dyar (1904, Proc. Ent. Soc. Wash. VI, 18) would seem to be a northern race of *vagans*, characterized by the bright ruddy wings in both sexes; there is considerable variability in the maculation of secondaries and pale specimens show a close resemblance to *proba* Hy. Edw. which, however, we have never seen in the ♂ sex with ruddy suffusion.

*Bicolor* Wlk. (1862, Tr. Ent. Soc. Lond. I, 270), a species omitted by Hampson but listed by Dyar, seems correctly referred by the latter to *vagans*.

As far as our material permits us to judge, *ptericidis* Edw. (Pl. XIV, Figs. 15, 16) may be separated from *vagans* and its forms, apart from its smaller size, by the fact that the secondaries in both sexes are black right up to the base of the fringe, whereas in those specimens of *vagans* which show black secondaries we find a distinct pale marginal area, a fact which fits in excellently with Boisduval's characterization "fringes broadly yellowish-gray". In typical *vagans* the ♂'s range in color from yellowish-ochre to deep smoky brown—we have never seen any red ♂'s nor had apparently Stretch—the ♀'s from ruddy-brown to bright brick-red, the secondaries in both sexes being more or less heavily suffused with black; the race *proba* Edw. has pale ochreous ♂'s and bright red ♀'s with secondaries concolorous with primaries, and the race *kasloa* Dyar has red wings in both sexes with the secondaries showing all forms of variation between black and red in which latter case there is a more or less distinct maculate submarginal black band.

In conclusion we offer the following synonymy to replace that of our List:

- 955 *vagans* *Bdv.*  
     ♀ *rufula* *Bdv.*  
     ♂ *punctata* *Pack.*  
     ♂ *bicolor* *Walk.*  
 a *proba* *Hy. Edw.*  
     ♀ *walsinghami* *Butl.*  
 b *kasloa* *Dyar.*  
 956 *pteridis* *Hy. Edw.*  
     *danbyi* *Neum.*  
 a *rubra* *Neum.*

*APANTESIS ORNATA HEWLETTI* var. nov. (Pl. XIII, Figs. 3, 4).

We have received from Miss Esther Hewlett of Nellie, San Diego Co., Calif., specimens of an apparent race of *ornata* which on account of the fact that it is very liable to be confused with *gencura* Stkr. (*incorrupta* *Hy. Edw.*) and its forms seems worthy of being named. It differs from typical *ornata* in having the subbasal half-band always well developed; as in *ornata* the veins are only marked in white along the outer margin, vein 1 being also slightly marked at base of wing.

The subbasal line is very occasionally met with in *ornata* but generally speaking it is entirely absent or confined to a slight creamy mark on costa; French's figure of his ♀ *shastaensis* (*Can. Ent.*, XXI, 162) is one of these instances; the specimen, however, is in other respects distinctly aberrant and our own collecting experiences in the type locality show that the normal form is without this band; the ♂'s of *shastaensis* from the same locality French considered to belong to *gencura* Stkr. (l. c. p. 162) although we are convinced that the two were merely sexes of one species; these ♂'s were, according to description, perfectly normal *ornata*. We therefore do not believe that the name *shastaensis*, based on an aberrant ♀ from a totally different locality, can be applied to the present form.

We have also received larvae from Miss Hewlett and these, although not yet full grown, correspond well with Gibson's description of Stage VI of *ornata* larvae (*Can. Ent.*, XXV, 122). Miss Hewlett tells us that captured specimens are generally of the form with scarlet secondaries whilst her bred specimens have almost invariably shown yellow secondaries, due probably to change in the amount of moisture

in her breeding cage as compared with out-door conditions. Our types (♂ and ♀) are both of the yellow-winged form; we do not care to propose a name for the red-winged one, as both occur equally frequently in nature in all the forms of *ornata*; we also have specimens from the vicinity of San Diego which show the lining on the veins as in *achaea* G. & R. as well as the sub-basal band of *hewletti*, an additional proof, if necessary, that in Southern California we find a race of *ornata* with normally well-developed sub-basal band.

PYGARCTIA EGLIENSIS Clem.

This species has generally been considered to be the same as *inopinatus* Hy. Edw. and placed by Hampson and Dyar in the genus *Am-malo* Wlk. A careful reading of Clemens' prefatory remarks to this species (1860, Proc. Acad. N. Sci. Phil. pp. 532-3) shows that the anterior tibia terminates "in front in a rather long curved spine" which at once precludes the present association. We therefore in our recent list transferred *eglenensis* Clem. to *Pygarctia* and left *inopinatus* Hy. Edw. as the correct name for *eglenensis* Auct.; we have not yet identified the species.

HALISDOTA DAVISI Hy. Edw.

In our list we placed this as a synonym of *cinctipes* Grt. but agree, after seeing the type, with Rothschild (Nov. Zool. XVI, 282) and Dyar (Proc. U. S. Nat. Mus. XLII, 52) that it should be treated as a good species; it is readily recognized by the paucity of the maculation of primaries which is usually reduced to the costal and discal spots. Dr. Dyar considers it an offshoot of *underwoodi* Roths. but we can hardly concur with this; to us it would seem to be more probably an immaculate form of *schausi*, the ground color being similar in both species. Dr. Dyar lists the true *cinctipes* (which is a Cuban species) from S. Florida (Proc. Wash. Ent. Soc. IV, 452); we have seen no Florida material of the typical form, our only Miami specimen being a small, rather faintly marked ♂, apparently closer to *schausi insularis* Roths. than to typical *cinctipes*; however the occurrence of the typical form there is very probably and in any case our material is far too scanty to warrant any definite statements regarding this extremely puzzling group.

ARACHNIS PICTA VERNA var. nov. (Pl. XIII, Figs. 5, 6).

We have received a series of an *Arachnis* from a correspondent in Three Rivers, Tulare Co., Calif., which does not exactly match any of the named species or races of this genus. In the ♂ sex it is closest in maculation to *maia* Ottol. (Pl. XIII, Fig. 7), the maculation and color of primaries on upper and under sides being practically identical; the secondaries however on the upper side show none of the hyaline nature so characteristic of the Coloradan *maia* but are evenly pink with three broken rows of black spots much as in *hampsoni* Dyar; the underside shows the same white costal spots which we find in *maia* and is otherwise similar to the upperside in markings. In the ♀ sex the dorsal dark gray markings are less broad than in *maia* (Fig. 8) and more as in *citra*, i. e., the basal segments show a narrow dark median line broadening gradually towards anal segment into triangular or diamond-shaped patches; the banding of the secondaries is also more as in *citra* for the subterminal blackish band is broken into spots, not broadly continuous as in *maia*, and the terminal border is somewhat reduced. As our series is very constant in these respects and as we also possess a single ♂ specimen from Eureka, Utah with similar maculation we believe we are justified in proposing the above racial name for this form which we take pleasure in naming after Mrs. Verna Fry, the collector; the status of the various forms needs carefully working out with due regard to genitalia and larvae before we can know whether we are dealing with several species or merely races of  *picta*; if *citra* should prove to be a good species our new form will probably become a western race of it characterized by the whiter coloring of the bands; for the present we treat it as a race of  *picta*; our types series consists of 3 ♂'s and 6 ♀'s all from the above mentioned locality.

APANTESIS FRANCONIA Hy. Edw.

In our recent List we made this a form of *figurata* Dru. with *preciosa* Nixon as a synonym; in the Hy. Edwards Coll. there is no specimen marked "type" but under *celia* is a specimen labelled "Franconia N. H. (Slosson)" which may possibly be the original type specimen if this is not in Mrs. Slosson's Collection. According to this specimen we believe Dr. Dyar is correct in listing *franconia* as a synonym of *celia*, which leaves the name *preciosa* Nixon for the yellow form of *figurata*; *celia* may be a small northern race of *figurata*, agreeing as it does in general type of maculation, but until exact details concerning the larvae are available any such reference would be premature.

**NOCTUIDAE**  
**AGROTINAE**

*SCHINIA TERRIFICA* sp. nov. (Pl. XVIII, Fig. 14).

Fore tibiae with one large inner claw and a couple of spines and several (2-4) smaller outer claws; head and thorax whitish-ochreous, the patagia slightly shaded with pale olivaceous; primaries with basal area light pink, bounded outwardly by the slightly deeper t. a. line which is strongly bulging on median vein; median space pale whitish ochreous crossed by a broad olivaceous brown median shade which occupies most of this space at inner margin and contains below costa a diffuse blackish reniform spot; outer margin of median space forms t. p. line which is not otherwise indicated, being evenly sinuate with veins somewhat dentated by white markings; subterminal space pink, this color extending through the terminal interspaces to outer margin, the veins themselves being broadly bordered with whitish, giving a marked striate appearance; fringes checkered white and olive-brown; secondaries white, shaded with smoky at base and along inner margin and with a broad terminal dark band, broken somewhat by whitish shades with a faint pink sprinkling; a large diffuse discal spot. Beneath whitish, shaded outwardly with pink and smoky and with large discal spots on all wings. Expanse 33 mm.

**HABITAT:** Colorado (Osler, Bruce). 4 ♂, 1 ♀. Types, Coll. Barnes.

This species has been for years in our collection under the name of *gloriosa* Stkr.; a recent study of the type (which we figure on Pl. XVIII, Fig. 15) shows that this latter species is very closely related to *sanguinea* Geyer of which it may be merely a form or race; our Colorado species is a much paler and more diffusely marked form.

*HEMIGROTELLA* gen. nov. (Type *Hemigrotella argenteo-striata* sp. nov.).

Palpi oblique, short, heavily scaled; squamation of head and thorax smooth, scaly; front somewhat roundedly protuberant but without tubercle; fore tibia with strong terminal claw, unspined; mid tibia with inner row of large spines; hind tibia with single spine between the spurs; venation normal; primaries long, narrow, costal and inner margins subparallel.

H. ARGENTEOSTRIATA sp. nov. (Pl. XVII, Fig. 15).

Palpi, head and thorax white, patagia tinged with yellow; abdomen light gray; primaries yellow-ochre with a silver costal stripe narrowing towards apex and three broad silver stripes, one from base to middle of wing below cell, the second from cell to near outer margin, the third, smaller, triangular,

below apex of wing; fringes white; secondaries white, tinged with smoky, especially in ♀. Beneath silvery-white. Expanse 24 mm.

HABITAT: Palm Spgs., Riverside Co., Calif. (Mch., Apr.). 8 ♂, 3 ♀. Types, Coll. Barnes.

GROTELLA SPALDINGI B. & McD. (Pl. XVII, Fig. 16).

We have before us long series of this species from Palm Springs, Riverside Co., Calif., and Olancha, Inyo Co., Calif.; there is a tendency in the Californian form to show a distinct checkering in the fringes which in our typical Utah series is lacking; this feature is however not constant as a number of our Olancha specimens are entirely without it and cannot be separated from the Utah form. We figure a specimen with the checkered nature of the fringes well defined.

EUXOA CINNABARINA sp. nov. (Pl. XV, Fig. 1).

Head and thorax rich cinnamon-brown, collar crossed by a pale band above base; primaries cinnamon-brown with the median space deeper in color than remainder of wing; subcostal and median veins outlined in white to end of cell, the angle between them at base of wing more or less filled with whitish, vein 1 faintly white marked; basal half line indicated by a whitish streak on costa; t. a. line blackish, regularly dentate, slightly outwardly oblique, bordered inwardly at costa with whitish, which is continued across wing as a paler brown shade than ground color; orbicular obliquely oval, outlined in yellowish and black and filled with brown; reniform lunate, similar to orbicular in color with slight whitish filling in lower portion; claviform a small dark loop; t. p. line dark, dentate, bent out below costa, incurved below cell, bordered at costa by a white line outwardly continued faintly across wing by a yellowish shade; s. t. line distinct, irregular, pale yellowish; slightly shaded inwardly by smoky; a black broken terminal line; fringes ruddy at base, paler outwardly. Secondaries light smoky with pale fringes and a rather well-marked discal lunule. Beneath whitish ochreous, tinged with pinkish along costa of both wings, broadest on secondaries; a discal spot on all wings, that of primaries more or less surrounded by smoky shading; abdomen ochreous above, pinkish beneath. Expanse ♂ 33 mm.; ♀ 41 mm.

HABITAT: ♂ Monachee Meadows, Tulare Co., Calif. (Aug.); ♀ Nellie, S. Diego Co., Calif. (July). 3 ♂, 1 ♀.

This handsome species belongs close to *divergens* but is readily recognized by the bright cinnamon color of the primaries; it lacks the black basal dash of *divergens* Wlk.

AGROTIS FORTITER sp. nov. (Pl. XV, Fig. 4).

Palpi, head, thorax, and primaries deep unicolorous purple-brown, the latter slightly shaded with grayish; maculation very obscure, t. a. line indicated



by a few black dots on veins; t. p. line rather better defined, bent outward below costa, incurved in fold with black dots on veins just beyond it giving a dentate appearance; reniform and orbicular obsolete; terminally the veins are finely black-lined; an ochreous line at base of fringes. Secondaries white basally with broad smoky terminal shading and pale ochreous basal fringe-line. Beneath primaries smoky gray, rather iridescent basally, with curved black post-median line; secondaries hyaline white broadly sprinkled with smoky-brown along costa, this portion crossed by a continuation of the dark line of primaries. Expanse 35 mm.

HABITAT: Stockton, Ut. (Spalding) (July 30); Glenwood Spgs., Colo. (July 8-15). 2 ♀. Types, Coll. Barnes.

Closely resembles *exculpatrix* Dyar but differs in lacking the distinctly black front of this species, the head and thorax being concolorous; the veins are also much less distinctly outlined in black; in respect to the concolorous nature of the front, it agrees with *corrodora* Sm. but the primaries show none of the red-brown coloring of this species nor the heavy black veining.

#### ANYTUS CONNECTA Sm.

This species, described as a *Polia* and placed in our list in the genus *Eumichtis*, must be transferred to the genus *Anytus* as the mid tibiae are rather feebly spined and the hind tibiae show constantly a single spine between the spurs; the species is well figured by Smith (Tr. Am. Ent. Soc. XVII, Pl. III, Fig. 2) and while allied to *discors* Grt. should be readily recognizable by the large pale orbicular and the white shading beyond the t. p. line above the inner margin; the type locality is Glenwood Spgs., Colo., and besides specimens from there which we have compared with the type in the National Museum we have series from Eureka, Utah, and Palmerlee, Ariz.; *cupola* Hamp. described from material from Eureka, Utah, (Ann. Mag. N. Hist. (8) XII, 590) may prove to be a synonym but without a knowledge of the type we are unable to definitely place this species.

#### PRONOCTUA PYROPHILOIDES PEABODYAE Dyar.

This form was described in a paper entitled "List of Lepidoptera taken at Williams, Ariz." from a single ♀ with pinkish ground color instead of the gray color of Californian specimen; Dr. Dyar mentions also a ♂ taken at Bluff, Utah. Both these specimens are marked "type" in the National Museum, but it seems well to restrict the type to the ♀ specimen from Arizona as the ♂ is very worn and the

pinkish color is doubtless due to discoloration, as a careful examination showed us traces of the original gray ground color on a small section of the primaries.

*PROTAGROTIS EXTENSA* Sm. (Pl. XV, Fig. 2).

This species, at present listed under the genus *Luperina*, should be transferred to the genus *Protagrotis* Hamp. as the hind tibiae show a single spine between the upper and lower pairs of spurs. The species is closely related to *niveivenosa* Grt. but lacks the white veins of primaries and is generally deeper in color.

### HADENINAE

*SCOTOGRAMMA FULGORA* sp. nov. (Pl. XVI, Fig. 9).

Head and thorax deep gray, collar tipped with white and crossed by a black line; patagia with well defined black line near upper margin; primaries dark smoky gray; a slight black dash at base; t. a. line obsolescent, geminate, thrice dentate, preceded above inner margin by an oblique smoky shade; claviform prominent, large, outlined in black and filled with smoky; orbicular a decumbent oval, outlined in white; reniform moderate, filled with a smoky shade in lower portion, incompletely outlined in white and black toward costa; t. p. line obsolescent, geminate, sinuate; s. t. line prominent white, forming a distinct W mark on veins 3 and 4, angled outwardly below costa and bent out on vein 1 to outer margin, preceded by dark streaks in central portion; terminal dark broken lunulate line; fringes smoky-gray cut by paler opposite the veins. Secondaries whitish with a broad smoky terminal suffusion and veins outlined in smoky; fringe pale with central dusky line. Beneath primaries smoky, sprinkled with white along costa and outwardly with prominent dark discal lunules; secondaries whitish, heavily sprinkled with smoky especially along costa and outer margin. Expanse 27 mm.

HABITAT: Olancha, Inyo Co., Calif. (Apr.) 1 ♂. Type, Coll. Barnes.

The species has probably been confused with *hadeniformis* Sm. but differs structurally, this latter species possessing a lunulate frontal prominence with large central tubercle, whereas our species has merely a rounded protuberance as in *trifolii*. We have three other specimens collected by O. Poling in Southern Utah.

*POLIA IMPOLITA* Morr.

The identity of this species has been for years more or less of a puzzle; in our list we followed Hampson, placing the species in *Scotogramma*, but it was unknown to us at the time. The species was described from a single specimen received from Prof. Bélanger of Quebec

and recently through the kind offices of Mr. G. Maheux, Provincial Entomologist of Quebec, we have been able to trace this type in the Collection of Laval University, Quebec, and have received a photograph of the same. It turns out to be the same species as *cristifera* Wlk. and the name must therefore be removed from *Scotogramma* and sunk as a synonym of this earlier name.

*POLIA SUBJUNCTA* G. & R.

This species has a very wide range extending from the Atlantic to the Pacific and from British Columbia on the north to Southern California in the south; it is not surprising, therefore, that several more or less well defined races can be separated; one of the best marked of these we have received from Southern California, it differing from the typical form of the Atlantic States in the general much lighter and grayer color and the almost entire absence of the carneous shades, especially beyond the reniform; above the basal streak and beyond the claviform the reddish shade still persists, but the general impression is that of a distinctly gray species. We propose the racial name *ELEANORA* for this form, our type series consisting of 2 ♂ and 6 ♀ from Nellie, Palomar Mt., S. Diego Co., Calif. We figure the form on Pl. XVI, Fig. 1.

*POLIA HANHAMI* B. & McD.

In Central and Southern California this species assumes quite a different aspect from that of the typical Vancouver Is. form (Pl. XVI, Fig. 6); in the Californian race (Fig. 5) the ground color of primaries is a pale flesh-color and the rather heavy blackish suffusion in the median and terminal spaces is greatly reduced, the dark median shade and the black-filled lower portion of reniform show very clearly in consequence; this latter has a couple of whitish dots on each side of the black filling but there is no trace of any white suffusion beyond the reniform as is often seen in the typical form. We propose the racial name *SEMICARNEA* for this form, our type series consisting of 4 ♂ and 3 ♀ from Camp Baldy, S. Bernardino Co., Calif. (June-July); we also have the species from Middle Calif. and Nellie, San Diego Co., Calif.

*POLIA PULVERULENTA* Sm. (Pl. XVI, Figs. 2, 3).

Through the kindness of Prof. H. T. Fernald of Amherst, Mass., we have received a photograph of the unique type of this species con-

tained in Mrs. Fernald's Collection, now in the possession of the Massachusetts Agricultural College; the species is a good one and not a form of *assimilis* as listed; it is one of those northern forms which extend across the entire continent and is apparently commoner on the Pacific coast than in the east; we have a series of specimens from Ketchikan, Alaska, and have seen several from the vicinity of Victoria, B. C.; it is also reported from various localities in the Canadian Rockies and from Winnipeg, Man. Mr. Wolley-Dod's remarks in the Report of the Ent. Soc. Ont. for 1910, p. 110 concerning the species are perfectly correct and it was due to the fact that our attention was called to this note by Mr. E. Blackmore of Victoria that we were spared from describing the Pacific coast specimens as a new species. The ♂ genitalia, while essentially of the same general type, show sufficient difference from *assimilis* in the finer detail to leave no doubt as to its specific distinctness; our series shows considerable variation in the size and shape of the spots and in the distinctness of the maculation; we figure a couple of specimens to illustrate this.

*EPIA AMABILIS* sp. nov. (Pl. XVI, Fig. 4).

Head and thorax deep smoky gray, collar crossed by a black line; pro and mesothoracic tufts tipped with black; primaries deep gray; basal half-line geminate, inner line black, broken, outer one gray, indistinct; t. a. line outwardly oblique, geminate, almost rigid, inner line gray, outer black; t. p. line rather squarely exerted around cell, strongly incurved in the submedian fold, geminate, inner line black, outer gray, slightly crenulate; median space below cell black shaded, obscuring a small black claviform, orbicular large, round, pale with darker central area; reniform moderate, lunate, edged with white and then with black, most prominently on inner side; s. t. line pale, arising from a dark costal shade and edged inwardly with smoky, forming a small W mark on veins 3 and 4, preceded by short black dashes; terminal dark crenulate line; fringes dusky. Secondaries dark smoky, paler basally with dark discal lunule. Beneath smoky, both wings paler basally, secondaries most prominently so; discal dot on all wings; postmedian dark line on secondaries. Expanse 29 mm.

HABITAT: Loma Linda, S. Bernardino Co., Calif. 1 ♂ Type, Coll. Barnes.

The species is allied to *minorata* Sm. but differs from the type, with which we recently compared it, by the lack of brown shades on primaries and the more strongly incurved nature of the t. p. line below cell.

## NEPHELODES DEMACULATA sp. nov. (Pl. XV, Fig. 3).

Head and thorax deep ochreous, at times tinged with purplish; primaries deep ochreous, in some specimens with a decided violaceous tinge; the maculation is of the usual type but so obscured as to be practically obsolete; the t. p. line is the best defined due to the paler character of the subterminal and terminal areas which further show the veins outlined in dusky; the outer half of the median area is often the darkest portion of the wing; secondaries deep smoky with pale fringes. Beneath light ochreous with faint discal dots and obscure postmedian line. Expanse 38 mm.

HABITAT: Plumas Co., Calif. (Aug.-Sept.) 7 ♂, 1 ♀. Types, Coll. Barnes.

The peculiar coloration of this species, which resembles that of some of the *Agroperina* group, should readily distinguish it from *pectinata* Sm. with which it agrees in antennal structure; the lack of maculation is also characteristic; in none of our specimens is the reniform distinct but in a few it can just be traced as a faint palish patch.

## XYLOMYGES COGNATA Sm. (Pl. XVI, Fig. 10).

We have already had occasion (Contrib. II (1), 16, Pl. VII, Figs. 13-15) to comment on the variability of this species; it was described from three ♂ specimens from Vancouver Is., B. C., Oregon and Colorado (Bruce), this last specimen being in the collection of the National Museum and marked "type"; we have seen no other Colorado material besides this type, but specimens from Vancouver Is. which we compared with it agree so that this form may be regarded as typical; Smith's figure of the species (Trans. Am. Ent. Soc., XXI, Pl. V, Fig. 3) also agrees with our figures 13 and 14. With regard to this latter specimen it bears the label "Calgary, Alta." but is probably a portion of the material distributed by Neumoegen labelled indiscriminately "Ft. Calgary, Brit. Columbia" or "N. W. B. C.," and which was mostly collected by Danby in the Kootenay District of British Columbia; Mr. Wolley Dod states that the species never has been taken at Calgary, Alta.

We have recently received more material of the California form (which we figured previously in Fig. 15) from Eldridge, Sonoma Co.; it differs from the typical form in the even olivaceous gray coloration of the primaries with obscure maculation; it is also considerably smaller in size. As it seems perfectly constant in these characteristics we propose for it the name *MINORATA* (Pl. XVI, Fig. 11), our types

being 5 ♂, 2 ♀ from the above mentioned locality; it also occurs in a very slightly different form in Southern California.

Along with *minorata* we received a series of a closely allied species which has possibly been confused with *cognata* but for which there appears to be no name available; we describe it as follows:

*XYLOMYGES FEBRUALIS* sp. nov. (Pl. XVI, Fig. 12).

Collar and thorax with thick vestiture composed of whitish scales, variably and contrastingly mixed with black; a black transverse line across collar; primaries white suffused with black (at times largely black) and shaded with olivaceous ochreous, especially at base of wing and around reniform; maculation much as in *cognata* but better defined; subbasal line geminate, crenulate, white filled, followed below cubital vein by a broad blackish shade connecting it with t. a. line; subbasal space largely dark, distinctly olivaceous ochreous along inner margin; t. a. line geminate, prominently white-filled, irregularly dentate; claviform variable in size, usually large, outlined in black, filled with olivaceous; orbicular inconspicuous, large, oval, outlined in black, white filled; reniform large, broad, irregularly lunate, whitish, shaded with olivaceous in lower portion and with central dark lunule; median shade broad, dark, outwardly oblique to base of reniform, then angled, narrow, dentate and parallel to t. p. line, the median space beyond it largely olivaceous; t. p. line strongly crenulate, broadly geminate, white filled, well bent out beyond reniform, then inwardly oblique and closely approached to median shade; s. t. line whitish, irregular, slightly dentate on veins 3 and 4, preceded by black shades and followed by a black suffusion which occupies the whole terminal area except at apex of wing which is pale; a narrow white terminal line; fringes dark, cut by white opposite veins. Secondaries whitish, slightly sprinkled with smoky and with a prominent dark discal dot and terminal line; a faint curved median line. Beneath primaries pale with traces of a dark postmedian line bent slightly at costa; secondaries much as above, rather paler with stronger maculation. Expanse 37 mm.

HABITAT: Eldridge, Sonoma Co., Calif. (Feb.) 8 ♂, 2 ♀. Types, Coll. Barnes.

The species is readily separated from the form *minorata* which occurs with it by the larger size, the much more contrasted maculation and the strikingly black and white thoracic vestiture; from typical *cognata* which it more nearly approaches it may be quickly distinguished by the entirely blackish terminal area of primaries; the maculation, especially the t. p. line, is better defined, this line being more strongly and evenly crenulate above the inner margin than in *cognata*. The ♂ genitalia are very similar but there are minor points of distinction which point to specific distinctness; in *cognata* the terminal

area of the claspers is deeply and triangularly excavated, leaving sharp dorsal and ventral teeth or spines; in our species these spines are much smaller and the triangular excavation less prominent; the harpe is also more slender and rather longer than in *cognata*. There is considerable variation in the amount of black shading on the primaries, a few specimens before us being very strongly suffused with this color with almost no olivaceous shading.

CIRPHIS INCOGNITA sp. nov. (Pl. XVII, Figs. 6, 9).

Head and thorax light ochreous, collar rather pinkish in color and crossed by two or three dark lines, patagia with a few dark scales; primaries ochreous, sprinkled faintly with dark dots and with faint brownish lines on each side of the veins and in the center of each interspace beyond the cell; the veins themselves beyond the cell are faintly white; a dark streak extends along the median vein from base of wing to t. p. line, containing a small white spot or comma mark with dark central dot at lower angle of cell; t. p. line a curved series of black dots at times very well marked and joined to form a dentate line; a faint trace of the dark subapical triangular shade; terminal line of dark dots; fringes with palish basal line. Secondaries in both sexes shiny white with faint dark terminal dots, not reaching inner angle. Beneath primaries and costa of secondaries pale smoky; remainder of secondaries whitish; terminal dark dots to both wings. Expanse 30 mm.

HABITAT: Brownsville, Texas. 6 ♂, 6 ♀. Types, Coll. Barnes.

This is the species we figured in Contr. II, (1), Pl. IX, Fig. 14 as doubtfully *texana* Morr.; it having been proved by an examination of the type that *texana* is correctly referred to *ligata* by Hampson it remained to find a name for our Brownsville species which we have been unable to do; by Hampson's keys it would fall in the neighborhood of *latiuscula* H. S. but is certainly not this species, being much paler in color without any ruddy tinges, with pure white secondaries and of much smaller size; it would seem to be closer to *punctifera* Moesch. which Hampson lists as a synonym of *latiuscula* but which from the description has white secondaries. It also bears quite a resemblance to the figure of *cinereicollis* Wlk. given by Hampson (Cat. Lep. Phal. B. M., V, Pl. 93, Fig. 18) but lacks the black streak below base of cell of this species.

The ♀'s are usually better marked than the ♂'s, at times showing traces of a punctiform t. a. line, forming a slight outward angle in submedian fold; the genital tufting of the ♂ is ochreous.

## CUCULLIINAE

*COPICUCULLIA BASIPUNCTA* sp. nov. (Pl. XVI, Fig. 5).

Palpi and head deep gray sprinkled with white; antennal region with two dark transverse lines; tegulae white with dark line at base and a faint one near tips which are also blackish; patagia and thorax gray, former with a dark line near posterior margin; metathoracic tuft large, black; abdomen pale ochreous. Primaries blue-gray with the usual strigate appearance caused by the veins being faintly outlined in black; a distinct black dot at base of wing below costa; t. a. line arising from a small dark costal patch, indistinct in costal region with prominent outward tooth below cell and a smaller tooth at inner margin, heavily marked in black and preceded by some black shading; orbicular and reniform included in a dark costal shade, former round, with pale center, ringed with white and black, reniform large with pale central lunule, similarly outlined to orbicular; t. p. line faint, pale, crenulate, bent outward below costa, then subparallel to margin, marked inwardly in submedian fold and at inner margin by black spots, the former preceded by a prominent white streak connecting it with the tooth of the t. a. line; faint pale streaks between the veins terminally and a dark blotch above inner angle drawn rearward to a point which almost touches t. p. line; fringes alternately pale and dark. Secondaries shiny white with veins slightly outlined in dark. Beneath primaries pale gray with darker costa and fringes, latter checkered basally with white; secondaries as above. Expanse 35 mm.

HABITAT: Palm Spgs., Riverside Co., Calif. (Mch.) 1 ♂. Type, Coll. Barnes.

This very distinct species should be easily recognized by the pure white secondaries, the basal black dot and the white quadrate patch in the submedian fold.

*ONCOCNEMIS PRIMULA* sp. nov. (Pl. XVII, Fig. 3).

Head and thorax a delicate flesh color, a transverse dark band on tegulae, patagia with two black spots and a larger black spot on mesothorax centrodorsally; squamation largely hairy. Primaries flesh-color, the median area largely suffused with black on which background a small round orbicular with central black dot and a very large, almost quadrate, reniform stand out sharply; slight dark basal shading; t. a. line upright, black, irregular; t. p. line geminate, costal portion lost in black shading, lower portion inwardly oblique and dentate; slight black subterminal spotting consisting of a costal blotch, a slight patch around vein 3 and another at anal angle; fringes concolorous, with incomplete row of dark basal dots. Secondaries in both sexes white with a geminate black dot at anal angle which in the ♀ shows traces of being continued toward costa as a dark s. t. line. Beneath white with maculation of upper side partially visible. Expanse 31 mm.

HABITAT: Palm Spgs., Riverside Co., Calif. (Mch.) 1 ♂, 1 ♀. Types, Coll. Barnes.



Closely allied to *flagrantis* Sm., differing in the larger size, brighter coloration, and white secondaries in both sexes.

GRAPTOLITHA PUELLA Sm.

The acquisition recently of the co-type of this species from the Doll Collection shows that the figure given in Hampson's Cat. Lep. Het. Brit. Mus. Pl. CII, Fig. 30, is very faulty, much too pale and apt to give an entirely erroneous impression of the species; it is only fair, however, to Sir Geo. Hampson to state that the species was unknown to him and his figure is merely a reproduction of a colored drawing of the type in the National Museum which was evidently poorly executed; Smith's original photograph (Tr. Am. Ent. Soc. XXVII, Pl. IV, Fig. 25) gives a much better idea of the species and shows it to be extremely close to what we described later from Kerrville, Texas, as *lacyi* (Contr. II, (3), p. 111), in fact they are so close that we should be inclined to consider the two names as synonymous if it were not for the widely separated type localities, the two specimens of *puella* being labelled California; of course there is the possibility that this label is erroneous as many of the older collectors (from one of whom these type specimens apparently came) were careless in their data, but lacking at the present time sufficient material, we believe it safer to associate the two names closely and leave the matter of their identity or distinctness to be settled when more material is available.

EUROTYPE ANCEPS Steph.

In Ill. Brit. Ent. Haust., III, 31, Pl. 26, Fig. 2, Stephens describes and figures a species which he doubtfully calls *polymita* Linn.; in his Cat. Lep. Brit. Mus. 1850, p. 285, he proposes the name *anceps* for the same species, having evidently recognized that it was not the true *polymita* and lists it as doubtfully North American. Sir Geo. Hampson to whom we referred the matter, writes us that Stephens figure agrees exactly with the type of *acutissima* Grt. and we thoroughly concur with him in this reference. As Stephens' name has priority the synonymy of the species must be changed as follows:

- anceps* Steph.
- polymita* Steph. (*nec* Linn.)
- acutissima* Grt.
- form* *confragosa* Morr.
- medialis* Grt.

## CONISTRA SIDUS Gn.

In our recent List we followed Hampson in making *walkeri* Grt. a synonym of *sidus* Gn. and listing *vinulenta* Grt. as an aberrational form. We believe, however, after a study of the original descriptions that it will be more correct to list *vinulenta* as the synonym and *walkeri* as the form.

Guenée in his description gives the color of *sidus* as even brick-red with a yellow reniform which he remarks will probably also be white in some specimens as in the European *satellitica*; Grote's description of *vinulenta* was based on a red specimen with white reniform as a reference to his description and the colored figure given clearly shows; the difference between the two is therefore merely a slightly different shade of the reniform which scarcely warrants a name in our opinion. There is no type of *vinulenta* labelled as such at the Philadelphia Academy where the type should be, but there is an old specimen with a label "No. 239" which agrees excellently with Grote's figure and which is probably the original type specimen.

*Walkeri* is based on an ochreous-brown specimen rather suffused with smoky, the color probably being due to the fact that the specimen had hibernated, as we have noticed that nearly all specimens taken in early spring lack the brilliant color of those of the fall; no type is marked as such at Philadelphia but there is in the series a specimen on an old pin without a label which agrees so well with Grote's figure that it could very well be considered the original of it; the name *walkeri* may be used for the dull ochreous form of *sidus* with suffused and indistinct maculation but we can see nothing in either Grote's figures or the presumable types to warrant specific separation.

## CONISTRA GRAEFIANA Grt. (Pl. XV, Fig. 16).

This species should be removed from the synonymy of *indirecta* Wlk. in our list; our error was due primarily to an apparent mix-up in the British Museum series as the specimens figured by Hampson (Cat. Lep. Phal. VI, Pl. CVI, Figs. 27, 28) as *indirecta* Wlk. and *moffatiana* Grt. and based seemingly on type material certainly represent but one species and Hampson in his text had already referred *graeana* to *indirecta* Wlk. (Cat. Lep. Phal. VI, 466).

The original descriptions of *graciana* (Bull. Buff. Soc. II, 89) and *moffatiana* (Bull. Geol. Surv. VI, 581) and especially the latter give us a good clue as to what the true *graciana* really is; the figure of this latter species in Grote's Ill. Essay Pl. III, Fig. 38, is erroneous and correctly referred to *moffatiana* by Hampson, as this is one of Mr. Moffat's specimens on which Grote based his later name, stating at the time that *graciana* can always be distinguished by its "yellow ground color, red lines which are also straighter and perhaps thicker, as well as the paler hind wings"; the original description of *graciana* bears out these distinctions excellently. It is possible that the true type is in the Graef Coll. at the Brooklyn Inst.; the British Museum type, if it agrees with Hampson's figure of *indirecta*, must be spurious. We figure both species, our figure of *indirecta* (Pl. XV, Fig. 17) being of a specimen we compared in 1913 with Walker's type.

HOMOGLAEA VARIEGATA sp. nov. (Pl. XV, Fig. 7).

Palpi and front heavily clothed with pinkish brown hairs; thorax hairy, brown; primaries deep ochreous heavily black-sprinkled leaving the ground color only visible along the costa, between the geminate portion of t. a. and t. p. lines and slightly in the cell and subterminally; basal half line black, indistinct; t. a. line geminate, slightly outwardly oblique, crenulate, filled with ochreous; orbicular obliquely oval, large, partially outlined in orange; reniform upright, narrowly figure-of-eight-shaped, black-filled, the outer edge rather rigid and outlined in pale ochreous followed by an orange line which extends around the entire spot; a dark indefinite median shade-line subparallel to t. a. line; veins beyond reniform slightly outlined in ochreous; t. p. line geminate, gently sinuate and finely crenulate, filled with pale ochreous, followed by a broad dark shade band limited outwardly at costa by a dark dash slightly shaded with orange; beyond this is a paler s. t. area containing minute black dots representing s. t. line, followed by dark terminal shading; fringes dark with orange-ochreous basal portion, forming a distinct pale crenulate line. Secondaries dark smoky with paler, slightly pinkish fringes. Beneath primaries smoky with distinct pinkish shades along costa and terminally; secondaries paler, pink shaded with prominent dark discal dot and postmedian line. Expanse 40 mm.

HABITAT: Palmerlee, Ariz. 2 ♂. Types, Coll. Barnes.

In one ♂, which we have made a Paratype, the ground color is a pale pinkish ochreous with obsolescent maculation; enough remains of the spots, the costo-apical dash and the s. t. line to show that the two specimens belong to a single species which doubtless shows great variability as regards the ground color and distinctness of maculation.

## ACRONYCTINAE

## TRACHEA RUBIGINOSA Wlk.

Sir Geo. Hampson informs us that this species, listed by us in the genus *Oligia*, is in all probability a synonym of *Trachca binotata* Wlk., being another of those cases in which Walker described the same specimen twice under different names. *Rubiginosa* was described from a ♂ from Vancouver Is. presented by Dr. Lyall (Cat. Lep. B. M. XXXII, 674) and *binotata* a few pages previously (l. c. p. 663) from a specimen from the same source and locality so that there is every reason to believe that Hampson is correct, especially as nothing in the description contradicts this association.

## TRACHEA MONICA sp. nov. (Pl. XV, Fig. 9).

Very similar to *susquesa* Sm. (Fig. 8) of which it may be possibly a race; the general ground color of the primaries is much deeper with less of the light brown shades; the pale areas, on the contrary, beyond the reniform and claviform are paler, almost whitish and the veins 3, 4, 6 and 7 are better outlined terminally with white; the maculation is similar, but more indistinct; the general squamation of the wing is rougher; secondaries rather heavily and evenly sprinkled with smoky over a white ground; on the underside the discal spot which is quite prominent in *susquesa* is reduced to the merest dot and there is no postmedian line; the excavation of the outer margin at vein 5 appears also to be rather smaller; the wing expanse (34 mm.) is distinctly larger.

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

## TRACHEA SERRULA sp. nov. (Pl. XVI, Fig. 7).

♂ antennae distinctly serrate and fasciculate; head and thorax dark gray, peppered with white; primaries similar in color with slight pale ochreous shades beyond reniform and claviform and a rather indistinct maculation with the exception of a black basal streak and a large claviform, outlined in black and extending across the whole median space; t. a. line scarcely traceable, in general slightly oblique and irregular; t. p. line obscure, bent outward below costa to just beyond reniform and then inwardly oblique, passing very close to lower end of reniform, orbicular dark, oval, partially outlined with white; reniform figure-of-eight-shaped, outlined, especially in lower portion, with black and followed by a palish shade occupying the bend of the t. p. line; s. t. line close to outer margin, obscure, best marked by white dentate streaks on veins 3 and 4 and 6 and 7; terminal space somewhat darker than subterminal one; fringes dark, spotted with ochreous at end of veins; secondaries strongly excavated at vein 5, whitish in ♂ with veins and outer border sprinkled with smoky, in ♀ largely smoky. Beneath pale, more or less sprinkled with smoky, especially primaries, with small discal dot on each wing. Expanse 30 mm.

HABITAT: Palm Spgs., Riverside Co., Calif. 7 ♂, 2 ♀. Types, Coll. Barnes.

The species belongs in the *binotata* group and is closely allied to *susquesa* Sm., but differs in the distinctly serrate antennae and the course of the t. p. line which is less bent around cell and more closely approximate to reniform; the color also is dark gray instead of brownish.

AGROPERINA POPOFENSIS Sm.

This species, described as a *Luperina* (1900, Proc. Wash. Acad. Sci. II, 492), should be transferred to the genus *Agroperina*; an examination of the type shows it to be very close to *indela* Sm. of which it is probably only a northern race; we have a series from Kodiak, Alaska.

ACRONYCTA ARIOCH Stkr.

In our notes concerning this species in Contr. III (3), 166, we have made a rather grave error, confusing the species evidently with *A. gasta* Stkr.; it is this latter species which resembles so closely *A. megacephala* from Europe as to lead to our suggestion that the specimen serving as type bore a wrong locality label. *A. arioch*, which is related to *oblinita* A. & S. should be reinstated on our lists, whilst *gasta* may be dropped; the type specimen was received by Strecker, according to information received from Mr. Wm. Gerhard of the Field Museum, from a Chicago collector, Paul Vollbrecht, a German by birth, who might accidentally have mixed a European specimen with those collected in the vicinity of Chicago by himself.

MEROLONCHE DOLLI sp. nov. (Pl. XVI, Fig. 6).

♂ antennae lamellate; head and thorax hairy, dark gray; collar with a central black vertical line; thorax with two central dark lines, upper and lower edges of patagia black; primaries dark gray, heavily black shaded; a minute black dash on costa at base followed outwardly by a pale patch representing the filling of an obsolete subbasal line; a distinct black basal dash below median vein reaching to t. a. line; this line geminate, very distinct due to the pale filling, with three prominent outward angles, below costa, below median vein and above inner margin; median space largely blackish with a pale oblique costal patch, descending between the spots almost to t. p. line; orbicular small, round, white centered; reniform obscured by black shades, rather broadly lunate; t. p. line very distinctly dentate, geminate, pale-filled, bent out around cell and incurved in fold; s. t. line represented by a few intravenular dark marks on a paler ground color; secondaries dull smoky with whitish fringes.

Beneath primaries smoky, secondaries whitish with smoky sprinkling and a small discal dash. Expanse 37 mm.

HABITAT: Central Park, L. I., N. Y. (April) 2 ♂. Types, Coll. Barnes.

We recently received the types with other Noctuid material from the Doll Collection and take pleasure in naming the species after this well known collector; we believe the species has been known to Eastern collectors for some time but there seems to be no available name, and it is the first Eastern record for a species of this genus. In appearance it superficially resembles a dark *Acronycta distans* Grt. but the hairy nature of the palpal and thoracic vestiture as well as a reduced proboscis render the reference to *Merolonche* advisable; the antennae resemble those of *spinea* Grt. with the slight lateral projections reduced to mere stubs, giving a distinctly lamellate appearance.

LEUCOCNEMIS VARIABILIS sp. nov. (Pl. XVII, Figs. 13, 14).

♀. Primaries dark gray sprinkled with white and shaded slightly with ochreous; t. a. and t. p. lines wanting; orbicular a long decumbent oval, white with dark center; reniform small, irregular, whitish; claviform indistinct, outlined in dark, longer than orbicular; s. t. line close to edge of wing, white, very irregularly dentate, preceded below apex by several blackish streaks; a white terminal line followed by a black line at base of fringes; these are long, whitish with the terminal portion checkered with black. Secondaries pale smoky ochreous. Beneath pale, primaries tinged with smoky along costa and outer margin.

♂. Much paler than ♀ as a rule, almost whitish with obsolete maculation. Expanse 20 mm.

HABITAT: Olancho, Inyo Co., Calif. 11 ♂, 16 ♀. Types, Coll. Barnes.

The species is extraordinarily variable; our description is drawn up from a well marked ♀ but we have all manner of intergrades to almost immaculate white specimens with the merest traces of dark shades; in general the ♂'s are decidedly paler and more immaculate than the ♀'s and of the series before us only one ♂ specimen shows a maculation in agreement with the above description. The palest specimens still show traces of the dark terminal spots on fringes and a slight dark apical shade.

STILBIA APPOSITA sp. nov. (Pl. XVI, Fig. 8).

Head and thorax dark gray, the latter with small divided mesothoracic tuft tipped with blackish; abdomen smooth, smoky ochreous; primaries dark

gray slightly suffused with ochreous in the submedian fold and heavily shaded with blackish in costo-median and subterminal areas; t. a. line geminate, black, partially white-filled, irregularly dentate with outward angle on cubital vein and inward tooth in the fold; orbicular obscure, round, largely lost in the dark costal shading; reniform conspicuous, whitish, with central lunate dark streak; t. p. line obscure, oblique at costa followed by whitish shading, bent around reniform and almost touching it with inward curve in the fold and outward tooth on vein 1; s. t. line defined by dark shading in s. t. area, inwardly oblique from apex to vein 6, bulging outwardly across veins 3-5, curved inward in the fold and bent outward above inner margin; apical area white-shaded; a terminal dark line; fringes smoky, deeper basally. Secondaries smoky-ochreous with heavy, broad, smoky outward border partially broken by ochreous shades in extreme terminal area; traces of a curved t. p. line preceding this border; a heavy dark terminal line; fringes pale at base followed by a smoky area, the tips being whitish. Beneath primaries smoky, sprinkled lightly with whitish and with a round pale discal spot; secondaries paler than above. Expanse 28 mm.

HABITAT: Prescott, Arizona (June, Sept.) 2 ♀. Types, Coll. Barnes.

The lack of definite structural characters would seem to place the species in *Stilbia*; in maculation it seems fairly close to the type of the genus, *anomala* Haw.

*ACOPA BISTRIGATA* sp. nov. (Pl. XVII, Fig. 18).

♂ antennae thick, serrate and fasciculate; proboscis wanting; front rather roughly prominent; thoracic vestiture rough, scaly, mixed brown and white; abdomen grayish, untufted; legs heavily clothed with thick brown hairs; primaries short, broad, light brown, shaded with paler, basal area darker; t. a. line broad, white, straight to submedian fold, then with a prominent outward tooth above vein 1; a broad white discal dash continued by a white line to inner margin, subparallel to t. a. line; a white line at apex of wing preceded by a large dark brown patch; a ruddy brown broken terminal line; secondaries pinkish-brown. Beneath primaries smoky, tinged with ruddy with a white dash at apex and another a short distance from it on costa, the area between being brownish; secondaries pale, sprinkled with ruddy-brown with a brown apical patch and traces of a curved postmedian line. Expanse 21 mm.

HABITAT: Paradise, Cochise Co., Ariz. (Aug.); Huachuca Mts., Ariz. (Aug.) 2 ♂. Types, Coll. Barnes.

The reference to *Acopa* is not very satisfactory although it runs out to this genus by Hampson's key; the heavy hairy clothing of the legs and the general appearance point to a new genus, but we are loath at the present time to create a new one, and place it provisionally here.

NAMANGANA VIRIDESCENS sp. nov. (Pl. XV, Fig. 12).

♂ antennae rather broad, ciliate and fasciculate; palpi ascending, deep chocolate brown, rimmed with ochreous at end of 2nd joint; front smooth, roughly clad with long chocolate-brown hairs; head and thorax with rough squamation of hair-like scales, emerald-green with slight brown admixture, ochreous at base of antennae; patagia partially chocolate-brown, broadly ringed with ochreous; primaries deep black-brown strongly suffused with emerald-green; basal line curved, geminate, green-filled; t. a. line rather irregular, in general upright, green-filled; claviform very large, outlined in green, open above and below, dark filled; reniform rather obscure and much as orbicular in size, partially outlined and filled with green; t. p. line green-filled, arising from a green costal patch above reniform, bent strongly out just below costa to well beyond reniform, then parallel to outer margin with slight inward tooth in submedian fold; s. t. line poorly defined, whitish, preceded by broad green lunules in central portion of wing; terminal area green with brown-lined veins and terminal interspaceal blackish triangular spots; fringes pale, cut with blackish opposite the spots. Secondaries brownish ochreous along inner margin; traces of a pale postmedian curved line and a pale terminal line between vein 3 and inner angle with dark lunules at edge of wing; fringes ochreous cut by smoky patches. Beneath primaries smoky-brown, tinged with ochreous on costa and fringes with traces of a postmedian dark line; secondaries pale ochreous, sprinkled with brown with large brown discal spot and distinct curved crenulate postmedian line; fringes on both wings ochreous cut with brown. Expanse 40 mm.

HABITAT: ♂ Chiricahua Mts., Arizona (Sept.), ♀, S. W. Arizona.  
1 ♂, 1 ♀. Types, Coll. Barnes.

The generic reference is provisional; it is impossible to follow out the species in Hampson's key as the thoracic vestiture is disarranged in our specimens and all marked structural features are lacking; in any case at the best Hampson's finer subdivisions, based on the divergent nature of the thoracic tufting, are extremely difficult to comprehend and we are not at all convinced that he has correctly diagnosed all our North American species. To our mind the present species is related to a group of species consisting of *smaragdina* Neum., *marina* Sm., *laetabilis* Sm. and *cano*a Barnes; all these show a rounded frontal prominence smoothly clothed with closely appressed scales, differing in this respect from *viridescens* but resembling it in general habitus, smooth abdomen and lack of further definite structural characters. These four species were placed by Hampson in the genera *Trachea*, *Cerna*, *Amiana* and *Namangana* but with the exception of *laetabilis* were unknown to him at the time; *laetabilis* is obviously incorrectly placed (owing to a wrong conception of Dyar's genus *Amiana* which



falls near *Lithacodia*) and we placed it in our list provisionally in *Namangana* which, as we have already had occasion to remark, is more or less of a dumping ground for species with uncertain relationships. Possibly some of Dr. Dyar's new Mexican genera will prove to be the final resting place for these troublesome species but until we have had the opportunity of examining his types we are uncertain even of this.

#### EUTRICOPIS NEXILIS Morr.

This species, which occurs in Colorado and the Pacific Northwest, shows typically on the underside, apart from the ordinary pale median spots, considerable whitish shading on the secondaries at the base and costo-apically; we have a series of specimens from the southern Sierras which entirely lack this pale shading with the exception of a few pale hairs basally; the secondaries, roughly speaking, show a deep pink costal half and a black inner half, the pink portion extending about half way down outer margin; there is a rather broad black marginal line on both wings below and the fringes of primaries on upper side are prominently white with a dark apical spot; otherwise we can see no marked difference in maculation between the forms which we consider racial; for the Californian form we propose the name *SUBCOLORATA*, our types being 8 ♂, 3 ♀ from Tuolumne Meadows, Calif. (July); we also have specimens from Mineral King, Tulare Co., Calif. (July).

#### ANNAPHILA ASTROLOGA sp. nov. (Pl. XIX, Fig. 11).

Pectus and base of palpi white; upper side of palpi black; thorax scaled with black and white and with a few reddish-colored hairs; abdomen blackish, ringed with pale ochreous inter-segmentally; primaries largely blackish; t. a. line geminate, filled with white, slightly oblique with prominent outward angle below cell; orbicular obscure, round, outlined in black, crossed by a dark median line, subparallel to t. a. line; reniform oval, white, dark centered, attached outwardly to the broadly white-shaded t. p. line which starts from a white spot on costa, forms a small loop at upper end of reniform followed by a much larger one crossing vein 4, bends strongly inward below cell forming two slight teeth and then bulges outward to inner margin; s. t. space slightly shaded with blue-white; s. t. line white, faint, irregular, close to outer margin. Secondaries with central area orange, basal area black with slight orange shades; a broad black outer border into which the orange color bulges roundedly opposite cell; a very faint trace of a black discal dot or else none at all. Beneath primaries orange crossed by broad black median and subterminal bands the latter strongly broadened at costa; terminal area white-shaded; a faint

discal dot; secondaries orange with narrow antemedian black curved line, small discal dot and broad black outer border, interrupted terminally by whitish ochreous shading, broadest and most distinct at apex; fringes dusky, slightly marked with white on secondaries. Expanse 21 mm.

HABITAT: Redington, Ariz.; S. Ariz. (Poling); Ariz. 4 ♀. Types, Coll. Barnes.

We figured this species as *divinula* Grt. in our Contributions, Vol. I, No. 4, Pl. XXV, Fig. 10; it differs however from this California species (Pl. XIX, Fig. 13) in its larger size and lack of prominent black discal streak on secondaries above and on all wings beneath besides other minor details of maculation.

PSEUDACONTIA MODESTELLA sp. nov. (Pl. XVI, Fig. 13).

Very similar to *groteana* Dyar (Fig. 14) but smaller in size and deeper in color, the whole wing being deep black-brown without any gray shading and with all the maculation except the t. p. line obsolete; the t. p. line as in *groteana* with the white shade above inner margin slightly more conspicuous; fringes unicolorous blackish without the checkered terminal area of *groteana*. Beneath blackish, primaries with a white spot beyond the cell and another below it on inner margin; secondaries with two superimposed white spots at end of cell and a small one above anal angle. Expanse 19 mm.

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

## ERASTRIINAE

ORUZA ALBOCOSTALIATA Pack.

As Dr. Dyar has pointed out (1914, Proc. U. S. Nat. Mus., XLVII, 379) this species should be removed from the genus *Pleonectyptera* as listed by us (No. 3457) and placed in the genus *Oruza* Wlk. to precede *Cobubatha* Wlk.

A second species closely related to the above and unfortunately very similar in name is *albocostata* Druce (1899, Biol. Cent. Am. Het., II, 537, Pl. 99, Fig. 8) of which we have several specimens from Arizona; in Druce's species the white costal streak is rather narrower, especially toward apex of wing, the discal mark is usually faint and when present is a distinct lunule, not a round dot as in *albocostaliata*; the subterminal line is also not so sharply defined. This species should be added to our list.

OZARBA NEBULA sp. nov. (Pl. XVIII, Fig. 5).

Primaries pinkish-gray suffused with olivaceous in the outer portion of median area and the costal portion of the subterminal area; t. a. line geminate, pink-filled, upright, with an outward bulge in the submedian fold; median shade dark, outwardly oblique from costa to a point on the submedian fold close to t. p. line, then bent slightly inward and again bulging outwardly to inner margin; t. p. line geminate, pink-filled, outwardly oblique to vein 7, concave to vein 5, forming two short teeth on veins 5 and 7, then straight and slightly inwardly oblique to inner margin; reniform a narrow oblique oval, outlined in white and situated close to t. p. line, the intermediate portion filled with pinkish; beyond the teeth of the t. p. line two olivaceous-brown streaks, the upper one broader and heavier; several white points on costa beyond t. p. line with olivaceous shading beyond them; s. t. line, faint, pale, in general parallel to outer margin; a faint pale terminal line; fringes purplish with pale pink apex. Secondaries pale smoky. Beneath primaries dark smoky, secondaries paler with small discal dot and traces of curved postmedian line. Expanse 15 mm.

HABITAT: Winnfield, La. (June 16-23). 1 ♂. Type, Coll. Barnes.

Besides the type we have three worn specimens, two labelled "Texas", the other Chokoloskee, Fla. The species is closely related to *aeria* Grt. and *fannia* Druce but the small size and white-outlined reniform should distinguish it; apparently in some collections it has been placed under *aetheria* Grt. as one of our specimens is so labelled.

CHAMYRIS SIRIUS sp. nov. (Pl. XVII, Fig. 17).

Very close superficially to *cerintha* in maculation but differing in the following points; the base of the collar is very distinctly white-banded which is only very occasionally the case in *cerintha*; the basal white area on primaries juts further out into the following dark space along the median vein; the orbicular and reniform are more definitely outlined in black and the greenish or purplish waved lines between them are less suffused and form four quite distinct lines on inner margin; the t. p. line is shaded outwardly with dark brown for its whole length and the crenulations of the s. t. line are deeper; the size is smaller. Expanse 25 mm.

HABITAT: Kerrville, Texas. 1 ♂, 2 ♀. Types, Coll. Barnes.

Genus CRYPHIA Hbn.

This monotypical genus is based on the species *nana*, figured in the Zutr. Exot. Schmett. Figs. 53-54 from Georgia. Following Grote and Smith (who however had never satisfactorily identified it) the species has been generally listed in our North American catalogues under *Bryophila* or *Jaspidia*. Hampson (1910, Cat. Lep. Phal. Brit. Mus., X, 552) on the strength of a single Alabama specimen in the

Grote collection, has referred the species to the genus *Lithacodia* Hbn.; we have before us a specimen of the species identified by Hampson as *nana* but doubt greatly the correctness of this determination; to our mind the reference of *actheria* Grt. as a synonym of *nana*, as given in our Check List, seems more probably; of course it will be impossible ever to be absolutely certain concerning the identity of the species, but we would call attention to the fact that the t. p. line in Hubner's figure is represented as being squarely exerted around the cell, which certainly fits *actheria* of which we figure a specimen (Pl. XVIII, Fig. 4) which has been compared with Grote's type and marked "exact". We see, therefore, no reason for changing the conception of the species as given in our list in which *Cryphia* Hbn. supercedes *Hyperstrotia* Hamp., both genera being based on the same species; the venation as given in Hampson's diagnosis is correct, veins 7, 8 and 9 of primaries being stalked, 10 and 11 free and no accessory cell.

Two closely allied species, *flaviguttata* Grt. and *secta* Grt., have been included in *Eustrotia* by Hampson presumably because a small accessory cell is present although a note under the latter species calls attention to a variability in the venation of the specimens under this name in the British Museum collection. Typically we find that in *Eustrotia* vein 7 is connate with 8 and 9 from the angle of the accessory cell, 10 being free from its upper corner; we have examined two specimens of *flaviguttata* and six specimens of *secta* (1 ♂, 5 ♀) and find that in all cases vein 7 is distinctly stalked with 8 and 9, an accessory cell being present but reduced in size. The stalked nature of vein 7 combined with the general maculation certainly points toward an association with the genus *Cryphia* from which indeed the venation only differs in the presence of the small accessory cell; as this however is apparently constant and would represent a more primitive type according to Hampson (l. c. p. 2) we propose the generic term PROTOCRYPHIA for these two species, specifying *secta* Grt. as type of the genus.

Several species have been mixed under the name *secta* in our collections, which probably accounts for Hampson's remark concerning the variability of the venation; the true *secta* (Pl. XVIII, Fig. 7) is readily recognized by the presence of a large dark patch at the center of the inner margin; both Grote's original diagnosis and his

type specimen agree in this respect. We have before us specimens (2 ♂, 4 ♀) of a very similar species which, however, is at once distinguished by the even gray color of the primaries with no dark blotch on inner margin; the venation also is constantly different, there being no accessory cell, 7, 8 and 9 stalked, 10 free but very closely approached to 11 for a short distance beyond its point of origin; it is a true *Cryphia* and apparently unnamed; we describe it as follows:

*CRYPHIA PERVERTENS* sp. nov. (Pl. XVIII, Fig. 8).

Primaries rather dark gray, variably shaded with lighter gray, maculation obscure; t. a. line straight to cubital vein then slightly angled and somewhat inwardly oblique, preceded by faint dark blotch on costa; median shade outwardly oblique from center of costa to inner margin close to t. p. line; reniform small, narrow, partially outlined in whitish with two superimposed black dots in center, the upper one often obsolete; t. p. line squarely exerted around cell, bent inward in submedian fold; s. t. line faint, irregular, preceded below costa by a darker shade; terminal broken dark line. Secondaries deep smoky. Expanse 19 mm.

HABITAT: New Brighton, Pa. (June-July), Big Indian Valley, Catskill Mts., N. Y. (July). 2 ♂, 4 ♀. Types, Coll. Barnes.

A third species, similar in venation to *pervertens* but which according to our dated material is on the wing a month later than this species we characterize as follows:

*CRYPHIA VILLIFICANS* sp. nov. (Pl. XVIII, Fig. 9).

Primaries deeper in color than *pervertens* with more contrasted coloration, the inner side of t. a. line and outer edge of t. p. line being more or less relieved by white shading; maculation very similar to that of *pervertens* but t. a. line with stronger angle on cubitus and more oblique lower half; lower portion of median area partially brown-shaded, approaching *secta* Grt. in this respect somewhat; a whitish apical oblique shade; s. t. line more irregular than in preceding species.

HABITAT: New Brighton, Pa. (July-Aug.); Essex Co., N. J. (July). 5 ♀. Types, Coll. Barnes.

The species identified by Hampson as *nana* is without a name if our conception of Hubner's species be accepted as correct; it corresponds fairly well structurally with the definition of *Lithacodia* except that the front is prominently bulging and not smooth as in our other North American species; this would throw it according to Hampson's keys into *Bryocodia* Hamp., but as it appears to have little similarity

to the species included under this generic head by Hampson we describe it as a *Lithacodia* in which genus it appears at least fairly at home.

LITHACODIA INDETERMINATA sp. nov. (Pl. XVIII, Fig. 3).

Metathorax with prominent scale tuft; abdomen with large tufts on 4th and 5th segments; primaries deep dark gray scarcely relieved by paler shading, with obscure maculation; t. a. line obscurely geminate, poorly defined and rather irregularly dentate in costal half, strongly inwardly oblique below cell and quite prominently black; a broad oblique costal patch in median area rather paler than the ground color followed by a narrow dark shade which connects with a small loop-like reniform, defined in black and open toward costa, connected by a fine black line along vein 3 with t. p. line; below this a faint ruddy shade stretching across t. p. line; a faint black line from angle of t. a. line through submedian fold but not reaching t. p. line; this line obscure, geminate, crenulate, outwardly bulging to vein 3 then curved sharply inward and again straight below fold to inner margin; beyond t. p. line at costa a slightly darker patch defined below by a distinct short black line extending between t. p. and s. t. lines; s. t. line pale, obscure, irregular, rather prominently bulging across veins 3 and 4; faint broken dark terminal line; secondaries smoky. Beneath primaries smoky, secondaries paler with distinct discal dot and faint post-median curved line. Expanse 19 mm.

HABITAT: Winnfield, La. 1 ♀. Type, Coll. Barnes.

The species resembles somewhat a *Sarrothrips*, the primaries being rather broad with the costal and inner margins semiparallel.

HOPLOTARACHE ALBIOCULA sp. nov. (Pl. XVII, Fig. 12).

Palpi white laterally; front and thorax with an admixture of white and black scaling, the former with a raised circular process with tubercle on its lower margin, abdomen smoky gray, untufted; primaries pale ochreous, heavily suffused with blackish in median and subterminal areas; basal area pale with a fine black basal streak connecting with a long ill-defined claviform outlined in black and filled with white and continued by a white line to s. t. line; t. a. line marked by an oblique dark streak from costa and a dentate mark at inner margin; median space largely dark except between the spots and beyond the reniform; both spots prominent, white, the orbicular decumbent, oval, the reniform large, rounded; t. p. line not defined; s. t. line commencing as an oblique dark streak from apex and continued as a diffuse dark shade parallel to outer margin with a small outward bend at inner margin; the terminal area more or less pale with slight dark shading; fringes sharply black and white checkered. Secondaries smoky with veins partially lined with black and blackish fringes slightly pointed with white. Beneath pale smoky with dark checkered fringes; traces of a diffuse s. t. line on primaries and a large discal spot on secondaries. Expanse 22 mm.

HABITAT: Olancha, Inyo Co., Calif. 1 ♀. Type, Coll. Barnes.

The species according to Hampson's key would fall into the above genus, although totally dissimilar to the other species placed here. Superficially it bears considerable similarity to our *Leucocnemis variabilis* but is darker and heavier marked. Possibly its nearest ally is *Paracretonia aleptivoides* B. & McD. a desert species from the same general region.

TARACHE CORA sp. nov. (Pl. XVII, Figs. 19, 20).

♂. Front and collar white; thorax largely purple-brown, the patagia shaded with white; abdomen dull ochreous; primaries with hyaline fovea at base; costal edge to near apex broadly white, narrowing beyond cell; remainder of wing purple-brown, shaded with olivaceous just below the white area which is crossed by two yellow outwardly oblique bands, dividing the wing into three equal parts, the border line between the light and dark areas of wing forming a slight angle where the inner yellow band touches it; above inner margin beyond fovea some slight pale marks indicate the t. a. line; reniform round, partially projecting into white costal area and outlined in blackish; t. p. line only distinct above inner margin as a waved white line margined inwardly by olivaceous which is preceded by some bluish-white scaling; subterminal area shaded with bluish-white; terminal area white, broadest above anal angle, narrowed to a point some distance below apex, bisected by a pale yellow shade; terminal dark dots on apical portion of outer margin; fringes white with a slight apical dark shade and a larger one opposite cell; secondaries hyaline whitish, shaded along outer margin with brownish; fringes with basal half pale brownish, outer portion white. Beneath primaries smoky brown with cell ochreous; secondaries paler than above with faint dark discal dash. Expanse 25 mm.

♀. Larger than ♂ with basal half of primaries white, crossed by a broad sinuate yellow band originating in a purple-brown costal blotch and preceded by a bluish-gray costo-basal round spot and similar shading along inner margin; orbicular a small round blue-gray spot; reniform a similar larger spot partially encircled with white; a faint gray shade between spots; outer area of wing purple-brown shaded with olivaceous and blue gray with large triangular white costo-apical spot; a strongly sinuate t. p. band bends around reniform, largely olivaceous, bordered outwardly with blackish and arising from a blackish blotch on costa; irregular bluish-white shading subterminally; terminal area and fringes as in ♂ except latter have slight dark shade above anal angle. Secondaries pale smoky, darker outwardly. Beneath primaries smoky with palish costo-apical patch; secondaries creamy with small discal dash. Expanse 28 mm.

HABITAT: ♂, Baboquivera Mts., Ariz.; ♀ Redington, Ariz., Paradise, Ariz. 1 ♂, 5 ♀. Types, Coll. Barnes.

We are not sure that our ♂ and ♀ represent the sexes of a single species, but judging by the sexual differences found in allied

species (*lucasi* Sm., *tetragona* Wlk.) we should not be surprised to find our reference correct; the ♂ resembles *lanceolata* Sm. but may be distinguished by the basal fovea; veins 3 and 4 of secondaries are stalked in both sexes.

### CATOCALINAE

CAENURGIA TRIANGULA sp. nov. (Pl. XV, Fig. 13).

Head and thorax light purplish-gray; primaries with the cell, costal region to t. p. line and inner margin purplish gray; reniform narrow, gray, slightly oblique, continued by an oblique broader band of similar color bordered finely with white to a point above anal angle; the large triangular basal area formed by this band, the cubital vein and vein 1 is deep black brown, its lower margin straight and bordered by a fine whitish line; before reniform and near base of wing just above inner margin slight blackish streaks; t. p. line white, rigid, from a point on costa before apex to near inner margin where it connects with the upper border line of the pale band joining the reniform with the anal angle thus forming at this point a sharp acute angle; this angle as far as vein 3 is filled with a triangular patch of black-brown; between veins 3 and 4 from their point of origin to t. p. line is a pale brown shade and between veins 4 and 6 in the space between reniform and t. p. line a quadrilateral black-brown patch above which the costal region is purple-gray; s. t. space light brown bordered outwardly by a blackish s. t. line, rigid, parallel to t. p. line and somewhat diffuse below apex; terminal space purplish-gray bordered by a fine dark terminal line; fringes dusky. Secondaries smoky crossed by a pale postmedian band somewhat bent above anal angle; a darker subterminal shade and dark terminal line. Beneath light smoky ochreous with traces of paler postmedian band on both wings. Expanse 28-30 mm.

HABITAT: Redington, Ariz.; Palmerlee, Ariz.; Santa Catalina Mts., Ariz. 6 ♂, 6 ♀. Types, Coll. Barnes.

The species is allied to *intercalaris* Grt. (Pl. XV, Fig. 14), but has a much longer triangular black basal patch, the lower margin of which is straight and not curved up near base as in Grote's species; the paler area separating the two dark patches beyond the reniform is confined to the area between veins 3 and 4 in our species whereas in *intercalaris* it extends between veins 3 and 5 and is much paler in color; various other points of distinction may be noted from our illustrations. We also figure (Pl. XV, Fig. 15) *diagonalis* Dyar which we are not convinced is specifically distinct from *intercalaris*.

DORYODES BISTRALIS Geyer. (Pl. XVII, Figs. 4, 5).

In sorting over our material of this genus we were struck by the fact that specimens from the Northern Atlantic and New England



States were invariably larger and darker than those from southern localities; as there appeared to be two races or possibly species involved it was necessary if possible to ascertain to which form Geyer's name was applicable. The species was figured in the Zutraege, IV, Figs. 775-6 but unfortunately in the text the only locality given is "North America"; from the figure it is impossible to ascertain the minute details, but we would note that the size of the figure is distinctly smaller than that of the New York and Maine specimens; it might also be noted that a large proportion of Hubner's North American material came from Georgia (presumably from Abbot's collecting) so that there would be nothing out of the way in selecting this state as the home of the species.

*Acutaria* H. S. was figured in the Samml. Eur. Schmett., VI, 74, Fig. 447, as a European species and as we have no access at present to this work we have been forced to rely on Guenée's description and figure, drawn up from two Georgia specimens (Sp. Gen., X, 233, Pl. 17, Fig. 6); this figure is also poor but the size is small as was to be expected from the locality given for the specimens. Hampson in his Cat. Lep. Phal. B. M., XIII, p. 114, figures the large northern form as *bistrialis*, having no southern material before him except Floridan material which he has referred to *spadaria* Gn., his diagnosis of this latter species corresponding with our own identification from a series from Everglade, Fla.; we imagine therefore that we are safe in following Hampson's citation of *divisa* Wlk. and *promptella* Wlk. to *spadaria* Gn. especially as the size given by Walker for his types distinctly points to their being large forms.

As far then as our present knowledge goes we must apply the name *bistrialis* Geyer with synonym *acutaria* H. S. to the small southern form which in the ♂'s averages a wing expanse of 30 mm. and in the ♀'s about 34 mm. We have the form from as far north as Southern Pines, N. C. (figured by us as *bistrialis*, Contr. I, (5) Pl. VIII, Fig. 19) and from various Florida localities (Ft. Myers, Dade City, Glenwood); we imagine the Everglade specimens listed in Grossbeck's List of Florida Insects (Bull. Am. Mus., 37, p. 66) under *bistriaria* should be referred to *spadaria*; all our specimens collected at the same time were this latter species.

For the larger northern form we propose the racial name GRANDIPENNIS (Pl. XVII, Figs. 1, 2), our type series consisting of 7 ♂'s

from Long Is., N. Y., Kittery, Me., Elizabeth and Anglesea, N. J.; the average expanse in the  $\delta$ 's is 34 mm. and of the  $\eta$ 's 37 mm.; the race, besides being larger, is deeper ochreous with less of the purplish suffusion found in the smaller southern specimens and the dark streak from base of wing is usually quite broad with the upper and lower silver borderings overlapping well at end of cell; in size and general appearance it looks closer to *spadaria* (Pl. XVII, Figs. 7, 8) than to *bistrialis*. We figure our conception of all the species and add the description of what appears to be a good species, as far as species go in this genus.

*DORYODES TENUISTRIGA* sp. nov. (Pl. XVII, Figs. 10, 11).

Thorax pale pinkish-gray; primaries pale olive-ochreous, broadly shaded along costa and inner and outer margins with pale purplish; two faint dots in the cell; a narrow, dark, olive-brown striga below median vein narrowing at end of cell and curving upward to below apex bordered by a silver streak on upper side to end of cell and on under side from apex to vein 3, a faint dark s. t. line near outer margin not reaching below submedian fold. Secondaries whitish. Beneath primaries smoky, secondaries whitish with smoky costa. Expanse  $\delta$  33 mm.,  $\eta$  41 mm.

HABITAT: San Benito, Texas (Mch.-Apr.); Brownsville, Texas (Mch.).  
2  $\delta$ , 1  $\eta$ . Types, Coll. Barnes.

The species may be distinguished from *spadaria* Gn. by the paler ground color and the narrower black striga, especially noticeable at end of cell where the two silver streaks slightly overlap; the apex of primaries seems also less pointed in the  $\delta$  sex.

## EREBINAE

### *DRASTERIA GRAPHICA* Hbn.

The type locality of this species which is figured in Hübner's Zuträge I, Figs. 11-12, is given as Georgia; both the locality and the figure point strongly to *graphica* being the same species as *capiticola* Wlk., given specific rank in our List and figured in both sexes by us (Contr. III, (3) Pl. XIII, Figs. 7, 8); *capiticola* (not *capticola* as we have listed it) will sink therefore to *graphica* and for the northern form from New Jersey and Long Island localities which has commonly been known as *graphica* we will apparently need a name. This race of *graphica* (Pl. XIX, Figs. 1, 2), as we consider it, is distinguished by the fact that the primaries in both sexes are practically similarly marked, the  $\eta$  showing none of the obsolescence of markings char-

acteristic of the southern *graphica*; the white dots of the subterminal line are less prominent in the northern form and the two teeth of the extracellular patch are generally much more pronounced; the yellow color of secondaries is slightly paler and shows less of the inclination towards orange that we find in *graphica*. We propose the name ATLANTICA for this race, our types (3 ♂, 3 ♀) having been captured at Rock Beach, L. I., on June 9th by Mr. J. Doll. This race should not be confused with the very similar species, *occulta* Hy. Edw. (Fig. 3), which also occurs at Lakehurst, N. J., and the vicinity of Boston, Mass., and which is rather larger, much deeper purplish in color of primaries with a broader terminal area and with heavier black banding on secondaries; we figure both species which illustrates the differences better than a description.

SYNEDA ABRUPTA sp. nov. (Pl. XIX, Figs. 12, 14).

♂. Head gray; thorax an admixture of ochreous and gray scaling with a longitudinal black streak on each tegula and black shading on the patagia; primaries with basal area lilac-gray crossed near base by a geminate black subbasal line, not reaching inner margin, and defined outwardly by a broadly geminate t. a. line, black, irregular, filled in with brown and with prominent outward bulges in the cell and again in submedian fold; median area whitish ochreous, paler inwardly and rather shiny, crossed outwardly by a geminate brown line arising from a diffuse smoky area on costa above reniform which is itself dark smoky, its basal edge formed by a straight white streak, its outer edge very irregularly dentate and outlined with white, this color also extending along veins 3 and 4 to t. p. line; beyond reniform the sinus formed by the t. p. line is filled with brownish shading; t. p. line as usual strongly bent around cell with small tooth just below costa and more prominent one on vein 6, bluntly protruding between veins 3 and 4, straight from base of vein 3 to inner margin; s. t. space largely smoky; terminal space lilac-gray defined inwardly by a slightly paler, obscure, very waved s. t. line, strongly bulged outwardly below costa and at vein 3; dark crenulate terminal line; fringes checkered, white and smoky. Secondaries with basal half rather hyaline, slightly smoky, with dark lunule and broad outer smoky band broken by a pale spot on outer margin between veins 2 and 3; fringes checkered. Beneath whitish hyaline, primaries with large dark discal lunule in a diffuse dark spot and broad outer border, secondaries with smaller lunule and narrow subterminal dark band, the marginal area being white with slight dark spot between veins 3 and 4.

♀. Median area darker than in ♂, with more lilac-gray shading; secondaries with basal area scarcely paler than marginal band; beneath more obscure with pale marginal area of secondaries generally obscured with smoky. Expanse 41 mm.

HABITAT: Huachuca Mts., Palmerlee, Ariz.; Jemez Spgs., N. M.; 2 ♂, 3 ♀. Types, Coll. Barnes.

The species is closely allied to *sabulosa* Hy. Edw. but differs among other things in the more contrasted maculation, especially the pale median area and the white markings around reniform; *sabulosa* is listed at present in the genus *Cissusa* Wlk. (type, *spadix* Cram.) but cannot stay there on account of the scaly nature of the thoracic vestiture; for the present we place both species in *Syneda* and must await Sir Geo. Hampson's revision of the *Ercebiac* (*Noctuinae*) for the correct location.

SYNEDA TEJONICA Behr. (Pl. XIX, Figs. 5, 6).

A good deal of confusion exists concerning the identity of this species, described in 1870 (Tr. Am. Ent. Soc. III, 26) from three species from Ft. Tejon, Calif., which locality we have recently discovered to be in San Bernardino Co. The description, mainly in Latin, is not very lucid and the fact that the types are destroyed does not tend to improve the situation; however, there is one feature of the diagnosis which eliminates practically all of our identified *Synedas* from consideration, viz, that Behr distinctly states that the under side of all wings is *white* (*subtus alae omnes candidae*) more or less tinged with orange; the only two species known to us to which this could possibly apply are *Drasteria mirifica* Hy. Edw. and the species listed as *Syneda perfecta* Hy. Edw. A foot note by Behr further elucidates the situation as he states that "the species varies in the coloration of the hind wings, which are, in two specimens, nearly white with only a slight orange tinge about disc and margin." This at once eliminates *mirifica* and points strongly towards *perfecta* as it is well-known that the  $\delta$ 's of this species have the secondaries largely white whilst in the  $\varphi$ 's they are orange. We have before us a series of specimens from Loma Linda, San Bernardino, Co., Calif., which complies with Behr's diagnosis in every respect, showing the pale violet median and terminal areas of primaries, the white wings in  $\delta$  and the orange ones in  $\varphi$  and the white under side in both sexes, although we might note that in the  $\varphi$  the orange suffusion is at times extended so as to almost cover the entire wings; we believe without question that these represent the true *tejonica* Behr. As compared with *perfecta* Hy. Edw. they are so close that we should hesitate to even give the two names racial value; however, as the name *perfecta* was based on Ari-

zona specimens, for the present it may be well to consider it as applying to an Arizona race of *tejonica* which latter name has well-established priority.

*SYNEDA PULCHRA* sp. nov. (Pl. XIX, Fig. 4).

Head and thorax gray, tegulae with darker lateral stripes; primaries with basal area black-brown slightly sprinkled with gray, this area bordered by a darker t. a. line, irregular in course with a prominent inward angle below median vein, followed by a rounded bulge and then bent strongly backward to inner margin; median space ochreous, grayish-brown at costa and inner margin and crossed outwardly by a geminate brown line; reniform a dark lunate blotch bordered inwardly by an ochreous line; t. p. line as usual bent strongly outwardly beyond cell, forming prominent angles on veins 3, 4 and 6, bent backward below vein 3 to its base then rounded and rather irregular to inner margin; beyond the reniform some white shading especially on veins 3 and 4; subterminal space black-brown bordered by a pale, quite regular s. t. line, parallel to outer margin with slight inward bend in submedian fold and preceded in costal area by black dashes bordered outwardly by a dark line arising from an apical dark streak; terminal area violet-gray with marginal dark crenulate line; fringes smoky spotted at base with gray. Secondaries vermilion with a faint dark discal lunule, a narrow postmedian dark band curving downward at vein 2 to anal angle, where it is thickest, and median and costal dark blotches on outer margin, fringes pinkish tinged with smoky opposite blotches. Beneath pinkish, primaries with postmedian dark band, forming a heavy triangular dark blotch on costa of primaries, heavy discal lunule and traces of apical and median dark shading along outer margin; secondaries as above. Expanse 34 mm.

HABITAT: Palm Sgs., Riverside Co., Calif. (Mch.) 1 ♂. Type. Coll. Barnes.

Obviously allied to *tejonica* Behr but differing in the course of t. a. and s. t. lines and the ochreous median band; the ♂ secondaries are also vermilion instead of white with pinkish shading. In view of the fact that these features are usually constant in the group and that our new species comes from a desert region we venture to describe from a single specimen.

*SYNEDA HUDSONICA* G. & R. (Pl. XIX, Figs. 7, 8).

This species is well-figured by Grote on Pl. III, Figs. 7, 8 of Proc. Ent. Soc. Phil. IV (1865); its range is probably over the whole of northern Canada from Hudson Bay to Alaska and down the Rockies at higher altitudes into Colorado and Utah; we have typical specimens from Field, B. C., and Glacier National Park, Mont.; specimens from the southern portion of Colorado and Utah have been given

the name *scoposita* Hy. Edw. but this is apparently only a race with slightly yellower secondaries and rather more brown shades on primaries of ♂ sex.

In southern Manitoba we meet with a race (Pl. XIX, Figs. 9, 10) of the same species which is characterized by the pale gray color of primaries and by the obsolescence of the maculation in the ♀ sex, the primaries at times being almost uniform gray; the s. t. line of primaries is also generally not so markedly crenulate and the color of secondaries is a pale ivory; just as in the type form the median pale band may or may not show brown shading outwardly. We propose for this race the name *HEATHI*, our type series (2 ♂, 3 ♀) having been captured at Cartwright, Man. (June) by the late Mr. E. F. Heath; we have other specimens from Winnipeg and Miniota, Man., and from various Saskatchewan localities.

### HYPHENINAE

#### HEMEROPLANIS SCOPULAEAPES Haw.

Sir Geo. Hampson has called our attention to the genus *Scopelopus* Steph. (1830, Ill. Brit. Ent. Haust. III, p. 124), erected for the species *inops* Steph. which name Stephens proposed to replace *scopulaepes* Haw. (1809, Brit. Ent. No. 260); stating that the species is probably a native of Georgia and erroneously included among the British Lepidoptera by Haworth; from the generic and specific descriptions there seems no doubt but that the name was applied to what is now listed as *Pleconctyptera pyralis* Hbn. which names, both generic and specific, will have to fall. Apparently, however, both *Scopelopus* Steph. and *Pleconctyptera* Grt. are synonyms of *Hemeroplanis* Hbn. (1816, Zutr., I, 23, Fig. 127; 1825, Verz. p. 259) based on the single species *pyralis* Hbn. (*pyraloides* Hbn.) The generic name *Hemeroplanis* has probably been sunk as a homonym of *Hemeroplanes* Hbn. (1820, Verz. p. 133); we believe according to the latest rulings that both names are valid but in any case *Hemeroplanis* Hbn. has priority as the whole Vol. I of the Zuträge was completed in 1818 and the plate containing *Hemeroplanis pyralis* was probably issued in 1816; generic names based on figures in the Zuträge are considered by some authors as *non descr.* but Rule 79 of Banks and Caudell's Code distinctly permits of their acceptance and we see no reason for not following this.

There seems also to be no reason for changing the original name as given by Haworth and the synonymy will therefore stand:

HEMEROPLANIS Hbn.

*Scopelopus* Steph.

*Pleonectyptera* Grt.

scopulaepes Haw.

*pyralis* Hbn.

*inops* Steph.

*irrecta* Wlk.

*foccalis* Zell.

MYCTEROPHORA RUBRICANS sp. nov. (Pl. XVIII, Figs. 1, 2).

Palpi long, porrect, blade-like; ♂ antennae strongly bipectinate, ♀ simple; thorax and both wings pale ochreous, heavily sprinkled and shaded with fuscous and with a distinct pinkish suffusion over the whole wings; maculation variably distinct due to the greater or less amount of fuscous shading; t. a. line rather closer to base than usual, dark, irregular, with an inward angle on median vein; a broad dusky median shade rounded outwardly below costa, preceded in the cell by a small dark dot representing the orbicular and followed by a small dark lunule with pale center in the place of the reniform; t. p. line dark, single, strongly bent outward below costa to beyond cell, then inwardly oblique and wavy, in general parallel to outer margin; s. t. line faintly represented by a diffuse ochreous shade-line preceded and followed by heavier fuscous shading; a more or less broken, dark, crenulate terminal line; fringes concolorous, slightly checkered with pinkish opposite veins and cut by a median smoky line. Secondaries similar to primaries in maculation without the basal line; a large dark discal lunule resting on the median shade. Beneath pale smoky with pinkish fringes and faint traces of the maculation of the upper side. *Expanse* ♂ 26 mm., ♀ 24 mm.

**HABITAT:** Monachee Meadows, Tulare Co., Calif., 5 ♂, 8 ♀. *Types*, Coll. Barnes.

The species is allied to *monticola* Hlst. and may possibly prove to be identical with it; this latter species possesses, however, none of the ruddy shading which is characteristic of our species and from our notes on Hulst's type would seem to differ somewhat in minor details of maculation.

Genus PARAHYPENODES gen. nov. (Type *P. quadralis* sp. nov.).

Proboscis greatly reduced; labial palpi long, upturned, second joint blade-like, far exceeding front, heavily and smoothly scaled, third joint almost as long as the second, thread-like, acuminate; ♂ antennae heavily ciliate; front rough-scaled; legs normal; primaries with 10 veins, 3, 4 and 5 separate from

around lower end of cell, 6 from below apex of cell, 7 and 10 from a point at apex of cell, 8 and 9 absent, 11 free from about middle of cell; secondaries with 3 and 4 from a point at end of cell, 5 parallel to 4 from below middle of discocellulars, 6 and 7 slightly stalked.

*P. QUADRALIS* sp. nov. (Pl. XVIII, Fig. 6).

Primaries dull ochreous gray, shaded with deep smoky; t. a. line single, dark, irregular, arising from small dark costal blotch, bent inward below costa with prominent outward bulge in the submedian fold; t. p. line single, dentate, squarely exerted around cell, then strongly inwardly oblique to a point on the middle of inner margin; at the end of cell a square blackish patch, the most prominent feature of the maculation; subterminal area dark smoky, the terminal area pale grayish, the difference between the two shades defining the s. t. line which is in general parallel to outer margin with a slight bulge opposite cell; outer margin slightly crenulate with dark terminal line; fringes dull ochreous, cut with smoky. Secondaries deep smoky with traces of a darker oblique line crossing from costa near apex to inner margin above anal angle. Beneath smoky, secondaries paler in basal area with traces of a curved post-median line. Expanse 18 mm.

HABITAT: St. Therese Isl., St. Johns' Co., Que. (July). 3 ♂. Types, Coll. Barnes, Paratype, Coll. W. Chagnon.

We can find neither a generic nor a specific term applicable to this species. In Schaus' recent revision of the *Hypeninae*, to which the species evidently belongs, no mention is made of any genus with veins 8 and 9 of primaries lacking; we risk therefore the description of both genus and species which should be readily recognizable superficially by its general *Epizeuxis*-like appearance and the square dark patch at end of cell. We are indebted to Mr. W. Chagnon of St. Johns, Que., for the specimens; a Paratype remains in his collection.

Genus *EPIZEUXIS* Hbn.

Schaus, in his "Revision of the Subfamily Hypeninae" (1916, Proc. U. S. Nat. Mus., 50, p. 359) gives the type of this genus as *acmula* Hbn. and the original reference as "Verz., 1816, p. 346"; this date is obviously wrong as may be seen by referring to Sherborn's article on the dates of Hubner's Verzeichniss (Ann. Mag. N. H., 1912, Jan.); according to this article page 346 was not issued until 1826; Schaus further ignores Grote's fixation of the type as *calvarialis* D. & S. in 1874 (Buff. Bull., II, 47). The generic term *Epizeuxis* was however used by Hubner long before it appeared in the *Verzeichniss*; in the *Zutraege Exot. Schmett.* he uses it in connection with our *N. Ameri-*



can species *lituralis* (l. c. Figs. 19, 20) and this portion of the publication was probably issued considerably before 1818; as this is a very clear case of the usage of a generic term along with a single specific name, we hold that the genus was originally monobasic with *lituralis* Hbn. as type of the genus, Hubner's later action in the Verzeichniss being merely an extension of the generic conception to include other species which he considered congeneric.

Our usual conception of the genus as given in Smith's revision of Deltoid Moths (1895, Bull. 48 U. S. Nat. Mus.) and as followed by Dyar and Schaus must be changed. *Epizcuxis* Hbn. will supplant *Zanclognatha* Led. as used in our lists and for the genus to which the name *Epizcuxis* has been usually attached we must seek a new name; *Hclia* Gn. cannot be used as it is preoccupied by *Hclia* Hbn. (Verz., 259) and Grote's term *Pseudaglossa* (Buff. Bull., II, 47) we believe will fall to *Camptylochila* Steph. (1834, Ill. Brit. Ent. Haust., IV, p. 21) proposed for two species, *undulalis* and *bistrigalis*, presumably British, but which Stephens later (1850, Cat. Lep. Brit. Mus., p. 303) lists as North American; judging by Wood's figures of both species (Ind. Ent., Pl. 27, Figs. 773 and 774) and Stephens' figure of the latter species (l. c. Pl. 33, Fig. 3) we believe that *undulalis* is *aemula* Hbn. and *bistrigalis* will fall to *lubricalis* Geyer. With *undulalis* (*acmula*) as type, the genus *Camptylochila* can be employed in precisely the same sense, therefore, as *Epizcuxis* as used by Schaus and for those who desire fine distinctions Grote's *Pseudaglossa* may still be used for the *lubricalis* group as has been done by Schaus (l. c. p. 360) who separates the two in his key on antennal differences. We are indebted to Sir Geo. Hampson for first calling our attention to Stephens' generic name. In going over the species of this genus we have come across a group of four closely allied species for which apparently only two names are available; of these four the first named and best known species is *rotundalis* Wlk. (*borcalis* Sm.) (Pl. XVIII, Fig. 10) a deep purple-brown species with indistinct maculation; in well-marked specimens the lines are rather broad, blackish, the t. a. upright and the t. p. only slightly bent inward at costa and practically parallel to outer margin; the reniform and orbicular are never prominent and the under side of secondaries is pale smoky with obscure discal spot and dark postmedian and subterminal lines.

A second species is *forbesi* Frch. (1895, Bull. Ill. Sta. Lab. N. Hist., IV, 8) of which *merrickalis* Sm. must be made a synonym;

French's description is very clear and applies exactly to Co-types of *merrickalis* before us as well as to a long New Brighton series; in his revision Smith sank *forbesi* to *rotundalis* and later probably, recognizing the differences as specific but overlooking French's name, redescribed the species. *Forbesi* (Pl. XVIII, Fig. 11) is a much better marked species than *rotundalis*; the t. p. and s. t. lines are marked at costa with ochreous streaks, the former is much more strongly bent outward below costa and more irregularly dentate; the secondaries are paler on both sides with two distinct dark cross-lines and a pale s. t. line in the broad dark marginal border.

The two other forms before us have received Mss. names from Smith and we have Co-types in our collection; the names however have never been published as far as we can ascertain; using Smith's names we therefore present here the characteristic features of each species.

*C. JULIA* sp. nov. (Pl. XVIII, Fig. 13) is close to *rotundalis* but averages rather larger and is slightly paler with faint pale dots on costa at the inception of the lines; the t. a. is bordered inwardly by a faint pale line, the t. p. is bent more strongly outward beyond the cell and the reniform is represented by a distinct pale dot; beneath a very characteristic feature is the pale basal area of secondaries with the dark discal dot preceded half way to base of wing by a small dark dot; there is a distinct broad postmedian line and pale s. t. line. Four of Smith's Co-types before us are from New Brighton, Pa.; we have other specimens from the same locality as well as from Manchester, N. H., and Decatur, Ill.

*C. DIMINUENDIS* sp. nov. (Pl. XVIII, Fig. 12) is the smallest of the four species, averaging 18 mm. wing expanse and is at once recognizable by the ochreous orbicular and reniform, the former a mere dot, the latter small but distinct; the color is even purple-brown with no ochreous shades along costa; the t. p. line black, irregular, well bent out at costa and incurved in fold; the under side is rather even dull smoky with base of secondaries paler with small discal dot and postmedian line. We have before us a long series from New Brighton, Pa., including five of Smith's Co-types; we also have the species from Pittsburg, Pa. (♀ Co-type), Cincinnati, Ohio, and Douglas Lake, Michigan.

RENIA MEMORALIS sp. nov. (Pl. XV, Figs. 10, 11).

Head, thorax and primaries a distinct reddish-brown somewhat shaded with smoky, giving rather a purplish hue along costa and subterminally; a faint basal curved half-line; t. a. line dark, even, slightly rounded outwardly with minute angle at costa; orbicular a round orange spot, poorly defined by black; reniform orange, narrowly lunate with central upper and lower black dots often joined by a dark line; a median dark shade crossing the reniform; t. p. line bent outward at costa, then evenly crenulate and parallel to outer margin; s. t. line faint, ochreous, irregular, preceded by dark shading; a broken dark terminal line. Secondaries smoky, paler basally with dark, slightly crenulate median line, sharply angled near inner margin, shaded outwardly by pale ochreous; a faint dark s. t. line most distinct at inner margin where it is shaded slightly with ochreous. Beneath smoky brown, basal half of wings pale with smoky sprinkles, primaries with discal dash, rather distinct straight postmedian line and faint s. t. line, defined at costa by several ochreous dots; secondaries with large prominent discal streak, a curved crenulate postmedian line and a faint pale s. t. line; dark marginal line to both wings. Expanse 28 mm.

HABITAT: Long Is., N. Y. (Aug.); Nueces Riv., Texas. 2 ♂, 2 ♀. Types, Coll. Barnes.

We have had the upper wings of a specimen from Elizabeth, N. J., in the collection for some time awaiting further material, so imagine the species will occur in most of the Eastern States. This species has probably been confused with *factiosalis* Wlk. but differs in its much larger size, a red-brown color in both sexes (*factiosalis* is smoky brown in ♂) and more sharply angled median line on secondaries; it differs from *larvalis* Grt. with which it agrees in size, by the more regular t. a. line.

**NOTODONTIDAE**

HETEROCAMPA CUBANA Grt. (Pl. XX, Fig. 14).

We have received several specimens of this species from Venice, Fla.; it is a new addition to our North American fauna. The species is allied to *varia* Wlk. but lacks the white subapical shade; the course of the t. p. line is also somewhat different and the median line makes a sharp outward angle above the inner margin. It is this species which is reported in Lepidoptera p. 109 by Mr. Bonniwell as a peculiar form of *H. varia*.

## LYMANTRIIDAE

OLENE VAGANS B. & McD. (Pl. XX, Figs. 8, 9).

In the summer of 1917 whilst on a collecting trip in Maine, Dr. McDunnough took two *Olene* larvae from an apple tree at Packard's Camp, Sebec Lake; at the same place on a hazel bush he also took a single larva which was distinct from the preceding although closely related. In the course of time the first two hatched into a ♂ and ♀ of the above species; the other larva produced a ♂ (Pl. XX, Fig. 7) which on returning home and comparing with the material in the collection we decided must be *willingi* which we had treated in our revision as a race of *vagans* but which in the light of the larval distinctions must be regarded as a distinct species.

Numerous ♂ specimens of *Olene* taken at light at Sebec Lake were carefully worked over and separated, using the bred material as a basis; we found that with the exception of rubbed specimens (which are very difficult to place correctly) the majority of the ♂ specimens could be fairly readily referred to either the one form or the other by taking into account a combination of the following features: (1) *vagans* has a rather darker color with the cross lines more evident and with a tendency for the t. a. and t. p. lines to approach each other quite closely at the inner margin; (2) the dark band following the t. p. line in *vagans* is quite well defined outwardly by an irregular white s. t. line terminating in a distinct white spot above inner margin and showing slight dark transverse dashes below costa; in *willingi* the s. t. area is very poorly defined and the white spot is far less noticeable; (3) the reniform is more distinctly white shaded in *vagans* than in *willingi*.

With regard to the ♀'s we are unable to give any comparisons, as the only ♀ secured was the one bred from apple; we believe however on the strength of this specimen that our ♀ types of *vagans* belong to another species and that the name must be restricted to the ♂ type figured in our Contributions, Vol. II, (2) Pl. III, Fig. 1; we figure the correct ♀ (Pl. XX, Fig. 9), and a comparison of this figure with those on Pl. III, Figs. 2 and 4 of the revision will show the marked differences; it may be that our ♀ Co-type should

be referred to *willingi* but until the ♀ of this has been bred it is impossible to make any definite statements.

With regard to the larvae, our figures on Plate V, Figs. 5 and 6 of the revision are correct; we would call attention to the distinct differences in the dorsal tufts which are clearly visible in the photographs. In the text (pp. 63 and 64) instead of "segment II" should be substituted "segment 11" and we would point out that there actually is in *willingi* a small dorsal hair pencil arising out of the raised tuft on this segment but the hairs forming it are very apt to be rubbed off when the larvae crawls around and it is only in freshly moulted individuals that it is clearly visible. We append a description of both larvae drawn up from the living specimens:

O. VAGANS (mature larva).

Head black. Body dull gray-black marbled with white with coral-colored eversible glands; two anterior and two posterior lateral black hair pencils; eighth abdominal segment (seg. 11) with a dorsal tuft of black hair surrounded at the base by white feathery hairs; subdorsal rosettes of similar white hair on meso- and metathorax and on abdominal segments 5-7; first four abdominal segments with heavy light-brown dorsal tufts intermingled sparsely with white; lateral rosettes of short white plumed hairs on all the segments; subspiracular tufts of long white plumed hair, each tuft with a central black plumed hair which is occasionally double; on the meso- and metathorax the number of black hairs is normally 2-3.

O. WILLINGI (mature larva).

Head black. Body and lateral black hair pencils as in the preceding; 8th abdominal segment with a fine black hair pencil arising out of the dorsal tuft; the dorsal tufts on abdominal segments 1-4 are mouse gray without an admixture of white hairs except that they are bordered laterally by the usual white rosettes which occur further on the meso- and metathorax and on abdominal segments 5-7; the prothoracic hairs are quite characteristically tinged with ochreous; the lateral and subspiracular tufts are pale gray, the hairs being much less plumed than in the preceding species; the central black hair is also merely barbed, not plumed.

The distinctions in the color and quality of the hair can be readily seen in the cocoons which are formed of the larval hairs loosely spun together; that of *vagans* is much deeper in color and lacks the slight ochreous tinge found in *willingi* cocoon.

With regard to our figures in the revision on Plate III, we might say that the type (Fig. 1) does not show the close approximation

of the t. a. and t. p. lines often found and which may be seen in the bred specimen we figure in this present paper (Pl. XX, Fig. 8); it does however distinctly show the well-defined s. t. area and there is no doubt as to the determination of our Maine series; the specimen from Hymers, Ont., (Rev. Fig. 9) should probably be referred to *vagans* as a dark form; note the approximation of the lines and the distinct white area around the reniform. With regard to *grisea* B. & McD. our type series from Utah seems to agree with *willingi* rather than *vagans*, and we propose for the present treating the two as races of one species; as the name *grisea* has page priority the species will be known by this name with *willingi* as a northern race. The Manitoba specimen figured as *grisea* (Rev. Fig. 3) we regard as rather doubtfully placed; it may represent a new form but until the larva is known nothing definite can be said.

Generally speaking *vagans* seems to show a relationship with *basiflava* whilst *grisea* var. *willingi* tends more towards *atomaria*.

## LASIOCAMPIDAE

## DICOGASTER CORONADA Barnes.

The receipt of two Lasiocampid larvae feeding on oak from Paradise, Ariz., which we succeeded in breeding through into the ♂ and ♀ of the above species proves that our description of the larva published in the revision (Contr. I, (2), p. 16, 1911) was erroneous; the larval notes published under *coronada* should possibly be referred to *Quadrina diazoma* Grt. which appears to occur in the same general locality but of this we have no definite knowledge. We offer the following description of the true *coronada* larva.

Head large, blackish, brown at the extreme sides with white central line and white clypeus with central dark line; three outcurved white lines on each cheek; whole head covered with long brownish hairs. Body broad and rather flat with strongly developed lateral tubercles on anterior segments, very similar to those found in *Tolyte* larvae; clothed with sparse rather short deep brown hairs shading into white laterally; color deep velvety black-brown with very faint pale dorsal stripe; prothoracic shield largely whitish; posterior margin of segments rather broadly whitish narrowing laterally; a broken pale ochreous supra-spiracular stripe consisting of two distinct portions on each segment, an anterior straight short stripe and a posterior larger oblique patch situated directly above the spiracle which is pale with a faint light patch below it. Each abdominal segment is subdivided into four subsegments, the fourth one containing subdorsally two minute orange dots on each side; anal plate whitish; legs reddish; prolegs pale, tinged with pink; under side pale whitish ochreous. Breadth of head 7 mm. Length at rest 70 mm. Width, 12 mm.

## TOLYTE LOWRIE sp. nov. (Pl. XX, Figs. 10, 11).

Palpi black at sides; front white with an admixture of black hairs; thorax pure white, the tufting deep brown, heaviest on metathorax, the anterior portion often covered by the white thoracic hairs; abdomen light blue-gray dorsally, shading into white laterally; primaries white, banded with light blue-gray with the veins outlined in white; basal area gray-shaded followed by an upright band of white, enclosing a narrow gray line; median band gray, the inner edge straight, the outer slightly angled below costa gently concave between veins 4 and 6 and then practically straight to inner margin; following the median band is a prominent broad white area bounded outwardly by



an oblique dark shade band from costa near apex and more or less rigid with a slight outward bend at inner margin; this pale area is crossed by an obsolescent oblique gray line; subterminal area beyond oblique shade and terminal area slightly paler blue-gray; s. t. line broad, distinct, white, bent inward and forming more or less of a white blotch between veins 5 and 6 and slightly accentuated on veins 2 and 3; a white terminal line; fringes blue-gray, paler outwardly; secondaries white crossed by a broad subterminal smoky band, narrowing toward costa and slightly angled at vein 4; slight smoky shading above inner margin toward base of wing. Beneath much as above with the maculation less distinct, the subterminal dark band of primaries strongly marked. Expanse ♂ 35 mm., ♀ 43 mm.

HABITAT: Santa Cruz Mts., Calif. 4 ♂, 4 ♀. Types, Coll. Barnes.

This species was bred by Miss Elizabeth Lowrie and her sister from eggs laid by a captured ♀, taken at Mt. Hermon in the Santa Cruz Mts. at an elevation of 400 ft., the larva feeding on pine; it is the first recorded *Tolyte* species from California and appears sufficiently distinct to warrant a name; we take much pleasure in naming it after the collectors who have been instrumental in supplying many an interesting specimen to our collection. The species is allied to *minta* Dyar from Florida but is larger with a much more regular outer edge to the median gray band. The larva, according to Miss Lowrie, is gray-brown with a black transverse mark on 3rd body segment containing two yellow dots, beneath whitish, tinged with yellow mesially and with central diamond-shaped black patches; from an alcohol specimen kindly forwarded us it would seem as if the larva showed a series of broad, dark, dorsal diamond-shaped patches, more or less connected, and a waved dark stigmatal line, but these points may have been accentuated by the preserving fluid.

## GEOMETRIDAE

### HEMITHEIINAE

#### RACHEOSPILA IRREGULARIA sp. nov.

Palpi and front dull red-brown; a white fillet between antennae edged posteriorly with red; collar and thorax green; abdomen green dorsally with four large raised white spots ringed with red, anal segment white, beneath white; legs white, fore coxae green-tinged. Primaries bright green with narrow white costa; t. a. line white with prominent outward angle in submedian fold; t. p. line very irregular and strongly dentate, straight from costa to above vein 4, strongly bent outward across veins 3 and 4 with teeth on the veins, bent back sharply to the submedian fold with tooth on vein 2 and then perpendicular to inner margin; a small black discal dot; a narrow red terminal line broken by white dots at ends of veins; fringes white, faintly red-tinged opposite veins. Secondaries similar in maculation to primaries with the same irregular t. p. line. Beneath whitish slightly green-tinged with faint red terminal line. Expanse 19 mm.

HABITAT: Brownsville, Texas (May, June). 2 ♀. Types, Coll. Barnes.

Belongs in Section II of *Racheospila* as defined by Prout; apparently related to *texana* Hlst. but with much smaller discal dots and more irregular t. p. line.

#### NEMORIA AEMULARIA sp. nov.

Palpi ochreous tinged with ruddy; front dull pinkish-red with white inter-antennal fillet; thorax and collar green; abdomen with basal segments green, terminal segments whitish, with a narrow broken dorsal line of ruddy-brown in the ♂ and a broad band of same color in ♀ which practically displaces all the green color; abdomen beneath and legs pale ochreous; primaries pale blue- or yellow-green, heavily and roughly striate with pale creamy, veins outlined in creamy; costa cream colored, ruddy at extreme base; t. a. line faint, creamy, rounded, partially hidden by the striations; t. p. line broad, creamy, almost parallel to outer margin; fringes creamy with slight yellow tinge; secondaries similar to primaries in maculation. Beneath whitish, partly hyaline. Expanse ♂ 23 mm., ♀ 25 mm.

HABITAT: Paradise, Cochise Co., Ariz.; Palmerlee, Ariz. 5 ♂, 4 ♀. Types, Coll. Barnes.

The species is hardly a typical *Nemoria*, the ♀ palpi being longer than usual and more as in *Racheospila*; as however it appears to be otherwise obviously related to *viridicaria* Hlst. and *caerulescens* Prout we place it in this genus. Its yellow-green coloration with veins outlined more or less in ochreous is characteristic.

## NEMORIA PUNCTULARIA sp. nov.

Palpi pale ochreous, tinged with reddish, 3rd joint largely reddish; front dull reddish, dotted anteriorly with white; white fillet between antennae bordered posteriorly with red; collar and thorax green; abdomen dorsally largely light brown with dark purple blotches at base and on 3rd and 4th segments, each with a slight sprinkling of white scales forming a more or less evident small central patch; laterally the abdomen is tinged with green shading into white, beneath white; legs ochreous tinged with ruddy; primaries bright green, evenly sprinkled with fine white dots, costa narrowly white with red shading at base; faint white t. a. line, outwardly oblique; t. p. line white, faint, almost straight across wing; a prominent purple-brown discal dot; fringes pale with slight ruddy shading near apex. Secondaries similar to primaries in maculation but the cross-lines curved; discal dot present. Beneath pale greenish white with ochreous costa. Expanse 27 mm.

HABITAT: San Francisco, Calif. (♂); Camp Baldy, S. Bern. Mts., Calif. (June-July) (♀). 1 ♂, 2 ♀. Types, Coll. Barnes.

Very similar in maculation to *darwiniana* Dyar but with large discal spots; the abdominal maculation is peculiar, the prominent white spots with narrow red border of *darwiniana* being modified into purplish blotches with small white center, segment II being brownish, not green.

## ACIDALIINAE

## ACIDALIA BUCEPHALARIA sp. nov. (Pl. XXIII, Fig. 2).

Primaries even dark ochreous, very slightly speckled with black; cross lines well defined, blackish; t. a. line single, bent outward below costa, then inwardly oblique to inner margin, a small discal dot, usually quite distinct, followed by a slightly waved dark line in general parallel to outer margin; a rather heavier and more strongly waved s. t. line, parallel to the preceding; faint traces of a pale line in the terminal space preceded by smoky shading; a faint dark dotted fringe line; secondaries with the lines of primaries continued with the exception of the t. a. line and with the discal dot usually represented by a small dark dot in the median line. Beneath paler than above with similar maculation, the t. a. line of primaries being however lacking, the other lines very distinct as is usually the case with the discal dots. Expanse 24 mm.

HABITAT: Tuolumne Meadows, Calif. 13 ♂, 8 ♀. Types, Coll. Barnes.

The species is very close to *sideraria* Gn., agreeing in antennal structure but entirely lacking all trace of the ruddy terminal shading found in this species; the under side also is much paler ochreous and more heavily marked. In connection with the generic name *Acidalia* Tr. (1825) we would note that we are aware that this is preoccupied

by *Acidalia* Hbn. (1818, Verz., p. 31) but are not certain as to the correct name to be used in its place; it is very possible, according to Messrs. Prout and Hampson, that *Scopula* Schr. (which in any case has priority and for which the correct type is said to be *ornata* Scop.), should be employed.

### LARENTIINAE

#### LITHOSTEGE FUSCATA Grossb.

After a careful study of the type from Colton, Calif., in Rutgers College Collection and a comparison with several specimens taken with us, we cannot find any distinct characteristics that would separate this from *rotundata* Pack.; the wings are rather more suffused with gray than is the case with Packard's type specimen from San Diego, Calif., but only slightly more so than in the type specimen of *arizonata* Grt. in the Brooklyn Inst. Coll. which is listed as a synonym of *rotundata*; we can make absolutely nothing of the supposed difference in the course of the three subterminal white lines on which Grossbeck lays stress. We have a good series of specimens from Arizona localities as well as from various S. Californian localities as far north as the San Bernardino region and find that there is as much variation between specimens from any one locality as there is between the types of *rotundata* Pack., *arizonata* Grt. and *fuscata* Grt. The name *fuscata* may be retained for the suffused forms if desired but we cannot see that it is entitled to specific rank.

STAMNODES DECEPTIVA sp. nov. (Pl. XXIII, Fig. 1).

Front, thorax and abdomen light fuscous, tinged with pink between the antennae and at base of collar; primaries deep orange with basal third of costa gray-black; a large, broadly triangular spot of same color on costa beyond middle and a smaller narrower one before apex; apical third of outer margin gray black with irregular inner edge closely approached to apex of costal triangle; fringes dusky, cut with white. Secondaries orange with gray-black markings as follows; a basal spot, the basal half of costa which is joined to two spots in the cell, a large oblong patch on costa near apex, a larger patch above inner margin joined at its extremities to the margin and enclosing a spot of orange color, a smaller lunate patch above anal angle and a slight irregular band on central portion of outer margin; fringes dusky partially cut with white. Beneath primaries as above but costa pale ochreous, this color enclosing the outer triangular spot; secondaries pale ochreous with blackish markings

of upper side repeated, with pink shading at base of wing and a broken pink band centrally in the postmedian pale area. Expanse 24 mm.

HABITAT: Paradise, Cochize Co., Ariz. (June, Aug.). 2 ♂. Types, Coll. Barnes.

A very striking species, allied to *ferivactaria* Grt. but differing in the maculation of the secondaries.

*EUSTROMA FASCIATA* sp. nov. (Pl. XXI, Fig. 1).

Primaries with the basal area whitish, sprinkled with brown, crossed by a fine brown rounded basal line and bordered outwardly by a broad deep chocolate brown band which tends to suffuse over the whole basal area; this band is followed by a broad upright white ante-median band, faintly brown sprinkled, the inner edge of this band is gently rounded at costa and is rather even without prominent angles (in the ♀ there is a small projection in the cell) the outer edge is regularly dentate and curved slightly inward at costa; median area deep chocolate brown, shaded with pale in costal portion around a small discal dot and crossed by two waved dark lines, parallel above inner margin, diverging in the cell and approaching each other again at costa; outer border of median space with prominent bulges between veins 2 and 3 and 3 and 4 and a slight inner angle on vein 1; subterminal and terminal spaces largely whitish, lightly sprinkled with brown with a fairly evident crenulate pale s. t. line, shaded inwardly with brown which forms a distinct patch at costa; a dark brown subapical patch and a slight oblique apical streak; terminal broken dark line. Secondaries whitish, lightly brown-sprinkled with a fairly evident median dark line bent rather sharply at vein 4 and heaviest above inner margin; faint traces of a pale s. t. line, shaded inwardly with brown. Beneath pale with the maculation of upper side partially showing through, a pale broken s. t. line on primaries and a distinct discal dot on all wings. Expanse ♂ 34 mm., ♀ 37 mm.

HABITAT: ♂, ♀, Ketchikan, Alaska (June, July); ♀, Cowichan Lake, Vanc. Is., B. C. (June). 1 ♂, 3 ♀. Types, Coll. Barnes.

The species is allied to *nubilata* Pack. (Fig. 2) but has the ante-median white band with much more regular edges and less bent in at costa; there is also no trace of yellow shading; various other minor points of distinction are best brought out by our figure; the ♂ genitalia offer no point of distinction from that of *nubilata* as far as we can see; the species should be readily recognized by the contrasting nature of the alternate brown and white bands.

*DYSSTROMA MULLEOLATA* Hlst. (Pl. XXI, Figs. 7, 8).

In our notes on *truncata* and its forms (1917, Contr. III (4), 227-30) we accepted tentatively Mr. Swett's determination of this form which we considered a race of *truncata* but which Mr. Swett treated

as a good species (1917, C. Ent. XLIX, 68). Recently we examined the so-called "Type" at Rutgers College which as we have already noted (l. c. p. 229) is labelled "Washington Terr.;" this type proves to be not what we figured (l. c. Pl. 21, Figs. 4, 5), but a similarly colored form of *citrata* L. (according to our genitalic slides) which Mr. Swett in his paper (l. c. p. 65) has called *punctum-notata* Haw. and which is quite common on Vancouver Is. in August; the specimen bears out the original description excellently except that the locality is wrong and the size given ( $1\frac{1}{2}$ - $1\frac{3}{4}$  in.) is considerably too large; in the same paper however (1881, Bull. Brooklyn Ent. Soc. IV, 26-8) we find a similar discrepancy in the size of another described species, *Cidaria nocticolata* (*montanata* Pack.), which certainly does not expand to  $1\frac{1}{4}$  in., and further would note that the type of *semi-atrata*, listed as from Colorado also bears a label "W. T." in the Hulst Coll. It would seem then that this particular paper abounds in inaccuracies and we believe that until further evidence to the contrary be produced it will be best to accept this specimen in the Hulst Coll. as the type of *mulleolata* and transfer the name to *citrata* L. For the large *truncata* form Mr. Swett has already in our opinion given us sufficient names (l. c. pp. 69-70); *sobria* Swett, being the first on the list, may be used for the race collectively. A reference to our figures will show how extremely close the two species are superficially.

The above mix-up is only a further illustration of how extremely necessary it is to have an accurate knowledge of type specimens before attempting to revise a group.

DYSSTROMA BRUNNEATA Pack. (Pl. XXI, Fig. 9).

After a careful study of the type and a comparison with it of specimens from Ketchikan, Alaska, we believe the species distinct from either *truncata* or *citrata* and very closely related to *kasloata* Tayl.; the genitalia of our Ketchikan species (which we consider identical with *brunnata*) shows an entire lack of spines to the Aedoeagus. We have a single ♂ from Nepigon, Ont., which we also incline to place here, showing that the species extends across the entire continent in northern latitudes.

Genus HYDRIOMENA Hbn.

We have recently received a number of specimens belonging to this genus taken by our collector in the Monachee Meadows, Tulare

Co., Calif., at an altitude of about 8000 ft.; these meadows are situated on the Eastern side of the Sierras, south of Mt. Whitney near the headwaters of the south branch of the Kern River and proved to be an excellent collecting ground.

Superficially all the specimens appeared very similar but an examination of the structure of the  $\delta$  antennae and uncus showed clearly that three species were represented, all belonging to the short-palpi group. Apparently they are races of species described from more northern localities to judge by the similarity of the structural details but as they present quite a distinct appearance we believe that racial names are warranted. The three species with which we associate our new forms are *henshawi* Swett, *shasta* B. & McD. and *irata* Swett; the first named may be separated by the thin  $\delta$  antennae which are scarcely thicker than in the  $\text{♀}$  sex; *shasta* has very thick  $\delta$  antennae, strongly laterally compressed and with the segmental incisions rather deeply cut so that the lower surface is distinctly serrate in appearance; in *irata* the antennae are rather thinner than in *shasta* but still more serrate; the differences in the shape of the Uncus have been already illustrated by us in our Revision of the genus. We describe the new races as follows.

HYDRIOMENA HENSHAWI EXPURGATA var. nov. (Pl. XXI, Fig. 6).

Typical *henshawi* is more or less entirely suffused with dull gray presenting quite a unicolorous appearance; the present race is much more contrastingly and brightly marked; the basal and median areas are pale with a slight ochreous tinge and the antemedian and subterminal blue-gray bands stand out sharply and brightly; the pale median area is bordered on both sides by distinct ruddy shades, especially toward the inner margin, and there is a certain amount of ruddy shading terminally and beyond the pale basal area, these shades serving to accentuate the blue-gray bands already mentioned.

HABITAT: Monachee Meadows, Tulare Co., Calif. (8000 ft.). 3  $\delta$ , 6  $\text{♀}$ . Types, Coll. Barnes.

HYDRIOMENA SHASTA BORUSSATA var. nov. (Pl. XXI, Fig. 5).

Larger and much paler than our unique type of *shasta*; primaries whitish, lightly sprinkled with smoky atoms with the dark cross lines and bands rather contrasted; subbasal line outwardly oblique with prominent outward angle in cell and inward angle in submedian fold; antemedian band prominent, dark, dentate; the border lines of the broad pale median area improminent, edged faintly with a ruddy suffusion; subterminal band broad except at inner angle,

followed by a prominent oblique dark apical dash surrounded by slight ruddy shading. Expanse 32 mm.

HABITAT: Monachee Meadows, Tulare Co., Calif. (July). 1 ♂, 1 ♀. Types, Coll. Barnes.

The description is drawn from the ♀ specimen, the ♂ being rubbed and generally duller in color as far as can be determined.

HYDRIOMENA IRATA QUAESITATA var. nov. (Pl. XXI, Fig. 4).

Dull gray with the bright ruddy shades of the typical form only very faintly indicated in the ante-median area; lines as in the type form, well defined; median area broad. Expanse 35 mm.

HABITAT: Monachee Meadows, Tulare Co., Calif. (July). 2 ♂. Types, Coll. Barnes.

SPARGANIA BELLIPICTA Warr. (syn. *S. ILLUSTRATA* B. & McD.).

This species, described in 1901 from Golden, Colo. (Nov. Zool. VIII, 468), was overlooked by us in preparing our Check List; from the description there seems little doubt that we redescribed the species under the name *illustrata* in 1917 (Contr. III, (4) p. 230).

EUPHYIA UNANGULATA Haw. (Pl. XXI, Fig. 3).

We have received two specimens of what seems to be undoubtedly this species from Ramparts, Alaska; the species is generically distinct from *alternata* Mull. (*sociata* Bork.) the areole of the primaries being double whereas in this latter species it is single; it may be separated from *intermediata* Gn. (*lacustrata* Auct.) which it agrees with generically by the presence of a dark terminal band on both sides of secondaries, this band in *intermediata* being broken up into several waved lines. The species must again be included on our lists; we omitted it from our Check List as the records had evidently been based on specimens of *alternata*; we figure one of the specimens which is not in the best of condition.

XANTHORHOE SALVATA Pears.

In his description of this supposedly new species, Mr. Pearsall entirely overlooked the fact that the antennal structure of his species agreed with that of the European *abrasaria* H. S.; on the strength of this and because the general description pointed strongly in this same direction we recently listed *salvata* as a race of *abrasaria*, giving however *trilineata* Warr. priority. An examination of the type has



shown us the correctness of our identification; how Mr. Pearsall ever came to associate this Colorado race with *incursata* Hbn. as he evidently did, judging by his paper, must remain a mystery; it exactly resembles a large specimen of the common form of *abrasaria* found in the White Mts., N. H., and to which the name *congregata* Wlk. applies. The true *incursata* (or at least a very closely allied race of the same) occurs in this country at high altitudes in the Canadian Rockies; we have a series from Laggan and Banff.

GEMM NASUSINA Pears. (Pl. XV, Fig. 7).

Following a discussion by Grossbeck (1908, Jour. N. Y. Ent. Soc. XVI, 21) of the genus *Gymnoscelis* Mab. and the species included in it by Hulst in which the variability of the number of pairs of spurs on the hind tibiae was pointed out Pearsall (1908, Can. Ent. XL, 344) erected the genus *Nasusina* for seven species which he claimed all possessed a similar nose-like frontal prominence; he designated as type the species *inferior* Hlst. The choice of *inferior* as the type of the genus is singularly unfortunate as this species does not possess the cone-like prominence found in *gypsata* Grt. and its allies as has been already noted by Grossbeck in the above mentioned article; in this species however the front is distinctly roundedly bulging, being considerably raised between the eyes, and is covered with a closely appressed thick mat of scales giving a very distinctive appearance quite in contrast to what is found in typical *Eupithecia* species where we have a flat sloping front with merely a terminal tuft of scales protruding between the palpi. We think therefore that the genus will hold, but so far as our investigations go should be made to include only three species, viz. *inferior* Hlst., *minuta* Hlst. and *vaporata* Pears. Of these last two species *vaporata* was described as a *Eupithecia* but has exactly the same style of raised front as *inferior*, our own opinion regarding this species being confirmed by Mr. F. E. Watson who has kindly examined the type specimens for us; *minuta* Hlst. has been included in Mabille's genus *Gymnoscelis* on the strength of the single pair of spurs on the hind tibiae; this genus, based on the European species *pumilata* Hbn., is however characterized by Meyrick as possessing a similar cone of scales on the front to that of *Eupithecia* (1892, Tr. Lond. Ent. Soc. p. 65) and Rebel (Spuler, Schmett. Eur. II, 68) notes the fact that veins 6 and 7 of secondaries are always unstalked;

as *minuta* shows these veins stalked as in *Eupithecia* and differs further from the characterization of *Gymnoscelis* in its frontal structure we believe this genus should be dropped and *minuta* included in *Nasusina*, the spurs of the hind tibiae having already been shown to be a variable feature although in this one species apparently constantly single. In the three species noted the palpi are short, rather laterally compressed with the second joint heavily tufted with scales on its dorsal surface.

The following species, included up to now under *Nasusina*, all agree in showing a cone-like protuberant front projecting between the eyes with closely appressed scaling and with the under surface more or less hollowed out so as to partially contain the rolled-up proboscis; the palpi also differ from the type found in *Nasusina* in being more compressed laterally with much closer appressed scaling and with little or none of the dorsal tufting found in both that genus and in *Eupithecia*; on the other hand at the base of the palpi on the under side the scaling is more prominent (Pl. XV, Fig. 6):

- gypsata* Grt.
- leucata* Hlst.
- remorata* Grossb.
- discoidalis* Grossb.
- artestata* Grossb.
- desperata* Hlst.
- mellisa* Grossb.
- insipidata* Pears.

Of these eight species the only one unknown to us and of which we do not possess a specimen compared with the type is *artestata* Grossb. and we presume that Grossbeck was correct in placing it, although the type at Philadelphia must be examined to make this certain; *opinata* Pears. we believe better placed in *Eupithecia*; the front is only very slightly bulging but has a scale tuft which probably misled Pearsall into placing the species in *Nasusina*; the palpi are also dorsally tufted and the species would in some ways appear to lead over from *Nasusina* to *Eupithecia*; *niveifascia* Hlst. is distinctly a *Eupithecia* and superficially somewhat similar to *perbrunnata* Tayl.

As it seems advisable to separate this group from the main bulk of the genus *Eupithecia* we propose for it the generic name PRORELLA, designating *gypsata* Grt. as type; the main characters of the genus

we have already given but would note further that the venation is that of *Eupithecia* and that the upper pair of spurs on the hind tibiae may be present or wanting; in *remorata* we find the greatest development of the frontal prominence but in the other species it is also readily recognizable; we would however warn against mistaking the conical scale tuft found generally in the genus *Eupithecia* for the frontal protuberance of *Prorolla*, this latter being actually a portion of the chitinous membrane and as well defined in denuded specimens as in those fully scaled. It is possible that *ravocostaliata* and its allies must also be referred here as they show a somewhat similar frontal projection, but further study of the whole *Eupithecia* group will be necessary before this is done.

NASUSINA INSIPIDATA Pears. (Pl. XXII, Fig. 4).

In our recent Check List we placed this species as a synonym of *mellisa* Grossb., our knowledge of the species being based on the Co-type from California in the American Museum; we recently examined the type from Las Vegas, N. M., in the National Museum and we believe that this represents a species distinct from *mellisa* (Pl. XXII, Fig. 3) and is not the same thing as the New York Co-type; it has a darker ground color with none of the ochreous shading found in *mellisa* and with apparently a smaller discal dot. Until good series of both these species are available for study it would be wise to keep them apart. We figure our conception of both species.

EUPITHECIA MENDICATA sp. nov. (Pl. XXII, Fig. 2).

Confused with *Nasusina vaporata* Pears. (Fig. 1) is another small species from the same locality which may be separated primarily on the frontal structure. We have already dealt with the structure of *vaporata*; in the new species the front is typically Eupitheciid i. e. sloping, non-protuberant and ending in a tuft of conical scaling; the palpi are also somewhat longer than in *vaporata* and project slightly beyond the front. Under the above name we describe the species as follows:

Primaries dull gray shaded along outer margin with smoky; the sub-basal, antemedian and postmedian lines are distinct, dark and parallel, being inclined sharply outwardly below costa, then angled or rounded and inwardly oblique, parallel to outer margin, to inner margin; the median space formed by the two latter lines is crossed by two further faint wavy lines and contains a rather prominent dark discal dot; there are also several faint lines preceding

the antemedian and one following the postmedian line; along the costa the main lines are generally accentuated by slight dark blotches; through the darker terminal space are traces of a pale waved s. t. line; a heavy blackish terminal line broken by pale dots on the veins. Secondaries with the lines of primaries continued, the postmedian being especially heavy and preceded by a minute discal dot. Beneath primaries darker than above with traces of the same maculation but much fainter and confined largely to the outer area; secondaries paler than above with dark basal area, well defined discal dot and postmedian line and dark subterminal one. Expanse 13-14 mm.

HABITAT: San Diego, Calif. (Apr.-May). 3 ♂, 2 ♀. Types, Coll. Barnes.

One ♀ Co-type is in the collection of the American Museum, this specimen having been included by Pearsall as a Co-type of *vaporata*; apart from the frontal structure the species may be recognized by the larger discal dot of primaries and the paler color with better defined ante- and postmedian lines.

#### EUPITHECIA MISERULATA Grt.

There seems to be no end gained in disputing the identity of this species as determined by Pearsall and Grossbeck (Ent. News, XIX, 312) and we agree in applying the name to the species with heavily fasciculate-ciliate antennae. Regarding the synonymy we are rather in doubt; *nebulosa* Hlst. was described from specimens from N. Y., Texas and N. J.; the type from N. J. is a ♀ in the Philadelphia Academy Coll. and is probably *miserulata*; the N. Y. and Texan specimens are in the Hulst. Coll. the latter being in very poor condition; under these circumstances we believe the holotype should be restricted to the N. Y. specimen as was virtually done by Grossbeck (Ent. News, XVIII, 343). This specimen is one of those forms with rather evident brown band following the postmedian line and with darker median area than usual and equals *grossbeckiata* Swett; knowing how close some of the *Eupithecia* species run to each other we are in doubt as to whether *nebulosa* may not eventually prove a good species but our material at present is totally inadequate to decide the question and we suggest for the present listing *nebulosa* (*grossbeckiata*) as a form of *miserulata* rather than making it an exact synonym in order that this possibly distinctive feature may not be totally lost to sight.

*Plumbaria* Hlst. based on a single ♀ from Washington, D. C., in the National Museum seems to be nothing but a ♀ *miserulata* and must be added to the synonymy.

## EUPITHECIA PERFUSCA Hlst.

This species was limited by Taylor to the one represented by the type ♀ from Utah in the National Museum (C. Ent. XL, 58) which he and Dr. Dyar seemed to regard as conspecific with an obscurely marked species common at Kaslo and Wellington B. C. After a study of this type we are in some considerable doubt as to whether this identification is correct; the type is a very immaculate specimen with less rounded apex of primaries and a distinct black band on the abdomen and runs closer to *slocanata* Tayl. than anything else we know of; more study, especially of Utah material, will be necessary to settle the status of *perfusca*; the whole group is one of the most difficult of this difficult genus.

## EUPITHECIA ANNULATA Hlst. (Pl. XXII, Fig. 9).

The species was described from a single specimen of doubtful locality, probably California; a study of the type at Rutgers College has convinced us that the species is the same as that described later by Pearsall as *limnata* from Vancouver Is. material.

## EUPITHECIA FLEBILIS Hlst.

This species from Alaska and *lagganata* Tayl. are very closely related and in fact a comparison of the types failed to show us any marked points of distinction; in view however of the wide divergence of the type localities it might be well to keep the two names separate until longer series establish firmly their exact relationship. We figure the type of *lagganata* Tayl. (Pl. XXII, Fig. 5).

## EUPITHECIA FORTUNATA Pears. (Pl. XXII, Fig. 6).

We believe this name must fall to *obumbrata* Tayl.; the type localities Golden, Colo., and Victoria, B. C., are wide apart but the species with its dark secondaries marked much as the primaries is easily recognized and rather striking; it is apparently a northern species extending down the Rockies and the Pacific Coast.

## EUPITHECIA FASCIATA Tayl. (Pl. XXII, Fig. 7).

This name will fall to *catskillata* Pears. which has a couple of years priority; two of the types from Ottawa and N. J. are before us and we have seen the third type from Mass. in Coll. Swett; they

are conspecific; we have also compared the type with Pearsall's type series of *catskillata* so feel reasonably sure of the correctness of our reference.

EUPITHECIA CALIFORNIATA Gumpf.

This name was given by Gumpfenberg (1888, Nov. Act. Halle 52, p. 174) for a supposed variety of *miserulata*, based on three specimens from California mentioned by Packard in his Monograph, p. 54, under *miserulata*; these three specimens which represent the types of *californiata* have been found by Mr. Swett in the Packard collection; they have, however, nothing to do with *miserulata* but are very closely related to *rotundopuncta* Pack.; they seem to have more pointed wings and a smaller discal dot but more study with better preserved material will be necessary before the exact differences can be pointed out.

EUPITHECIA ADORNATA Tayl. (Pl. XXII, Fig. 10).

This species will, we believe, fall to *obscurior* Hlst.; this latter species was described (Tr. Am. Ent. Soc. XXIII, 271) from specimens from California and Colorado; in the Rutgers Coll. the type is labelled "Colorado (Bruce)" and we would make this specimen the holotype; we have no record of the existence of any other type in other collections. Taylor's *adornata* was described from Calgary specimens and we have compared one of the Co-types with the type of *obscurior* and believe them to represent the same species. We might note in this connection that the type specimen of *nimbicolor* Hlst. from Calgary greatly resembles a rather suffused *obscurior*, but without comparing further material we would hesitate to call them identical; they should however be placed next each other in our lists; another very close ally is *incresata* Pears. described from Princeton Summit and Skagit Basin, B. C.; it shows the same brownish basal and s. t. shades but is rather duller in maculation.

EUPITHECIA PERILLATA Pears. (Pl. XXII, Fig. 11).

A study of types proves this species the same as *bhrensata* Pack.; the type of this latter at Cambridge is a rather worn specimen with the cross-lines indistinct whereas Pearsall's type shows the lines fairly clearly, but sufficient of the lines can be traced on Packard's type to

make the reference fairly certain; we might note that the discal dot varies considerably in size in the three specimens we possess from San Bernardino Co., Calif.

EUPITHECIA CLASSICATA Pears. (syn. E. PENUMBRATA Pears.) (Pl. XXII, Fig. 8).

The species *classicata* was described from a single male from the Huachuca Mts., Ariz., the type being now in the Coll. Am. Mus. Nat. Hist. ex Coll. Grossbeck; *penumbrata* was described several years later as a *Eucymatoge* from two specimens, a ♀ from Palmerlee, Ariz., the Holotype, which is also in the Am. Mus. Coll. ex Coll. Pearsall and a ♂ from Redington, Ariz., in the Barnes Coll labelled "Co-type," which we figure. The type of *classicata* is in very poor condition, but as far as can be told represents a rather dwarfed ♂ of *penumbrata*; Mr. F. Watson has kindly examined the venation of the type for us and reports that, although somewhat torn at this point by the spreading needle, the specimen appears to show two accessory cells, which would throw it into *Eucymatoge* as defined by Hulst. Pearsall evidently later considered the two names to be synonyms as the type of *penumbrata* bears a label in his handwriting "Is this a synonym of E. *classicata*?" and a "Yes" written diagonally across it; our own comparison of our Co-type with the types in New York failed to show any definite points of distinction, and we believe the above synonymy should be accepted; the species however, according to Mr. Prout, is better placed in the genus *Eupithecia*, belonging to a small group with double accessory cell, which includes *anticaria* Wlk. and *gracfi* Hlst.

EUCYMATOGE SPERMAPHAGA Dyar.

This recently described species (1917, Insec. Ins. Menstr., V, 68) is apparently the one listed by the Rev. G. W. Taylor as *togata* Hbn. (1909, C. Ent., XLI, 428). The larva of this European species has similar food-plants to that of *spermaphaga*, viz. the cones of various pine and fir species, and it will be interesting to determine whether any specific differences exist sufficient to warrant the retention of Dyar's name. As to the generic reference Dyar has probably followed Hulst who cites *togata* as the type of *Eucymatoge*; European authorities (Rebel, Prout., etc.), however, agree that the presence of a double areole on the primaries is not of generic value in this case and the species should be listed under *Eupithecia*.

## GEOMETRINAE

MACARIA UNIPUNCTARIA Wgt. (Pl. XXI, Figs. 10, 11).

We have recently received through the kindness of E. P. Van Duzee a photograph of the Paratype of *Melanolophia unipunctaria* Wgt. described recently in the Ent. News, 1916, XXVII, p. 458; the species is quite misplaced in the genus *Melanolophia* and belongs in the *granitata* group of *Macaria* being very close to *succosata* Zell. which was described ostensibly from Massachusetts material received from Packard. We have never seen any Eastern material that would correspond with Zeller's diagnosis, so cannot give the points of distinction; we would however call attention to the large red-brown costal spot beyond t. p. line common to both species. Besides a ♀ from the type locality we have specimens of *unipunctaria* from Monachee Meadows, Tulare Co., Calif., and various points in the Santa Catalina Mts. of Arizona; the species is probably a pine feeder. The ♂ antennae we should characterize as serrate and fasciculate rather than pectinate; the serrations are slightly shorter than in *multilineata* Pack. but larger than in the Vancouver Is. form of *disrupta* Wlk.

MACARIA ADONIS sp. nov. (Pl. XXI, Fig. 12).

Antennae in ♂ serrate and fasciculate, in ♀ simple; palpi, head and collar bright orange, abdomen pale ochreous with a double row of black dorsal dots; thorax and primaries mouse gray, the latter somewhat shaded with whitish on inner half of wing; three prominent black costal spots giving rise to the ordinary dark lines, the second line rather closer to the first than to the third (postmedian), these two being rather faint, slightly bent outward below costa, then straight across wing; the postmedian line is prominently angled on vein 6, then indistinct, broken and parallel to the other lines, all three showing under a lens traces of olivaceous scaling; beyond the t. p. line the outer area is bright cinnamon-brown with the exception of an apical gray patch and a smaller costal triangular patch adjacent to t. p. line; at times a faint gray s. t. line may be traced through the brown area arising from the apical gray patch; a broken terminal dark line; fringes dusky, deepest in the subapical excision, with a small pale area at apex of wing. Secondaries similar to primaries with the basal area rather paler, the two outer lines continued across wings, the outer being wavy; a small discal dot; outer margin crenulate, distinctly angled at vein 4. Beneath whitish, shaded with light brown especially on outer area, the lines of upper side reproduced; discal dots on all wings, most distinct on secondaries. Expanse 31-34 mm.

HABITAT: Monachee Meadows, Tulare Co., Calif. 5 ♂, 9 ♀. Types, Coll. Barnes.



The species belongs in the *bicolorata* group but we know of no name applicable to it; it is extremely handsome and should be easily recognized from our figure.

PHASIANE HEBETATA Hlst. (Pl. XXI, Fig. 13).

In our Contributions Vol. III (3) p. 181, we called attention to the poor condition of the type ♀ at Rutgers and expressed the opinion that *hebetata* would probably prove to be a poorly marked form of *decorata* Grossb. A further study of the type and comparison with more material proved conclusively to us that this reference was erroneous; we believe now that *hebetata* is the same species as our *ponderosa* form *dmaculata* (Contr. III, (4) p. 235); the heavily sprinkled under side with tinges of ochreous along costal border of primaries and the large discal dot of secondaries are characteristic; besides a specimen which we figure which agrees absolutely with the type, we have a Colorado ♂ of the heavily marked form *ponderosa*. The synonymy would therefore stand

*hebetata* Hlst.

*dmaculata* B. & McD.

form *ponderosa* B. & McD.

*Decorata* Grossb. must be reinstated as a good species and not a form of *hebetata*.

ITAME SERICEATA Hlst. (Pl. XXI, Figs. 16, 17, 19, 20).

This species was described (1898, C. Ent. XXX, 191) from several specimens from Colorado Desert (Edw.) and Arizona (Kunze); in Ent. News XVIII, 149, Grossbeck refers the 2 ♀ types in the Hulst. Coll. to *correllata* Hlst.; Dr. Dyar (Ent. News XVIII, 205) on the strength of a type from Prescott, Ariz., in the National Museum objects to this reference and Grossbeck (1907, Tr. Am. Ent. Soc. XXXIII, 341), after having seen a specimen agreeing with the National Museum type, refers 1 ♀ type (Colorado Desert) to *correllata*, but keeps the other (Senator, Ariz.) as a good species, noting however later on (1909, Ent. News, XX, 354) that *sericcata* Hlst. falls as a synonymy of *colata* Grt.

The type of this latter species is a ♀ from Tucson, Ariz., in the Brooklyn Inst. Coll.; we have examined this type carefully as well as the two types in the Hulst Coll. representing respectively *correllata* and *sericcata* and fail to find specific differences; *colata*

and *sericcata* are based on ♀ specimens and both show a straighter t. p. line with very little bend in the submedian fold as compared with *corrcllata*, based on a ♂ specimen; this difference we believe to be sexual and not specific and not even entirely constant in either sex, as a long series before us from Vineyard, Utah, shows considerable variation in the course of this t. p. line in both sexes; we believe we are correct in referring both *sericcata* and *corrcllata* as synonyms of *colata* Grt.

We figure a pair of specimens from Utah which agree with the types of *corrcllata* and *colata* respectively, and also a pair from Monachee Meadows, Tulare Co., Calif., which shows a still greater curve in the t. p. line and probably represents the form of the High Sierras.

ITAME SIMPLICIATA sp. nov. (Pl. XXI, Fig. 15).

Front whitish, thorax and primaries whitish to pale mouse gray, evenly sprinkled with brown atoms; t. a. line obscure, strongly angled outwardly below costa, then slightly incurved to inner margin; t. p. line prominent, almost upright, with a small outward tooth on vein 5 and an outward bend above inner margin, accentuated by a dark spot above vein 5 and more heavily marked in the submedian fold, followed except at costa by a dark shade; s. t. line only marked for a short distance below costa by a dark shade-line; fringes pale outwardly, darker at base. Secondaries smoky, whitish along inner margin with smoky speckles, fringes white outwardly. Beneath primaries smoky brown with the apex broadly light gray; secondaries light gray sprinkled with brown and with an obscure curved brown postmedian line. Expanse 24 mm.

HABITAT: Paradise, Arizona (Mch. Apr.) 2 ♂. Types, Coll. Barnes.

The species is allied to *pallipennata* B. & McD. but is more even in color with a straighter t. p. line and no postmedian line on upper side of secondaries.

PLATAEA TRILINEARIA ASTRIGARIA var. nov. (Pl. XX, Fig. 1).

Median area of wing pale olivaceous bordered by white bands as in the type form; remainder of wing very pale olivaceous, scarcely darker than the white bands in consequence of which these latter are very improminent; s. t. line faint, white, just perceptible on the slightly darker ground; an oblique white discal streak; fringes white with very prominent blackish streaks opposite the veins. Secondaries white, slightly peppered with dusky atoms. Expanse ♂ 36 mm., ♀ 33 mm.

HABITAT: Olancha, Inyo Co., Calif. 1 ♂, 1 ♀. Types, Coll. Barnes.

A very striking race easily recognizable by its pale coloration and entire lack of white marks on the veins; it may prove to be a good species but for the present we treat it as a desert race of *trilinearia*.

## PLATAEA CALCARIA Pears.

*Apicrena calcaria* Pears., 1911, C. Ent. XLIII, 205 (♀).

*Plataea triangulata* B. & McD., 1916, Contr. III, (1), 27, Pl. III, Fig. 18. (♂).

The receipt of several more specimens of both sexes from Palm Spgs., Calif., and also of a ♂ from Yuma Co., Ariz., convinces us that our *triangulata* is merely the ♂ sex of Pearsall's *calcaria* of which we have recently examined the type; the sexual difference is striking but the agreement in structure of the two sexes makes the reference certain. We can see no reason for retaining the genus *Apicrena* Pears.; the venation is that of *Plataea* with which genus it also agrees in the shortly pectinate ♀ antennae.

## GLAUCINA PUELLARIA Dyar. (Pl. XXII, Figs. 12, 13).

The types are several ♀'s in the National Museum from various southern Arizona localities; they appear to be conspecific although a Co-type sent us years ago by Dr. Dyar from Catalina Spgs., Ariz. (Schwarz) represents an entirely different species, being a ♀ *Synglochis perumbraria* Hlst.; the 2 ♂'s mentioned by Dr. Dyar in his description as being doubtfully identical we believe to be something else and, as these are provided with type labels and might lead to confusion later, we hereby restrict the type of *puellaria* to the ♀ from S. Arizona, Poling. We believe the species will prove to be synonymous with *escaria* Grt.; the markings and color of primaries agree exactly with a specimen (also from S. Arizona, Poling) which we have compared with the ♂ type in the Brooklyn Inst.; the under side of both wings shows a broad darkish marginal band in the *puellaria* types but we believe this is merely a ♀ characteristic. In our Contributions (Vol. III (3) 183) we were inclined to associate *erroraria* Dyar with *escaria* Grt. but believe now that the species is valid; at that time our notion of *puellaria* was taken from the ♂ specimens instead of the true ♀ types. *Erroraria* (Pl. XXII, Fig. 14), the type being a ♀ from Hot Springs, Ariz. (Schwarz), is very similar to *puellaria* (*escaria*) in maculation but the color of primaries is paler, approaching fawn-gray, and the secondaries have a whiter basal area; the type shows a whitish, subcrenulate s. t. line which is obsolete in the two co-types from Tucson, Ariz.; we have not yet definitely identified ♂'s of *erroraria*.

The group is a difficult one and will require further study, but we are reasonably sure of our reference of *puellaria* Dyar to *escaria* Grt.

*GLAUCINA SIMULARIA* sp. nov. (Pl. XXI, Fig. 14).

Thorax and primaries deep smoky; t. a. line indistinct, sharply angled outwardly below cubitus; a slight black streak in cell; median shade and t. p. line close together and parallel, arising from apical portion of costa and strongly inwardly oblique, the former broad, smoky, bent outward below costa, then oblique and slightly crenulate with a faint inward angle in submedian fold; t. p. line narrow, oblique at costa, slightly bulging at vein 6, then curving obliquely backward to submedian fold where it bends outward and continues less obliquely to inner margin just beyond its center; it is followed by a distinct light brown shade-band; subterminal area shaded with blackish and white and bounded outwardly by a white s. t. line, in general parallel to t. p. line; fringes dark with white basal line. Secondaries heavily sprinkled with smoky and with a deeper smoky terminal border, containing a white, slightly irregular s. t. line parallel to outer margin; fringes as on primaries. Beneath heavily peppered with smoky with traces of the subterminal markings of upper side on both wings; secondaries with small discal dot. Expanse 28 mm.

HABITAT: Monachee Meadows, Tulare Co., Calif. 1 ♀. Type, Coll. Barnes.

The species is closely allied to *hulstinoides* Grossb. but is larger, darker-winged and the lateral rim of the frontal prominence is not so well defined. Both species show distinct pectinate antennae in the ♀ sex which may eventually lead to their separation from the genus *Glaucina* to which in maculation they show no very great affinity. The tibial spine on our species is small and might easily be overlooked.

*PTEROTAEA OBLIVISCATA* sp. nov. (Pl. XXI, Fig. 21).

Very similar to *memoriata* Pears. (Pl. XXI, Fig. 18) but paler in color without the ochreous tinge of this species; the maculation is very obscure, but in general similar to that of *memoriata*; the s. t. line is better defined, irregular, distinctly dentate, the whole terminal area being paler than the s. t. area and without the heavy dark shades at apex and anal angle with a pale space between veins 3 and 4 which characterizes *memoriata*; there is a distinct row of terminal blackish interspaceal dots on both wings (lacking in Pearsall's species) and usually a small but fairly clear discal dot. Beneath both wings are whitish with generally a small discal dot and dotted terminal line. Expanse 23 mm.

HABITAT: Paradise, Arizona (May, Aug., Sept.) 7 ♂, 4 ♀. Types, Coll. Barnes.

As the species is difficult to describe we give figures of both species which should show the salient points of distinction better than a mere description; we have a good series of *memoriata* before us and the differences seem perfectly constant; both species occur in the same locality and are alike in structure.

CLEORA (SELIDOSEMA) DIONARIA sp. nov. (Pl. XX, Fig. 6).

Primaries whitish, rather heavily sprinkled with smoky and with a yellowish tinge on the veins in the neighborhood of the cross-lines; four obscure equidistant smoky patches on costa giving rise to cross-lines of which the first is obsolescent, outwardly rounded and closely approached to the second at inner margin; the second corresponds to the ordinary t. p. line, is not very distinct, inwardly oblique and slightly dentate; the third is bent out below costa forming an angle in which a discal ringlet rests, then irregular to inner margin and approximate to t. p. line; the fourth or t. p. line is the most distinct of all, evenly dentate, rounded outwardly below costa, then oblique inwardly to inner margin above which it forms a rather prominent inward excavation with an outward angle on vein 1; following it is a slight brownish shade, most distinct on the veins; s. t. line obscure, pale, dentate, preceded by smoky shade; a black scalloped terminal line, accentuated at base of scallops by a dark dot; secondaries similar to primaries in color, with a distinct dentate t. p. line and a somewhat larger discal ringlet. Beneath silky whitish, costa of primaries pale ochreous, blotched with smoky; faint discal ringlets and dark terminal line to both wings.

♀. Whiter than the ♂ with prominent discal ringlet on secondaries. Expanse ♂ 40 mm.; ♀ 45 mm.

HABITAT: Palmerlee, Ariz. 4 ♂, 1 ♀. Types. Coll. Barnes.

Very similar to *grisearia* Grt. but larger, less contrasted in coloration and with a discal ringlet on secondaries instead of a dot; it is also allied to *furfuraria* Hlst. but separated readily by the ringlet; the ♂ shows no hair-pencil on the hind-tibia.

CLEORA PORCELARIA Gn.

This species, which was not definitely recognized by either Packard or Hlst., was doubtfully placed as a synonym of *umbrosaria* Hbn. by Hulst in Dyar's List (p. 325) and this reference was followed by ourselves in our recent Check List. The types are stated to be 3 ♂ in Coll. Paris Museum and Boisduval; M. Oberthur states (Ét. Lep. Comp., VII, 274) that no specimen exists in his collection *ex* Coll. Boisduval and we were unable on our last visit to Paris to find any type specimens there so that we must conclude that the types are probably lost.

Guenée in his description separates *porcelaria* (not *porcellaria* as usually written) from his *gnopharia* by the fact that the discal ringlet, so prominent in this latter species, is reduced to a simple curved dash (un simple trait arqué); he further mentions particularly a fovea (vésicule) at the base of primaries which forms on the under side a small rounded depression (une petite fossette arrondie).

These two features lead us to believe that without much doubt Guenée had before him specimens of what is listed at present as *indicataria* Wlk.; this species distinctly resembles *umbrosaria* (*gnopharia*) in type of maculation, but has the ringlet reduced to a curved dash and further shows a very prominent fovea at the base of primaries. As Guenée ascribes the name *porcelaria* to Abbot (presumably according to an unpublished figure), we may take it that the type locality was Georgia; in this case *flaria* Wlk. and *maestosa* Hlst. (vide B. & McD. Contr., III, (3), 185) become synonyms of *porcelaria* and the name *indicataria* Wlk. may be employed for the northern race common in the New England States and Canada if it be so desired.

As regards *gnopharia* Gn. and *umbrosaria* Hbn. we believe, as far as we can judge from the rather poor figures given, that they are synonyms; Guenée's idea of *umbrosaria* with uniform dark gray under side and no subterminal band does not coincide with Hubner's figure in our copy of the Sammlung Ex. Schmett.

PHILTRAEA ELEGANTARIA PAUCIMACULA var. nov. (Pl. XX, Fig. 3).

The typical form of this species (Fig. 2), has the black markings on both sides of the t. a. and t. p. lines and within the circular reniform yellow spot very heavy, the latter being almost entirely black filled; the typical species occurs in the mountain ranges of Pima Co., Ariz. In the eastern portion of its range the species assumes a somewhat different aspect, showing a marked reduction of black spotting, especially noticeable within the reniform ring where the spots are usually mere dots and the center is white; as this difference seems entirely constant we propose the above racial name, our type series being 2 ♂, 5 ♀ from San Benito, Texas (Mch.); we also have the race from Greenville, Miss., and it extends west through New Mexico (Ft. Wingate, Jemez Spgs.) to the eastern border of Arizona (White Mts.); the Ft. Wingate specimens are slightly better marked than our types, but eastern Arizona ones show even less markings; it may be that semi-desert conditions are responsible for the lack of maculation.

PLAGODIS KUETZINGARIA Pack. (Pl. XXIII, Fig. 3).

We already (Contr. III, (4) p. 249) have had occasion to refer to this species and its involved synonymy; on a recent visit to Cambridge we went over the specimens of this species contained in the Packard collection and found that of the original type specimens only the single specimen from Maryland was present and this did not agree well with either the description or the figure given (Pl. XI, Fig. 44). A visit to the collection of the Boston Society of Natural History proved, however, that there still existed in the Harris Collection the specimen labelled "Cambridge May 6," "Coll. Harris," and as this agrees well with Packard's figure we propose that it be made the holotype of the species. Of the other specimens mentioned from Albany (Lintner) Ithaca (Comstock) and New York (Grote) we have no record; it may be that they may still be found in the respective collections; Morrison's Cambridge specimen is probably destroyed.

*Purpuraria* Pears. we believe will prove a distinct species from *kuetzingaria* as thus limited; the group seems to be an involved one and until careful comparisons of  $\delta$  genitalia can be made we prefer not to make too definite statements.

GONODONTIS? SIMPLICIUS sp. nov. (Pl. XX, Figs. 4, 5).

Palpi moderate, porrect;  $\delta$  antennae bipectinate to near apex,  $\eta$  antennae faintly serrate; head, thorax, abdomen and wings pale grayish ochreous, the latter heavily sprinkled with blackish dots which thicken in the subterminal area forming an irregular blackish band bordered outwardly by a pale s. t. line beyond which the terminal area is paler than remainder of wing; a discal dot on both wings, largest on primaries; the t. p. line is generally wanting, but in some instances is present, slightly crenulate, outwardly oblique from costa to vein 6 then bent and parallel to outer margin; fringes pale ochreous. Beneath considerably paler than above but similar in maculation. In the  $\eta$  the abdomen projects considerably beyond the secondaries with protuberant ovipositor and the wings are rather stumpy looking, giving the appearance of being slightly aborted. Expanse 35 mm.

HABITAT: Olancha, Inyo Co., Calif. (June). 8  $\delta$ , 8  $\eta$ . Types, Coll. Barnes.

The generic reference is doubtful and the species possibly might better be referred to *Meris* Hlst.; the venation appears to agree with Hlst's definition of this genus, veins 10, 11 and 12 anastomosing; the hind tibiae in the  $\delta$  are without hair pencil and we can see no fovea at base of primaries; the species resembles, however, *ectrapelaria*

Grossb. so closely that we feel it should be placed next this species; from *cetraplaria* it differs by its much smaller size and generally more slender build; the ♀ has a much longer abdomen which protrudes well beyond the secondaries and from what can be seen of the t. p. line it appears to be more crenulate in our new species.

SYNTAXIS TRIANGULATA B. & McD.

This recently described species (Contr. III, (I) 33) was placed by us in *Sabulodes* from a single ♀ specimen; the receipt of a ♂ from Kerrville, Texas, which has pectinate antennae renders the removal from this genus necessary; the antennae of the ♀, as noted in our original description, are distinctly bidentate and although the ♂ antennae are much more strongly pectinate than in *fuscata* Hlst. or *jubararia* Hlst. the reference to the genus *Synaxis* is the most satisfactory we know of at the present time, the palpi being distinctly shorter than we find in members of the genus *Pherne* and *Epiplatymetra*.

STENASPILATES METZARIA Dyar.

This name is based on a rather dark gray ♂ from Claremont, Calif., of the species *apapinaria* Dyar, described the year previous from ochreous ♀ specimens from San Diego, Calif.; as in the whole *Stenaspilates* group there is a great variety of color exhibited in this species, the ♂'s ranging from dark gray to dark ochreous, the ♀'s being more constantly deep ochreous. If desired, the name *metzaria* may be used for the color-form of *apapinaria* as noted.

SABULODES ACCENTUATA sp. nov. (Pl. XXIII, Fig. 4).

Thorax and wings pale to deep ochreous, the primaries striate in appearance and crossed by two rather broad smoky lines, the t. a. line outwardly oblique from costa to lower portion of cell, then slightly angled and almost straight to inner margin; t. p. line from costa near apex, very slightly sinuate, almost rigidly oblique, accentuated on the veins by black dots, continued across secondaries as a straight line, similarly dotted on the veins. Beneath silky ochreous with maculation of upper side showing through; fringes rather deeper in color with distinct black dots at end of veins. Expanse 39 mm.

HABITAT: Flagstaff, Arizona (May). 4 ♂. Types, Coll. Barnes.



## DESTUTIA SERICEATA B. &amp; McD.

We find on going over our collection that this species recently described by us (1917, Contr., III (4) 261) is closely related to the species now listed as *Phengommataca dissimilis* Hlst.; typical *dissimilis* from Glenwood Spgs., Colo., is without cross lines and of a rather deeper yellow shade than *sericeata* but we have specimens from Jemez Spgs., N. Mex., showing traces of lines which have a similar course to those of our species although not so clearly defined. Both species are without the tibial hair-pencil, a feature which led Hulst to place *dissimilis* in the genus *Phengommataca* where it is clearly misplaced; we believe they would be better placed in Grossbeck's genus *Destutia* which differs from *Sabulodes* in the lack of this tibial hair pencil; they may prove to be merely races or seasonal forms of one species.

## MEGALOPYGIDAE

## MEGALOPYGE LAPENA Schaus.

In Can. Ent. 1913, p. 185, we recorded the above species from Arizona; recently, together with Dr. Dyar, we compared one of our Arizona specimens with Schaus' type in the National Museum and noted that they were not identical; in the type ♂ there is a distinct small brown patch on primaries at end of cell at the origin of vein 5 which in our Arizona specimens (Pl. XX, Fig. 12) is reduced quite constantly to a small dark dot which, together with the subapical spot, is rather darker brown than the basal patch; Druce's figure of *lapena* in Biol. Cent. Am. Het. Pl. 86, Fig. 13, does not bring out very clearly the nature of the discocellular patch which is really much better defined than in the copy before us. For our Arizona form, which we treat as a race rather than a species, we propose the name *HETEROPUNCTA*, our types being 3 ♂ from Chiricahua Mts., Ariz. (Aug.) and 2 ♀ from Palmerlee, Ariz., and Paradise, Cochise Co., Ariz.

PYRALIDAE  
PYRAUSTINAE

SYNGAMIA FLOREPICTA Dyar.

The species was described (1914, Proc. U. S. N. M. XI.VII, 392) from Mexico and was later listed (1917, Insec. Ins. Menstr., V, 71) from the United States. There seems little doubt that the name is a synonym of *talis* Grt. (No. 4936 of our list); the description agrees perfectly with a specimen we have compared with Grote's type in the British Museum. The species is rather widely distributed throughout the Gulf States.

ISCHNURGES CHROMAPHILA Dyar.

If Dr. Dyar's record of this species from Arizona (1917, Insec. Ins. Menstr., V, 72) is based on correctly identified material then *chromaphila* becomes a synonym of *roscofenalis* Illst. (No. 5053 of our list); the species was described from material from N. Carolina and Arizona and we have specimens from both localities which we cannot separate either in structure or maculation; our long Arizona series shows considerable variation in the amount of pink shading beyond the cell on primaries. We see no adequate reason for removing the species from the genus *Diasemia* at present as the maxillary palpi are certainly not filiform although not very markedly tufted.

LOXOSTEGE ANARTALIS Grt.

In our Collection there have been several species included under this one name; typical *anartalis* (Pl. XXII, Fig. 15) was described from Soda Springs, Siskiyou Co., Calif., and is characterized by the deep black border of secondaries preceded by a broad band of creamy white with the basal area blackish; beneath both wings show a broad black border. Hulst's description of *lulualis* (Trans. Am. Ent. Soc., XIII, 150) applies exactly to this form and although we restricted the name to the type specimen from Anticosti Island (Contr. III, (3) 191) this action of ours may not hold if the specimen does not agree with the diagnosis. We have several specimens from Manitoba and Alberta (Pl. XXII, Fig. 17) which differ from typical *anartalis* at the first glance by lacking the broad white area of secondaries which is

reduced to a narrow dull gray band preceded by a dotted blackish line, the whole basal area being deep smoky; the outer band is less intensely black and narrower. Beneath there is none of the prominent black marginal banding of *anartalis*, both wings being pale whitish ochreous with slightly darker terminal area; the primaries show small orbicular and reniform marks and there is a trace of a dotted post-median line crossing both wings; the fringes are pale smoky basally, whitish outwardly and there is a broken dark terminal line to both wings. The coloration of the upper side of primaries is rather variable, being deep smoky-black more or less shaded and suffused with white scaling giving a grayish appearance basally and subterminally; the maculation is similar to that of *anartalis* but the orbicular and reniform are smaller and generally better defined and the median area often considerably darker than the rest of the wing. We regard this form as specifically distinct from *anartalis* and propose the name ALBERTALIS for the species; our type ♂ is without a label but probably from the same locality as our ♀ type which was taken at Gleichen, Alta. (July) by Mr. Wolley-Dod; we have other specimens from Beulah and Miniota, Manitoba, and a single Alaskan ♂ which presumably belongs here but which has the whole basal half of secondaries much paler.

In Utah we meet with another form (Pl. XXII, Fig. 16) in which the secondaries are entirely blackish with a trace of a pale s. t. band confined to the central portion of the wing and quite improminent. Beneath both wings are much darker than in *albertalis*, being gray quite heavily sprinkled with smoky, the maculation being otherwise as in this species. The primaries above are quite similar to those of *albertalis* but slightly darker in tone. For this form we propose the name SAXICOLALIS, our type being a ♂ from Stockton, Utah (May); besides this specimen we have four other worn ones taken at Eureka, Utah, in April and May.

LOXOSTEGE TERPNALIS sp. nov. (Pl. XXII, Fig. 20).

Palpi, head and thorax clothed with mixed black and white scales; primaries with a general dark bluish-gray appearance caused by heavy white scaling over a blackish ground color, shaded with white broadly before t. a. line and beyond t. p. line as well as along outer margin except at apex; t. a. line rather regularly outcurved; t. p. line arising from slight blotch on costa, squarely exerted around the cell and finely crenulate with a prominent tooth above vein 1; some apical dark shading continued as a fine line across wing

and broadening at inner margin; a faint terminal dark line; fringes checkered black and white at base, paler outwardly with dark central line. Secondaries light brownish with small dark discal dot, traces of a curved postmedian line and a rather heavy subterminal shade line; fringes pale with dark basal and median lines. Beneath pale brownish, primaries with orbicular and reniform marked in black and the t. p. line of upper side fairly distinctly outlined; secondaries paler and less maculate than above. Expanse 22 mm.

HABITAT: Olancha, Inyo Co., Calif. (Apr. June) 2 ♀. Types, Coll. Barnes.

Allied to *allectalis* Grt. and *lepidalis* Hbst. but with the bulge of the t. p. line closer to outer margin than in either of these two species.

LOXOSTEGE UNILINEALIS sp. nov. (Pl. XXIV, Fig. 1).

Primaries pale creamy white slightly sprinkled with smoky and with a single dark line starting from costa near apex, gently rounded and then rigidly oblique to just beyond the middle of inner margin; a faint dark terminal line; fringes pale with faint smoky median line. Secondaries whitish, slightly smoky outwardly with terminal line and fringes as on primaries. Beneath primaries pale smoky with the maculation of upper side partially developed; secondaries white. Expanse 14 mm.

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

This small species is placed in the genus *Loxostege* on account of the conically protuberant front; if the frontal structure did not disagree we should be inclined to place it in *Edia* Dyar (*Titanio*) along with the *belialis* group although even here it would be aberrant. The proboscis is reduced and concealed by the palpi which are rather shorter than usual in the genus.

LOXOSTEGE PARVIPICTA sp. nov. (Pl. XXIII, Fig. 10).

Palpi and front whitish; thorax pale yellow with a central pinkish-purple stripe; primaries pale yellow crossed by two curved parallel bands of pinkish-purple; costa to first line of a similar color; a large round pinkish-purple discal dot; secondaries white in ♂, in ♀ shaded with pinkish terminally. Beneath primaries largely pinkish with pale yellow terminal area, secondaries as above. Expanse 13 mm.

HABITAT: Olancha, Inyo Co., Calif. 3 ♂, 2 ♀. Types, Coll. Barnes.

Belongs in the *vibicalis* group but has a rather more prominent frontal protuberance than usual.

TITANIO SUBARGENTALIS sp. nov.

Vestiture of palpi and head very shaggy, composed of mixed black and white hairs. Primaries blackish with indistinct maculation very similar to that

of *Oreania trivialis* B. & McD.; some whitish scattered scaling at base and in cell and a better defined s. t. band of whitish scales becoming obsolete towards apex of wing. Secondaries deep smoky with darker shade near outer margin between veins 2 and 3 outlined outwardly partially by a paler shade. Beneath silvery with a slight smoky tinge, primaries with discal dash and faint s. t. line; secondaries with discal spot (which appears closer to base of wing than usual owing to the shortness of the cell) and a curved dark indistinct s. t. line bent downward at anal angle; fringes on both wings smoky. Expanse 20 mm.

HABITAT: Nebraska Hill near Tolland, Gilpin Co., Colo. (July 5). 1 ♂. Type, Coll. Barnes.

The specimen was sent us by Prof. T. D. A. Cockerell through whose kindness we are permitted to retain it. It is in rather poor condition and we should have hesitated to describe it if it had not been for the structural characters and the characteristic under side which should render the species recognizable; from *trivialis* it may be separated by the very hairy palpi which in *trivialis* are smooth scaled. It is probably a day flyer, our specimen having been captured sitting on the flower of *Silene acaulis*.

PHLYCTAENIA ANGUSTALIS sp. nov. (Pl. XXII, Fig. 19).

Primaries long, narrow, light mouse gray somewhat darker in costal area; maculation rather indistinct; t. a. line black, inwardly oblique with a prominent outward tooth in the cell, preceded on inner margin by a slight white dash and dark spot; t. a. line gently rounded and slightly dentate from costa to vein 4, sharply bent inward to beyond reniform with slight outward tooth in fold and then parallel to t. a. line to inner margin; beyond the t. p. line is a pale shade, narrower in costal portion, broad above inner margin and defined slightly outwardly by a darker line; a dark subapical shade; veins apically partially outlined in black; reniform narrow, indistinct, partially outlined in black, pale filled; terminal dark dots not reaching anal angle; fringes dusky, slightly white-spotted. Secondaries hyaline smoky with curved postmedian dark line, prominently dentate below costa; a triangular smoky shade on outer margin between veins 2 and 4; terminal dark dots on veins, most distinct on the dark patch; fringes smoky, cut by a pale median line. Beneath smoky with a dark reniform mark on primaries and dentate postmedian line crossing both wings; terminal dark dots, most prominent on secondaries. Expanse 34 mm.

HABITAT: La Puerta Valley, S. Calif. (March). 2 ♂, 2 ♀. Types, Coll. Barnes.

The large size and long, narrow primaries render the species easily distinguishable; it belongs in the *itysalis* group.

PHLYCTAENIA BERBERALIS sp. nov. (Pl. XXIV, Fig. 2).

Primaries pale ochreous sparsely dusted with fuscous, maculation fairly distinct; t. a. line single, black with prominent tooth in the cell and slight inward bend in the submedian fold; orbicular a small round spot filled with the pale ground color; reniform medium-sized, lunate, pale-centered; four or five minute dark costal spots between reniform and apex; t. p. line single, dentate, with large inward loop below the cell to base of vein 2, terminal dotted line; fringes pale. Secondaries pale smoky with traces of discal dot and bent postmedian line and distinct terminal dotted line. Beneath primaries pale smoky with traces of the maculation of upper side visible, secondaries paler with discal dot and postmedian line better defined than on upper side; terminal dotted line on both wings. Expanse 18-22 mm.

HABITAT: Loma Linda, S. Bernardino Co., Calif. (May, June, Sept.).  
3 ♂, 7 ♀. Types, Coll. Barnes.

Closely allied to *washingtonalis* Grt. but duller in color and without the brown patch above the reniform; it is paler than *indistinctalis* Warr. with better defined maculation. There are apparently two generations, the September specimens being much smaller than the spring ones.

PYRAUSTA OCHREICOSTALIS sp. nov. (Pl. XXIII, Fig. 8).

Head, thorax and abdomen ochreous; primaries ochreous along costa and through the cell, remainder of wing deep blue-gray caused by white scaling over a blackish ground; whitish shading through the submedian fold to t. p. line; veins lined with white; t. a. line only marked by a white dash on inner margin preceded by a slight dark spot; t. p. line far out, gently rounded from costa to vein 2 then curved strongly towards base of wing and again straight to inner margin near t. a. line, shaded outwardly by a white line broadest below costa; a terminal white line and slight dark dots at ends of veins; fringes pale ochreous. Secondaries hyaline whitish shaded with smoky outwardly, with smoky postmedian wavy line angled sharply at vein 2 near outer margin and not continued to inner margin; terminal broken dark line; fringes pale. Beneath primaries pale smoky with t. p. line and pale shade at costa more or less defined; secondaries whitish with dark costal postmedian mark. Expanse 18 mm.

HABITAT: Palm Spgs., Riverside Co., Calif. (Apr.) 2 ♂. Types, Coll. Barnes.

The species is closely allied to *linealis* Fern. differing in the ochreous shades along costa and in the cell; it is not quite a typical member of the genus *Pyrausta* as the front is sloping and slightly raised above the level of the eyes terminally without forming the distinct conical protuberance of *Loxostege*; it belongs in a group with *linealis* Fern.,

*nafacalis* Hlst., *sartoralis* B. & McD., *pilatcalis* B. & McD., and possibly a few other species which for the present we place in *Pyrausta* until a satisfactory revision of this unwieldy genus can be made.

*PYRAUSTA ZONALIS* sp. nov. (Pl. XXIV, Fig. 10).

Head, thorax and abdomen brown, palpi beneath, a lateral line above each eye and the segmental incisions white; primaries with sharply pointed apex, deep smoky brown with indistinct maculation, reniform and orbicular marked by indistinct dark shades; t. p. line minutely waved, fairly distinct, far out, evenly rounded from costa to vein 3 where it bends in and then runs straight again to inner margin; fringes pale smoky, dotted near base by prominent dark spots. Secondaries dull smoky with traces of a postmedian line angled at vein 2 and fringes as on primaries. Beneath light smoky with maculation of upper side partially visible. Expanse, 15 mm.

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

Closely allied to *nafacalis* Hlst. but much smaller, with less distinct maculation and with no white terminal shade on primaries.

*PYRAUSTA PYTHIALIS* sp. nov. (Pl. XXIII, Fig. 7).

Palpi, head and thorax ochreous-brown with a slight pinkish tinge; base of palpi and line above each eye white; abdomen ochreous at base, other segments smoky, ringed with pale ochreous; primaries deep pink with a bright yellow patch at base of wing on inner margin extending from base to t. a. line which line is fragmentary, yellow-bordered and denticulate; orbicular and reniform obscure, small, fuscous spots; t. p. line originating in a well defined triangular costal patch, obscure, yellow, bent well inward below cell and then perpendicular and somewhat waved to inner margin; terminal area and fringes bright yellow. Secondaries smoky with central portion of outer margin narrowly bright yellow, the inner edge of this area distinctly dentate; a faint, pale, straight s. t. line from lower edge of this yellow area runs toward costa but does not reach beyond vein 6; fringes bright yellow. Beneath primaries smoky with pale yellow costo-apical triangular patch, outer margin and fringes; secondaries pale smoky, darker in costal area with dentate curved postmedian line and pale yellow outer margin and fringes. Expanse 17 mm.

HABITAT: Cartwright, Man. (Heath); Aweme, Man. (Criddle) (June). 8 ♂. Types, Coll. Barnes.

This species is seemingly related to *acrionalis* Wlk. but has a slightly more bulging front than this species, somewhat similar to that found in the *linealis* group. We have been unable to find any name to fit the species and venture to describe it as new; if we have overlooked an older name no doubt some kind friend will call our attention to the matter.



## PYRAUSTA INVETERASCALIS sp. nov. (Pl. XXIII, Fig. 6).

Very similar to the preceding species but slightly smaller, the ground color of primaries dull vinous, the basal yellow shade lacking, the terminal yellow area confined to the fringes and a narrow terminal line on the wing itself; the yellow triangular costal patch present but duller in color; lines about the same in their general course. Secondaries smoky, entirely without the yellow terminal area and with pale smoky fringes; postmedian line similar to that of preceding species but rather better defined. Beneath primaries deep smoky with pale yellow costo-apical patch and similarly colored fringes which show a distinct broken dark line at base; secondaries pale hyaline, smoky outwardly and along costa with traces of a postmedian line. Expanse 15 mm.

HABITAT: New Brighton, Pa. (June). 2 ♂. Types, Coll. Barnes.

Besides the types we have two other worn specimens from the same locality, one labelled "*angustalis*" which is a Western species fully twice the size and without the pale fringes of primaries.

## PYRAUSTA TUOLUMNALIS sp. nov. (Pl. XXIII, Fig. 11).

Base of palpi and pectus white; palpi and thorax mixed black and ochreous; abdomen black with white scaling and segmental incisions marked in white; primaries dark blue-gray suffused in basal and subterminal areas with rather ruddy brown, contrasting considerably with the median and terminal spaces; t. a. line obscure, dark, incurved at inner margin; orbicular and reniform slight dark blotches; t. p. line single, dark, rather distinct, rounded outwardly below costa and bent strongly inward in submedian fold, then perpendicular to inner margin; space between reniform and t. p. line filled by a yellow patch; a smaller triangular yellow patch beyond t. p. line at costa which is more or less distinctly continued by a fine yellow line, bordering t. p. line outwardly to inner margin; fringes dusky tipped with whitish. Secondaries blackish, crossed by a broad postmedian band of pale creamy color; a dark terminal line; fringes with basal half dusky, outer half white. Beneath creamy with the maculation distinctly defined in black; on primaries reniform, orbicular and claviform are represented by dark spots, the latter being an elongate dash; t. p. line fine black, sinuate; a dark, subterminal, somewhat broken band, continued across secondaries which show as well a dark median line and small discal dot; fringes as above. Expanse 15 mm.

HABITAT: Tuolumne Meadows, Calif. 10 ♂, 5 ♀. Types, Coll. Barnes.

The species resembles closely *ochosalis* Dyar in type of maculation, but should be recognized by the cream-colored band on secondaries.

## PYRAUSTA MERRICKALIS sp. nov. (Pl. XXIV, Fig. 9).

Palpi brown laterally, ochreous at base and on upper surface; head rough scaled, ochreous; thorax and primaries deep brown, the lines on latter very obscure, blackish; t. a. line outcurved, t. p. line slightly irregular in upper half

and subparallel to outer margin, bent in strongly below cell, with slight traces of ochreous shading outwardly most marked at costa; orbicular and reniform obscure dark spots, with faint ochreous dash between them; secondaries and fringes deep smoky. Beneath primaries much as above with the ochreous costal spot distinct; secondaries paler, with traces of a bent postmedial line tinged outwardly with ochreous and a dark discal spot. Expanse 13 mm.

HABITAT: New Brighton, Pa. (July 9-26) (F. Merrick). 5 ♂. Types, Coll. Barnes.

The species is very closely related to *xanthocrypta* Dyar from S. Calif. and Mexico but is smaller and much deeper in the color of both wings.

PYRAUSTA EMIGRALIS sp. nov. (Pl. XXIV, Fig. 7).

Pectus and base of palpi whitish ochreous; palpi outwardly smoky, upper surface ochreous; head ochreous; thorax and wings deep black-brown with very obscure markings, the most prominent features being an ochreous dash between two dark shades representing the ordinary spots and a curved row of ochreous dots delineating the t. p. line outwardly and strongly bent inward in submedian fold; the t. a. and t. p. lines are scarcely visible as slightly darker shade-lines. Secondaries deep unicolorous brown. Beneath deep black on both wings with an ochreous dash on costa near apex. Expanse 19-20 mm.

HABITAT: Palmerlee, Ariz. 5 ♂, 2 ♀. Types, Coll. Barnes.

Also a close ally of *xanthocrypta* but the dotted nature of the ochreous t. p. shading and the almost unicolorous dark under side should separate it easily. These three species, *xanthocrypta* Dyar, *merrickalis* B. & McD. and *emigralis* B. & McD. form a group that we place for the present in the genus *Pyrausta*, following Dyar, but which seems to have no particular resemblance to any of the other N. American species included in this genus.

We have a species very similar in general appearance to the preceding group but differing structurally in having a rudimentary proboscis which is entirely hidden between the palpi; for this reason we incline to place it in Dyar's new Schoenobiid genus *Loxotegopsis* (Ins. Ins. Menst. V, 84) with which it agrees well structurally; it is apparently widely spread throughout the west, but we can find no name applicable, and describe it as follows:

LOXOTEGOPSIS CURIALIS sp. nov. (Pl. XXIV, Fig. 8).

Palpi brown laterally, ochreous above; head ochreous; thorax and primaries deep brown with obscure maculation; t. a. and t. p. lines darker, obscure, the former bent outwards, the latter irregular and parallel to outer margin

in upper half, strongly bent inward in submedian fold and then perpendicular to inner margin; outwardly this line is bordered with ochreous, forming a more or less obvious blotch on costa; orbicular and reniform obscure, blackish with an ochreous streak between them; fringes dusky. Secondaries pale smoky basally, darker terminally with indistinct curved dark postmedian line and large discal spot. Beneath pale smoky, darker in the ♀'s, with the maculation of upper side faintly repeated and the discal spots forming more or less obvious ringlets. Expanse 20-25 mm.

HABITAT: Eureka, Utah (July) (Spalding), type; Redington, Ariz., Palmerlee, Ariz.; Camp Baldy, S. Bern. Mts., Calif. 7 ♂, 2 ♀. Types, Coll. Barnes.

The species is almost an exact counterpart of *xanthocrypta* in maculation but the palpi are somewhat longer and the proboscis obsolete; we cannot but feel, however, that there is probably a close relationship between the two species and that the present arrangement which would place them in different subfamilies is quite artificial; it is very probable that the conception of the *Schoenobiinae* must be somewhat revised and that it will be impossible to place all genera under this group simply because they show a reduced proboscis.

#### NOCTUELIA RUFOFASCIALIS Steph.

This name which was proposed for *fascialis* Haw. (*nec* Hübner) (1834, Ill. Brit. Ent. Haust., IV, 33) must supercede *thalialis* Wlk.; the species is figured by Wood (Ind. Ent. Pl. 27, Fig. 790) and is credited correctly to N. America by Stephens in his List Lep. Brit. Mus., 1850, p. 309; Sir Geo. Hampson tells us that Haworth's specimen exists in the British museum labelled "fascialis n. sp. I bought this from Mr. Knight as British" and that it is undoubtedly the same species as *thalialis*.

#### NOCTUELIA MINIMA Dyar.

This species, described in Ins. Insc. Menst., V, 132, is, to judge by the description, the same as *Pyrausta commortalis* Grt. (C. Ent., XIII, 232); the reference to *Noctuelia* rather than to *Pyrausta* seems preferable.

#### NOCTUELIA PALMALIS sp. nov. (Pl. XXIII, Fig. 5).

Palpi white at base, gray laterally; head and thorax dark gray mixed with white and ruddy scaling; primaries ruddy brown scaled with white at base and broadly on outer side of t. a. line and inner side of t. p. line; t. a. line upright, t. p. line slightly irregular, nearly perpendicular from costa to vein 5,

bent back at right angles as far as the cell and then slightly outwardly oblique to inner margin just before anal angle; fringes smoky. Secondaries pale ruddy, deeper in ♀ than ♂, shaded with smoky outwardly with traces of a dotted s. t. line. Beneath pale ruddy with dusky fringes. Expanse 15-16 mm.

HABITAT: Palm Springs, Riverside Co., Calif. (March). 1 ♂, 2 ♀. Types, Coll. Barnes.

Allied to *puertalis* B. & McD. but ruddier in color with a differently formed t. p. line.

NOCTUELIA VIRULA sp. nov. (Pl. XXIII, Fig. 9).

Palpi white below, brownish above; head and thorax red-brown with white lines above eyes and along margin of patagia; primaries olivaceous brown with a slight ruddy tinge; a white shade at base above inner margin; t. a. line far out, rigidly inwardly oblique, blackish, bordered broadly outwardly with white; t. p. line black, starting from costa near apex, perpendicular to vein 4, bent backward sharply to near t. a. line and then outwardly oblique to anal angle, the portions of the line above and below the prominent bend shaded inwardly with white; a fine white terminal line; fringes light brown in basal half, white outwardly. Secondaries in ♂ pure white with faint terminal brown dots, in ♀ with a continuous brown terminal line and dusky fringes on both wings. Beneath primaries smoky, secondaries white. Expanse 12 mm.

HABITAT: Palm Springs, Riverside Co., Calif. (March). 3 ♂, 3 ♀. Types, Coll. Barnes.

Closely allied to *bububattalis* Hlst. but smaller and easily distinguished by the white secondaries.

CORNIFRONS ACTUALIS sp. nov. (Pl. XXII, Fig. 18).

Head white; thorax white peppered with black, patagia black-bordered; primaries white suffused with dark gray in lower half of wing and subterminally; t. a. line very oblique, arising from middle of costa, with prominent tooth in the cell and a distinct tooth at inner margin; reniform a small obscure dark shade; t. p. line arising nearer apex than usual, angled outwardly on vein 7, then crenulate and curving gently backward to vein 3 where it again juts sharply outward, forms two teeth, and curves back to inner margin; in the upper half of the wing it is preceded by a broad white area, and beyond it except at apex (which is white) the subterminal area is largely gray; terminal area narrowly white; dark terminal line; fringes pale, smoky at tips. Secondaries whitish, shaded with smoky outwardly with traces in central area of a dark curved s. t. line opposite which is a very distinct dark terminal line which fades considerably toward apex and inner margin; fringes white, tipped with smoky opposite dark portion of terminal line. Beneath primaries pale smoky, secondaries white. Expanse 28 mm.

HABITAT: ♂, Loma Linda, S. Bernardino Co., Calif. (Mch.); ♀, Palm Springs, Riverside Co., Calif. (Mch.) 1 ♂, 1 ♀. Types, Coll. Barnes.

The species belongs in the same section with *phasma* Dyar, the frontal prominence being distinctly blade-shaped and the corneous plate with small lateral projections. The very oblique nature of the t. a. line and the point of origin of the t. p. line near apex are characteristic features.

### NYMPHULINAE

#### CATACLYSTA (ELOPHILA) FULICALIS Clem.

In reading over Dr. Dyar's recent Notes on N. Am. *Nymphulidae* (1917, Ins. Ins. Menstr. V, 75) we noted that Dyar's conceptions of *fulicalis* Clem. and *confusalis* Wlk. seemed to be just the reverse of our own and a recent visit to Washington confirmed this opinion; the series in the museum under *fulicalis* is what we have called *confusalis* Wlk. based on a specimen which we had compared with the type (*vide* Contr. II, (5) p. 215); the type of *fulicalis* is not labelled as such at Philadelphia but the series under this name, which very possibly includes the type specimen, is certainly not *fulicalis* of Dr. Dyar; Clemens' description is fortunately very clear; he distinctly mentions the narrow dark line on the secondaries which Dr. Dyar claims is absent, and in his description of the primaries states that the oblique ochreous band is margined *along the discal nervure on both sides* with fuscous, no mention being made of a discal spot; there seems therefore little doubt that *fulicalis* Dyar is *confusalis* Wlk. and *confusalis* Dyar equals *fulicalis* Clem. Regarding Lederer's species cited by Dr. Dyar in the synonymy, we prefer to say nothing as without a definite knowledge of the type specimens neither his descriptions nor his figures can be of much use; we might note, however, that Lederer himself was inclined to associate his *opulentalis* with *fulicalis* Clem. and not his *angulatalis*; if Dr. Dyar's references are correct *angulatalis* will have priority over *confusalis* Wlk.; the type of *angulatalis* is a single ♂ from the Kaden Coll. but we have no record as to where this collection now is; the Felder Coll. which should contain the types of *opulentalis* is at Tring Museum but we do not know whether these particular types still exist in it.

#### HYDROPIONEA FENESTRALIS B. & McD.

Dr. Dyar has referred this species to *Clupeosoma* but Sir Geo. Hampson informs us that the correct genus is *Hydropionea* Hamp. (1917, Am. Mag. N. Hist. (80) XX, p. 275); a comparison of the

types has proved to both Dr. Dyar and ourselves that the species is not synonymous with *lavinia* Schaus as claimed by Dr. Dyar (Ins. Menst. V, 79).

HYDROPIONEA EUMOROS Dyar.

This species is the same as *oblectalis* Hlst. at present listed under *Loxostege* but properly referable to the same genus as *fenestralis* B. & McD. Dyar's name becomes a synonym.

### CRAMBINAE

CRAMBUS OSLARELLUS Haim.

It was an error on our part to cite this species (Contr. III, (3) 191) as a synonym of *carpenterellus* Pack. It is a good species and may be distinguished from *carpenterellus* by the less angled nature of the subterminal white line which is gently rounded opposite the cell and not sharply angled as in *carpenterellus*; the white costal spot preceding this line is larger in *carpenterellus* and the tooth on inner side of the white basal streak is more prolonged along the vein; the outer margin is also slightly more bulging; our figure (l. c. Pl. XIV, Fig. 18) represents *oslarellus*.

CRAMBUS BARTELLUS sp. nov. (Pl. XXIV, Fig. 3).

Palpi and head white, the former brown laterally; primaries white, shaded with brown; the basal half of wing entirely white with some slight pale brown shading in the cell at base and along vein 1; a broad dentate brown median band with prominent outward angles in the cell and below median vein shaded with blackish; outer half of s. t. area brown-shaded; s. t. line fine, brown, prominently bent outward opposite cell and with slight inward angle above inner margin, partially separated from subterminal brown shading by a white line, especially distinct at costa; terminal area white, with outward brown shading cut by the pale veins; fringes brown, slightly cut by white and with distinct white basal line; secondaries pale smoky with indistinct dark s. t. line. Beneath pale smoky, veins of primaries marked with white terminally, secondaries as above. Expanse 22 mm.

HABITAT: Tuolumne Meadows, Calif. (Aug.). 3 ♂. Types, Coll. Barnes.

Closely related to *oregonicus* Grt. of which it may be merely a race with the white areas greatly extended; its white color with contrasting brown bands should make it easily recognizable.

CRAMBUS ERICELLUS sp. nov. (Pl. XXIV, Fig. 4).

♂. Palpi smoky, tinged with white; thorax and primaries brown, the latter faintly black-sprinkled and shaded with gray broadly along inner margin and beyond cell (this shade being at times very noticeable, at others more or less obsolescent); median and subterminal dark cross-lines are more or less present (at times very distinctly), subparallel, rounded strongly outwardly below costa, then inwardly oblique and forming an angle above submedian fold; above inner angle three or four terminal dark dots; fringes gray with a shiny basal line; secondaries even smoky with paler fringes cut near the base by a darker line. Beneath unicolorous smoky. Expanse 26 mm.

HABITAT: Tuolumne Meadows, Calif. (July, Aug.) 15 ♂. Types, Coll. Barnes.

The species is allied to *undatus* Grt. in type of maculation but lacks the white streak through the cell and the prominently metallic fringes; we have a ♀ from the same locality which we are inclined to refer here which is much smaller, grayer, with more pointed apex of primaries and without the cross-lines.

CRAMBUS MODESTELLUS sp. nov. (Pl. XXIV, Fig. 5).

Thorax and primaries light gray, under the lens with a peculiar rough scaly appearance; traces of a white streak through the cell most prominent beyond the cell in subterminal area; two yellowish brown cross lines medianly and subterminally, subparallel, the inner bent sharply out below costa then angled and inwardly oblique with a distinct sharp tooth below cell; the outer gently bulging below costa and slightly crenulate, bulging again above inner margin, bordered outwardly narrowly with white; a very fine dark terminal line; fringes gray slightly white-shaded at base. Secondaries smoky with paler fringes. Beneath smoky, fringes of secondaries white. Expanse 25 mm.

HABITAT: Kerrville, Tex. 2 ♂. Types, Coll. Barnes.

Allied to *scellus* but larger, more even gray and with the apex of primaries less falcate.

CRAMBUS ANGULATUS sp. nov. (Pl. XXIV, Fig. 15).

Primaries whitish, sprinkled with light brown, at times very heavily; a fine dark brown line, starting just beyond middle of costa, projects very sharply outward, forming an acute angle in the subterminal area and then runs obliquely to middle of inner margin with a slight tooth at lower angle of cell above which it is rather heavier than elsewhere; a brown s. t. line forming a prominent bulge in upper half of wing which nearly attains outer margin, an inward angle on vein 2 and a less prominent bulge above inner margin; this line is bordered outwardly by a fine white line following which is brown shading, most prominent along costa and in lower portion of wing; a slight white triangular patch on costa beyond s. t. line; outer margin slightly bulging below vein 3 with two

or three black dots on this section; fringes pale basally with the portion opposite the black dots shiny; a dark median line and the extreme tips brownish. Secondaries whitish (at times pale smoky) with a brownish marginal line, diffuse at apex. Beneath primaries pale brownish, secondaries whitish. Expanse 14-15 mm.

HABITAT: San Diego, Calif. (July-Aug.) 7 ♂. Types, Coll. Barnes.

We employ one of W. D. Kearfott's Mss. names as specimens have possibly been distributed under this name.

*THAUMATOPSIS ACTUELLUS* sp. nov. (Pl. XXIV, Fig. 6).

♂ antennae unipectinate. Primaries light brown with a broad white streak from base of wing through the cell to the outer margin above which the costal area is deep brown; veins as well as a streak through the submedian fold outlined in dark brown partially covered with white scaling. Secondaries deep black-brown with paler fringes. Beneath smoky. Expanse 20-25 mm.

HABITAT: Lakeland, Fla. (May); St. Petersburg, Fla. (Nov.); Stemper, Fla. (July); Southern Pines, N. C. (Aug.). 1 ♂, 3 ♀. Types, Coll. Barnes.

Very similar to *pectinifer* Zell. from Texas but in this species the white streak does not extend beyond the cell.

*PLATYTES PURITELLUS* Kft. (syn. *DINEPHELALIS* Dyar).

This species, of which the two ♀ types are before us (not ♂ and ♀ as erroneously listed in the original description, Proc. U. S. Nat. Mus. 35, p. 393) has been redescribed recently by Dr. Dyar (1917, Ins. Insc. Menst. V, 85) under the name *dinephelalis*; we possess a ♂ specimen which we have compared with the type in the National Museum.

*PLATYTES DAMON* sp. nov. (Pl. XXIV, Figs. 13, 14).

♂. Antennae lamellate, rather thick and strongly compressed laterally, palpi long, porrect, covered with mixed brown and white hairs; thorax and primaries rather a bright brown, the latter with the main veins marked in white and those beyond the cell blackish with narrow white edging on both sides; two white streaks through the cell as well as one in the submedian fold all partially black sprinkled; a more or less complete submarginal white line sprinkled with black scales and a prominent white line at base of fringes bordered outwardly by a narrow brown line beyond which the fringes are dusky. Secondaries deep smoky with somewhat paler fringes which show an ochreous basal line. Beneath light smoky with a prominent white line at base of fringes. Expanse 15-17 mm.



♀. Much paler than the ♂, almost yellowish with the white markings on the veins more extended; the secondaries are whitish with a faint brownish border; fringes whitish. Expanse 18-20 mm.

HABITAT: San Diego, Calif. 13 ♂, 6 ♀. Types, Coll. Barnes.

The practical absence of the proboscis would place the species in the Australian genus *Ubida* Wlk. according to Hampson's key but we prefer for the present to place it in *Playtcs* with which it agrees in all other respects. We employ an Mss. name given by W. D. Kearfott and found on specimens in his Pyralid collection recently acquired by us; the name has never been published but specimens may have been distributed and our use of the same name will obviate any change in nomenclature.

### MACROTHECINAE

#### ALPHEIAS TRANSFERENS Dyar.

This recently described species (Ins. Ins. Menstr. V, 82) is the one figured by us in Contr. I (5) Pl. III, Figs. 10, 13, under the erroneous name of *ponda* Dyar; it is not *vivarilis* Dyar as Dr. Dyar suggested (Ins. Ins. Menstr. I, 22) which species is probably a synonym of *baccalis* Rag. according to our notes on the type in Paris.

The following two species appear to be new.

#### MACROTHECA BILINEALIS sp. nov. (Pl. XXIV, Fig. 11).

Thorax and primaries even gray, the latter crossed by two black distinct lines, the inner about the middle of wing, almost rigidly perpendicular to inner margin with very slight angle below the cell, the outer near margin of wing, oblique, subparallel to outer margin; faint dark fringe dots and a minute obsolete discal dot. Secondaries pale smoky. Expanse 18 mm.

HABITAT: Paradise, Cochise Co., Ariz. (June) 2 ♂. Types, Coll. Barnes.

#### MACROTHECA ANGULALIS sp. nov. (Pl. XXIV, Fig. 12).

Primaries gray, heavily suffused with black, especially in median area and shaded broadly but faintly with ochreous along inner margin; two heavy black cross-lines, the inner forming a very prominent outward angle in the cell and bordered inwardly with a fine white line; the outer slightly irregular, subparallel to outer margin; a dark discal streak and a black, somewhat interrupted terminal line; secondaries pale smoky. The ♀ is more obscured with smoky with less distinct maculation. Expanse 19 mm.

HABITAT: ♂ Tehachapi, Kern Co., Calif; ♀ Camp Baldy, S. Bern. Mts., Calif. 1 ♂, 1 ♀. Types, Coll. Barnes.

## PHYCITINAE

## MINEOLA CALIGINELLA Hlst.

The so-called type in Rutgers College Coll. is labelled "California" and is probably spurious; there is however a ♀ from Arizona in the series with Hulst's label *caliginella* and this is so close to a San Diego specimen of *caliginoidella* Dyar that we should hesitate to separate the two; both Ragonot and Hulst in their revisions list *comptella* Rag. from Calif. as a synonym, the former mentioning the fact that the ♂ (presumably of *comptella*) shows a strong tooth at the base of the antenna; this of course separates the species structurally from *caliginoidella* Dyar which is without a tooth; if we regard this Arizona ♀ as the true type it remains to be seen whether *comptella* is really a synonym of *caliginella* or whether we have two species represented, with the possibility of *caliginoidella* being a synonym of Hulst's species. Until Ragonot's type has been carefully examined and a series of both sexes of *caliginella* from Arizona has been obtained we must leave the matter in abeyance.

## PINIPESTIS ALBOVITELLA Hlst.

The type locality given in the original description is Hot Springs, N. Mex. (Aug.), but the type in the Hulst Coll. bears the label "Colo. (Bruce)"; it agrees well with Hampson's figure in Ragonot's Monograph (Pl. 50, Fig. 3) and also with the description, so we suppose it is another case of careless labelling and that the specimen may be accepted as the original type.

## TACOMA TEXANELLA Hlst.

We have already noted (Contr. III, (3) 193) that the type of this species and that of *dulciella* Hlst. showed great similarity; a further examination leads us to the belief that the two names refer to but one species, *texanella* having priority.

## HOMOEOSOMA IMPRESSALE Hlst.

Attention has already been called (Contr. III (3) 200) to the mix-up in the types of this species; the true type from Nevada is probably a specimen in the Hulst collection labelled *uncanalis*; it agrees in markings and locality label with the original description and is the species figured by Ragonot as *uncanale* on Pl. XXXIII, Fig. 18, of his Monograph; of course it cannot possibly be *uncanale*,

which is a dull gray species allied to *clongellum* Dyar; the type of *uncanali* is presumably a ♀ in the Hulst Coll. from Custer Co., Colo.

TLASCALA OREGONELLA sp. nov. (Pl. XXIV, Fig. 16).

Very similar to *umbripennis* Hlst. from Colorado but duller in color without the shiny appearance and with the secondaries of a paler smokier shade without the brown tints of Hulst's species; primaries with the basal area considerably gray-sprinkled; t. p. line distinct, gray, bent abruptly outward at vein 5; terminal space gray shaded. Beneath primaries dull smoky with traces of a pale costo-apical spot bordered by black; secondaries pale smoky with darker costa; distinct pale basal fringe line. Expanse 27 mm.

HABITAT: Crater Lake, Oregon (July 16-23) (McDunnough). 2 ♂, 2 ♀. Types, Coll. Barnes.

This may simply be a race of *umbripennis* but the above mentioned points of distinction seem constant enough to warrant a name; the species was taken among some low scrub pines at an altitude of over 8000 ft. and probably is a pine feeder.

MELITARA PARABATES Dyar. (Pl. XXII, Fig. 21).

This species (Proc. U. S. N. M. XLIV, 322) must be added to our lists; we have a long series from various Arizona localities; it is allied to *dentata* Grt. but is narrower winged, grayer and has a shorter tooth in the t. p. line opposite cell.

OLYCA PONDEROSELLA sp. nov. (Pl. XXII, Fig. 22).

♂ antennae ciliate; palpi largely blackish, sprinkled with white especially at base; basal tuft black with white sprinkles; front largely whitish; thorax deep gray sprinkled with whitish; primaries deep gray with heavy white sprinkling; the cross lines obscure in ♂, better defined in ♀; t. a. line up-right, dentate, with prominent tooth below cell, t. p. line obsolete at costa, very oblique inwardly in lower portion, approximate to t. a. line on inner margin where the two lines are obscured by a diffuse dark shade; a black basal streak extending along the fold to margin, usually broken in median area, a heavy black streak in outer half of cell and all veins beyond cell distinctly lined with black, the heavy streak of cell being continued more faintly above vein 5 by a streak similar to those on the veins. Secondaries hyaline white, slightly smoky outwardly in ♀. Expanse 37-42 mm.

HABITAT: Palm Spgs., Riverside Co., Calif. (Apr.). 5 ♂, 3 ♀. Types, Coll. Barnes.

The species is superficially similar to *Cactobrosis strigalis* B. & McD. but is heavier and less smooth in maculation; the distinct tufting at base of palpi and on 3rd joint separate it generically from this species.

## ANERASTIINAE

## ALTOONA ARDIFERELLA Hlst.

There appears to be an unfortunate mix-up in the types of the species; the species was described as *Altoona ardiferella* (Ent. Am. IV, 118) from material from Texas (no further data given); Ragonot in his List of N. Am. Phycids (Ent. Am. V, 116) transfers it to *Zophodia*; Hulst in his revision (Tr. Am. Ent. Soc. XVII, 208) again places it in *Altoona*, listing it from Texas and N. Mex. and disagreeing with Ragonot on the ground that the species shows an "entire absence of tongue"; Ragonot in his Monograph figures the species (Pl. XXIV, Fig. 14) placing it in *Tolima* in an addenda to Vol. II. In Dyar's Catalogue Hulst places the species in *Saluria* giving its distribution as Texas, Colo., N. Mex., Cal.; Dyar (Proc. Ent. Soc. Wash. VI, 159) makes *nigromaculella* Hlst. a synonym and places it in the genus *Pectiniigeria* Rag.

In the Hulst collection the so-called type of *ardiferella* is labelled Colo. (July) and is probably spurious as it does not agree well with the description; the only Texas specimen is in a small series under the label *nigromaculella* and is a specimen of *Zophodia dilatifasciella* Rag.; the description fits this specimen rather better than it does the Colorado "type", especially the statement regarding the presence of a basal dash, but in view of Hulst's definite remark that the tongue is entirely lacking we hardly think it wise to accept this as type. Ragonot's figure seems quite accurate but we doubt if this equals *nigromaculella* Hulst; it is possible that the true type was lent Ragonot to figure and never returned, but until the Ragonot collection can be carefully examined we imagine the identity of *ardiferella* will remain doubtful; in any case it seems hardly wise to accept any specimen in the Hulst Coll. as type; for the present we believe that Ragonot's figure must be considered as typical. On the strength of a very similar species of which both sexes are before us and which Dr. Dyar has been calling *ardiferella* Hlst. we believe that this group will fall into the genus *Parramatta* Hamp. (1901, Rag. Mon. Phyc., II, 366). The ♂'s are without any antennal tuft and vein 10 of primaries is widely separated from 8 and 9. Our new species we describe as follows:

PARRAMATTA PLACIDELLA sp. nov. (Pl. XXIV, Fig. 17).

♂ antennae untufted, ciliate; palpi long, porrect, blackish laterally, mixed dorsally with white scales; thorax largely whitish with faint ochreous tint; primaries whitish, lightly sprinkled with black atoms; a faint black dash at base below which is an orange ochreous patch on inner margin extending nearly to t. a. line and continued beyond the t. a. line as a broad band which at times extends across the entire median space but is generally confined to the immediate vicinity of the t. a. line; this line white, rounded outwardly, not distinct at costa where it merges into the ground color, followed by a distinct triangular black spot in the cell which does not touch costa but is at times connected with it by a fine black line bordering the t. a. line; this cellular black patch rests on the ochreous shade already mentioned; preceding the t. a. line on inner margin is a slight intensification of the black sprinkling forming a darker shade but no distinct spot; discal spots black, superimposed but the upper one generally obsolete; t. p. line white, bordered inwardly with black and followed outwardly by slight black shading, arising from center of an oblique black patch on costa, bulged outwardly opposite the discal spot and with small inward angle in the fold; an incomplete terminal dotted line; fringes pale inwardly, smoky outwardly. Secondaries whitish, in ♀ tinged with smoky. Beneath primaries smoky with whitish apical patch preceded by a dark streak; secondaries as above. Expanse 19 mm.

HABITAT: Olancha, Inyo Co., Calif. (June). 1 ♂, 4 ♀. Types, Coll. Barnes.

The species is much paler than *ardiferella*, especially in the median area; we have several specimens from Stockton, Utah, one of which has been labelled "*ardiferella*" by Dr. Dyar.

## AEGERIIDAE

GAEA PALMI Beut. (Pl. XX, Figs. 13, 15).

This species was described in the genus *Sesia* (*Synanthedon*) ostensibly from two ♂'s (Jour. N. Y. Ent. Soc., I, 126); the receipt recently of a series of both sexes from Kingman, Arizona, some of which were taken in copula, shows that Beutenmuller had mistaken the sex and that the types were two ♀'s. The color of fresh ♀'s is glossy blue-black, the brown color mentioned in the description being due to the poor condition of the types, one of which is before us. The ♂ is totally different, displaying a remarkable sex dimorphism, in view of which fact we believe that the following description of this sex may be of value:

♂. Antennae strongly serrate and fasciculate; palpi rather long, slightly upturned, 3rd joint porrect, long, pointed; pectus and under side of palpi white, 3rd joint fuscous; head mixed black and ochreous; thorax black with a central and two lateral pale ochreous stripes; abdomen grayish-ochreous, anal tuft blackish edged laterally with ochreous; legs pale smoky ochreous, coxae blackish; wings opaque, primaries smoky with an orange tinge, a heavy black discal dot followed by a small orange spot and sometimes preceded by a dash of the same color; fringes dusky; secondaries bright orange at the base, shaded broadly with smoky outwardly; a small discal dot; fringes dusky with a faint pale basal line. Beneath much as above but primaries showing rather more orange shading.

As veins 3 and 4 of the secondaries are connate we believe the species should be removed from *Synanthedon* and placed in the genus *Gaca*; a proboscis is present but apparently rather reduced and generally hidden by the palpi; the species was collected during the early part of October.

## COSSIDAE

Genus HETEROCOMA gen. nov. (type H. ALBISTRIGA sp. nov.).

Palpi minute, upturned, hairy; ♂ antennae bipectinate, ♀ serrate; thorax and abdomen clothed with long hair; proboscis absent; hind-tibiae with two pairs of well-developed spurs; venation much as in *Comadia* but without the *cellula intrusa* on both wings; veins 6 and 7 of secondaries well stalked.

H. ALBISTRIGA sp. nov. (Pl. XX, Figs. 16, 17).

Thorax light silvery gray, mesothorax crossed by a curved black line and tipped posteriorly with black; abdomen smoky, paler laterally and on anal segment; primaries light gray, non-striate, costa white with numerous small dark strigae; vein 1 streaked with white to subterminal area; an outwardly oblique white streak at end of cell extending a short distance along vein 3; a faint white incomplete s. t. line parallel to outer margin; near base of wing between cubital vein and vein 1 two short ochreous upright dashes; an incomplete and indistinct ochreous band at end of cell crossing the white streak and ending at vein 1; fringes concolorous, paler outwardly. Secondaries deep smoky. Beneath smoky, costa paler with dark dashes; fringes whitish outwardly.

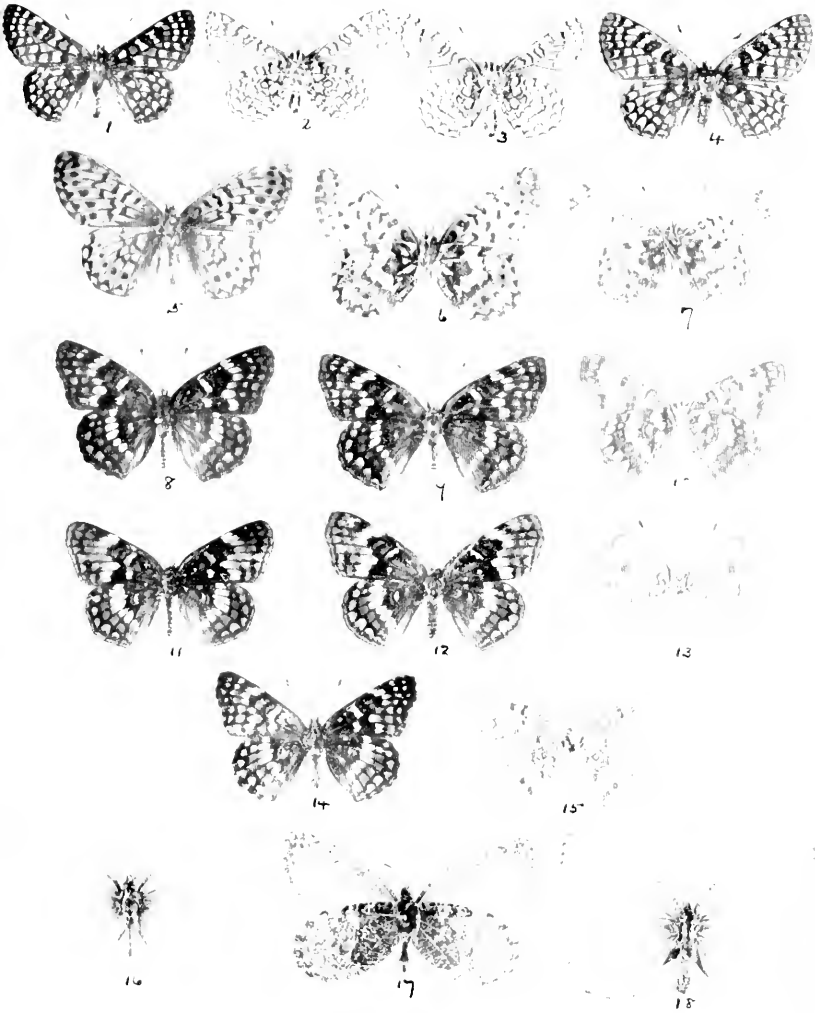
♀. Generally whitish with obsolescent maculation. Expanse 30 mm.

HABITAT: Paradise, Cochise Co., Arizona. 2 ♂ 1 ♀. Types, Coll. Barnes.

## PLATE XI

- Fig. 1. *Euphydryas magdalena* B. & McD. Type, ♂ White Mts., Ariz.  
 Fig. 2. *Euphydryas magdalena* B. & McD. ♂ White Mts., Ariz.  
 Fig. 3. *Euphydryas magdalena* B. & McD. ♂ White Mts., Ariz.  
 Fig. 4. *Euphydryas magdalena* B. & McD. Paratype, ♀ White Mts., Ariz.  
 Fig. 5. *Brenthis helena ingens* B. & McD. Type, ♂ Yellowstone Pk.,  
 Wyo.  
 Fig. 6. *Brenthis helena ingens* B. & McD. Paratype, ♂ Yellowstone Pk.,  
 Wyo.  
 Fig. 7. *Brenthis helena* Edw. ♂ Silverton, Colo.  
 Fig. 8. *Melitaea hoffmani segregata* B. & McD. Paratype, ♂ Crater Lake,  
 Ore.  
 Fig. 9. *Melitaea hoffmani segregata* B. & McD. Type, ♀ Crater Lake,  
 Ore.  
 Fig. 10. *Melitaea hoffmani segregata* B. & McD. ♂ Crater Lake, Ore.  
 Fig. 11. *Melitaea hoffmani* Behr ♂ Nevada Co., Calif.  
 Fig. 12. *Melitaea hoffmani* Behr ♀ Nevada Co., Calif.  
 Fig. 13. *Melitaea acastus* Edw. ♂ Glenwood Spgs., Colo.  
 Fig. 14. *Melitaea flavula* B. & McD. Paratype, ♂ Colo. (Bruce).  
 Fig. 15. *Melitaea flavula* B. & McD. Paratype, ♂ Colorado.  
 Fig. 16. *Oeneis lucilla* B. & McD. Type, ♂ Hall Valley, Colo.  
 Fig. 17. *Oeneis lucilla* B. & McD. Paratype, ♂ Hall Valley, Colo.  
 Fig. 18. *Oeneis lucilla* B. & McD. Paratype, ♀ Hall Valley, Colo.









## PLATE XII

- Fig. 1. *Apodemia mormo deserti* B. & McD. Type, ♂ La Puerta Valley,  
Calif.
- Fig. 2. *Apodemia mormo deserti* B. & McD. Type, ♀ La Puerta, Valley,  
Calif.
- Fig. 3. *Apodemia mormo* Feld. ♂ Eureka, Utah.
- Fig. 4. *Apodemia mormo* Feld. ♀ Eureka, Utah.
- Fig. 5. *Calephelis perditalis* B. & McD. Type, ♂ San Benito, Texas.
- Fig. 6. *Calephelis perditalis* B. & McD. Paratype, ♀ San Benito, Texas.
- Fig. 7. *Calephelis perditalis* B. & McD. Type, ♀ San Benito, Texas.
- Fig. 8. *Calephelis nemesis* Edw. ♂ San Benito, Texas.
- Fig. 9. *Calephelis nemesis* Edw. ♀ Brownsville, Texas.
- Fig. 10. *Calephelis nemesis* Edw. ♀ San Benito, Texas.
- Fig. 11. *Calephelis virginicensis* Gray ♂ Fort Myers, Fla.
- Fig. 12. *Calephelis virginicensis* Gray ♀ Vicksburg, Miss.
- Fig. 13. *Calephelis virginicensis* Gray ♀ Fort Myers, Fla.
- Fig. 14. *Apodemia multiplaga* Schaus ♀ San Benito, Texas.

PLATE VII







## PLATE XIII

- Fig. 1. *Hemileuca electra clio* B. & McD. Type, ♂ Kingman, Ariz.  
Fig. 2. *Hemileuca electra clio* B. & McD. Type, ♀ Kingman, Ariz.  
Fig. 3. *Apantesis ornata hewletti* B. & McD. Type, ♀ Nellie, S. Diego,  
Co., Calif.  
Fig. 4. *Apantesis ornata hewletti* B. & McD. Type, ♀ Nellie, S. Diego  
Co., Calif.  
Fig. 5. *Arachnis picta verna* B. & McD. Type, ♂ Tulare Co., Calif.  
Fig. 6. *Arachnis picta verna* B. & McD. Type, ♀ Tulare Co., Calif.  
Fig. 7. *Arachnis picta maia* Ottol. ♂ Colo. (Bruce).  
Fig. 8. *Arachnis picta maia* Ottol. ♀ Salida, Colo.



PLATE XIII



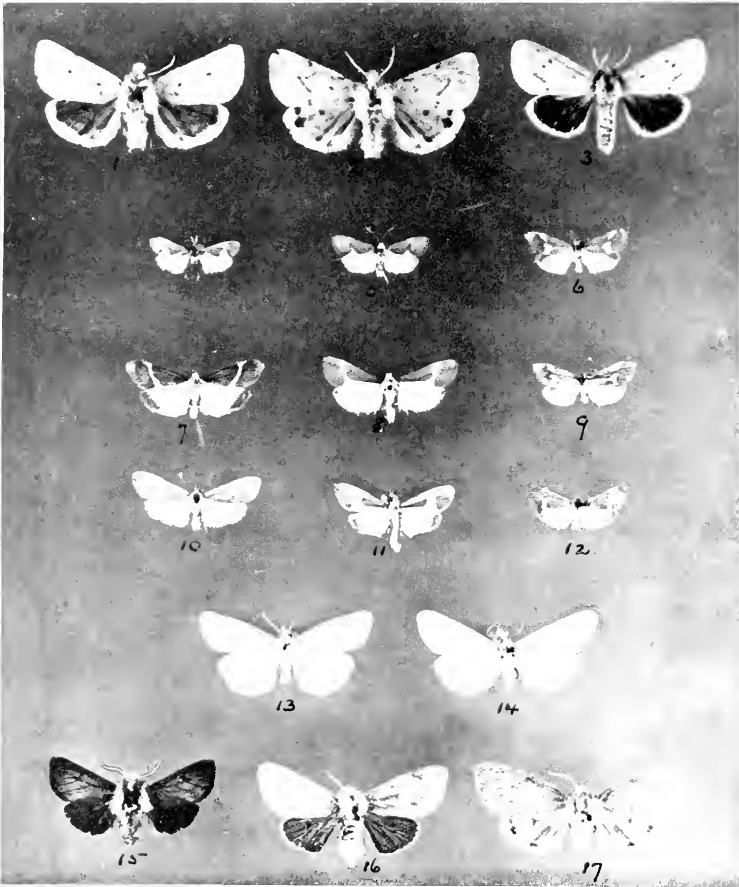




## PLATE XIV

- Fig. 1. *Diacrisia vagans* Bdv. ♂ Stanislaus Co., Calif.  
 Fig. 2. *Diacrisia vagans proba* Hy. Edw. ♂ Truckee, Calif.  
 Fig. 3. *Diacrisia vagans* Bdv. ♀ California.  
 Fig. 4. *Illice unifascia* G. & R. ♀ Kerrville, Texas.  
 Fig. 5. *Illice unifascia ruptifascia* B. & McD. Paratype, ♂ Brownsville,  
 Texas.  
 Fig. 6. *Illice liberomacula* Dyar ♂ San Diego, Calif.  
 Fig. 7. *Illice perrosea* Dyar ♂ San Diego, Calif.  
 Fig. 8. *Illice angelus* Dyar ♂ Babauivera Mts., Ariz.  
 Fig. 9. *Illice liberomacula* f. *basijuncta* B. & McD. Paratype, ♂ San  
 Diego, Calif.  
 Fig. 10. *Illice barnesi* Dyar ♂ Glenwood Spgs., Colo.  
 Fig. 11. *Illice picta* B. & McD. Type, ♂ Texas.  
 Fig. 12. *Illice dorsimacula* Dyar ♂ San Diego, Calif.  
 Fig. 13. *Eubaphe fragilis* Stkr. ♂ So. Utah.  
 Fig. 14. *Eubaphe costata pallipennis* B. & McD. ♂ Glenwood Spgs., Colo.  
 Fig. 15. *Diacrisia pteridis* Hy. Edw. ♂ Wellington, B. C.  
 Fig. 16. *Diacrisia pteridis* Hy. Edw. ♀ Duncans, Vanc. Is., B. C.  
 Fig. 17. *Diacrisia vagans proba* Hy. Edw. ♀ Plumas Co., Calif.

PLATE XIV





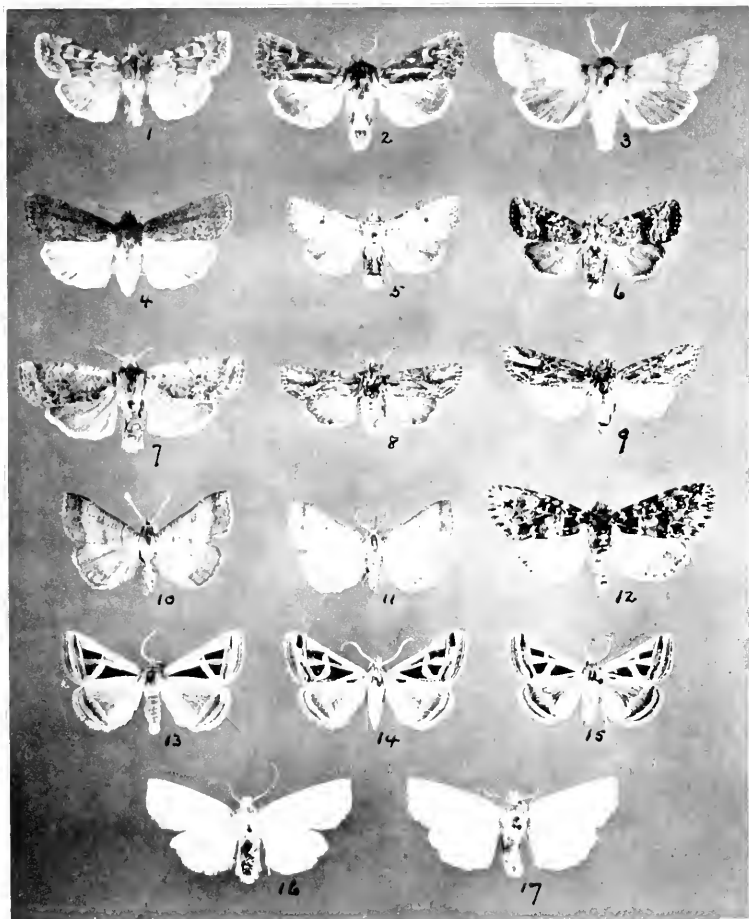


## PLATE XV

- Fig. 1. *Euxoa cinnabarina* B. & McD. Paratype, ♂ Monachee Mdws., Calif.
- Fig. 2. *Protogrotis extensa* Sm. ♂ Colo. (Bruce).
- Fig. 3. *Nephelodes demaculata* B. & McD. Paratype, ♂ Plumas Co., Calif.
- Fig. 4. *Agrotis fortitcr* B. & McD. Type, ♀ Stockton, Utah.
- Fig. 5. *Polia hanhami semicarne* B & McD. Type, ♂ Camp Baldy, S. Bern. Mts., Calif.
- Fig. 6. *Polia hanhami* B. & McD. ♂ Duncans, Vanc. Is., B. C.
- Fig. 7. *Homogluca variegata* B. & McD. Type, ♂ Palmerlee, Ariz.
- Fig. 8. *Trachea susquesa* Sm. ♂ San Diego, Calif.
- Fig. 9. *Trachea monica* B. & McD. Type, ♂ Redington, Ariz.
- Fig. 10. *Renia nemoralis* B. & McD. Type, ♂ Long Is., N. Y.
- Fig. 11. *Renia nemoralis* B. & McD. Paratype, ♀ No locality.
- Fig. 12. *Namangana viridescens* B. & McD. Type, ♂ Chiricahua Mts., Ariz.
- Fig. 13. *Caenurgia triangula* B. & McD. Paratype, ♂ Redington, Ariz.
- Fig. 14. *Caenurgia intercalaris* Grt. ♂ Paradise, Ariz.
- Fig. 15. *Caenurgia diagonalis* Dyar ♀ Redington, Ariz.
- Fig. 16. *Conistra gracifiana* Grt. ♀ Concord, Mass.
- Fig. 17. *Conistra indirecta* Wlk. ♀ Canada.



PLATE XV







## PLATE XVI

- Fig. 1. *Polia subjuncta cleanora* B. & McD. Paratype, ♀ Nelloe, S. Diego Co., Calif.
- Fig. 2. *Polia pulverulenta* Sm. ♂ Ketchikan, Alaska.
- Fig. 3. *Polia pulverulenta* Sm. ♂ Ketchikan, Alaska.
- Fig. 4. *Ephia amabilis* B. & McD. Type, ♀ Loma Linda, Calif.
- Fig. 5. *Copicucullia basipuncta* B. & McD. Type, ♂ Palm Spgs., Calif.
- Fig. 6. *Merolonche doli* B. & McD. Type, ♂ Central Park, L. I.
- Fig. 7. *Trachea serrula* B. & McD. Paratype, ♂ Palm Spgs., Calif.
- Fig. 8. *Stilbia apposita* B. & McD. Type, ♀ Prescott, Ariz.
- Fig. 9. *Scotogramma fulgora* B. & McD. Type, ♂ Olancho, Inyo Co., Calif.
- Fig. 10. *Xylomyges cognata* Sm. ♂ Victoria, B. C.
- Fig. 11. *Xylomyges cognata minorata* B. & McD. Type, ♂ Eldridge, Sonoma Co., Calif.
- Fig. 12. *Xylomyges februalis* B. & McD. Type, ♂ Sonoma Co., Calif.
- Fig. 13. *Pseudacontia modestella* B. & McD. Paratype, ♀ Camp Baldy, Calif.
- Fig. 14. *Pseudacontia grotesca* Dyar ♀ Paradise, Ariz.

PLATE XVI



1



2



3



4



5



6



7



8



9



10



11



12



13



14



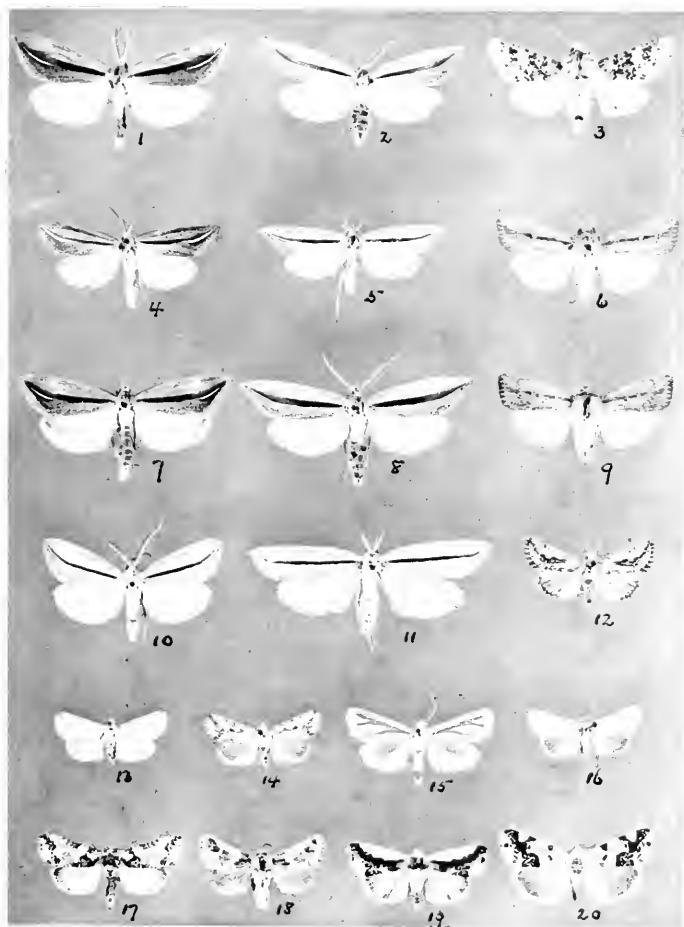


## PLATE XVII

- Fig. 1. *Doryodes bistrialis grandipennis* B. & McD. Paratype, ♂  
 Fig. 2. *Doryodes bistrialis grandipennis* B. & McD. Type, ♀ Anglesea,  
 N. J.  
 Fig. 3. *Oncocnemis primula* B. & McD. Type, ♂ Palm Spgs., Calif.  
 Fig. 4. *Doryodes bistrialis* Geyer ♂ Dade City, Fla.  
 Fig. 5. *Doryodes bistrialis* Geyer ♀ Ft. Myers, Fla.  
 Fig. 6. *Cirphis incognita* B. & McD. Paratype, ♂ Brownsville, Tex.  
 Fig. 7. *Doryodes spadaria* Gn. ♂ Everglade, Fla.  
 Fig. 8. *Doryodes spadaria* Gn. ♀ Everglade, Fla.  
 Fig. 9. *Cirphis incognita* B. & McD. Paratype, ♀ Brownsville, Tex.  
 Fig. 10. *Doryodes tenuistriga* B. & McD. Type, ♂ San Benito, Tex.  
 Fig. 11. *Doryodes tenuistriga* B. & McD. Type, ♀ Brownsville, Tex.  
 Fig. 12. *Hoplotarache albicula* B. & McD. Type, ♀ Olancha, Inyo Co.,  
 Calif.  
 Fig. 13. *Leucocnemis variabilis* B. & McD. Paratype, ♂ Olancha, Calif.  
 Fig. 14. *Leucocnemis variabilis* B. & McD. Paratype, ♀ Olancha, Calif.  
 Fig. 15. *Hemigrotella argenteostriata* B. & McD. Paratype, ♂ Palm Spgs.,  
 Calif.  
 Fig. 16. *Grotella spaldingi* B. & McD. ♀ Palm Spgs., Calif.  
 Fig. 17. *Chamyris sirius* B. & McD. Type, ♂ Kerrville, Tex.  
 Fig. 18. *Acopa bistrigata* B. & McD. Type, ♂ Paradise, Ariz.  
 Fig. 19. *Tarache cora* B. & McD. Type, ♂ Babaquivera Mts., Ariz.  
 Fig. 20. *Tarache cora* B. & McD. Paratype, ♀ Paradise, Ariz.



PLATE XVII



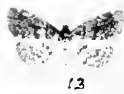
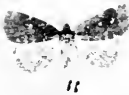




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- Fig. 1. *Mycterophora rubricans* B. & McD. Paratype, ♂ Monachee Mdws., Calif.
- Fig. 2. *Mycterophora rubricans* B. & McD. Paratype, ♀ Monachee Mdws., Calif.
- Fig. 3. *Lithacodia indeterminata* B. & McD. Type, ♀ Winnfield, La.
- Fig. 4. *Cryphia nana* Hhn. ♀ S. Pines, N. C.
- Fig. 5. *Ozarba nebula* B. & McD. Type, ♂ Winnfield, La.
- Fig. 6. *Parahypenodes quadralis* B. & McD. Type, ♂ St. Johns Co., Que.
- Fig. 7. *Protocryphia secta* Grt. ♀ Decatur, Ill.
- Fig. 8. *Cryphia pervertens* B. & McD. Type, ♀ New Brighton, Pa.
- Fig. 9. *Cryphia villificans* B. & McD. Type, ♀ New Brighton, Pa.
- Fig. 10. *Camptylochila rotundalis* Wlk. ♂ Chicago, Ill.
- Fig. 11. *Camptylochila forbesi* Frch. ♂ New Brighton, Pa.
- Fig. 12. *Camptylochila diminutendis* B. & McD. ♂ New Brighton, Pa.
- Fig. 13. *Camptylochila julia* B. & McD. ♂ New Brighton, Pa.
- Fig. 14. *Schinia terrifica* B. & McD. Type, ♂ Colorado (Oslar).
- Fig. 15. *Schinia gloriosa* Stkr. Type, ♀ San Antonio, Tex.

PLATE XVIII





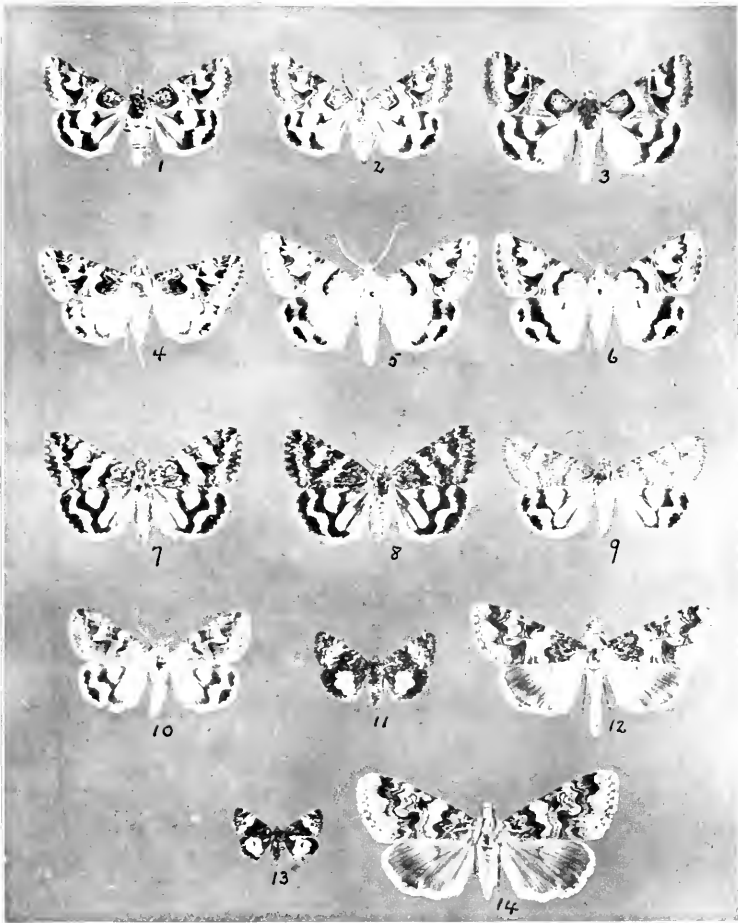


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- Fig. 1. *Drasteria graphica atlantica* B. & McD. Paratype, ♂ Rock Beach, L. I.  
Fig. 2. *Drasteria graphica atlantica* B. & McD. Paratype, ♀ Rock Beach, L. I.  
Fig. 3. *Drasteria occulta* Hy. Edw. ♂ Lakehurst, N. J.  
Fig. 4. *Syneda pulchra* B & McD. Type, ♂ Palm Spgs., Calif.  
Fig. 5. *Syneda tejonica* Behr ♂ Loma Linda, Calif.  
Fig. 6. *Syneda tejonica* Behr ♀ Loma Linda, Calif.  
Fig. 7. *Syneda hudsonica* G. & R. ♂ Field, B. C.  
Fig. 8. *Syneda hudsonica* G. & R. ♀ Glacier Park, Mont.  
Fig. 9. *Syneda hudsonica heathi* B. & McD. Paratype, ♀ Cartwright, Man.  
Fig. 10. *Syneda hudsonica heathi* B. & McD. Type, ♂ Cartwright, Man.  
Fig. 11. *Annaphila astrologa* B. & McD. Paratype, ♀ Arizona.  
Fig. 12. *Syneda abrupta* B. & McD. Type, ♂ Palmerlee, Ariz.  
Fig. 13. *Annaphila divinda* Grt. ♀ San Diego, Calif.  
Fig. 14. *Syneda abrupta* B. & McD. Type, ♀ Jemez Spgs., N. M.



PLATE XIX



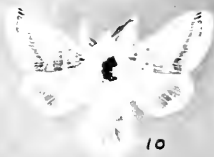




## PLATE XX

- Fig. 1. *Plataea trilinearis astrigaria* B. & McD. Type, ♂ Olancha, Calif.  
 Fig. 2. *Phyltraea elegantaria* Hy. Edw. ♂ Babaquivera Mts., Ariz.  
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 Fig. 4. *Gonodontis (?) simplicius* B. & McD. Paratype, ♂ Olancha, Calif.  
 Fig. 5. *Gonodontis (?) simplicius* B. & McD. Type, ♀ Olancha, Calif.  
 Fig. 6. *Cleora dionaria* B. & McD. Type, ♂ Palmerlee, Ariz.  
 Fig. 7. *Olene willingi* B. & McD. ♂ Sebec Lake, Me.  
 Fig. 8. *Olene vagans* B. & McD. ♂ Sebec Lake, Me.  
 Fig. 9. *Olene vagans* B. & McD. ♀ Sebec Lake, Me.  
 Fig. 10. *Tolyte lowrici* B. & McD. Paratype, ♂ Santa Cruz Mts., Calif.  
 Fig. 11. *Tolyte lowrici* B. & McD. Paratype, ♀ Santa Cruz Mts., Calif.  
 Fig. 12. *Megalopyge lapena heteropuncta* B. & McD. Type, ♂ Chiricahua Mts., Ariz.  
 Fig. 13. *Gaea palmi* Beut. ♂ Kingman Ariz.  
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 Fig. 16. *Heterocoma albistriga* B. & McD. Paratype, ♂ Paradise, Ariz.  
 Fig. 17. *Heterocoma albistriga* B. & McD. Type, ♀ Paradise, Ariz.

PLATE XX





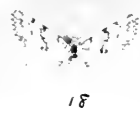


## PLATE XXI

- Fig. 1. *Eustroma fasciata* B. & McD. Type, ♀ Cowichan Lake, Vanc. Is.,  
B. C.
- Fig. 2. *Eustroma nubilata* Pack. ♀ Wellington, B. C.
- Fig. 3. *Euphyia unangulata* Haw. ♂ Ramparts, Alaska.
- Fig. 4. *Hydriomena irata quaesitata* B. & McD. Type, ♂ Monachee  
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- Fig. 5. *Hydriomena shasta brunneata* B. & McD. Type, ♂ Monachee  
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- Fig. 6. *Hydriomena henschawi expurgata* B. & McD. Type, ♂ Monachee  
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- Fig. 7. *Dysstroma mulleolata* Hlst. ♂ Duncans, Vanc. Is., B. C.
- Fig. 8. *Dysstroma mulleolata* Hlst. ♀ Wellington, B. C.
- Fig. 9. *Dysstroma brunneata* Pack. ♂ Ketchikan, Alaska.
- Fig. 10. *Macaria unipunctaria* Wgt. ♂ Redington, Ariz.
- Fig. 11. *Macaria unipunctaria* Wgt. ♀ Deer Park Spgs., Lake Tahoe,  
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- Fig. 12. *Macaria adonis* B. & McD. Paratype, ♂ Monachee Mdws., Calif.
- Fig. 13. *Phasiane hebetata* Hlst. ♂ Yosemite, Calif.
- Fig. 14. *Glaucina simularia* B. & McD. Type, ♀ Monachee Mdws., Calif.
- Fig. 15. *Itame simpliciatata* B. & McD. Type, ♂ Paradise, Ariz.
- Fig. 16. *Itame colata* Grt. ♂ Vineyard, Utah.
- Fig. 17. *Itame colata* Grt. ♀ Vineyard, Utah.
- Fig. 18. *Pterotaca memoriata* Pears. ♂ Paradise, Ariz.
- Fig. 19. *Itame colata* Grt. ♂ Monachee Mdws., Calif.
- Fig. 20. *Itame colata* Grt. ♀ Monachee Mdws., Calif.
- Fig. 21. *Pterotaca obliviscata* B. & McD. Paratype, ♂ Paradise, Ariz.



PLATE XXI



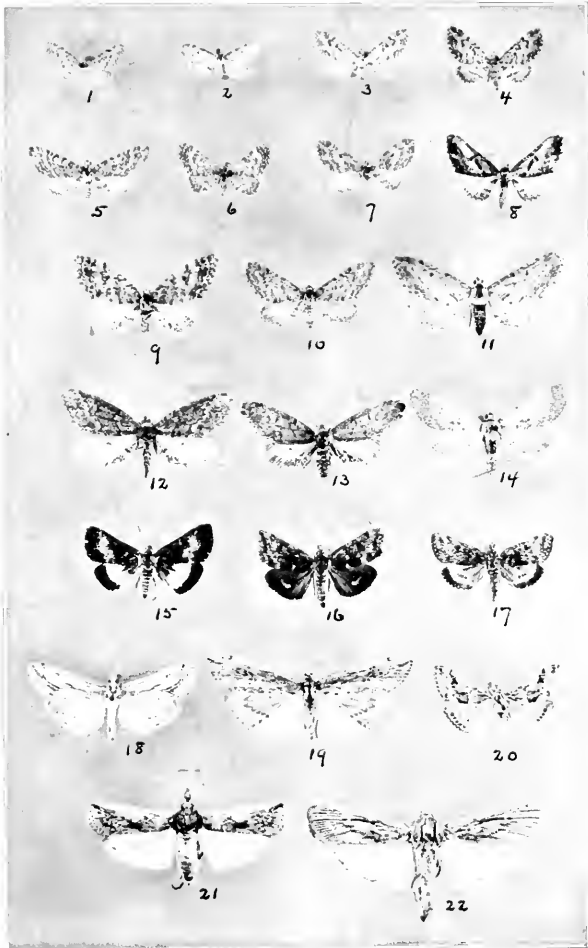




## PLATE XXII

- Fig. 1. *Nasusina vaporata* Pears. ♀ Loma Linda, Calif.  
 Fig. 2. *Eupithecia mendicata* B. & McD. Paratype, ♂ San Diego, Calif.  
 Fig. 3. *Prorrella mellisa* Grossb. ♀ Kingman, Ariz.  
 Fig. 4. *Prorrella insipidata* Pears. ♀ Prescott, Ariz.  
 Fig. 5. *Eupithecia lagganata* Tayl. Type, ♂ Laggan, Alta.  
 Fig. 6. *Eupithecia obumbrata* Tayl. ♂ Vanc. Is., B. C.  
 Fig. 7. *Eupithecia fasciata* Tayl. Type, ♀ Ottawa, Canada.  
 Fig. 8. *Eupithecia penumbrata* Pears. Cotype, ♂ Redington, Ariz.  
 Fig. 9. *Eupithecia annulata* Hlst. ♂ Wellington, B. C.  
 Fig. 10. *Eupithecia adornata* Tayl. Cotype, ♂ Calgary, Alta.  
 Fig. 11. *Eupithecia behrensata* Pack. ♀ Loma Linda, Calif.  
 Fig. 12. *Glaucina escaria* Grt. ♂ Paradise, Ariz.  
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 Fig. 14. *Glaucina erroraria* Dyar. ♀ Wenden, Yuma Co., Ariz.  
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 Fig. 21. *Melitara parabates* Dyar ♂ Gila Co., Ariz.  
 Fig. 22. *Olyca ponderosella* B. & McD. Type, ♀ Palm Spgs., Calif.

PLATE XXII





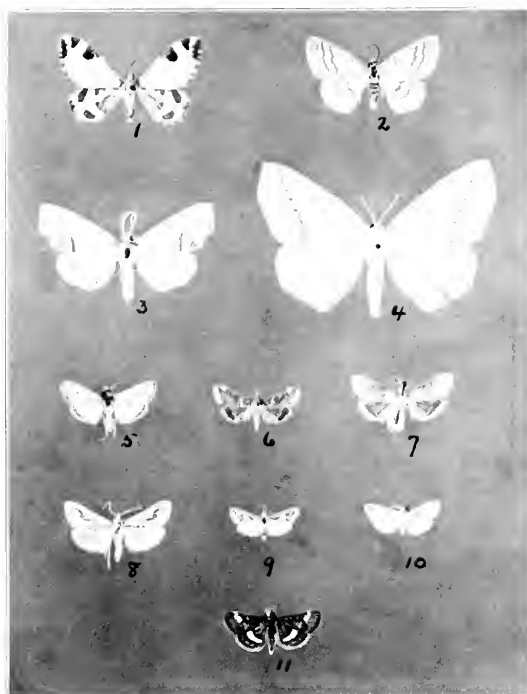


## PLATE XXIII

- Fig. 1. *Stammodes deceptiva* B. & McD. Type, ♂ Paradise, Ariz.  
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Fig. 3. *Plagodis kuetzingaria* Pack. ♂ Newton, Mass.  
Fig. 4. *Sabulodes accentuata* B. & McD. Type, ♂ Flagstaff, Ariz.  
Fig. 5. *Noctuclia palmalis* B. & McD. Type, ♀ Palm Spgs., Calif.  
Fig. 6. *Pyrausta incterascalis* B. & McD. Type, ♂ New Brighton, Pa.  
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Fig. 8. *Pyrausta ochreicostalis* B. & McD. Type, ♂ Palm Spgs., Calif.  
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PLATE XXIII







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- Fig. 1. *Loxostege unilincalis* B. & McD. Type, ♂ Redington, Ariz.  
Fig. 2. *Phlyctaenia berberalis* B. & McD. Type, ♀ Loma Linda, Calif.  
Fig. 3. *Crambus bartellus* B. & McD. Type, ♂ Tuolumne Mdws., Calif.  
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Fig. 7. *Pyrausta emigralis* B. & McD. ♂ Palmerlee, Ariz.  
Fig. 8. *Loxotegopsis curialis* B. & McD. Paratype, ♂ Eureka, Utah.  
Fig. 9. *Pyrausta merrickalis* B. & McD. Paratype, ♂ New Brighton, Pa.  
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PLATE XXIX







## PLATE XXV

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CONTRIBUTIONS  
TO THE  
NATURAL HISTORY  
OF THE  
**LEPIDOPTERA**  
OF  
NORTH AMERICA

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VOL. IV  
No. 3

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NOTES AND NEW SPECIES

BY  
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NOTES AND NEW SPECIES  
TORTRICIDAE

AMORBIA SYNNEURANA, n. sp. Pl. XXXI, Fig. 3.

Labial palpi light yellow, slightly brownish exteriorly. Face, head and thorax light straw-yellow. Forewings light straw-yellow with a small faint light reddish brown dash on the middle of costa, directed outwardly, and with a similarly colored very faint dash on apical third of costa. Hindwings pale straw-colored. Abdomen light yellow with whitish underside. Legs pale yellow. Underside of wings unicolorous light yellow. The female has both pairs of wings a shade darker than the male, but is identical in markings.

Alar expanse: ♂ 20-24 mm.; ♀ 26 mm.

HABITAT: Redington and Babaquivera Mts., Arizona.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22634).

This species is similar to *Amorbia emigratella* Buseck, especially in the males, but is without the dark costal-apical edging of the hindwings found in that species, and the markings of the forewings are much paler. The female differs from any described species of the genus by having veins 7 and 8 of the forewings united as in the male, not stalked as is the normal. The Californian *Amorbia cuneana* Walsingham, is very variable in color, but is much larger and even the palest male of that species is darker ochreous than those of the present species. The male genitalia of this genus are very uniform with but slight specific modification, but *A. synneurana* has the costa of the harps somewhat arched, not straight, and the center of the transtilla is much less spined than in *A. cuneana* Wlsh., it also has a very different armature of the penis from this species (see Pl. XXXI, Fig. 1 and 3).

SPARGANOTHIS MACHIMIANA, n. sp. Pl. XXVIII, Fig. 2.

Labial palpi light ochreous, suffused with dark fuscous exteriorly and with dark fuscous terminal joints. Face naked. Head and thorax light ochreous brown. Forewings light ochreous brown, evenly sprinkled with single scales of darker brown and dark fuscous; a faint series of small blackish dots along the costal and terminal edges; a conspicuous small black round dot at the end of the cell; cilia ochreous. Hindwings light brownish fuscous with paler cilia; underside with very faint transverse blackish striation. Abdomen ochreous fuscous above, yellowish on the underside. Legs ochreous with dusky tarsal joints.

Alar expanse: 21-26 mm.

HABITAT: Paradise, Cochise Co. and Palmerlee, Arizona.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22635).

SPARGANTHUS UMBRANA, n. sp. Pl. XXVIII, Fig. 3.

Labial palpi dark reddish brown. Face naked. Head and thorax light reddish brown. Forewings light ochreous with golden and greenish iridescence and with dark brown markings; an ill-defined, narrow, reddish brown fascia from before the middle of costa to just beyond the middle of dorsum; an apical dark brown area occupies the outer third of the wing and is sharply outlined against the lighter ground color of the basal two-thirds, which terminates before apical third of costa and bulges outwards shortly below the costa into the darker apical part of the wing; a small reddish brown spot on the fold near the base. Cilia light ochreous. Hindwings dark fuscous brown with light ochreous cilia. Abdomen dark ochreous with lighter underside. Legs ochreous with tarsal joints faintly annulated with fuscous.

Alar expanse: 22-24 mm.

HABITAT: Denver, Colorado. Oslar, collector.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22636).

A somewhat variable species, closely allied to the very variable Californian species *S. senecioniana* Walsingham, which I consider only a variety of *rudana* Walsingham and of the immaculate *inconditana* Walsingham; in a very large series before me these forms grade into each other so completely, that I can only consider them all one species, as many genitalia slides of the various forms seem to support. The present species differs in having much longer labial palpi than the Californian species, which must bear the first Walsingham name, *inconditana*.

PLATYNOTA IRIDANA, n. sp.

Labial palpi reddish brown, mottled with black. Head and thorax reddish brown. Forewings of the female reddish brown with a darker brown indistinct, outwardly oblique fascia from before the middle of costa to before tornus; another blackish brown fascia, broad on the apical third of costa becomes attenuated and stops before it reaches tornus; on both sides of this last dark fascia are narrower light reddish outwardly oblique and curved fasciae which are heavily overlaid with iridescent and silvery scales; extreme terminal edge and apex dark brown; at the end of the cell a conspicuous black dot. In the males the costal fold reaches to apical third of costa, broad on basal half and narrow outwardly; basal two-thirds of the wing heavily overlaid with dark, blackish brown scales, contrasting with a light ochreous transverse space at

apical fifth, which is overlaid with iridescent scales; terminal edge dark reddish brown. Hindwings in both sexes light reddish brown. Abdomen light golden brown with golden ochreous underside. Legs light ochreous, dusted with dark brown.

Alar expanse: ♂ 14 mm.; ♀ 15-17 mm.

HABITAT: St. Petersburg, Florida

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22637).

Nearest to the larger and lighter colored *Platynota metallica* Walsingham.

PLATYNOTA VIRIDANA, n. sp. Pl. XXVIII, Fig. 4.

Labial palpi light greenish yellow, heavily sprinkled with blackish fuscous scales. Head and thorax greenish yellow, face and patagia heavily overlaid with blackish fuscous. Forewings light yellow with a green lustre, sparsely overlaid with darker ochreous and light brown scales; a well defined, outwardly oblique, blackish fuscous fascia from middle of costa to apical third of dorsum contains a number of reddish and brown scales; a similarly colored triangular costal spot at apical third; terminal edge and apex broadly blackish fuscous with a reddish brown line along the extreme edge; cilia ochreous; costal fold in the male very small and not firmly pressed down, covering only basal sixth of costa. Hindwings dark fuscous with cilia lighter. Abdomen and legs ochreous fuscous.

Alar expanse: 17 mm.

HABITAT: Dewey, Arizona.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22638).

PLATYNOTA CHIQUITANA, n. sp.

Labial palpi, head and thorax blackish brown. Forewings dark brown with outer half lighter yellowish brown especially in the males; costal fold of the male short and narrow, reaching only one-fourth of the costa; a blackish brown, outwardly oblique, fascia from the middle of costa to apical third of dorsum becomes indistinct and suffused on its lower half, but is edged along its entire basal side with minute tufts of raised scales; similar small tufts of black scales are found in two series across the apical part of the wing, starting on either side of an obscure dark brown triangular costal spot at apical third; additional small tufts of scales are scattered on apical part of the wing; terminal edge dark reddish brown with small raised scale tufts. Cilia golden brown. Hindwings dark reddish brown. Abdomen dark fuscous with yellowish brown underside. Legs blackish brown.

Alar expanse: 12-16 mm.

HABITAT: San Diego and Loma Linda, San Bern Co., California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22639).

An inconspicuous species, mainly distinguished superficially by its small size.

*TORTRIX PERONEANA*, n. sp.

Labial palpi reddish ochreous. Face and head dark ochreous. Collar dark reddish brown. Thorax light yellow. Forewings light yellow, slightly suffused with reddish scales, especially on outer half and along costa; a short dark brown line from just before the middle of costa is directed towards tornus but stops at the end of the cell and forms a right angle with a similar, inwardly directed line from apical fourth of costa; costal edge narrowly reddish brown except within the triangle formed by these two lines; terminal edge and cilia dark reddish fuscous. Male without costal fold. Hindwings light reddish fuscous with white cilia. Abdomen light yellow. Legs yellow shaded exteriorly with brown.

Alar expanse: 18-19 mm.

HABITAT: Palmerlee, Cochise Co., Arizona.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22640).

A striking species of the *quercifolia* and *semicircularana* group, easily recognized by its simple pattern.

The venation of the female of this species is normal with veins 3 and 4 of the hindwings connate; the males have these veins distinctly separate, tho' approximate, a tendency found in several species of the family and indicating that this character, 3 and 4 of hindwing separate or connate, must be used with considerable circumspection in the generic division of the family, more so, probably, than has been the case.

*TORTRIX CARNANA*, n. sp. Pl. XXVIII, Fig. 1.

Labial palpi light reddish brown. Face and head deep reddish brown. Thorax reddish brown; patagia tipped with white. Forewings white with vivid reddish brown markings; basal fourth reddish brown except along dorsal edge; a broad reddish brown fascia from the middle of costa, outwardly projected to the end of the cell, reaches nearly across the wing to the fold; the white apical third of the wing outside this fascia is faintly suffused with red except on a pure white costal streak immediately beyond the fascia. Cilia white. Hindwings pale rusty red. Underside of both wings light golden red with the white costal

marking of the forewing showing through. Abdomen reddish brown with whitish base and underside. Legs white, strongly suffused with red exteriorly.

Alar expanse: 26-29 mm.

HABITAT: Camp Baldy, San Bern. Mts., California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22641).

A very striking species, not easily confused with any described species but probably nearest to *T. vividana* Dyar.

*TORTRIX DIMORPHANA*, n. sp.

Labial palpi, face, head and thorax light canary yellow. Forewings light canary yellow with blackish fuscous markings; in the female the dark markings are confined to a short, inwardly directed, diffused dorsal streak just before tornus and sometimes a scattering of black scales along the terminal and dorsal margins; in the male there is an oblique blackish fascia from middle of costa to just before tornus, interrupted on the middle of the wing by the ground color; there is also a well defined blackish costal spot at apical fourth. Cilia whitish. Hindwings and cilia white. Abdomen whitish ochreous. Legs light ochreous, shaded exteriorly with brown.

Alar expanse: 21-24 mm.

HABITAT: Duncans, Vancouver Is. Hanham coll.; Victoria, British Columbia.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22642).

Allied to *T. clemensiana* Fernald, but broader winged and distinguished by the dark markings of the forewings.

*TORTRIX INVIDANA*, n. sp. Pl. XXXI, Fig. 9.

Labial palpi dirty white, shaded exteriorly with black; terminal joint black. Face, head and thorax dirty white with a few single black scales; patagia strongly speckled with black. Ground color of the forewings white with gray and black markings; basal fourth thickly overlaid with gray and black transverse striation except on dorsal edge; on the middle of costa is a sharply limited black spot, from which an outwardly oblique, strongly angulated fascia of gray and black scales runs to the dorsum just before tornus; at apical fourth of costa is a large rectangular black and gray spot with a minute costal dash of the ground color in the center; beyond this are two thin blackish lines across the wing, the first terminating in a large ill defined gray spot above tornus, the outer just before apex is continued into a series of black dashes along terminal and tornal edge and beyond and along dorsal edge between the fascia and the basal part. Cilia dirty white. Hindwings light fuscous with the edges slightly darker and with a thin fuscous line in the dirty white cilia, parallel with the

edge. Abdomen fuscous with whitish underside. Legs dirty white, shaded with fuscous exteriorly.

Alar expanse: 19-22 mm.

HABITAT: Duncans, Vancouver Is. Hanham coll.; Victoria, British Columbia.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22643).

Allied to and with strong general resemblance to *Tortrix dissitana* Grote, but without the solid black triangular markings on the terminal edge of this species.

PERONEA MAXIMANA, n. sp. Pl. XXXII, Fig. 1.

Labial palpi white, mottled exteriorly with black scales. Face, head and thorax whitish fuscous, sparsely sprinkled with single black scales. Forewings whitish gray with a faint bluish tint and irregularly sprinkled and strigulated with darker gray and black scales; costal edge with irregularly placed blackish brown geminate dashes; terminal edge with a scalloped blackish brown marginal line, at basal third of costa is an outwardly directed transverse blackish fuscous fascia, sometimes faintly indicated. A somewhat more distinct irregular transverse dark shade across the end of the cell from the middle of costa is also variable in the different specimens, but is at least always indicated by a dark spot at the end of the cell, containing two short longitudinal black streaks; a small blackish dot on the fold near the base. Hindwings light shining fuscous with darker fuscous irregular transverse striation which is more pronounced on the underside; underside of forewings dark fuscous with whitish costal edge on which several dark costal dashes show conspicuously. Abdomen dark fuscous with yellowish anal tuft. Legs dirty ochreous white.

Alar expanse: 28-30 mm.

HABITAT: Vancouver Is. Hanham coll.; Victoria, British Columbia. A. J. Crocker coll.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22644).

A striking species nearest allied to *Peronea ferruginiquittata* Fernald. A series of specimens from the same locality but smaller (22-27 mm) seem to grade right into the larger form, which I have made the type and I am unable to separate them, at least for the present.

PERONEA FUSCANA, n. sp.

Labial palpi whitish on their inner side, dark fuscous exteriorly. Face, head and thorax dark fuscous. Forewings dark fuscous with a few scattered brown scales and with black markings; base of costa broadly black; a black rectangular triangle, consisting of two costal spots and an intermediate spot below and between these, closely connected around a small dot of the ground

color at apical third; a small black dot on the fold near the base; faint blackish brown transverse striation on apical third of the wing; cilia dirty white. Hindwings light shiny fuscous with whitish cilia. Abdomen ochreous fuscous with lighter underside. Legs ochreous fuscous with blackish shading exteriorly.

Alar expanse: 16 mm.

HABITAT: Aweme, Manitoba, Criddle coll.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22645).

A dark inconspicuous species of the *Subnivana* group.

PERONEA STADIANA, n. sp.

Labial palpi yellowish white on the inner side, mottled with reddish brown exteriorly. Face, head and thorax light reddish brown. Forewings light reddish brown with a dark brown triangle, enclosing a small triangular spot of the ground color on apical third of costa; a faint dark brown striation on basal third of the wing; apical third rather heavily overlaid with dark brown; a small black dot on the middle of the cell and a similar dot at the end of the cell, containing a few white scales; a small black dot on the fold near base; all of these black spots consist of raised scales; the extreme terminal edge of the wing dusted with black; cilia light fuscous. Hindwings dark brownish fuscous with yellowish cilia. Abdomen fuscous above, underside light ochreous. Legs light ochreous; tarsal joints shaded exteriorly with brown.

Alar expanse: 15-17 mm.

HABITAT: Ottawa, Canada. C. H. Young coll.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22646).

Apparently a not very variable species, near *P. tiburnana* Clemens in color, but smaller and with the costal triangle less extensive.

## PHALONIIDAE

*HYSTEROSIA PERSPICUANA*, n. sp. Pl. XXVIII, Fig. 5.

Labial palpi whitish gray, sprinkled with dark brown scales. Head and thorax whitish gray sprinkled with brown. Forewings without costal fold in the male; the white ground color thickly and evenly dusted with gray, black and light fawn colored scales so as to appear gray to the unaided eye; from the middle of costa to near base of dorsum runs a dark gray narrow fascia, ill defined outwardly, but sharply outlined basally by a line of white scales; a large blackish brown transverse spot, undulated in outline toward the base and outwardly curved toward apex reaches from apical fourth of costa to tornus and is edged outwardly by a line of pure white scales; an indistinct triangular dark gray area before tornus is emphasized by a lighter gray edge toward the base of the wing; cilia white with base and tips brown. Hindwings whitish, heavily but indefinitely mottled with transverse gray striation, which is more pronounced on the underside; cilia white dotted with brown. Underside of forewings light brown with the outer curved white line and the dark subapical spot of the upper surface clearly indicated. Abdomen light grayish brown. Legs whitish, dusted with brown.

Alar expanse: 25-27 mm.

HABITAT: Paradise, Cochise Co., Arizona.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22647).

Nearest to *H. terminana* Busck, but very distinct from any of our described species of the genus by its soft gray color and the externally white edged dark apical spot.

*HYSTEROSIA CANARIANA*, n. sp. Pl. XXVIII, Fig. 6.

Labial palpi light yellow, mottled externally with brown. Face, head and thorax light yellow. Forewings pale canary yellow, overlaid with darker yellow scales and with reddish brown and blackish markings; costal fold of the male blackish brown, reaching to basal third; a series of faint, equidistant, light brown dots along costal edge beyond the fold; an inwardly oblique blackish brown streak across the base of the cell; a small black spot at the end of the cell and a reddish brown streak, mixed with black scales across the tip of the wing from apical fourth to tornus. Cilia reddish white. Hindwings light fuscous with faint transverse darker striation. Abdomen dark fuscous with yellow anal tuft. Legs light ochreous.

Alar expanse: 19-23 mm.

HABITAT: White Mountains, Arizona.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22648).



Nearest to *H. antroalbida* Walsingham, but darker yellow with darker markings and at once distinguished from it by the dark hindwings.

*HYSTEROSIA FULVIPPLICANA* Walsingham. Pl. XXXII, Fig. 10.

1879, Ill. Lep. Het. Brit. Mus., Vol. IV, p. 25, Pl. LXXVI, Fig. 2, 3.  
n. syns:

*Hysterosia aegrana* Walsingham.

1879, Ill. Lep. Het. Brit. Mus., Vol. IV, p. 26, Pl. LXXVI, Fig. 4.

*Hysterosia homonana* Kearfott.

1907, Can. Ent., Vol. XXXIX, p. 84.

*Hysterosia komonana* Kearfott.

1907, Can. Ent., XXXIX, p. 121.

A very large and perfect series from the type locality of Walsingham's species show sufficient variation in the ground color of the forewings to indicate that the two names *fulviplicana* and *aegrana* apply to only one species of which the males normally are the larger and white, while the females are ochreous and much smaller, but both sexes vary and intergrade to some extent and enough to account for Walsingham's description and figures of the supposed two species.

Lord Walsingham evidently had some suspicion of this, but his short series did not enable him to connect the extremes in coloration and size. In spite of considerable collection in the type region only one species of this genus has been turned up and only one seems to occur there.

Kearfott's two names *Hysterosia homonana* and *H. komonana* apply to small varieties of male specimens of this same species as his types prove; genitalia slides of cotypes of both his species have been made and are found to be alike and identical with those of *fulviplicana* Walsingham.

The synonymy is augmented by the names *refuga* Meyrick and *fermentata* Meyrick, supplied with the idea of supplanting Kearfott's "nonsense" names.

It is further added to by Lord Walsingham's identification of the European *Hysterosia inopiana* Stephens, from California, which in our opinion was based on a female of the variable *fulviplicana*, this European name should be discontinued in our North American List

except as a synonym of *fulvificana* as *H. inopiana* Walsingham, not Stephens.

In most species of Lepidoptera the female is larger than the male in alar expanse and the opposite condition in this species is noteworthy, though found in several others. It does not hold for the other species of the genus. In the oecophorid genus *Scmioscopis* it is the condition found in all the species, that the males run considerably larger than the females.

HYSTEROSIA TERMINANA Busck.

1907, Jour. N. Y. Ent. Soc., XV, p. 33.

n. syn.

*Hysterosia merrickana* Kearfott.

1907, Can. Ent., XXXIX, p. 59, 121.

These two names published with short intervals stand for the same species and *merrickana* must sink as a synonym.

HYSTEROSIA BARACANA Busck.

1907, Jour. N. Y. Ent. Soc., XV, p. 38.

n. syn:

*Hysterosia tiscana* Kearfott.

1907, Can. Ent., XXXIX, p. 123.

*Hysterosia vigilans* Meyrick.

1912, Ent. Mo. Mag., XLVIII, p. 35.

Kearfott's name *H. tiscana*, published a few months after *Hysterosia baracana*, falls as a synonym for it and with it Meyrick's substitute for Kearfott's name.

HYSTEROSIA CARTWRIGHTANA Kearfott.

1907, Can. Ent., XXXIX, p. 123.

This name has been placed wrongfully as a synonym of *H. zillana* Busck, and should be resurrected as a valid species. The genitalia of this genus are remarkably uniform and difficult to differentiate, but exhibit good characters, however small, in the form of the trans-tilla and the armature of the penis.

PHALONIA MARLOFFIANA Busek.

1907, Jour. N. Y. Ent. Soc., XV, p. 26.

new syn:

*Phalonia nonlavana* Kearf.

1907, Trans. Am. Ent. Soc., XXXIII, p. 85.

This synonymy and that of the two *Hysterosia* species, presented in this paper was realized and admitted by Mr. Kearfott during his visit at the National Museum shortly after their publication, but was not published by our late friend, as intended, before his untimely demise.

## COSMOPTERYGIDAE

PSACAPHORA EDITHELLA, n. sp. Pl. XXVIII, Fig. 11.

Labial palpi light whitish straw colored with anterior edge purplish black. Face, head and thorax shiny purplish black; antennae purplish black. Forewings shining golden red with bronzy black and metallic golden markings; extreme base of wing black, which color is continued narrowly on the costal edge to basal fourth and broadly along the dorsal edge to basal third; the outer half of the dorsal part of this area is heavily irrorated transversely with metallic gold and terminates in a tuft of raised scales; near the end of this black area is a blunt irregular extension upwards into the cell, so strongly overlaid with metallic golden scales as to obscure the black entirely in certain lights and appear solid gold; a similarly colored elongate spot on outer half of the cell; an elongate black, golden irrorated spot on the end of the fold, but not touching the dorsal edge, terminates in a tuft of raised scales and has a large spur upwards over the end of the cell; the tufts of raised scales have the lower scales pure white and when the tufts are pressed down in setting the specimen these scales protrude and form small white spots at the edge of the black and golden areas; just beyond apical fourth is a conspicuous white costal dash and beyond this the costal, apical and terminal edges are deep black, heavily overlaid with metallic golden scales. Cilia bronzy black. Hindwings and cilia bronzy black. Abdomen black. Legs black with the ends of the joints white.

Alar expanse: 16-17.5 mm.

HABITAT: Chimney Gulch, Golden, Colorado. Oslar coll.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22649).

A very brilliant moth, typical of the genus and nearest to *P. purpuricella* Busck, but easily distinguished by the lighter color, different pattern and striking metallic golden wings.

Named in honor of Miss Edith Horstmann.

STAGMATOPHORA WYATTELLA, n. sp.

Labial palpi white with base of second joint and with base and a broad annulation on terminal joint black. Face and head white. Thorax black. Forewings black with a strong purplish sheen and with silvery white markings; an outwardly oblique white streak from basal fourth of costa reaching to the fold; a similar but smaller streak on the middle of costa and a semicircular white costal spot at apical fourth; a silvery white spot on the middle of dorsal edge, connected by white scales with another white spot at apical fourth of dorsum; a few scattered white scales at apex. Cilia blackish fuscous. Hindwings dark blackish brown with a strong purple sheen; cilia blackish fuscous. Abdomen

blackish brown with silvery underside. Legs black with broad white bars and tarsal annulation.

Alar expanse: 13-16 mm.

HABITAT: Palos Park and Edgebrook, Chicago, Illinois. A. K. Wyatt coll.

Type and cotypes in Collection Barnes; cotype in U. S. National Museum (No. 22650).

Named in honor of the collector. Very close and similar in color and ornamentation to *Stigmatophora sexnotella* Chambers and easily confused with this species, but somewhat larger and differing in the more extended white markings, in the connected dorsal spots and in the much darker hindwings.

## GELECHIIDAE

## ISOPHRICTIS ACTIELLA, n. sp.

Labial palpi, face, head and thorax white. Forewings dark brownish fuscous with a greenish sheen; a broad longitudinal spindle-shaped white streak on the middle of the wing from base to the end of the cell; an outwardly oblique white costal streak before the cilia, meeting a similar opposite dorsal streak in a sharp angle; three white costal dashes and five nearly confluent dorsal pencils beyond these first streaks; a deep black basal line at base of apical cilia; cilia white with three parallel black lines beyond the black base. Hindwings silvery fuscous. Abdomen dark fuscous. Legs dark fuscous with narrow white annulations at the end of the joints.

Alar expanse: 10-11 mm.

HABITAT: San Diego, California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22651).

A small strongly marked species, nearest *Isophrictis (Paltodora) canicostella* Walsingham, which differs in the white costa and other details of the pattern.

All the American species hitherto placed in the genus *Paltodora* Meyrick must be transferred to the genus *Isophrictis* Meyrick (Ent. Mo. Mag., Vol. LIII, p. 113, 1917).

## EPITHECTIS CITRINELLA, n. sp.

Labial palpi light yellow with a broad black annulation on the middle of terminal joint. Face, head and thorax light yellow; base of patagium black. Forewings light lemon yellow; base of costal edge black; a black costal spot at basal fourth and another just beyond the middle; a small black spot on dorsal edge at the end of the fold and three small black dots along the terminal edge. Cilia dusky. Hindwings light silvery fuscous. Abdomen yellow with dusky annulations. Legs yellow with black bars on the front tibiae.

Alar expanse: 8-10 mm.

HABITAT: Palmerlee, Arizona.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22652).

Closest and quite similar to *E. saundersella* Chambers, but with the forewings lighter yellow, with no black markings except those mentioned above, and with yellow thorax.

## TELPHUSA BALDIANA, n. sp.

Labial palpi whitish, heavily sprinkled with fuscous and black scales especially on outer surface; terminal joint with an ill defined broad black annulation around the middle and another just before the tip. Face whitish. Head and thorax light fuscous, each scale tipped with white. Forewings bluish white, overlaid with fuscous, black and brown scales; a rather well defined outwardly oblique fasciæ of black raised scales from near the base of costa to basal fourth of dorsum; an ill defined light fuscous spot on the middle of costa; an ill defined transverse shade of fuscous over the end of the cell, edged exteriorly by a narrow nearly unmottled white fascia; at the end of the cell a short transverse streak of black and brown raised scales, tip of the wing well overlaid with fuscous; a short longitudinal black line on the end of veins 5 and 6. Cilia light fuscous. Abdomen light ochreous fuscous. Legs light ochreous with ill defined fuscous bars and annulations.

Alar expanse: 19-21 mm.

HABITAT: Camp Baldy, San Bernardino Co., California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22653).

The largest described North American species of the genus and easily distinguished by the deep black basal fascia.

## ARISTOTELIA MONILELLA, n. sp.

Labial palpi white, second joint with an indistinct brown annulation near the tip, terminal joint with two broad, blackish brown annulations. Face, head and collar yellowish white. Thorax golden brown. Forewings light golden brown; at basal fourth an outwardly oblique white transverse streak, attenuated towards dorsum and not quite reaching the dorsal edge; on the middle of the costa is an equilateral triangular white spot and at apical fourth an inwardly directed triangular white spot; all of these white spots are marginal and continued across the wing by black and metallic blue scales and terminate on the dorsal edge in small white spots; apical and terminal edges broadly velvety black with conspicuous tufts of metallic blue scales around the margin. Cilia dark brown with white tips. Underside of both wings brown and both with a large white spot at apical fourth. Abdomen black, each joint tipped with silvery white. Legs dark brown with white bars and tarsal annulations.

Alar expanse: 12-13 mm.

HABITAT: Southern Pines, North Carolina.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22654).

Very close to *Aristotelia elegantella* Chambers and to *A. argentifera* Buseck and rivalling them in exquisite beauty, but easily distinguished from either by the different pattern.

## ARISTOTELIA LINDANELLA, n. sp.

Labial palpi white, second joint slightly shaded exteriorly with reddish brown; terminal joint with two annulations and extreme tip black. Face, head and thorax light yellow. Forewings yellowish white; extreme base of costa black; at basal third a broad blackish brown transverse fascia, slightly nearer base at costa than on the dorsal edge; at apical third is a similar broader fascia, strongly overlaid with brick-red on the dorsal half and touching on the dorsal edge a third broad fascia across the tip of the wing, which is nearly all brick red with only the costal end blackish brown; tip of the wing white with a few scattered brown scales. Cilia white. Hindwings light whitish fuscous. Abdomen yellowish with silvery underside. Legs white with dark brown bars and nearly black tarsal joints.

Alar expanse: 10-11 mm.

HABITAT: Loma Linda, San Bernardino Co., and Olancho, Inva Co., California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22655).

Nearest to *Aristotelia bifasciella* Buseck, but smaller with straighter fasciae and at once distinguished by the yellow head and the brick-red shading on the wings.

## ANACAMPISIS PSORALIELLA, n. sp. Pl. XXVIII, Fig. 10.

Labial palpi and tongue light golden ochreous. Face, head and thorax olivaceous blackish brown. Forewings nearly unicolorous blackish brown with apical fourth a shade lighter; the two shades are faintly but sharply defined by a transverse line, which is slightly but sharply outwardly curved and pointed on the middle; four hardly perceptible darker brown spots, one near the base, one on the middle of the cell, one at the end of the cell and one on the middle of the fold. Cilia dark brown. Hindwings dark olivaceous brown with the cilia a shade lighter. Abdomen blackish brown with light yellowish underside. Legs yellowish shaded exteriorly with brown.

Alar expanse: 18-21 mm.

HABITAT: Sionx City, Iowa.

Food plant: *Psoralea argophylla*.

Bred by Dr. A. W. Lindsey.

Type and cotype in Collection Barnes; cotype in U. S. National Museum (No. 22656).

Allied to *A. lupinella* Buseck, but larger and differing in the light yellow labial palpi.



## ANACAMPSIS LACTEUSOCHRELLA Chambers.

*Gelechia lacteusochrella* Chambers, 1875, Cinn. Quart. Jour., Vol. II, p. 244; Busck, 1903, Proc. U. S. Nat. Mus., Vol. XXV, p. 897; Barnes, 1917, List Lep. Bor. Am., No. 6329.

This name, which for nearly half a century has been on our list as unrecognized, we now apply to a small inconspicuous species of *Anacamopsis* from Riverside, Calif., and South California, which agrees well with Chambers' description, incomplete as it is. The species is nearest *A. crescentifasciella* Chamb. and *A. argyrothamniella* Busck, and good series are found so labelled in U. S. National Museum and in collection Barnes.

## EUCORDYLEA ELUCIDELLA, n. sp.

Second joint of labial palpi blackish brown with a large ill-defined white annulation below the middle; terminal joint black with two narrow diffused white annulations, one at base and one on the middle and with extreme tip white; brush on the inner side of second joint in the male large, dirty yellowish white; this brush is not found in the females. Antennae black with narrow white annulations. Face and head yellowish white, sprinkled with fuscous. Thorax dark fuscous. Forewings light gray with three ill-defined and obscure blackish dashes on costa, one at basal fourth, one on the middle and one at apical third; these black dashes are edged with white and are faintly continued across the wing, the first as an outwardly oblique narrow and broken fascia, the two others straight across the wing; each of these fascia is emphasized by tufts of raised black scales, edged with white, two of which on each fascia are larger and more persistent in the flown specimen than the other markings. Cilia light fuscous. Hindwings light fuscous; in the males with a large expansive bright yellow hairtuft at base. Abdomen ochreous above with fuscous underside. Legs ochreous white barred and annulated with black.

Alar expanse: 11-13 mm.

HABITAT: San Diego, California. June.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22657).

The genus *Eucordylea* Dietz was erected on the peculiar labial tuft and has been known hitherto only from a few males. The females are now found to have palpi as normal in the genus *Recurvaria* with which *Eucordylea* is identical in venation. I postpone until a revision of the family the decision whether or not the genus *Eucordylea* can be logically maintained.

*GELECHIA SPILOSELLA*, n. sp.

Labial palpi with well developed furrowed brush, whitish fuscous, mottled with dark fuscous and black. Face ochreous fuscous. Head and thorax dark fuscous. Forewings dark fuscous minutely irrorated with black, extreme tip of each scale being black; a prominent blackish brown spot on the middle of the cell and another similar spot obliquely below it on the fold, both partly edged with light brown scales; a small light brown spot on the end of the cell contains one or sometimes two small black spots; a very faint, hardly discernable lighter fuscous transverse shade across the wing at apical fourth, sometimes accentuated by a faint ochreous costal spot; a few black dots along the terminal edge before the lighter fuscous cilia. Hindwings brownish fuscous. Abdomen dark fuscous with basal joints velvety ochreous above. Legs dark fuscous with narrow ochreous tarsal annulations.

Alar expanse: 20-21 mm.

HABITAT: San Diego, California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22658).

*GELECHIA RETINIELLA*, n. sp.

Labial palpi white. Face and head white. Thorax light yellow. Forewings white, heavily overlaid with light ochreous scales, which only leaves the white ground color exposed on a very diffused outwardly oblique fascia from basal fourth of costa to basal third of dorsum, on a similarly ill-defined transverse fascia across the middle of the wing and on a somewhat better defined transverse fascia at apical fourth. Cilia whitish fuscous. Hindwings silvery fuscous. Abdomen ochreous. Legs dark ochreous with white annulations.

Alar expanse: 18-21 mm.

HABITAT: Verdi, Nevada.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22659).

Described from a series placed by the late Wm. Kearfott under this name; the specimens are in rather poor condition, but the species is so strikingly different from any described N. Am. species that it is deemed well to record it especially as specimens probably have been named for collectors. The light ochreous color with the transverse white fascia suggest somewhat the genus *Evetria* (*Retinia*).

*GELECHIA XANTHOPHELELLA*, n. sp.

Labial palpi light yellow, terminal joint sprinkled with black anteriorly. Face and head yellowish white. Thorax light yellow; patagina black. Forewings light yellow with a blackish brown longitudinal streak through the middle of the wing from base to the middle of the cell, whence it bends obliquely upwards to the middle of costa; costal edge above this line sprinkled with black; an ill-defined, irregular blackish brown fascia at apical third contains a short

black transverse spot at the end of the cell. Cilia yellowish white. Hindwings silvery white with yellowish cilia. Abdomen light silvery yellow. Legs silvery yellow with dark tarsal annulations.

Alar expanse: 11-14 mm.

HABITAT: Olancho, Inya Co., and La Puerta Valley, California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22660).

A bright easily recognized little species allied to *Gelechia abdominella* Busck and *G. coticola* Busck.

#### GELECHIA BENITELLA, n. sp.

Second joint of labial palpi light yellow, terminal joint blackish brown with extreme base and tip yellow. Face and head light yellow. Thorax dark blackish brown with a broad central longitudinal yellow stripe. Forewings dark purplish brown; a light yellow streak from basal fifth of costa curves downwards and outwards along the fold and then upwards, ending at the end of the cell; it is partially edged with black scales; a light yellow triangular costal spot at apical fourth. Cilia purplish fuscous. Hindwings light fuscous. Abdomen dark fuscous with yellowish base and underside. Legs purplish black with narrow yellow tarsal annulations. Venation typical; hindwings with 3 and 4 connate, 6 and 7 closely approximate.

Alar expanse: 12-13 mm.

HABITAT: San Benito, Texas.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22661).

Probably nearest to *Gelechia inaequalis* Busck. The pattern reminds somewhat of *Telphusa longifasciella* Clemens.

#### GELECHIA RECTISTRIGELLA, n. sp.

Labial palpi long, thin, second joint but slightly thickened by a short even brush, furrowed in its entire length; terminal joint nearly as long as second, white sprinkled with black and brown scales. Lower part of face whitish, upper part of face and head light ochreous. Thorax white evenly sprinkled with dark brown. Forewings white with the venation nearly perfectly outlined by thin dark brown lines: on the middle of costa a narrow blackish brown edge, terminating at apical third in a small whitish dash; on the end of the cell a small round black dot. Cilia light reddish fuscous, sprinkled with black. Hindwings dark fuscous with ochreous fuscous cilia. Abdomen light ochreous with whitish underside. Legs whitish, heavily shaded exteriorly with black; tarsi black with very narrow ochreous annulations at the base of the joints.

Alar expanse: 20 mm.

HABITAT: West Riverside, California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22662).

Of the group *strigella* Busck and *figurella* Busck, and intermediate in size and pattern but very distinct from either.

GELECHIA PSILOPTERA, n. sp.

Second joint of labial palpi light yellow, much sprinkled with black exteriorly; terminal joint black with a few scattered yellow scales. Face, head and thorax shiny blackish brown with a purple sheen. Forewings to the naked eye shiny blackish brown, nearly black; under a lens it is seen that the black tipped, closely applied scales have light yellow bases and that the wing thereby is finely dusted with yellow; at apical third is a small indistinct and diffused yellowish costal spot, an inconspicuous purplish black spot at the end of the cell, another on the middle of the cell and a third below this latter on the fold; in some specimens these spots are hardly discernible or absent. Cilia blackish fuscous. Hindwings dark fuscous with cilia a shade lighter. Abdomen blackish brown. Legs light brown with dusky tarsi.

Alar expanse: 16-17 mm.

HABITAT: Meach Lake, Ottawa Co., Quebec, Canada.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22663).

A shiny nearly black species with rather narrow pointed wings.

DICHOMERIS MOLLIS, n. sp.

Tuft on second joint of labial palpi well developed, pointed, ochreous on the inner side, blackish brown exteriorly except for a thin white line on the upper edge; terminal joint ochreous with white base and with a longitudinal black line in front. Face, head and thorax ochreous fuscous. Forewings light ochreous fuscous sprinkled with black; costal edge narrowly and faintly touched with brick red; a small inconspicuous second discal spot at the end of the cell white, edged with black; a similar even less conspicuous dot, consisting of a few scales on the middle of the cell; a very faint row of black dots on the terminal edge, which is slightly darker than the rest of the wing; cilia ochreous fuscous mixed with black. Hindwings light fuscous with ochreous fuscous cilia. Abdomen ochreous fuscous above, underside blackish with a central longitudinal broad ochreous line. Legs blackish fuscous on their outer surfaces, light ochreous on their inner side.

Alar expanse: 19-21 mm.

HABITAT: Redington, Arizona.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22664).

This is very close to and may prove merely a western variety of *D. georgiella* Walker (*rosocostella* Walsingham), but the tuft on the labial palpi is longer and more pointed and the forewings are narrower and more uniformly colored than in the eastern species.

## OECOPHORIDAE

AGONOPTERYX CALLOSELLA, n. sp. Pl. XXXVIII, Fig. 4.

Labial palpi with well developed brush, decreasing in length towards base and apex; terminal joint slightly thickened with scales anteriorly; light ochreous; second joint shaded exteriorly with black; terminal joint with a faint annulation on the middle and with extreme tip black. Face light ochreous. Head and thorax reddish ochreous. Forewings reddish ochreous, sparsely sprinkled with black; first and second discal spots small, deep black; a faint small blackish cloud anterior to and above second discal spot; a faint row of terminal black dots; cilia reddish ochreous with a purple sheen. Hindwings light ochreous fuscous with whitish fuscous cilia. Abdomen ochreous with four longitudinal rows of black dots on the underside. Legs ochreous with ill-defined black tarsal annulations.

Alar expanse: 19-23 mm.

HABITAT: San Diego, San Bernardino Co., and Monachee Meadows (8000'), California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22665).

AGONOPTERYX PTELEAE, n. sp. Pl. XXVIII, Fig. 13, Pl. XXXVIII,

Fig. 1.

Brush on second joint of labial palpi largest in the middle, shorter towards base and apex, furrowed, light ochreous, sprinkled with black and brown exteriorly; terminal joint ochreous with broad ill-defined black annulation before the tip. Face light silvery ochreous. Head reddish ochreous. Thorax dark ochreous, mottled with brown and black scales; extreme posterior tip black. Forewings light ochreous brown with black markings; extreme dorsal base whitish ochreous, broadly edged with black; a series of ill-defined black dots on costal edge from base to apical third; at apical third a large blackish ill-defined spot, reaching down to the end of the cell; an indistinct series of terminal black dots along the edge; first and second discal spots small, black, the latter obscured in the large costal spot; cilia ochreous brown; the entire wing and especially the costal edge with a roughened aspect, because the scales are slightly raised, not firmly pressed down as is normal in the genus. Hindwings light ochreous fuscous; base and cilia a shade lighter than the rest of the wing. Abdomen light ochreous brown with two ill-defined longitudinal rows of black scales on the underside. Legs ochreous brown, barred and annulated with blackish brown.

Alar expanse: 20-22 mm.

HABITAT: Decatur, Illinois.

Food plant: *Ptelea trifoliata*

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 2266).

Bred in a fine large series from Hoptree together with *A. nigri-notella* Busck, by Dr. J. H. McDunnough.

The species reminds by the roughened scales of *A. scabella* Zeller and is nearest to this species, but easily distinguished from all described N. Am. species by the striking black, nearly circular costal spot.

AGONOPTERYX TERINELLA, n. sp. Pl. XXVIII, Fig. 15.

Second joint of labial palpi with moderate evenly rounded divided brush; light ochreous sprinkled with black exteriorly; terminal joint slightly thickened with scales, light ochreous with two pale blackish brown broad annulations at base and around middle and with extreme tip black. Face silvery ochreous. Head and thorax light ochreous. Forewings light ochreous, sprinkled with blackish brown; the scarcely paler ochreous basal and costal area is limited by a dark brown shade; on the middle of the cell are two obliquely placed small blackish brown dots; a similar second discal spot at the end of the cell is preceded by a small dusky area on the upper part of the cell; a series of obscure small brown costal spots and a more pronounced and better defined row of terminal marginal spots. Cilia light ochreous. Hindwings pale ochreous fuscous with whitish ochreous cilia. Abdomen ochreous fuscous above; underside ochreous with two longitudinal rows of black dots.

Alar expanse: 23-24 mm.

HABITAT: Silverton, Colorado

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22667).

AGONOPTERYX BLACELLA, n. sp. Pl. XXXVIII, Fig. 2.

Brush on second joint trumpet shaped, gradually larger towards apex; light ochreous gray, dusted with black exteriorly; terminal joint light ochreous with two ill-defined black annulations, one near base and one near apex and with extreme apex black. Face silvery ochreous. Head and thorax blackish fuscous, the latter with a small posterior bifid tuft of raised scales. Forewings dark ochreous fuscous, slightly sprinkled with single black scales; dorsal half of extreme base whitish ochreous, edged exteriorly with black; a series of small ill-defined black dots on basal third of costa; two obliquely placed small tufts of black scales on the middle of the cell, the outer one edged with a few yellowish scales, followed by a cloudy area at the upper edge of the cell, somewhat darker than the rest of the wing; second discal spot indistinct, white, circular and edged with black scales; midway between first and second discal spot a minute yellowish dot; a faintly indicated series of blackish dots around apical and terminal edge; sometimes a small faint dark cloud before tornus; cilia concolorous with the wing. Hindwings shiny light ochreous fuscous with

whitish fuscous cilia. Abdomen dark fuscous above; underside light ochreous with four longitudinal rows of black dots, which are more or less confluent in the males. Legs light ochreous, shaded exteriorly with blackish brown.

Alar expanse: 19-24 mm.

HABITAT: Shasta Retreat and Truckee, California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22668).

AGONOPTERYX LATIPALPELLA, n. sp.

Second joint of labial palpi with strong, evenly rounded, divided brush; light ochreous, sprinkled with single black scales; apical joint heavily thickened with scales nearly to the tip, light ochreous with an ill-defined black annulation at base and a similar one on the middle. Face, head and thorax ochreous fuscous. Collar narrowly black. Forewings light fuscous ochreous, sparsely sprinkled with black; extreme base light ochreous, edged with black; the light shade continues faintly along the costa, hardly paler than the rest of the wing; a series of black cloudy costal spots; a small, easily obliterated, white first discal spot with a more persistent black basal edge; a larger round white second discal dot encircled by black scales; cilia ochreous. Hind wings ochreous fuscous with lighter ochreous cilia. Abdomen fuscous above, underside ochreous with two black longitudinal lines.

Alar expanse: 17-19 mm.

HABITAT: Brownsville and San Benito, Texas.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22669).

DEPRESSARIA GROTEELLA Robinson.

1870, Ann. Lyc. Nat. Hist. N. Y., IX, p. 157, Pl. I, Fig. 10.

*Depressaria symmochlota* Meyrick.

1918, Exot. Micros, Vol. II, p. 223.

The larva of *Depressaria groteella* Robinson feeds on *Corylus* and has apparently been redescribed by Meyrick as *D. symmochlota*. A bred series from Sebec Lake, Maine, exhibits some variation especially in size and in the more or less obscure angulated thin fascia across the veins of the forewings but agrees in every detail with Meyrick's description and his name may with advantage be placed as a synonym of Robinson's species provisionally at least until an examination of the unique type in England can be made.

We take occasion to point out the inconvenience of descriptions from single specimens of American Microlepidoptera by European authors, such as those by Mr. Meyrick in the same paper (Exot.

Micros, Vol. II, p. 223, 1918) of two *Depressaria* from Colorado. Everybody knows that there are additional undescribed species of *Depressaria* in Colorado and the merest beginner can easily describe such from stray specimens in his possession; such descriptions however are not advancing our knowledge, but retarding it. It is impossible to determine such a species WITH CERTAINTY from even the best description in a group of so many and so closely similar species as *Agonopteryx* and *Depressaria*, at least not without a most careful figure of the moth and its genitalia, and our EXACT knowledge of such insect is therefore suspended until someone can go to England and compare specimens with the unique type in Mr. Meyrick's private collection.

This kind of work was excusable and even defensible fifty years ago, when the American fauna was little known and when every authoritative determination extended our knowledge of geographical distribution, if nothing more. It may again become of value, when the fauna eventually shall be so well known as it is in Europe, when any deviating variety described can easily be recognized and assigned to its proper position as species or variety as the case may be, but at the present time, when we are struggling with many as yet unrecognized described species and are trying to acquire sound knowledge of our fauna through the collection of large series and careful breeding, any stray description from "Colorado, 7000 feet, one specimen," is a hindrance pure and simple to our knowledge, not an advance as a description should be.

Colorado has an area of over 100,000 square miles, more than England and Scotland together, and it has a thousand different localities of 7000 feet altitude. How would Mr. Meyrick consider a locality for a new species given as: Great Britain, without indication whether it came from Cornwall or Aberdeen? It is a regrettable fact that the most of the "unrecognized" species in our American lists and empty spaces in our American collections are no longer those of Chambers, whose many insufficiently described species hitherto have been our main difficulty, but are those of our eminent colleague in England, whose genius and indefatigable diligence has advanced the knowledge of the world's micro-fauna more than any other past or present worker and to whom the American student otherwise is greatly indebted for his continued liberal assistance.



We have such profound and often expressed admiration for our eminent English friend that we trust no offense can be provoked by our earnest desire not to see him spasmodically descend to the level of his, often undeservedly, abused countryman, Francis Walker, and without his excuse.

*BORKHAUSENIA HAYDENELLA*, Chambers. Pl. XXXVIII, Fig. 5.

*Blepharocera haydenella*, Chambers.

1877, Bull. U. S. Geol. Surv., III, p. 145.

*Chambersia haydenella*, Riley.

1908, Busck, Proc. U. S. Nat. Mus., Vol. XXXV, p. 187.

1917, Barnes, List Lep. Bor. Am., No. 6503.

This species which has remained unrecognized since its description in 1877 from a unique specimen from Colorado in spite of considerable effort to place it, is now definitely determined and we are able to dispose of the long standing empty generic name *Chambersia* Riley. The credit for this interesting identification is entirely due to our friend Dr. J. H. McDunnough, who collected and determined three male specimens at Silverton, Colorado. We have carefully gone over the generic and specific characters and find it to be a very distinct species of the genus *Borkhausenia*.

It is generically identical in all respects with the Australian genus *Crossophora* Meyrick, which was separated from *Borkhausenia* only by the somewhat longer ciliation of the male antennae, a character also found in our N. Am. *B. ascriptella* Busck and as already stated (Proc. U. S. Nat. Mus., Vol. XXXV, p. 204, 1908) a character which can not be maintained as of generic value.

## STENOMIDAE

The family *Stenomidae* is the prevalent family of Microlepidoptera in Central and South America and comprises there many hundred species of remarkable specific diversity in color, size and shape, but with little generic differentiation.

North of the Rio Grande the family is represented only by the few species tabulated below.

The family can be recognized by the following characters: Labial palpi long recurved, second joint smooth, terminal joint pointed. Male antennae ciliate, female antennae simple; no pecten on first antennal joint. Forewings with 12 veins (sometimes 11 by veins 2 and 3 united); apical veins separate (in one small central American genus 8 and 9 stalked); 7 separate to termen or apex (in one south American genus, *Gonioterma*, vein 8 also to termen); 2-3 and 4 variable in position, sometimes even within the species, separate, connate or stalked; 2 and 3 sometimes coincident. Hindwings broader than the forewings with rounded termen; 6 and 7 stalked; 3 and 4 connate, stalked or coincident; 5 approximate to, connate or stalked with 4. Posterior tibiae hairy above. Male genitalia with peculiar spatulate, forked hairs, so far as I know, not found in any other family of Microlepidoptera.

The male genitalia of the Microlepidoptera present most valuable characters for the classification and each family type of these organs can rarely be confused with those of any other family. Normally the genus is also well characterized by the genitalia and with the exception of a few groups (*Colcophoridae* and *Sesiidae*), in which a remarkable uniformity is found, the specific identity is nearly always clearly expressed in the male genitalia, if nowhere else then in the armature of the penis. Several hundred slides made during the last year by Mr. Carl Heinrich and myself prove beyond adventure, that we shall eventually be able to determine with certainty any Microlepidopteron (possibly with the above mentioned few group exceptions) by its genitalia alone.

The specific characters in these organs are commonly so striking as to afford much easier and surer differentiation between closely allied species than the wing coloration and this fact makes the geni-

talia of particular value in the determination of the specific identity or non-identity of closely allied forms in different continents or faunal areas, and of the various forms in species, which exhibit great variety in color and wing pattern. Differences of opinion as to the identity or non-identity of such forms may at once be changed from individual speculation to scientific certainty by a comparison of the male genitalia of the forms in question. The structure of the male genitalia is normally too intricate for successful photographic reproduction and really satisfactory figures must be drawn under the specialists' close supervision; but in very many cases can the species be definitely recognized from a good photograph of its male genitalia alone and it has been deemed worth while to so illustrate in this paper examples of various forms in the different micro-families in the hope to stimulate further study and more perfect illustration of these absorbingly interesting organs, which will give much new light and aid to the proper classification of the Microlepidoptera.

We like to call attention to the fact that Lord Walsingham first used these organs for specific differentiation in the present family thirty years ago (Insect Life, Vol. II, 1889) and that his few simple genitalia characters then given for his new species in the genus *Stenoma* enable their recognition.

Incidentally it may be stated that the genus *Menesta* Clemens, which Walsingham at that time considered allied to *Stenoma* and the relationship of which has since been in dispute and of some uncertainty, due to the reduced and superficially *Stenomid*-like venation, is conclusively proven by its genitalia not to be a *Stenomid* but a *Gelechiid*.

Only two genera of this family is at present recognized from North America north of Mexico; they may be separated as follows:  
Forewings with 11 veins; 2 and 3 coincident: Hindwings, with 7 veins;

3 and 4 coincident.....*Menestomorpha* Walsingham  
Forewings with 12 veins; Hindwings with 8 veins.....*Stenoma* Zeller

Genus *MENESTOMORPHA* Walsingham.

1907, Proc. U. S. Nat. Museum, Vol. XXXIII, p. 214.

Type: *M. oblongata* Wlsm.

Forewings with 11 veins; 7 to apex; 2 and 3 coincident, stalked with 4. Hindwings with 7 veins; 3 and 4 coincident, connate with 5.

Only one species is at present recognized.

MENESTOMORPHA OBLONGATA Walsingham. Pl. XXX, Fig. 8.

Rared from Cynipid gall on Oak, Fort Grant, Arizona.

Genus STENOMA Zeller.

1839, Isis, p. 195.

Type: *S. litura*, Zeller.

Forewings with 12 veins; 7 to termen or apex; 2 and 3 separate, connate or stalked; 4 free. Hindwings with 8 veins; 3 and 4 connate or stalked; 6 and 7 stalked.

The species at present recognized in North America may be separated as follows:

	Forewings not unicolorous .....	1
	Forewings unicolorous or nearly so, with only second discal spot darker .....	7
1	Uncus simple .....	2
	Uncus forked .....	6
2	Forewings with costa white .....	3
	Forewings with costa not white .....	<i>humilis</i> Zeller
3	Forewings with faint longitudinal ochreous lines .....	<i>crambitella</i> Wlsm
	Forewings without longitudinal lines .....	4
4	Forewings with pronounced black second discal spots .....	<i>irene</i> Busck
	Forewings without defined spot at end of cell .....	5
5	Forewings with dorsal dark area interrupted at apical third; left clasping organ of ♂ genitalia forked .....	<i>schlaegeri</i> Zeller
	Forewings with dorsal dark area continued beyond apical third; left clasping organ of ♂ genitalia simple .....	<i>lindseyi</i> Busck
6	Forewings narrow, pointed; termen very oblique; Hindwings, triangular pointed .....	<i>furcata</i> Wlsm.
	Forewings broader, rounded; termen less oblique; Hindwings rounded .....	<i>algidella</i> Walker
7	Ground color of forewings white .....	8
	Ground color not white .....	9
8	Forewings pure white with black second discal spots .....	<i>cecalis</i> Zeller
	Forewings yellowish white without discal spots .....	<i>thomasi</i> Busck
9	Forewings dark brown .....	<i>decorasella</i> Busck
	Forewings grayish or ochreous stone colored .....	10
10	Forewings ochreous .....	<i>unipunctella</i> Clemens
	Forewings grayish .....	11
11	Forewings with apex pointed; with single black dot at the end of the cell .....	<i>mistrella</i> Busck
	Forewings with apex rounded; with two black dots at end of cell .....	12
12	Occurring in Eastern or Central States .....	<i>quercicella</i> Busck
	Described from California .....	<i>ossella</i> Wlsm.

This last species, *S. osseella* *Walsingham*, is known only from the two female types in Zeller's collection, now in the British Museum, supposed to have come from California. By the description it cannot be differentiated from the eastern *S. quercicella* Busck, and it may ultimately prove that this name is a synonym of *osseella*, but to this date no specimen of *quercicella* has been received from California; in fact, tho very considerable collecting has been done of late years on the west coast no species of *Stenoma* has been obtained west of the Rocky Mountains and the family is apparently not represented there. I am therefore inclined to doubt the locality given to the Zeller specimens, which may prove to come from central or South America.

All the North American species of *Stenoma* may readily be determined by their striking characters of the male genitalia shown on plates XXIX and XXX.

*STENOMA LINDSEYI*, n. sp. Pl. XXIX, Fig. 2.

Closely allied to and very similar in size and color to *Stenoma schlaegeri*, of which it is the western representative; but the forewings are somewhat longer, narrower and more pointed and the dark dorsal area, which in *schlaegeri* is interrupted by white shortly beyond the middle of the wing, is continued to tornus. Hindwings of the males dark brownish or blackish fuscous, very considerably darker than those of *schlaegeri*. The genitalia of the male are nearest to those of *schlaegeri*, asymmetrical and with uncus simple as in this species, but with the left antlerlike organ hooked, not forked and with a differently shaped oedeagus.

Alar expanse: 25-28 mm.

HABITAT: Paradise and White Mts., Arizona; Fort Wingate, New Mexico.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22670).

Named in honor of Dr. A. W. Lindsey, who in many ways has materially assisted in the preparation of this paper and who has been good enough to draw the genitalia for this family, which were found to be unsuited for photographic reproduction.

*STENOMA IRENE*, n. sp. Pl. XXVIII, Fig. 7, 9; Pl. XXX, Fig. 1.

Labial palpi white, slightly shaded with dark fuscous exteriorly. Face and head white. Thorax dark fuscous with a proportionately large bluish black rounded posterior tuft. Forewings of the females white with the extreme base of dorsal edge dark fuscous, a conspicuous deep black short transverse streak on the end of the cell; a faint, ill-defined fuscous shade below this to tornus; a very faint narrow transverse, outwardly curved, fuscous line across apical

part of the wing; in some specimens a cloudy spot on the middle of dorsum. Cilia white. The males have entire basal fifth of the wing blackish brown and have besides the pattern of the female additional cloudy ill-defined, more or less transverse areas on the middle of the wing and across apical third; also an interrupted line of small black marginal dots. Hindwings light whitish fuscous. Anterior legs dark brown on their outer side; other legs white with dusky tarsi.

Alar expanse: 19-20 mm.

HABITAT: Brownsville and San Benito, Texas.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22671).

Intermediate in color between *S. algidella* Walker and *S. vestalis* Zeller, smaller than either, and differing from both in the single simple uncus and by the dark basal area of the forewings in the male.

Named in honor of Mrs. Winifred Irene Lindsey.

STENOMA THOMASI, n. sp. Pl. XXX, Fig. 5.

Labial palpi, face, head, thorax and forewings yellowish creamy white without any markings. Hindwings pale yellowish white with cilia pure white. Abdomen creamy white. Legs white with dusky tarsal joints.

Alar expanse: 21-24 mm.

HABITAT: Palmerlee, Paradise and Huachuca Mts., Arizona; Albuquerque, New Mexico.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22672).

Nearest in size and color to *Stenoma crambitella* Walsingham, but without the indistinct longitudinal markings and the minute second discal spot of this species; also very distinct in the male genitalia; (compare Figs. 5 and 7, Pl. XXX); the attenuated cleft uncus distinguishes this species from all described North American species of the genus.

## ETHMIIDAE

The North American species of this family have been carefully studied anew with the advantage of very large series of nearly all of them; several were hitherto known from a few or single representatives. All but one of the described species are figured on Plates XXVI and XXVII. We are under obligation to Rev. Joseph de Gryse of Staunton, Virginia, for the drawings which are photographed on Plate XXVI. The genitalia are shown on Plates XXXIV, XXXV and XXXVI.

The value of the genitalia in this family was first demonstrated by Dr. Harrison G. Dyar in his revisional paper (Jour. N. Y. Ent. Soc., Vol. X, p. 202-208, 1902) and his descriptions of these organs readily enable the recognition of most of the species. A few species, suspected by him to be synonyms, have proven to be so by further study and the synonymy is given below.

The genitalia of this family demonstrates clearly the value as well as the limitations of photographic reproduction of these organs. Some species exhibit an extraordinary diversity of these structures, which can readily be recognized from a photograph, while other undoubtedly distinct species have attained or retained a most remarkable similarity in these highly developed structures, which is apt to confuse in a study of the photographs if not accompanied by a careful comparison of the actual organs under the microscope.

*ETHMIA ARCTOSTAPHYLELLA* Walsingham. Pl. XXVI, Figs. 10-11-12;

Pl. XXXIV, Fig. 6.

1880, Proc. Zool. Soc. Lond., p. 88.

ii. *syns*:

*Ethmia obscurcella* Beutenmüller.

1888, Ent. Amer., Vol. IV, p. 29.

*Ethmia mediella* Busck.

1913, Jour. Ent. & Zool., Vol. V, p. 99.

Large series clearly indicate that these names stand only for varieties of one species, which grade into each other. The genitalia are

identical (Pl. XXXIV, Fig. 6). The names may with advantage be retained for the extreme varieties.

ETHMIA DISCOSTRIGELLA Chambers. Pl. XXVI, Fig. 14; Pl. XXVII, Fig. 10; Pl. XXXIV, Fig. 9.

1877, Bull. U. S. Geol. Surv., Vol. III, p. 122.

n. syn:

*Ethmia subcaerulea* Walsingham.

1880, Proc. Zool. Soc. Lond., p. 89.

Very large series of *discostrigella* show considerable variation and all gradations to the form described by Walsingham are found. The genitalia are identical.

ETHMIA APICIPUNCTELLA Chambers. Pl. XXVI, Fig. 15; Pl. XXXVI, Fig. 7.

1875, Can. Ent., Vol. VII, p. 8.

n. syn:

*Ethmia zaralla* Busck.

1915, Proc. Ent. Soc. Wash., Vol. XVII, p. 84.

Pl. XXVI, Fig. 15; Pl. XXXVI, Fig. 7.

Large series prove this synonym beyond question. The genitalia of the species are shown on Pl. XXXVI, Fig. —.

ETHMIA HAGENELLA Chambers. Pl. XXVII, Figs. 7, 8; Pl. XXXV, Fig. 4.

1878, Bull. U. S. Geol. Surv., IV, p. 80.

n. syn:

*Ethmia josephinella* Dyar.

1902, Jour. N. Y. Ent. Soc., X, p. 205.

The two forms of pattern grade into each other and represent only one species; the genitalia are shown Pl. XXXV, Fig. 4.

ETHMIA GERANELLA, n. sp. Pl. XXVII, Fig. 3; Pl. XXXIV, Fig. 7.

Labial palpi whitish gray, sprinkled with black; second joint with a broad ill-defined black annulation near the tip; terminal joint with a narrow ill-defined annulation near the base and another near apex. Face and head whitish strongly overlaid with black and dark brown scales. Thorax blackish with a few white scales intermixed and with the tips of patagia white. Forewings narrow, apex pointed, termen very oblique; bluish white overlaid with dark brown scales; a broad longitudinal streak through the middle of the wing from



base to apex of black, brown and yellow scales is interrupted at the end of the cell by an oblique pure white dash; cilia bluish white, mixed with gray and black. Hindwings fuscous white with purer white cilia. Abdomen whitish fuscous. Legs blackish, sprinkled with white and with narrow white tarsal annulations.

Alar expanse: 21-22 mm.

HABITAT: La Puerta Valley, South California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22673).

Very similar and closely allied to the eastern *Ethmia macellosella*, Busck, with same pattern less boldly outlined, differing in the whitish hindwings and the smaller size. The male genitalia also show good distinguishing characters (Pl. XXXIV, Fig. 7).

## COLEOPHORIDAE

### COLEOPHORA KEARFOTTELLA, n. sp.

Labial palpi without projecting tuft, smooth; both joints somewhat thickened with scales; terminal joint blunt, white. Antennae with basal joint enlarged with heavy scaling and the following two joints also somewhat thickened, white with black annulations. Face silvery white. Head light golden ochreous. Thorax white. Forewings light golden ochreous, the color becoming gradually deeper towards apex, which is golden brown; a broad margin along costa from base to beyond apical fifth silvery white; dorsal edge from base to cilia narrowly silvery white; a thin silvery white line along the fold from base to the middle of the wing; the space between these latter two white lines is very pale golden yellow; dorsal cilia whitish; apical cilia golden ochreous. Hindwings light silvery fuscous. Abdomen dusky white above, silvery white on the underside. Legs white.

Alar expanse: 11-12 mm.

HABITAT: Essex Co., N. Jersey.

Foodplant: *Salix*.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22674).

Named in honor of our late friend W. D. Kearfott, who bred this interesting species and had it set apart as probably new.

The case is curiously made of silk and bud scales of the foodplant into a rough, irregular, very deceiving cover, nearly as broad as long, somewhat flattened and with the edges of the bud scales protruding; mouth at a very oblique angle, nearly horizontal. The species is near to *Coleophora cretaticostella*, Clemens, but of a darker, more reddish yellow color and at once distinguished by its case; it resembles also the Californian *C. accordella*, Walsingham, but is much smaller and paler.

BATRACHEDRA KNABI Walsingham. Pl. XXXVII, Fig. 4.

1909 and 1914, Biol. Cent. Am., Vol. IV, pp. 9 and 320. Pl. I, Fig. 8.

1912, Busck, Smithsonian Misc. Coll., Vol. LIX, p. 2.

This interesting and striking species, known hitherto from the unique female type in U. S. National Museum from Cordova, Mexico, has been recognized in good series of both sexes from Brownsville, Texas, and from Paradise, Cochise Co., Arizona. Specimens in U. S. National Museum and in Collection Barnes.

## HELIODINIDAE

## HELIODINES CICCELLA, n. sp.

Labial palpi golden yellow with dusky tip. Face and head dark purplish brown. Antennae brown. Collar yellowish. Thorax dark lead color. Forewings light golden reddish ochreous; six nearly equidistant metallic, silvery blue costal spots: the first at extreme base, all edged basally with black; the middle pair connected or nearly so with black scales on their lower edge; the outer pair likewise connected by a line of black and sometimes with the metallic color partly fused; five very uneven metallic dorsal spots: the first narrow along basal fifth of dorsum, narrowly edged above with black; the second small, round, edged basally with black and with a few black scales on its outer side; the third and largest elongate, occupies the middle of dorsum and is edged with black basally; the fourth at base of cilia similar to but a little larger than the second and also edged with black basally; the fifth a narrow silvery line along termen edged above with black; on the middle of the cell is a narrow longitudinal silvery spot, enlarged upward basally and sometimes connected with the third costal spot. Cilia dark greenish fuscous. Hindwings blackish brown with a purple sheen. Cilia blackish fuscous. Abdomen and legs dark purplish brown.

Alar expanse: 16-17 mm.

HABITAT: Palmerlee, Arizona.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22675).

## PLUTELLIDAE

PLUTELLA ARMORACIAE Busck.

1913, Proc. Ent. Soc. Wash., XIV, p. 219.

ii. syn:

*Plutella monochlora* Meyrick.

1914, Exot. Micros. I, p. 228.

Suspecting that Mr. Meyrick might have redescribed the Colorado horseradish pest as *P. monochlora*, the writer sent him cotypes of *P. armoraciae* in 1914 for comparison with the unique type of *monochlora*, described from Colorado, 5000 feet alt.

Mr. Meyrick immediately recognized it as his species and wrote me to that effect. It is due to an oversight on the writer's part, that the two names were placed separately in Barnes' List Lep. Bor. Am. as Nos. 7676 and 7682.

HARPIPTERYX XYLOSTELLA Linné. Pl. XXVIII, Fig. 12.

This well known European species has been identified from North Eastern United States and has been bred by Mr. S. A. Shaw at Hampton, New Hampshire, from Honeysuckle (*Lonicere*), the same food-plant as recorded in Europe.

The species is close to and nearly identical in the pattern of the forewing to our western *H. dentiferella* Walsingham, but is at once distinguished from it by the dark brown hindwings. The shape of the harps in the male genitalia of *xylostella* is somewhat more elongate oval with the costal and dorsal margins nearly parallel, while in *dentiferella* these organs are ovate and broader; otherwise the structures are very similar, compare Figs. 1 and 2, Pl. XXXIX. *H. frustrella* Walsingham and *H. canariella* Walsingham, must be considered only forms of *H. dentiferella*; the genitalia in the three forms are identical; but the names may with advantage be retained for the different extreme wing-patterns, tho somewhat intermediate varieties occur.

TRACHOMA FALCIFERELLA Walsingham.

1881, Proc. Zool. Soc. London, p. 307.

n. syn:

*Cerostoma ordinalis* Meyrick.

1914, Exot. Micros. I, p. 227.

A large series of *Trachoma falciferella* from Mt. Shasta and from Wellington, Brit. Col., in all stages of preservation show a considerable variation in markings and will easily include Meyrick's *ordinalis*, described from a single specimen from Wellington, Brit. Col.

## ELACHISTIDAE

## COELOPOETA BALDELLA, n. sp.

Palpi, head and thorax white. Antennae white with black annulations. Forewings white more or less suffused with golden ochreous and in some specimens dark brown, scattered scales, mostly on the outer half of the wing. Some specimens are nearly unmottled white except for a small suffused area below the end of the cell on which the darker scales persist. Cilia white sprinkled with ochreous. Hindwings and cilia white on the upper surface. Underside of both wings dark fuscous, contrasting strongly with the white upper surface of the male. Legs white sprinkled with dark fuscous. Abdomen silvery white.

Alar expanse, 10-14 mm.

HABITAT: Camp Baldy, Bernardino Co., California.

Type and cotypes in Collection Barnes; cotypes in U. S. National Museum (No. 22670).

A very large series, more than one hundred specimens, shows this species to be very close to the type of the genus *Coelopoeta glutinosi* Walsingham, but much lighter in color than the large series of cotypes sent to the National Museum by Lord Walsingham. The description of *C. glutinosi* however would include the present species and it is possible that Lord Walsingham had a mixed series before him. Examination of the genitalia prove these to be of a simple primitive type without much specific differentiation but sufficient to indicate that the two species are distinct and not merely varieties.

The genus *Coelopoeta* is intermediate between *Elachista* Auct and *Cygnodia* Herrick-Schaeffer, correlated with or derived from the latter.



## PLATE XXVI

- Fig. 1. *Ethmia albitogata* Wlsm.  
Fig. 2. *Ethmia coquillettella* Busck.  
Fig. 3. *Ethmia umbrimarginella* Busck.  
Fig. 4. *Ethmia lassencella* Busck.  
Fig. 5. *Ethmia albistrigella* Wlsm.  
Fig. 6. *Ethmia monachella* Busck.  
Fig. 7. *Ethmia caliginosella* Busck.  
Fig. 8. *Ethmia fuscipedella* Wlsm.  
Fig. 9. *Ethmia monticola* Wlsm.  
Fig. 10. *Ethmia arctostaphylella medicella* Busck.  
Fig. 11. *Ethmia arctostaphylella* Wlsm.  
Fig. 12. *Ethmia arctostaphylella obscurella* Beut.  
Fig. 13. *Ethmia semitenebrella* Dyar.  
Fig. 14. *Ethmia discostrigella* Cham.  
Fig. 15. *Ethmia opicipunctella* Cham.  
Fig. 16. *Ethmia pratticella* Busck.  
Fig. 17. *Tamarrha delticella* Fern.  
Fig. 18. *Tamarrha bittencella* Busck.



PLATE XXVI



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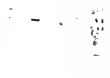
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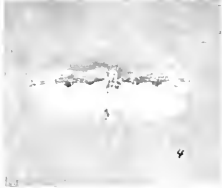




## PLATE XXVII

- Fig. 1. *Ethmia macelthosiella* Busck. ♂. Plummer's Id., Md.  
 Fig. 2. *Ethmia macelthosiella* Busck. ♀. Plummer's Id., Md.  
 Fig. 3. *Ethmia geranella* B. & B. Cotype ♂. La Puerta Valley, S. Cal.  
 Fig. 4. *Ethmia marmorea* Wlsm. Chimney Gulch, Colo.  
 Fig. 5. *Ethmia semilugens* Zell.  
 Fig. 6. *Ethmia mirusella* Cham. ♀. Aweme, Man.  
 Fig. 7. *Ethmia hagenella* Cham. Burnet Co., Tex.  
 Fig. 8. *Ethmia hagenella josephineella* Dyar. Mesilla, N. M.  
 Fig. 9. *Ethmia semionbra* Dyar. Cotype. Brownsville, Tex.  
 Fig. 10. *Ethmia discostrigella subcaerulea* Wlsm. Cotype. Blue Lake, Lake  
 Co., Cal. (Wlsm., 1871)  
 Fig. 11. *Ethmia zelleriella* Cham. ♂. Decatur, Ill.  
 Fig. 12. *Ethmia confusella* Wlk. San Francisco Mts., San Domingo, W. I.  
 Fig. 13. *Ethmia coranella* Dyar. ♂. Kerrville, Tex.  
 Fig. 14. *Ethmia longimaculella* Cham ♀. Montreal.  
 Fig. 15. *Ethmia apicipunctella* Cham ♀. San Benito, Tex.

PLATE XXVII







## PLATE XXVIII

- Fig. 1. *Tortrix carnana* B. & B. Cotype ♂. Camp Baldy, San Bernardino Mts., Cal.
- Fig. 2. *Sparganothis machimiana* B. & B. Type ♀. Paradise, Ariz.
- Fig. 3. *Sparganothis umbrana* B. & B. Type ♂. Denver, Colo.
- Fig. 4. *Platynota viridana* B. & B. Type ♂. Dewey, Ariz.
- Fig. 5. *Hysterosia perspicuana* B. & B. Type ♀. Paradise, Cochise Co., Ariz.
- Fig. 6. *Hysterosia canariana* B. & B. Type ♂. White Mts, Ariz.
- Fig. 7. *Stenoma irene* B. & B. Cotype ♀. San Benito, Tex.
- Fig. 8. *Batrachedra knabi* Wlsm. ♀. Kerrville, Tex.
- Fig. 9. *Stenoma irene* B. & B. Type ♂. Brownsville, Tex.
- Fig. 10. *Anacamptis psoralicella* B. & B. Type ♂. Sioux City, Ia.
- Fig. 11. *Psacaphora cdithella* B. & B. Type ♂. Chimney Gulch, Golden, Colo.
- Fig. 12. *Harpipteryx xylostella* Linn. European. U. S. N. M.
- Fig. 13. *Agonopteryx pteleac* B. & B. Cotype ♂. Decatur, Ill.
- Fig. 14. *Heliodines ciccella* B. & B. Cotype. Palmerlee, Ariz.
- Fig. 15. *Agonopteryx terinella* B. & B. Cotype. Silverton, Colo.



PLATE XXVIII



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## PLATE XXIX

## Male genitalia

- Fig. 1 *Stenoma schlugeri* Zell.  
Fig. 2 *Stenoma lindseyi* B. & B.  
Fig. 3 *Stenoma unipunctella* Clem.  
Fig. 4 *Stenoma algidella* Wlk.  
Fig. 5 *Stenoma quercicella* Busck  
Fig. 6 *Stenoma decorella* Busck.

PLATE XXIX



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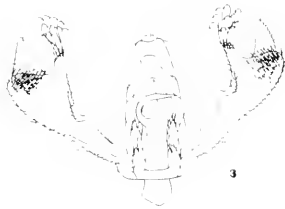
## PLATE XXX

## Male genitalia

- Fig. 1. *Stenoma irene* B. & B.  
Fig. 2. *Stenoma humilis* Zell.  
Fig. 3. *Stenoma furcata* Wlsm.  
Fig. 4. *Stenoma vestalis* Zell.  
Fig. 5. *Stenoma thomasi* B. & B.  
Fig. 6. *Stenoma nistralla* Buseck  
Fig. 7. *Stenoma crambitella* Wlsm.  
Fig. 8. *Menestomorpha oblongata* Wlsm.



PLATE XXX



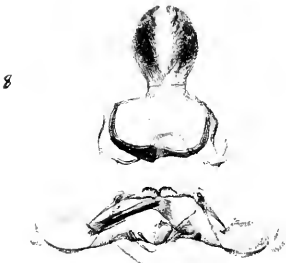
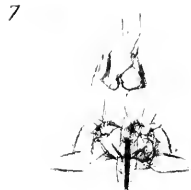




## PLATE XXXI

## Male genitalia

- Fig. 1. *Amorbia cuneana* Wlsm.  
Fig. 2. *Sparganothis xanthoides* Wlk.  
Fig. 3. *Amorbia synnucurana* B. & B.  
Fig. 4. *Sparganothis inconditana* Wlsm.  
Fig. 5. *Sparganothis sulphureana* Clem.  
Fig. 6. *Tortrix quercifoliana* Fern.  
Fig. 7. *Adoxophyes furcatana* Wlk.  
Fig. 8. *Cacoccia persicana* Fitch.  
Fig. 9. *Tortrix invidana* B. & B.







## PLATE XXXII

## Male genitalia

- Fig. 1. *Peronca maximana* B. & B.
- Fig. 2. *Peronca ferrugana* Schiff.
- Fig. 3. *Tortricodes fragariana* Busck.
- Fig. 4. *Tortricodes basiplagana* Wlsm.
- Fig. 5. *Phalonia angustana* Clem
- Fig. 6. *Tortrix dissitana* Grt.
- Fig. 7. *Peronca cervinana* Wlsm.
- Fig. 8. *Phalonia dorsimaculana* Rob.
- Fig. 9. *Peronca nivisellana* Wlsm.
- Fig. 10. *Hysterosia fulviplicana* Wlsm



PLATE XXXII



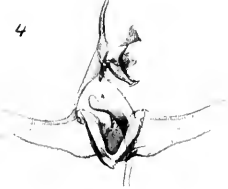
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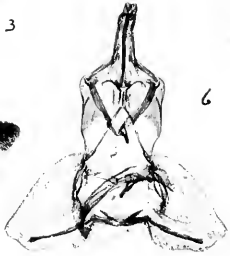
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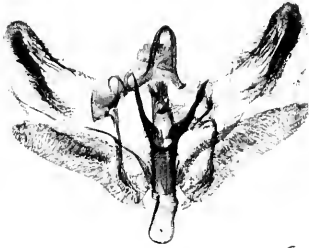
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## PLATE XXXIII

## Male genitalia

- Fig. 1. *Olethreutes permondana* Clem
- Fig. 2. *Olethreutes ferriferrana* Wik
- Fig. 3. *Ancylis nubilana* Clem.
- Fig. 4. *Eucosma virginiana* Busck.
- Fig. 5. *Eucosma crambitana* Wlsm.
- Fig. 6. *Eucosma sandiego* Kearf.
- Fig. 7. *Eucosma affectalis* Hulst.







## PLATE XXXIV

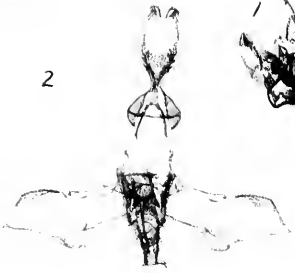
## Male genitalia

- Fig. 1. *Ethmia albitogata* Wlsm.  
Fig. 2. *Ethmia macelthosicella* Busck.  
Fig. 3. *Ethmia semitenebrella* Dyar.  
Fig. 4. *Ethmia semilugens* Zell.  
Fig. 5. *Ethmia coquilletella* Busck.  
Fig. 6. *Ethmia arctostaphylella obscurella* Beut  
Fig. 7. *Ethmia geranella* B & B.  
Fig. 8. *Ethmia albistrigella* Wlsm.  
Fig. 9. *Ethmia discastrigella* Cham.

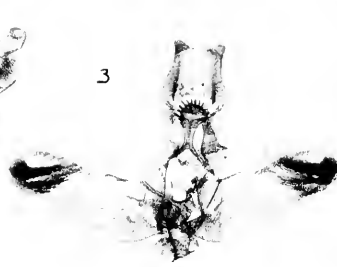


PLATE XXXIV

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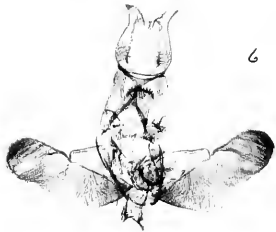
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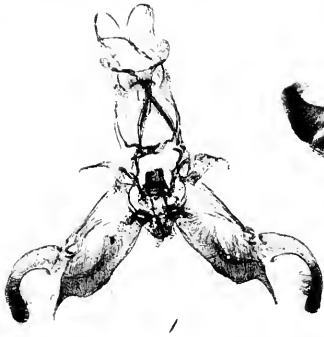




PLATE XXXV

Male genitalia

- Fig. 1 *Ethmia monticola* Wlsm.
- Fig. 2 *Ethmia zelleriella* Cham.
- Fig. 3 *Ethmia caliginosella* Busck
- Fig. 4 *Ethmia hagenella* Cham.
- Fig. 5 *Ethmia lasscnella* Busck.
- Fig. 6 *Ethmia fuscipcdella* Wlsm.



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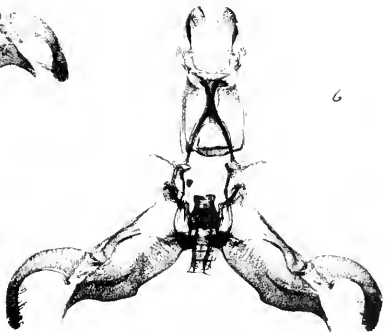
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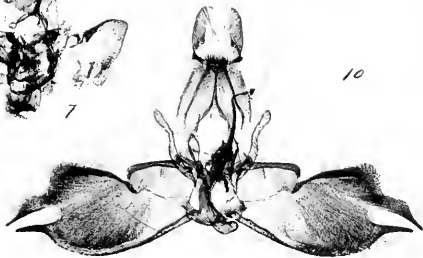
## PLATE XXXVI

## Male genitalia

- Fig. 1 *Ethmia longimaculella* Cham.  
Fig. 2 *Ethmia coranella* Dyar.  
Fig. 3 *Ethmia monachella* Busck.  
Fig. 4 *Ethmia mirusella* Cham.  
Fig. 5 *Ethmia marmorea* Wlsm.  
Fig. 6 *Ethmia scmiombra* Dyar.  
Fig. 7 *Ethmia apicipunctella* Cham.  
Fig. 8 *Tamarrha bittenella* Busck.  
Fig. 9 *Ethmia umbrimarginella* Busck.  
Fig. 10 *Tamarrha dellicella* Fern.



PLATE XXXVI



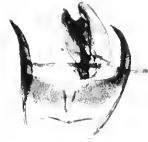




## PLATE XXXVII

## Male genitalia

- Fig. 1. *Trichostobas parvula* Hy. Edw.  
Fig. 2. *Scythris eboracensis* Zell.  
Fig. 3. *Gnorimoschema gallaesolidaginis* Riley.  
Fig. 4. *Batrachedra knabi* Wlsm.  
Fig. 5. *Gnorimoschema busckella* Kearf.  
Fig. 6. *Dichomeris ventrellus* Fitch.  
Fig. 7. *Gelechia fluviatella* Busck.







## PLATE XXXVIII

## Male genitalia

- Fig. 1. *Agonopteryx pteleac* B. & B.  
Fig. 2. *Agonopteryx blacella* B. & B.  
Fig. 3. *Borkhausenia pseudospirtella* Stainton.  
Fig. 4. *Agonopteryx callosella* B. & B.  
Fig. 5. *Borkhausenia haydenella* Cham.  
Fig. 6. *Oecophora newmanella* Clem.  
Fig. 7. *Semioscopis merricella* Dyar.  
Fig. 8. *Semioscopis packardella* Clem.



PLATE XXXVIII



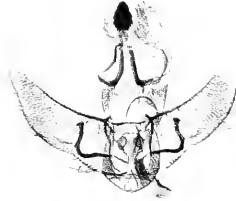
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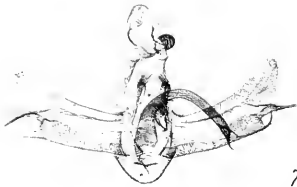
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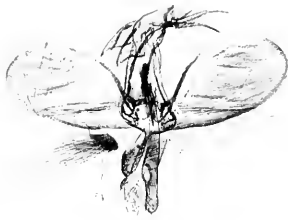


## PLATE XXXIX

## Male genitalia

- Fig. 1. *Harpipteryx canariella* Wlsm.  
Fig. 2. *Harpipteryx xylostella* Linn.  
Fig. 3. *Mieza basistriga* B. & McD.  
Fig. 4. *Mieza atrolinea* B. & McD.  
Fig. 5. *Mieza pupula* Hbn.  
Fig. 6. *Yponomeuta multipunctella* Clem.  
Fig. 7. *Bucculatrix crescentella* Braun.  
Fig. 8. *Epermenia imperialella* Busck.

PLATE XXXIX



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## PLATE XL

## Male genitalia

- Fig. 1. *Dorata lineata* Wlsm.  
Fig. 2. *Scardia anatomella* Grt.  
Fig. 3. *Phyllonorycta fitchella* Clem.  
Fig. 4. *Gracilaria rhoifruetella* Cham.  
Fig. 5. *Cameraria hamadryadella* Clem.  
Fig. 6. *Acrolophus plumifrontellus* Clem.  
Fig. 7. *Acrolophus quadrellus* B. & McD



PLATE XI.









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CONTRIBUTIONS  
TO THE  
NATURAL HISTORY  
OF THE  
LEPIDOPTERA  
OF  
NORTH AMERICA

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VOL. IV  
No. 4

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THE PTEROPHORIDÆ OF AMERICA,  
NORTH OF MEXICO

BY

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AND

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DECATUR, ILL.  
THE REVIEW PRESS  
AUGUST 31, 1921



## THE PTEROPHORIDAE OF AMERICA, NORTH OF MEXICO

For twenty-three years the *Pterophoridae* of North America have received no more attention than the occasional description of new species or the publication of a few biological notes. In fact the pioneer work on this very interesting family, Fernald's "Pterophoridae of North America", has remained the only work available for the identification of our species. Since its publication in 1898 many new species have inevitably been discovered, with the result that this excellent paper is now entirely inadequate for the proper study of our fauna. Unhappily, too, many new synonyms have been made, and the old synonymy, hallowed by years of use, has proven to be erroneous in several instances. Through spontaneous interest in these insects and a realization of their incomplete and imperfect classification, we were led over a year ago to commence this revision. In the course of our studies we have investigated one point after another until our task has exceeded our wildest anticipation, but we have fortunately succeeded in verifying all but a very few of the important questions which have come up. Of the resources which have enabled us to do this we will speak in detail.

The types of North American species are included in seven collections, viz., the U. S. National Museum, British Museum, American Museum of Natural History, Museum of Comparative Zoology (Cambridge Museum), the personal collections of Mr. Edward Meyrick, Marlborough, England, and of Mr. Fordyce Grinnell, Jr., now in the Southwest Museum at Los Angeles, and last, but most important of all, the Fernald collection, made by Prof. C. H. Fernald of Amherst, Mass. Of these we have studied in person the material from the National and Cambridge Museums, and the Fernald and Grinnell collections. The last contains the types of Grinnell's species. Fernald's collection is very rich in types, including Fitch's *Pterophoridae*, "paratypes" of most of Walsingham's North American species, all of Fish's types and those of Fernald's own species. The American Museum refuses to risk types in shipment, so Mr. Frank E. Watson has kindly compared specimens for us with the types of Grossbeck's species. We

understand that the collection contains paratypes of others, but since we have not examined these we prefer to reserve comment upon them.

In the British Museum are the types of the few species which Walker described from this continent, in addition to Lord Walsingham's collection, which contains his own types and some of Zeller's. Mr. Meyrick has very kindly visited the Museum in our behalf and compared specimens with all of these types. We are indebted to him also for making comparisons with the types in his own collection, and for the gift of a paratype of *Pterophorus citrites*, which we had been unable to place.

These comparisons have enabled us to establish beyond doubt the identity of all species occurring in North America, with the exception of those described in Europe by the older writers, Linnaeus, Haworth, Hübner, and Denis and Schiffermüller, and a very few whose types we have not located. Fortunately the latter class includes only two or three species about which there can be no reasonable doubt.

We wish to express our gratitude to those men whose assistance, either privately or as the officials of museums, has enabled us to lay a foundation of such gratifying soundness for our revision.

In the preparation of the paper we have concluded to illustrate only the primaries of the insects, solely for the reason that it is impossible to secure sufficient magnification of an entire specimen and at the same time retain such depth of focus as is necessary to produce a photograph with satisfactory definition. In the case of *Trichoptilus*, *Pterophorus*, *Platyptilia*, and the few species of other genera whose secondaries show characters of specific value, we illustrate these wings as well, but we have been forced to omit the bodies, even though in a number of species they are very distinctively marked. The illustration of genitalia has also been curtailed as much as possible, but we are able to give notes or a figure of at least part of the genitalia of all species except *T. pygmaeus* Wlsm., *P. williamsi* Grin., *rhododactyla* D. & S., *xylopsamma* Meyr., *O. baroni* Fish, *citrites* Meyr. and *unicolor* B. & McD. The value of the genitalia is limited, and in many cases where we have made a figure from a single slide we cannot say that the figure will be more than a possible help in the identification of the species.

In the figures of genitalia will be found some points which may need explanation. We have drawn these structures as opaque objects.

This means that not only the heavily chitinized structures normally shown in such drawings are treated as opaque, but also the thin membrane which closes the twelfth segment and reaches the anal opening. Visible through the various parts are a number of structures, of which we represent only the hidden portion of the oedeagus and the long hair-tuft on the claspers, when present. The latter is represented by fine broken lines, and its point of attachment by heavy dots. The outlines indicated by heavy lines are mostly definite, free margins. We have departed from this usage in a few cases to show heavy areas of chitin which are conspicuous and distinctive, as in *Adaina ambrosiae* Murt. The claspers in this family are often thin, more or less inflated sacs, which become flattened in mounting and exhibit two outlines of approximately the same shape, the inner representing the actual inner surface of the clasper. The harpe is developed only on the left valve, and is usually rather simple. Near its base, and often embracing it, the lower margin of the valve is often folded, forming, apparently, the sacculus of Pierce's works. On the right valve there is frequently a slight ridge which is probably a rudiment of the harpe. In *Oidacmatophorus mizar* B. & L. this bears a small transverse lobe which may be the ampulla of Pierce. In the thin membrane which connects the bases of the valves and closes the twelfth segment there is developed an area of chitinization which becomes thicker as it approaches the opening through which the oedeagus projects, and forms a free, forked organ of more or less complex shape which embraces this opening. This structure appears to be homologous with the juxta of Pierce. Its connections are not clear to us, but it extends very definitely, decreasing in strength, in most of our slides toward the ventral extremity, and exhibits definite lateral margins which we represent by heavy lines, although they are continuous with the membrane mentioned. A few slides show what appears to be a ruptured connection between the base of the fork and the inner face of the valves. Such apparent connections are indicated by dotted lines. In *Platyptilia* the juxta is not so developed, but the oedeagus projects through an opening in the posterior membrane whose sides are produced more or less as slender lobes. The oedeagus has a ventral process near its base by which it appears to be attached near the base of this opening. It probably moves in an arc whose center is this attachment. The gnathos is apparently not chitinized; other structures require no remarks. We are at a loss to explain the remarkable development of

the genitalia in some species of *Aldaina* and in *Oidacmatophorus monodactylus* Linn.

Before taking up the systematic treatment of these families a word regarding their relationship may not be amiss. By early writers both *Pterophoridae* and *Alucitidae* (better known as *Orncodidae*) were placed at the end of the order, a procedure from which Meyrick first departed by proposing the position which they have since occupied. Speaking of the *Pterophoridae* (Gen. Ins. c. 1.) he says: "The family is an aberrant group of the *Pyralidina*, with some relation to the *Orychirotidae*, *Orneodidae* and *Pyraustidae*, but no close or obvious connection with any of these, the indications of affinity being merely general." Some writers regard the *Pterophoridae*, *Alucitidae*, and presumably the *Orychirotidae* as an independent superfamily. We prefer to treat them as members of the *Pyraloidea*. We consider the two families together because the presence of only one Alucitid in our fauna renders that family too small for separate treatment, and this is its closest relationship.

## FAMILY PTEROPHORIDAE

- Phalaenae Alucitae* Linnaeus, Syst. Nat. ed. X, 1, 542, 1758 (in part).  
*Pterophorae* Huebner, Tentamen, 1806.  
*Pterophorites* Latreille, Consid. Gen. 370, 1810 (in part).  
 Duponchel, Cat. Meth. 380, 1845.  
*Alucitidae* Samouelle, Ent. Comp. 255, 1819 (in part).  
*Alucitae* Huebner, Verz. bck. Schmett. 428, 1825 (in part, *Integrae* + *Trifidae*).  
*Alucitidae* Stephens, Cat. Brit. Ins. II, 229, 1829 (in part).  
 Westwood, Mod. Class. Ins. II, 413, 1840 (in part).  
*Pterophoridae* Zeller, Isis X, 750, 1841 (in part, *Pterophoridae proprii*).  
 Wallengren, Skand. Fjäd. 1859.  
 Walsingham, Pter. Cal. Ore. 1880 (in part, ex. *Chrysocorys*).  
 Meyrick, Trans. Ent. Soc. Lond. 1890, 483.  
 Fernald, Smith's List Lep. N. A. 87, 1891.  
 Meyrick, Handbook, 429, 1895.  
 Tutt, Pter, Brit. 14, 1896.  
 Fernald, Pter, N. A. 1898.  
 Id., Bull. 52 U. S. N. M. 441, 1902.  
 Meyrick, Gen. Ins. C., 1910.  
 Spuler, Schmett, Eur. II, 317, 1910.  
 Meyrick, Wagner's Lep. Cat. pars 17, 3, 1913.  
 Fracker, Class. Lep. Larvae 94, 1915.  
 Mosher, Class. Lep. Pupae 70, 1916.  
 Barnes & McDunnough, Check List 150, 1917.

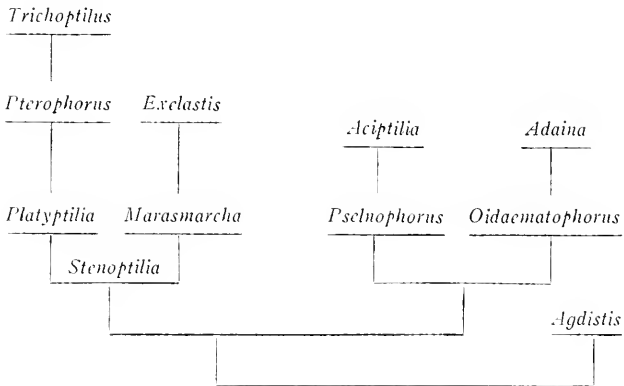
Ocelli sometimes present but never very easily seen. Proboscis well developed. Maxillary palpi absent. Labial palpi variably developed, sometimes very small. Primaries with vein A simple (or shortly forked, *vide* Meyrick),  $M_1$  and  $M_2$  very weak or absent;  $R_2$  often absent;  $R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  frequently stalked (the first almost obsolete in *Marasmarchia cervinicolor*). Primaries with a single cleft and secondaries with two in all but one species of our fauna. Secondaries with a conspicuous double row of black scales on under surface along cubital stem. Veins  $M_1$  and  $M_2$  very faint. All parts of these insects are more or less elongate and slender, and in resulting delicacy they rival the crane-flies. The legs are provided with two pairs of spurs on the hind tibiae and a terminal pair on the middle tibiae. The fore and mid tibiae also have bushy scale tufts in some species.

As pointed out by Meyrick, the black scales on the under surface of the secondaries are an absolute character for the Pterophoridae. With the exception of our one species of *Agdistis* the North American *Pterophoridae* may be placed at once by the cleft wings, without reference to other structures.

As to the internal classification of the family, we must depart from the customary arrangement. The presence of two anal veins in the secondaries of *Aciptilia*, *Pselnophorus*, *Adaina* and *Oidacmatophorus* definitely groups these four genera, while those remaining are characterized by the presence of only one anal in the secondaries, *Agdistis* alone excepted. It, however, is at once segregated by its entire wings. On this basis Spuler divides the *Pterophoridae* into three sub-families, the *Agdistinae*, *Platyptiliinae* and *Pterophorinae*. In our opinion these divisions are scarcely necessary to a convenient classification, but they are tenable. The last would become the rather clumsy word *Oidacmatophorinae* according to our revised nomenclature.

Which of the two higher groups should stand next to *Agdistis* in a linear series, seems to us largely a matter of personal opinion, for each is more highly developed in some particulars than the other. We prefer to begin with the complete *Platyptiliid* series, inserting *Oidacmatophorus* and allied genera before *Agdistis* because of their possession of two anal veins, as already mentioned. This arrangement results in the least possible deviation from that now in use, since it involves change of position in the cases of *Exelastis*, *Marasmarcha* and *Stenoptilia* alone.

The following diagram expresses our views on the phylogeny of the genera:





Within the genera the difficulties of the systematist multiply. Many species are very close, especially in *Platyptilia*, and can be separated only by careful study. In this one genus the genitalia are of no assistance, but in the others they are usually helpful. We have come to the conclusion that one trouble in the past has been the failure of the student to observe closely the more minute features of these insects, and the placing of undue emphasis on the pattern of the wings. In *Oidaematophorus* characters found in palpi and legs often serve to separate closely related species, while we have found that the pattern of the primaries is subject to such great variation that it is difficult to point out single features for the separation of many species. The remarkable fragility of specimens, once they have been dried, results in many lacking parts which might place them readily. The only remedy for this is, of course, careful collecting and abundant material. It is hopeless, without an extensive knowledge of the family, to attempt to identify many of the sad specimens which seem to be all too numerous in collections.

Too little work of a scientific nature has been done on the early stages to enable us to make generalizations of value, so we refer our readers to the notes given under various species.

The larvae of some species bore in the stems of plants, but in most of those whose habits are known they are external feeders on leaves or flowers. The pupae are naked, attached to a button of silk at the caudal end only.

We have adapted a portion of the key to the genera given by Meyrick in the *Genera Insectorum* to the uses of this paper, following the Comstock-Needham nomenclature, and have drawn our notes on genera largely from the same source.

## KEY TO THE GENERA

- |  |                        |
|--|------------------------|
| 1. Wings entire .....  | <i>Aedistis</i>        |
| Wings cleft, the primaries bifid, secondaries trifid .....   | 2                      |
| 2. Primaries with vein $R_5$ absent .....  | 3                      |
| Radius of primaries with all five branches .....   | 9                      |
| 3. Primaries with $Cu_1$ absent (only two veins in second lobe), deeply cleft<br>and with very slender lobes ..... | 4                      |
| $Cu_1$ present, primaries cleft much less than one-half their length .....   | 5                      |
| 4. Primaries with vein $R_1$ present .....   | <i>Trichoptilus</i>    |
| Primaries without $R_1$ .....  | <i>Aciptilia</i>       |
| 5. Branches of radius of primaries free .....  | <i>Oidaematophorus</i> |
| Some branches of radius stalked .....  | 6                      |

6.  $R_4$  and  $R_5$  of primaries short stalked,  $R_2$  stalked with  $R_4$ ,  $R_3$  absent  
 ..... Pselnophorus  
 $R_5$  free,  $R_2$  and  $R_4$  stalked (sometimes only connate?)..... 7
7. Secondaries with a tuft of black scales near tip of third feather.....  
 ..... Pterophorus  
 No such tuft ..... 8
8. Secondaries with only two veins in the second lobe.....Adaina  
 With three veins ..... 9
9. Fringes of inner margin of third lobe of secondaries with a few black  
 scales (sometimes faint in our species) .....Exelastis  
 These fringes without black scales ..... Marasmarcha
10.  $R_2$ ,  $R_3$  and  $R_4$  stalked .....Pterophorus  
 All branches of radius separate ..... 10
11. Secondaries usually with black scales in fringes of inner margin. Anal  
 angles of both lobes of primaries usually prominent..... Platyptilia  
 Without black scales. Anal angles marked, but very retreating..Stenoptilia

Genus **Trichoptilus** Walsingham.

Haplotype *Trichoptilus pygmaeus* Wlsm.

*Trichoptilus* Walsingham, Pter. Cal. Ore. 62, 1880. *Pygmaeus* sole species.

Meyrick, Trans. Ent. Soc. Lond. 1886, 7, 1886.

Id., op. cit., 484, 1890.

Fernald, Smith's List Lep. Bor. Am. 88, 1891.

Tutt, Pter. Brit. 77, 1891.

Höfmann, Deutsch., Pter., 49, 145, 1895.

Meyrick, Handbook, 430, 1895.

Fernald, Pter. N. A. 13, 1898.

Id., Bull. 52, U. S. N. M. 441, 1902.

Tutt, Ent. Rec. XVII, 36, 1905.

Meyrick, Trans. Ent. Soc. Lond. 1907, 472, 1908.

Id., Gen. Ins., C, 3, 4, 1910.

Id., Wagner's Lep. Cat. pars 17, 3, 1913.

Walsingham, Biol. Cent. Am., Lep. Het. IV, 434, 1915.

Barnes & McDunnough, Check List 150, 1917.

*Buckleria* Tutt, Ent. Rec. XV11, 37, 1905. Orthotype *Pterophorus paludum*  
 Zell.

*Stangcia* Tutt, Brit. Lep. V, 492, 1906. Haplotype *siceliota*.

Id., Ent. Rec. XX, 53, footnote, 1908. Cites *siceliota* as type.

Forehead without tuft; ocelli obsolete. Labial palpi moderate, ascending  
 Second joint with a terminal tuft beneath in some species; third joint variable  
 in length, slender. Fore wings cleft from before middle, both lobes slender,  
 tapering, without anal angle;  $Cu_2$  absent or stalked with  $M_3$ ;  $Cu_1$  absent;  $M_2$   
 and  $M_1$  scarcely traceable, short;  $R_5$  long,  $R_3$  absent,  $R_2$  absent or stalked with  
 $R_4$ ,  $R_1$  separate or stalked with  $R_4$ . Secondaries trifid, third feather usually with

a black scale tuft in the cilia of the inner margin. Vein  $Cu_2$  from middle of cell,  $Cu_1$  absent. (See pl. XLVIII, fig. 1.)

Like all previous writers, we have been unable to examine the structures of *pygmaeus*, the genotype. We have seen two specimens of this species, however, and a careful comparison with the other species regarded as congeneric leads us to believe that the ordinary use of the genus is correct.

## KEY TO THE SPECIES

1. Abdomen with parallel longitudinal stripes. Third feather of secondaries without black scale tuft in cilia ..... *parvulus*  
Abdomen otherwise. Tuft present ..... 2
2. Antennae longitudinally striped above ..... 3  
Antennae brown and white dotted above ..... 4
3. Second joint of palpi with long apical tuft below. Hind tibiae with two straight dorsal stripes before first spurs ..... *californicus*  
Second joint of palpi without tuft. Stripes of hind tibiae in part spiral, and anastomosed distally ..... *defectalis*
4. Size small, about 10 mm. expanse. Colors pale, whitish..... *pygmaeus*  
Much larger, rarely under 14 mm. Colors darker, brownish..... *lobidoctylus*

## 1. TRICHOPTILUS PARVULUS n. sp.

Head brown; palpi oblique, slender, exceeding vertex, brown with white dorsal and ventral lines; antennae lacking. Thorax brown. Legs white with brown stripes, tarsi of first two pairs lacking. Brown stripes of hind legs lost in broad brown bands at bases of spurs. Spurs white with a brown stripe. First pair inserted just beyond middle of tibia and reaching end of joint; terminal pair equal in length to first joint of tarsus. Tarsus whitish, first joint brown above except near base, remainder brown-tipped. Abdomen brown with a pair of whitish subdorsal stripes, two lateral on each side, one ventro-lateral and a mid ventral pale area which forms a stripe near base, bears a few ventral brown dots near middle, and is completely divided by a brown line toward outer end.

Primaries dull, dark brown, paler at the base and with some ochreous scales on the lobes. First lobe crossed by a whitish band about one-third from apex, and with a few pale scales indicating the usual band about twice as far from apex. Apical portion with whitish scales. Second lobe similar, without whitish scales in terminal area and with the outer pale band nearer apex. Fringes colorless, with a few whitish hairs in groups along inner margin, and numerous large black scales. Of the latter there are six tufts in the somewhat damaged fringes along the inner margin of the first lobe of the type, a series on the costal margin of the second lobe, broken at the outer white band, and five tufts on the inner margin. Secondaries and their fringes also dark brown, the third feather without dark scales in the dorsal cilia. Expanse 10 mm.

Described from one specimen:

Holotype ♀, Vernon ph., La., May, G. Coverdale, in coll. Barnes.

This species is the most highly specialized of our fauna, according to Mr. Meyrick's views on the phylogeny of the genus, because of the complete absence of the scale tuft in the fringes of the secondaries. This structure is present in all of our other species, though Mr. Meyrick records its absence from some of the exotic forms, and its absence in this case removes all hesitation which we have felt about describing from a single poor specimen. The parallel stripes of the abdomen are also strikingly different from anything else which we have examined.

2. *TRICHOPTILUS DEFECTALIS* Walker. Pl. XI.I, fig. 1. Pl. XLIX, fig. 9.

*Pterophorus defectalis* Walker, List Lep. Ins. B. M. XXX, 943, 1864.

*Pterophorus congrualis* id., op. cit. 943-4, 1864.

*Pterophorus oxydaetylus* id., op. cit. 944, 1864.

*Acipitilia hawaiiensis* Butler, Ann. & Mag. Nat. Hist. (5) VII, 408, 1881.

*Trichoptilus ochrodoetylus* Fish, Can. Ent. XIII, 142, 1881.

Fernald, Pter. N. A., 15, pl. V, ff. 13, 14, 1898.

Id., Bull. 52 U. S. N. M., 441, 1902.

*Trichoptilus compsochares* Meyrick, Trans. Ent. Soc. Lond. 16, 1886.

*Trichoptilus centetes* id., op. cit. 16, 1886.

Walsingham, Proc. Zool. Soc. Lond. 494, 1891.

Id., op. cit. 1897.

Grossbeck, Bull. Am. Mus. XXXVII, 135, 1917.

*Trichoptilus rulumensis* Pagenstecher, Zoologica XXIX, 239, 1900.

*Trichoptilus oxydaetylus* Walsingham, Faun. Haw. I, 471, 1907.

*Trichoptilus congrualis* Meyrick, Trans. Ent. Soc. Lond. 1907, 473, 1908.

Id., Gen. Ins., C, 5, 1910.

Id., Wagner's Lep. Cat. pars 17, 4, 1913.

Barnes & McDunnough, Check List 150, 1917.

*Trichoptilus defectalis* Meyrick, Gen. Ins., C, 5, 1910.

Fletcher, Trans. Linn. Soc. Lond. (2, Zool.) XIII, 312, 1910.

Walsingham, Biol. Cent. Am., Lep. Het. IV, 434, 1915.

*Buckleria defectalis* Fletcher, Trans. Linn. Soc. Lond. (2, Zool.) XIII, 308, 1910.

Head, thorax and abdomen light brownish ochreous. Posterior end of thorax whitish, abdomen often with divergent light and dark dashes on part of the segments above. Antennae white above with a longitudinal brown line. Third joint of palpi tipped with white and in some specimens touched with brown on the sides. Legs brown and white striped, offering the distinctive feature noted in the key.

Primaries light ochreous-brown, the first lobe more brownish and crossed by the two ordinary bands which are scarcely, if at all, paler than the ground color. Second lobe hardly darker than the discal area and with the bands scarcely indicated. Fringes brown, containing some whitish hairs and black scales in cleft on each lobe and several tufts of black scales on the inner margin the last at the apex and the preceding one followed by a pencil of white

hairs. On the costal margin of the second lobe toward its apex the fringes are white tipped. Secondaries dark brown, fringes concolorous, containing a tuft of black scales beyond middle of inner margin of third feather. Expanse 13 to 15 mm.

Distribution: If the synonymy here adopted is correct, this species occurs on every continent except Europe, and on numerous islands, including the East and West Indies and Hawaii. It is represented in coll. Barnes by a series from Florida containing twenty specimens from Chokoloskee, without dates, and one from St. Petersburg, taken in October. We have verified the identification of Arizona specimens in the National Museum. The type of *ochrodactylus* is labelled Texas.

The synonymy of this species is presented as it appears in the *Biologia*. It has largely been worked out by Mr. Meyrick, to whose experience and judgment we defer in adopting it, for we have not been able to examine material from the numerous foreign type-localities. The names which chiefly concern a student of the North American fauna, in that they take priority over the sole name based upon North American material, were described from the following localities: *defectalis* from Sierra Leone and the Congo, *congrualis* from India and China, *oxydactylus* from Ceylon and *hawaiiensis* from the island Maui of the Hawaiian group. The types of all four are in the British Museum, and in addition paratypes of *centetes* and *compsocharcs*. The types of Meyrick's species are in his own collection and that of *ralumcensis* Pag. in "Mus. Dahl" according to the *Biologia*. The type of *ochrodactylus* Fish is in the Fernald collection at Amherst, Mass. We have seen this type, and find it to be in fairly good condition, excepting the loss of the abdomen.

The "Lepidopterorum Catalogus" gives as a biological reference "Fletcher, Spol. Zeyl. 6 (21) p. 28 (biol.), t. A. f. 8 (1909)." We are not familiar with this article and know nothing else of the early stages.

3. TRICHOPTILUS CALIFORNICUS Walsingham, Pl. XLI, fig. 3. Pl. XLIX, fig. 8.

*Acitilus?* *californicus* Walsingham, Pter. Cal. Ore. 60, pl. 2, f. 9, 1880.

*Trichoptilus californicus* Meyrick, Trans. Ent. Soc. Lond. 7, 1886.

*Pterophorus californicus*, Fernald, Smith's List Lcp. N. A., 88, 1891.

‡*Trichoptilus lobidactylus* Fernald, Pter. N. A. 15, 1898 (in part).

Id., op. cit. pl. VII, fig. 12-14, 1898 (♂ gen.)

- Id., Bull. 52 U. S. N. M. 441, 1902 (in part).  
 B. C. Ent. Soc. Check List, 42, 1906.  
 Meyrick, Gen. Ins. C, 5, 1910 (in part).  
 Id., Wagner's Lep. Cat. pars 17, 4, 1913 (in part).  
 Barnes & McDunnough, Check List 150, 1917 (in part).  
 Grossbeck, Bull. Am. Mus. XXXVII, 135, 1917 (in part).

*Trichoptilus wrightii* Grinnell, Can. Ent. XL, 314, 1908.

‡*Trichoptilus lobidactylus* race *wrightii* Barnes & McDunnough, Check List 150, 1917.

Head and thorax brown, the posterior end of both thorax and patagia white or whitish. Antennae white above with a fine dark longitudinal stripe. Second joint of palpi with tuft below at distal end as noted in key, sometimes rubbed off in poor specimens; color same as head, white below. Third joint slender, moderately long, dark at the side and light above and below. Abdomen brownish above with divergent light and dark stripes on the first few segments and parallel stripes on the last two or three. Legs brown and white striped as in *defectalis*, the hind pair differing in that the two brown stripes on the upper surface of the tibiae before the first pair of spurs are separate and straight, not in part spiral and joined near their distal end.

Primaries concolorous with anterior part of thorax, varying from light ochreous to a dull brown. First lobe darker, the transverse bands marked distinctly with white scales on the costa, these usually continued from second band to apex. The primaries are otherwise as in *defectalis* with two exceptions. The costal fringes of the second lobe are not white tipped near the apex, and the white hairs in the fringes of the inner margin are grouped in two rather conspicuous patches. The secondaries are a darker, more dull shade of brown, each feather usually with a few dark scales in the apical fringes. The third feather has the tuft of black scales on the inner margin well-developed, and the fringes preceding it often contain noticeable white hairs. At the apex of this feather the fringes are usually white; otherwise they are concolorous with the wing. Expanse 14-18 mm.

Although the superficial appearance is not very different from that of *defectalis* Wlk. the male genitalia (plate XLIX, fig. 8) are much nearer to those of *lobidactylus* Fitch in form. The narrow valves at once separate the species from *defectalis*, in which they are very broad.

Distribution: We have seen no specimens of this genus from British Columbia, but think it probable that those recorded in the B. C. Check List as *lobidactylus* are this species. *Californicus* occurs throughout California, whence we have specimens taken in various places in May, Aug., Sept., and Oct. In the Barnes collection there are also specimens from Utah, Aug.; Colo., Ariz., Sept.; and Fla. May.

The early stages are unknown.

This species was described from specimens taken in Mendocino, Shasta and Colusa counties, Cal. The types are in the British Museum, and three paratypes in the Fernald collection. Our attention was first drawn to the distinctness of the species from *lobidactylus*, of which it had long been recorded as a synonym, by the discovery that all of our Californian specimens had striped antennae, in marked contrast to the dotted antennae of the latter species. Lord Walsingham both described and figured the species with dotted antennae, but in sending material to Mr. Meyrick for comparison with the type we called his attention to this feature, and he noted that they are striped in the types. This is true also of the paratypes in the Fernald collection. In the Grinnell collection of Pterophoridae as sent to us for examination there were no types of *Trichoptilus wrightii*, but in Mr. W. S. Wright's material we found two specimens from the type locality which were true *californicus*. Since we have seen only this species from the entire state of California, we feel that Mr. Grinnell was probably guilty of an oversight in describing his species with "barred" antennae.

#### 4. TRICHOPTILUS PYGMAEUS Walsingham.

- Trichoptilus pygmaeus* Walsingham, Pter. Cal. Ore. 64, pl. III, f. 15, 1880.  
 Meyrick, Trans. Ent. Soc. Lond. 7, 1886.  
 Fernald, Smith's List Lep. N. A. 88, 1891.  
 Id., Pter. N. A. 14, 1898.  
 Id., Bull. 52, U. S. N. M. 441, 1902.  
 B. C. Ent. Soc. Check List 42, 1906.  
 Meyrick, Gen. Ins. C, 5, 1910.  
 Id., Wagner's Lep. Cat. pars 17, 4, 1913.  
 Barnes & McDunnough, Check List 150, 1917.

Since we have seen only two specimens of *pygmaeus*, one a paratype, we reproduce the original description:

"Very small and slender.

"The head pale fawn-colour, with some erect scales above and behind the eyes; antennae slightly pubescent spotted alternately with fawn-brown and white above; the palpi projecting nearly the length of the head beyond it, whitish, touched with pale fawn-colour.

"Fore wings cleft slightly more than half their length, very pale fawn-colour, dusted with fuscous-brown scales along the costa, especially above the base of the fissure, also towards the base of the dorsal margin. The two slender lobes diverge considerably, and are barred before and beyond their middles more or less distinctly with white, which extends through the otherwise pale fawn-coloured cilia on both sides; along the base of these intermediate fawn-

coloured cilia are some scattered fuscous-brown scales, two darker tooth-like projections almost fuscous appearing on the dorsal margin of the second lobe.

"Hind wings pale greyish brown; the cilia cinereous, interrupted with white behind and at the points of the lobes. The third segment has long cinereous cilia, interrupted with white at the apex; slightly beyond the middle of its dorsal margin is a very small square projecting tooth of fuscous scales, preceded by a scarcely conspicuous white dash in the cilia.

"The legs are white, dotted and barred above with fawn-brown; the spurs white, the joints above them being thickly clothed with fawn-brown scales, from amongst which project some few almost erect white ones.

"Abdomen whitish, faintly touched with pale fawn-colour at the sides and above posteriorly.

"Expanse scarcely 10 millims."

The type series included three specimens taken "near Millville, in Shasta County, California, on the 11th of July, 1871." Two are now in the British Museum and the remaining paratype in the Fernald collection. It agrees very closely with the description. The second specimen which has been before us is in the National Museum. It lacked the abdomen and was slightly more grayish than Walsingham's figure, but we found no reason to doubt that it was true *pygmaeus*. This specimen was labelled "Washington, D. C. July," so careful collecting may prove the species to be much more common and widespread than it seems.

In common with other writers, we have had no opportunity to study the structures of the species so as to settle definitely the status of the genus of which it is the type, but the paratype which we have seen appears to substantiate the customary usage.

5. *TRICHOPTILUS LOBIDACTYLUS* Fitch, Pl. XLI, fig. 2. Pl. XLIX, fig. 7.

*Pterophorus lobidactylus* Fitch, Trans. N. Y. Agr. Soc. XIV, 847, 1854.

Id., 1st. Rept. Ent. N. Y. 143, 1854.

Morris, Cat. Lep. N. A. 54, 1860.

Walker, List Lep. Ins. B. M. XXX, 940, 1864.

Fernald, Smith's List Lep. N. A. 88, 1891.

*Aciptilus lobidactylus* Dimmock, Psyche III, 389, 1882 (morph.).

Id., op. cit. 404, 1882 (biol.).

*Trichoptilus lobidactylus* Fernald, Pter. N. A. 15, 1898 (in part).

Dyar, Psyche VIII, 249, 1898 (biol.).

Fernald, Bull. 52, U. S. N. M. 441, 1902 (in part).

Meyrick, Gen. Ins. C. 5, 1910 (in part).

Id., Wagner's Lep. Cat. pars 17, 4, 1913 (in part).



Barnes & McDunnough, Check List 150, 1917 (in part).

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVI, 135, 1917 (in part).

McDunnough, Can. Ent. LII, 88, pl. II, f. 1, 1920 (biol.).

*Trichoptilus lobidactyla* Dyar, Ent. Rec. XI, 140, pl. I, f. 1, 1899 (Larva).

Head brown with a white line over eyes. Antennae blackish below, alternately black and white spotted above. Palpi with second joint whitish, brown tipped, and with a terminal tuft projecting below third, which is white above and at its base below, otherwise brown. Thorax brown, posteriorly fawn with some white scales. Patagia concolorous, whitish tipped. Abdomen mixed fawn and brown. Dorsal surface with divergent white dashes, edged with dark brown, on alternate segments. Ventral surface with ventral and ventro-lateral white stripes edged with dark brown lines, the intervening spaces mixed fawn and brown with some white patches. Legs brown and white striped as in *californicus*.

Vestiture of primaries a mixture of bright brown, blackish and white scales, the first usually predominating and the last very scanty. First lobe with two transverse pale bands, sometimes white and sometimes partly obsolete. Costal fringes often white from outer band to apex. Second lobe with the bands not more than indicated by a few white scales. Fringes of mixed brown, black and white hairs containing a few black scales in the cleft. Inner margin of first lobe also with a dark preapical pencil, sometimes preceded and followed by white. Inner margin of wing with clusters of black scales and three white patches; apex of second lobe with a black pencil and some white hairs. Secondaries dark coppery brown with gray brown fringes. Third feather with black scales and white hairs at apex, the latter sometimes lacking, and with a large triangular black scale tuft in fringes of inner margin beyond middle, preceded by variably conspicuous pale hairs. Expanse 15 to 20 mm.

Fitch's type has been destroyed. The pin and type label remain in the Fernald collection, with the added notation of its loss.

*Lobidactylus* was described presumably from New York specimens. Its range has been extended to include all of the northern United States in various works, but the elimination of *californicus* from the synonymy curtails this range extensively. It is in the Barnes collection from Ontario (July), N. H., N. J. (June & July), and Meach Lake, Ottawa Co., Que. From the last named locality we have a small series, apparently reared, of very dark specimens. In the National Museum there are specimens from W. Va. and Ohio, the latter state being the most westerly locality of which we know. Grossbeck's Florida records probably refer partly to this species, since the food plant is mentioned, but the Barnes & McDunnough specimens mentioned are certainly *californicus*.

Prof. Fernald records the food plant as *Solidago canadensis* (Pter. N. A. 16). Dr. Dyar (Psyche VIII, 249) gives a description of the larva and pupa from material taken in Van Cortlandt Park, New York City, and reared on *Solidago* sp. Dimmock's papers give no further information beyond some morphological data and the locality Massachusetts. In Dr. McDunnough's paper descriptions, which we quote below, of the full grown larva and of the pupa are given, and a figure of the latter. The larva is here noted as feeding "on the terminal buds of a *Solidago* species". The descriptions are as follows:

"Larva (full-grown).—Head ochreous. Body cylindrical, green, with slightly darker mediodorsal line, due to the dorsal vessel showing through the integument, and containing on each segment centrally a minute black dot; several other similar black points are scattered with more or less regularity over the integument, the most constant being a single one midway between tubercles II and III and another, rather linear in shape, before the spiracle. Subdorsally there is a series of large, brownish, rectangular, chitinous patches extending across the major portion of each segment and containing tubercles I and II which are represented by two long brownish setae, arising from the centre of each patch, very glutinous, swollen irregularly several times during their length and club-shaped at their tips; the posterior portion of each patch contains two minute, whitish club-shaped setae. Tubercle III is represented on the abdominal segments by a single long brownish seta, a short anterior whitish one and a minute posterior hair (? III a of Dyar). Tubercle IV + V, directly below the spiracle, consists of an anterior shorter and a posterior longer clubbed white seta arising from a brownish base; there are usually also two further minute white clubbed hairs situated respectively on the ventral and on the posterior margins of this dark base. Ventral to the tubercles and on the posterior margin of each segment are generally several minute white clubbed hairs. A single white unclubbed hair arising from a dark base and surrounded by other minute hairs probably represents tubercle VI and two or three small hairs at the base of the prolegs constitute tubercle VII.

"On the thoracic segments the dorsal setae show some variation from that normally found on the abdominal segments: on the mesothorax tubercle I + II consists of two long setae and one minute white one whilst on the metathorax only a single long dorsal hair is found. On both segments tubercle III shows two long setae. The prothorax has a row of six long hairs along the anterior margin with a second row of six immediately behind these; the dorsal area corresponding to the prothoracic plate is covered with fine, minute, white, clubbed hairs. Ventrad and anterior to the spiracle is a tubercle bearing three hairs. All spiracles pale, brown-ringed. Length 10 mm.

"The arrangement of tubercular hairs as listed above differs in several points from Dr. Dyar's figure of the fifth abdominal segment of this species (1899, Ent. Rec XI, pl. 1, f. 1) but this is in the main due, I believe, to slight inconsistency in the number of small white secondary hairs which may occur

on each primary tubercle; Dr. Dyar's figure accentuates these secondary hairs, giving the impression that they are nearly as long as the primary, dark ones, which was far from the actual case in all specimens examined by me.

"*Pupa* (Fig. 1).—Rather bluntly truncate at apex with four short horns arising from the base of the antennal and eye-sheaths and a distinct sub-dorsal ridge extending as far as fourth abdominal segment. Colour green, with the horns and surrounding area extending over the prothorax vinous pink; a large, pink, dorsal patch is also present on each of the third and fourth abdominal segments (not segments 4-5 as stated by Dr. Dyar). The wing-cases are darker green than the remainder of the pupal integument and possesses three more or less complete parallel rows of minute white clubbed hairs; the sheaths of the legs and mouth parts are not very clearly differentiated and are well sprinkled with minute white warts on lenticles, particularly numerous on the eye caps. The tubercular setae of the larval stage are present, tubercles I and II being situated on the subdorsal ridge and particularly prominent on the pink-coloured segments. The prothoracic plate and the dorsal portions of the other thoracic segments are heavily sprinkled with small white lenticles; these lenticles on the abdominal segments are generally restricted to the area contiguous to the tubercular setae, this area being bounded posteriorly by a row of four or five short white clubbed hairs placed at regular intervals. The cephalic portion of the modified tenth abdominal plate contains a cluster of minute pinkish hairs and the cremaster is composed of a larger cluster of similarly coloured, glutinous hairs."

### Genus *Pterophorus* Geoffroy.

Logotype *Alucita didactyla* Linn.

*Pterophorus* Geoffroy, Hist. Nat. Ins. II, 90, 1762.

Fabricius, Syst. Ent. 671, 1775 (in part).

Latreille, Consid. Gen. 442, 1810. Cites *didactylus* as type.

*Oxyptilus* Zeller, Isis X, 765, 1841.

Wallengren, Skand. Fjäd. 14, 1859.

Zeller, Stett. ent. Zeit. XXVIII, 335, 1867.

Jordan, Ent. Mo. Mag. VI, 121, 1869.

Meyrick, Trans. Ent. Soc. Lond. 8, 1886.

Id., op. cit. 485, 1890.

Fernald, Smith's List Lep. N. A. 88, 1891.

Tutt, Pter. Brit. 60, 1891.

Meyrick, Handbook 431, 1895.

Hofmann, Deutsch. Pter. 49, 119, 1895.

Fernald, Pter. N. A. 16, 1898.

Id., Bull. 52 U. S. N. M. 441, 1902.

Tutt, Ent. Rec. XV11, 35, 1905. Cites *pitosellae* Zell. as type.

Meyrick, Gen. Ins. C, 6, 1910.

Id., Wagner's Lep. Cat. pars. 17, 5, 1913.

Walsingham, Biol. Cent. Am., Lep. Het. IV, 435, 1915.

Mosher, *Class. Lep. Pupae* 70, 1916.

Barnes & McDunnough, *Check List* 150, 1917.

*Capperia* Tutt, *Ent. Rec.* XVII, 37, 1905. Orthotype *heterodactyla* de Vill.

*Geina* Tutt, *Brit. Lep.* V, 411, 1906. Orthotype *didactylus* Linn.

*Crombrugghia* Tutt, *op. cit.* 449, 1906. Orthotype *distans* Zell.

Forehead smooth, without tuft in our species; ocelli obsolete. Labial palpi moderate, oblique; second joint with a ventral apical tuft in only one North American species; third joint moderate. Tibiae thickened with scales at bases of spurs. Primaries bifid, cleft from about middle;  $M_3$  and  $Cu_1$  stalked, connate with  $Cu_2$ ;  $R_5$  from below angle of cell,  $R_2$  and  $R_3$  stalked with  $R_4$  or  $R_3$  and  $R_4$  coincident;  $R_1$  free. Secondaries trifid, third segment with a well developed tuft of black scales in the fringes of the inner margin;  $Cu_2$  from middle of cell;  $Cu_1$  from near angle;  $R_5$  to apex. (See pl. XLVIII, fig. 2.)

Although the type of *Pterophorus* was fixed as *didactyla* in 1810, no subsequent writer with whose work we are familiar has recognized the genus as identical with *Oxyptilus* Zell. The attempt of Lord Walsingham and Mr. Durrant (*Ent. Mo. Mag.* XXIII, 41, 1897) to fix the type of *Alucita* Linn. gives us the first summary by modern writers of the history of *Pterophorus*. In this summary it is stated that Lamarck (*Syst. An. sans Vert.* 288, 1801) fixed the type as *pentadactylus*. The International Rules do not permit us to recognize this fixation, which is thrown out by Walsingham and Durrant for other reasons. Latreille's citation of *didactylus* is overlooked, apparently because it has no bearing on *Alucita*. On p. 42 we find the statement that Wallengren (*Skand. Fjär.* 20, 1859) "cited *monodactylus* Linn. as the type of *Pterophorus* (Geoffr.) auct." The authors accept this as the true type of *Pterophorus* on the basis that *didactylus* Geoff. was an incorrect identification of *monodactylus* Linn. Opinion 14 of the International Rules deals with a similar case and thereby validates the acceptance of *didactylus* Linn. as type of *Pterophorus* Geoff. The genus has commonly been used as limited by Walsingham and Durrant, but Mr. J. W. Tutt (*Ent. Rec.* XVII, 35, 1905) claims that Geoffroy himself fixed the type as *pentadactyla* Linn. We think that no other writer has taken this view of Geoffroy's work, though some have accepted *pentadactyla* as type of this genus through Lamarck's supposed fixation. Curtis (*Brit. Ent., Lep.* I, 161, 1827) actually cited this species as type but his action was rendered invalid by that of Latreille.

We follow Meyrick's synonymy. *Geina* Tutt is, of course, a synonym of *Pterophorus*. We are not familiar with the types of *Capperia*

and *Crombrugghia* in nature but from Tutt's remarks we judge these genera to be of the same character as numerous others of his, and therefore happily suppressed. We regard a genus as a systematic unit, not a biological division, and feel that when it loses its value for classification it has lost its right to exist.

The male genitalia in this genus show two forms of harpes, the one long, heavily chitinized and curved, the other weak and membranous. In our species and in the four European species which we have seen, *viz.*, *didactylus*, *hicracii*, *pilosellae* and *parvidactylus*, those species which have the terminal tuft on the second joint of the palpi are furnished with the second type, and those which lack this tuft have strong genitalia. These characters apparently divide the genus into two well marked groups, but we do not regard them as worthy of generic rank.

## KEY TO THE SPECIES

1. Second joint of palpi with a distal tuft projecting beneath third. *delaucarius*  
Palpi slender; second joint without tuft ..... 2
2. Median spurs of hind tibiae attached three-fifths or more of length of joint from its base ..... 3  
These spurs very close to middle of tibia ..... 4
3. Dorsal surface of abdomen with divergent white lines reaching from front to hind margins on several segments, widening behind. .... *ningoris*  
White lines on dorsal surface of abdomen obsolete at least anteriorly, usually limited to a few scales in posterior margins of segments. A much darker species ..... *raptor*
4. Light brown; abdomen without contrasting pure white marks above ..... *periscelidactylus*  
Very dark brown; abdomen with some pure white above except in darkest specimens ..... 5
5. Fourth abdominal segment brown above, the adjacent segments with white marks ..... *tenuidactylus*  
Fourth segment white above, others white marked. .... *cygnus*

1. PTEROPHORUS PERISCELIDACTYLUS Fitch. Pl. XLI, fig. 4. Pl. XLIX, fig. 5.

*Pterophorus periscelidactylus* Fitch, Trans. N. Y. Agr. Soc. XIV, 843, 1854 (biol.).

Id., 1st. Rept. Ent. N. Y. 139, 1854 (biol.).

Morris, Cat. Lep. N. A. 54, 1860.

Walker, List Lep. Ins. B. M. XXX, 940, 1864.

Riley, 1st Mo. Rept. 137, pl. II, ff. 15, 16, 1869 (biol.).

Id., Am. Ent. II, 234, fig. 148, 1870.

Id., 3rd. Mo. Rept. 65, fig. 27, 1871 (biol.).

- Packard, Guide 356, 1872.  
 Saunders, Can. Ent. V, 99, fig. 15, 1873.  
 Rogers, Can. Ent. VII, 217, 1875.  
*Oxyptilus perisclidactylus* Zeller, Stett. ent. Zeit. XXXII, 178, 1871.  
 Id., Verh. z.-b. Ges. Wien XXIII, 319, 1873.  
 Walsingham, Pter. Cal. Ore. 25, pl. II, f. 5, 1880.  
 Riley, Supp. Mo. Rept. 58, 1881.  
 Dimmock, Psyche III, 390, 1882.  
 Id., op. cit. 403, 1882.  
 Saunders, Can. Ent. XIX, 27, 1887.  
 Id., Ins. Inj. Fruits 268, 1889.  
 Hy. Edwards, Bull. 35, U. S. N. M. 136, 1889.  
 Fernald, Smith's List Lep. N. A. 88, 1891.  
 Dyar, Psyche VII, 253, 1895.  
 Comstock, Manual 238, 1895.  
 Smith, Econ. Ent. 318, 1896.  
 Truman, Ent. News V111, 28, 1897.  
 Fernald, Pter. N. A. 17, pl. II, ff. 3, 4; pl. V, ff. 1, 2, 1898.  
 Id., Bull. 52 U. S. N. M. 441, 1902.  
 Holland, Moth Book 416, fig. 237, 1903.  
 Osborn, Jr. Econ. Ent. II, 15, 1909.  
 Meyrick, Gen. Ins. C, 7, 1910.  
 Winn, List Ins. Que. 85, 1912.  
 Meyrick, Wagner's Lep. Cat. pars 17, 7, 1913.  
 Fracker, Class. Lep. Larvae 95, 1915.  
 Barnes & McDunnough, Check List 150, 1917.  
 Britton, Ins. Conn. 103, 1920.

General color light brown, the head, thorax and abdomen somewhat paler, the last with creamy-white dashes above and mostly whitish below. Antennae white, dark below and with a row of connected dark dots above. Palpi white, light brown at the sides. Legs white, the first two pairs striped with dark brown, their tarsi with brown shading on one side of all but the second joint. Hind pair with brown tufts at bases of spurs and brown annuli on the tarsi. First spurs attached near middle of tibia and reaching to its end.

Primaries with two white, diagonal, subparallel bands across first lobe, the basal one broader and less regular than the outer. These are continued across second feather, where they converge toward inner margin. Enclosed space on both lobes somewhat darker than rest of wing. Cleft preceded by a slight whitish patch, then by a short transverse brown dash. At two-fifths from base of wing is a whitish spot, more or less vague. Fringes creamy white, slightly darker in cleft, where they contain brown scales. At apex of both lobes and anal angle of first they are marked by dark pencils of hair, and before anal angle of second lobe a broader brown patch preceded at some distance by two small tufts of dark brown scales and some scattered white scales. First two feathers of hind wings dull brown with lighter fringes, the third light brown at base and tip, white between, fringes as on other lobes, but containing a large

tuft of dark brown scales at the outer end on both costal and inner margins. Some specimens are darker and of a duller shade of brown. Expanse 16-20 mm.

Distribution: Quebec to New Jersey, west to Manitoba, South Dakota and Mo. Fernald adds Texas but we are unable to verify this. The specimens which we have were taken in June with the exception of a single one without locality which bears an August date label. There are Mo. specimens in the Cornell collection dated May, and New York specimens dated July. The species was described from New York, and a reared specimen in coll. Fernald among Fitch's material is probably the type, though it does not bear Fernald's type label.

The early stages have been considered in a number of papers. Riley's third report gives a good account of the habits of the insect, and both this and Saunder's "Insects Injurious to Fruits" describe the early stages in part. Dyar's paper in *Psyche*, vol. VII, and Fracker's are the only papers known to us which give any information of value on the structure of the larva. Fernald's monograph of the family contains the following description of larva and pupa:

"*Larva*.—Length, about 12 mm. Head yellow, with the mouth parts brown. Body pale greenish yellow, deeply constricted between the segments. Each segment has a transverse row of ten moderately sized tubercles, from each of which arises a cluster of from six to twelve long, whitish, diverging hairs, besides which, scattered over the surface, are short hairs which are enlarged at the tip. Legs yellow, long and slender.

"*Pupa*.—Length, 11 mm. Diameter, 2 mm. Front obliquely truncated, with two irregular ridges extending up over the truncate part and along the dorsum on either side of the median line, diverging toward the meta-thorax, where they terminate in a pair of flattened, sharp-pointed projections, about as high as two-thirds of the diameter of the pupa. The ridges are higher, and toothed on the top of each segment. On the first five abdominal segments there is a row of short spines on each side, in line with the abdominal projections. These spines incline forward, and on the posterior side is a small tooth and two short diverging club-shaped bristles. The pupae attach themselves by a cluster of fine hooks at the end of the abdomen to a button of silk spun by the caterpillar before pupating. The pupal stage lasts about a week."

2. *PTEROPHORUS TENUIDACTYLUS* Fitch. Pl. XLI, fig. 5. Pl. XLIX, fig. 1.

*Pterophorus tenuidactylus* Fitch, Trans. N. Y. Agr. Soc. XIV, 848, 1854.

Id., 1st Rept. Ent. N. Y. 144, 1854.

Morris, Cat. Lep. N. A. 54, 1860.

Walker, List Lep. Ins. B. M. XXX, 940, 1864.

*Oxyptilus nigrociliatus* Zeller, Verh. z-b. Ges. Wien XXIII, 332, 1873.

Walsingham, Pter. Cal. Ore. 31, pl. II, f. 8, 1880.

Dimmock, Psyche III, 403, 1882.

Packard, Rept. U. S. Dept. Agr. 326, 1886 (*vide* Hy. Edw.).

Hy. Edwards, Bull. 35, U. S. N. M. 136, 1889.

Saunders, Ins. Inj. Fruits 314, 1889 (biol.).

Packard, 5th Rept. U. S. Ent. Com. 851, 1890.

*Oxyptilus tenuidactylus* Murtfeldt, Am. Ent. III, 235, 1880.

Fernald, Smith's List Lep. N. A. 88, 1891.

Dyar, Psyche VIII, 249, 1898 (biol.).

Fernald, Pter. N. A. 20, 1898.

Id., Bull. 52, U. S. N. M. 442, 1902.

Dyar, Proc. U. S. N. M. XXVII, 923, 1901, (biol.).

Anderson, Cat. B. C. Lep. 50, 1904.

B. C. Ent. Soc. Check List 42, 1906.

Forbes, Psyche XVI, 136, 1909.

Meyrick, Gen. Ins. C, 7, 1910.

Winn, List Ins. Que. 85, 1912.

Meyrick, Wagner's Lep. Cat. pars 17, 8, 1913.

Barnes & McDunnough, Check List 150, 1917.

Britton, Ins. Conn. 103, 1920.

*Oxyptilus delavariensis* Forbes, Rept. Ent. Ill. XIV, 91, 1885 (biol.).

Very dark brown, with a coppery tinge. Antennae white, dotted with brown above. Palpi white with lateral brown stripes, the third joint sometimes entirely brown. Thorax white behind. Legs white, first and second pairs striped with dark brown except tarsi, which are touched with brown on one side of each joint. Hind legs as in *periscelidactylus* but with dark brown markings. Abdomen brown, with diverging pairs of white stripes on the third segment. Fourth segment entirely brown above, fifth mostly white, due to the extension of stripes similar to those on the third. Beneath, the abdomen is more heavily marked with white, the fourth segment almost entirely white.

Primaries with a fine transverse white line across outer half of both lobes. First lobe with a broader stripe basad of this. Second lobe with this stripe represented by a small white patch. Fringes and secondaries as in *periscelidactylus* but much darker. Exp. 13-17 mm.

Fernald's figures of genitalia under this name appear to belong to the following species.

Distribution: Quebec to W. Va., west to Vancouver Id. (Day), Tex. and Cal. May to Aug.

There are three specimens in the Fernald collection among Fitch's material, two of which bear Fernald's type labels. One of these is fragmentary and the other a ♀ in good condition.



We have examined over forty specimens in the Barnes collection and smaller series in various other collections, among which were many bred specimens. The species is remarkably constant in superficial appearance, probably due to its general darkness, for the white markings are greatly reduced in the darker examples. The one dark segment of the abdomen, preceded and followed by white marks, is usually characteristic, though we have seen cases of obsolescence of these white marks.

*Tenuidactylus* has been reared from the buds of blackberry by several entomologists. Dyar (*Psyche* VIII) gives a description of the larva and pupa, while S. A. Forbes (*Ill. Rept.*) and Saunders give similar data and some remarks on the habits of the larva. According to Dyar the larvae feed on the buds of blackberry, which they mimic closely, and in B. C. on thimble-berry, *Rubus nutkanus*. There is a specimen in the Fernald collection which is labelled as having been reared from a larva boring in the stem of a species of *Solidago*. We have checked this identification carefully, and cannot account for such a strange difference in both habit and food plant if the record is correct. One Wisconsin specimen in the National Museum was reared from strawberry.

Dyar's description of larva and pupa is as follows:

"Head green, .7 mm. wide. Body pale green, with a faint sub-dorsal white band. Warts i and ii united, bearing about ten setae with simple ends; iii with six setae; a small wart behind it with two setae (iiia); iv + v with two large setae and several small ones; a single seta behind this (iiib); vi with a distinct tubercle, but somewhat confused among the secondary hairs; vii of three large setae with several shorter ones; secondary hairs scattered over the body, and these as well as some shorter ones from the warts have swollen or cleft tips.

"*Pupa*. Slender, tapering behind, fastened by the cremaster. A row of sub-dorsal tubercles bearing four spines in a fan-like arrangement, continued as a carinated ridge on the thorax. Thorax widened, the cases produced into a point along the abdomen. Two slight points above the eyes. Whitish green, cases more greenish. There are several spines on the thorax, and some fine, soft hairs on abdomen laterally. Another pupa was light purplish brown.

"On the buds of blackberry (*Rubus*), Keene Valley, N. Y., June. Found with *Batalis basilaris* Zell., but more closely resembles the blackberry buds than this *Tineid* does."

## 3. PTEROPHORUS CYGNUS n. sp. Pl. XLIX, fig. 2.

†*Oxyptilus tenuidactylus* Fernald, Pter. N. A. pl. VI, ff. 4-6, 1898(?).

We are unable to point out any superficial differences between *cygnus* and *tenuidactylus* except in the abdomen, hence the description of the latter species will answer almost completely for this. The hind legs of the unique type are unfortunately lacking, but in species otherwise so close we think it unlikely that they would show any marked difference. The abdomen differs from that of *tenuidactylus* in that every segment is marked more or less with white above, including the fourth. This, together with the third and fifth, is heavily marked. Beneath, the fourth segment bears two white dashes, while the others are mostly brown. Expanse 13 mm.

Described from one male, (holotype) taken at Iowa City, Ia., July 2, 1918, by A. W. Lindsey, and now in coll. Barnes.

In the male genitalia differences are found in the uncus, vinculum and valves as shown in the figures. The oedeagus was lost in making the slide. Fernald's figures agree except in the shape of the vinculum. Since Fernald removed the entire abdomen for study, we are unable to check this by superficial characters.

## 4. PTEROPHORUS RAPTOR Meyrick. Pl. XLI, fig. 6. Pl. XLIX, fig. 3.

*Oxyptilus raptor* Meyrick, Trans. Ent. Soc. Lond. 1907, 478, 1908.

Id., Gen. Ins. C, 7, 1910.

Id., Wagner's Lep. Cat. pars 17, 8, 1913 (in part).

Barnes & McDunnough, Check List 150, 1917 (in part).

The original description is as follows:

"♀. 19 mm. Palpi whitish, spotted with dark fuscous. Abdomen brown mixed with dark fuscous, segmental margins mixed with white. Legs white, lined and banded with dark fuscous. Forewings cleft from beyond middle, segments narrow, first pointed, second somewhat dilated, its apex long, acute, termen concave; ferruginous-fuscous, irrorated with dark fuscous; a small dark fuscous spot on base of cleft; first segment crossed by two inwardly oblique whitish bars at 1/3 and 2/3, former rather broad, latter slender; a similar bar crossing second segment at 2/3; cilia dark fuscous, on costa more blackish, and barred with whitish on costal markings, beneath apex with two whitish bars, on termen of second segment whitish except toward angles, on dorsum mostly whitish with dark fuscous bars before and beyond cleft, and a dark fuscous patch towards tornus. Hind-wings cleft firstly from 2/5, secondly from 1/4, segments very slender; dark fuscous, third segment brownish-ochreous from base to near 2/3 and at apex; cilia fuscous, both margins of third segment with a patch of blackish scales extending from before 2/3 of segment to 5/6.

"Colorado, U. S.; one specimen."

With a series of eleven specimens of both sexes before us we are unable to add to this description except by noting the position of the first pair of spurs on the hind tibiae in contrast to the preceding species, as noted in the key. Our specimens are from Denver, Chimney Gulch and South Park, Colo., taken by Oslar. Only two are dated, one June 23 from Chimney Gulch and one Aug. 19 from South Park. We have seen a single ♀ labelled Hessville, Ind., Sept. 8, which was submitted by Mr. A. K. Wyatt for identification.

5. *PTEROPHORUS NINGORIS* Walsingham. Pl. XLI, fig. 7. Pl. XLIX, fig. 6.

*Oxyptilus ningoris* Walsingham, Pter. Cal. Ore. 26, pl. II, f. 6, 1880.

- Fernald, Smith's List Lep. N. A. 88, 1891.  
 Id., Pter. N. A. 20, pl. VI, ff. 1-3, 1898.  
 Id., Bull. 52 U. S. N. M. 442, 1902.  
 Dyar, Proc. U. S. N. M. XXVII, 923, 1904 (biol.).  
 Anderson, Cat. B. C. Lep. 50, 1904.  
 B. C. Ent. Soc. Check List 42, 1906.  
 Meyrick, Gen. Ins. C, 7, 1910.  
 Id., Wagner's Lep. Cat. pars 17, 8, 1913.  
 Barnes & McDunnough, Check List 150, 1917.  
 Britton, Ins. Conn. 103, 1920.

§*Oxyptilus nigoris* Murtfeldt, Proc. Nat. Sci. Club, 13, 1896.

*Oxyptilus bernardinus* Grinnell, Can. Ent. XL, 315, 1908.

*Oxyptilus raptor* Meyrick, Wagner's Lep. Cat. pars 17, 8, 1913 (in part).

Barnes & McDunnough, Check List 150, 1917 (in part).

General color dull brown with a grayish cast, due to the presence of true brown only at the tips of the scales. Head with a few whitish scales. Antennae light spotted above, otherwise dark. Palpi rather long and slender, oblique, dark brown with both joints white-tipped. Fore and middle legs white striped with brown, the tarsi largely brown on their inner surface. Hind legs pure white with the usual bands at the bases of the spurs and on the joints of the tarsi. Tibiae also with an incompletely spiral brown line preceding spurs. First spurs attached about three-fifths from base of tibia and reaching its tip. Abdomen with many white scales and a pair of subdorsal stripes made up of divergent dashes on each segment. Beneath mostly white, due to anastomosis of longitudinal white stripes.

Fore wings usually with a somewhat hoary appearance, sometimes accentuated by the presence of white and fuscous scales, particularly along the costa. First lobe crossed by the usual two lines, the outer slender, the inner broad. Both are continued on the second lobe, but are very variable, sometimes extensive and sometimes greatly reduced. The outer line reaches the anal angle in well marked specimens. Cleft preceded by a few white scales, and disk with

two vague whitish spots, one near inner margin about one-third from base and one beyond it in cell. These wings are cleft from about the middle, and the lobes are somewhat narrow, so that in general appearance the species looks like a *Trichoptilus*. Fringes fuscous at apex, becoming white toward base of cleft and containing brown scales in cleft. Second lobe with tufts of fuscous scales at apex, anal angle, and along inner margin. Outer margin with fringes partly white, inner with fuscous fringes between last two tufts. Secondaries brown, similar to primaries, with gray-brown fringes. Third lobe somewhat paler, white beyond middle, with large tuft of blackish scales in fringes of outer third. Expanse 18-20 mm.

Distribution: California: we have specimens from Tulare and San Bernardino counties and Lake Tahoe. Part of the type series was taken in Oregon. Mr. G. O. Day sent in one ♀ labelled Cowichan Lake, Vanc. Id., and the B. C. Entomological Society records the species from the mainland. The specimens which we have examined were taken from the eighteenth of June to the end of July. The Connecticut record is probably based on a misidentification.

Dyar's account of the life history is as follows:

"Seven specimens, June 25, 27, 29, August 3. The young larvae were found webbing the heads and deforming the leaves of a wooly herbaceous plant with milky juice, *Hieracium albiflorum*. The larvae were very small but made a great showing as the whole head of the plant is webbed and distorted, the leaves crumpled and the flower shoot does not grow up as it normally would.

"*Larva*.—Head small, bilobed, pale honey yellow, mouth pointed. Body robust, tapering a little at the ends, feet normal, slender, dilated at the ends as usual in the Pterophoridae. Primary hairs simple, coarse, white, i and ii closely approximated, the tubercles black; iii single, iv and v closely approximated, vi single, the tubercles brownish ringed. Numerous small secondary hairs all over, white, short, broadly clavate tipped. Olivaceous green, the food dark; skin densely covered with minute black, flat granules; spiracles black ringed. Later there is a deep brown spot on tubercle i + ii.

"*Pupa*.—Attached by the anal extremity, free; pale yellow, the tubercles like those of the larva, the dorsal ones colored red. The young larva is without the capitate secondary hairs."

We have at hand a specimen compared by Mr. Meyrick with Walsingham's type in the British Museum, the specimens, four in number, which Walsingham placed in the Fernald collection, and a specimen personally compared with Grinnell's series of *bernardinus*, and are thus able to establish beyond reasonable doubt the identity and synonymy of this easily recognized species. In Grinnell's collection we found a series of five specimens over this name which were apparently those referred to in his description. None of these was

labelled type, so we selected the best and supplied it with a type label bearing a note of the circumstance. We are not acquainted with the European *tencrui* with which Walsingham compares his species, and so must accept his decision that they are distinct.

6. *PTEROPHORUS DELAWARICUS* Zeller. Pl. XLI, fig. 8. Pl. XLIX, fig. 4.

*Oxyptilus delawaricus* Zeller, Verh. z.-b. Ges. Wien XXIII, 320, 1873.

Walsingham, Pter. Cal. Ore. 29, pl. 11. f. 7, 1880.

Fernald, Smith's List Lep. N. A. 88, 1891.

Id., Pter. N. A. 19, pl. VI, ff. 7, 8, 1898.

Id., Bull. 52 U. S. N. M. 442, 1902.

Dyar, Proc. U. S. N. M. XXV, 397, 1902 (biol.).

Meyrick, Gen. Ins. C, 7, 1910.

Winn, List Ins. Que. 85, 1912.

Meyrick, Wagner's Lep. Cat. pars 17, 7, 1913.

Barnes & McDunnough, Check List 150, 1917.

*Oxyptilus bernardinus* form *finitimus* Grinnell, Can. Ent. XL, 315, 1908.

*Oxyptilus raptor* Meyrick, Wagner's Lep. Cat. pars 17, 8, 1913 (in part).

Barnes & McDunnough, Check List 150, 1917 (in part).

Bright golden brown, about the same color as *perisclidactylus*. Antennae white with brown spots above. Palpi brown at the sides, the vestiture of the second joint produced into a point below which almost reaches tip of third. Legs brown and white striped, fore and middle tarsi with each joint partly brown on one side. Hind legs banded and striped as in the preceding species. Abdomen with diverging white dashes above and some white scales in the posterior half below.

Wings marked as in *raptor*, from which they differ conspicuously in color. Expanse 13-20 mm.

Distribution: N. J. to Mass. and Quebec. S. Cal. to B. C. Early June to early Aug. We have seen a single specimen from Vancouver Id.

This is the only North American species belonging to the group characterized by the tufted second palpal joint and weak, membranous claspers.

Zeller described this species from a single male from the Delaware River which should now be in the British Museum. Unfortunately we had not yet placed the species when we submitted specimens to Mr. Meyrick for comparison with the types in that institution, but from Walsingham's notes in the "Pterophoridae of California and Oregon" we feel that its identity is sufficiently well established. The

single specimen mentioned in Grinnell's description of *bernardinus* and named *finitimus* was found to be without a label in the Grinnell collection, though placed in the series of *bernardinus*. We labelled this specimen type. It was so badly rubbed that comparison was difficult, but left no doubt that it is the same as the species figured by Walsingham under the name *delawareicus*. As to the identity of the eastern and western insects, we have felt some doubt. We have only two specimens from the east, both taken at Essex Co. Park, N. J., by W. D. Kearfott, June 30 and July 15. One is a male, and we are unable to find specific differences between its genitalia and those of western specimens. Our western series, including eleven specimens, comes from British Columbia and Washington. These specimens are, on the whole, larger and brighter than the two from New Jersey, but in the Fernald collection we find these conditions reversed. We are therefore disposed to believe that Walsingham and Zeller were right in their reference of the Californian species to *delawareicus*. It is quite likely that the species will be found in intervening territory, either in the States or in a northward curve in Canada, to connect the isolated localities which we are now able to give.

Dyar's notes on the early stages are puzzling to us, and we believe that they cannot refer to the true *delawareicus*. Our notes on the National Museum material do not mention his specimens in detail, but record no true *delawareicus*. All Colorado specimens which we listed were *tennidactylus*. Since *delawareicus* has tufted palpi and weak genitalia, we should expect its early stages to be decidedly different from *perisclidactylus*, which belongs in the other group, and think that Dyar's notes refer either to *raptor* or another species. His remarks on the adult suggest *perisclidactylus*, though he makes them in *contrasting* with that species.

We have examined several European species belonging to this group and concluded that *delawareicus* is distinct from them.

### Genus *Platyptilia* Huebner.

Logotype *Alucita gonodactyla* D. & S.

*Platyptilia* Huebner, Verz. bck. Schmett. 429, 1826.

Meyrick, Trans. Ent. Soc. Lond. 9, 1886.

Id., op. cit. 485, 1890.

Fernald, Smith's List Lep. N. A. 87, 1891.

- Meyrick, Handbook 432, 1895.  
 Hofmann, Deutsch. Pter. 48, 60, 1895.  
 Tutt, Pter. Brit. 22, 1896.  
 Fernald, Pter. N. A. 22, 1898.  
 Id., Bull. 52 U. S. N. M. 442, 1902.  
 Tutt, Ent. Rec. XVII, 35, 1905, cites *gonodactyla* D. & S. (*megadactyla* Hbn.) as type.  
 Meyrick, Gen. Ins. C, 9, 1910.  
 Id., Wagner's Lep. Cat. pars 17, 10, 1913.  
 Walsingham, Biol. Cent. Am., Lep. Het. IV, 437, 1915.  
 Mosher, Class. Lep. Pupae 70, 1916.  
 Barnes & McDunnough, Check List 150, 1917.
- §*Amblyptilia* Huebner, Verz. bek. Schmett. 430, 1826.  
 Tutt, Ent. Rec. XVII, 35, 1905, cites *acanthodactyla* Hbn. as type.
- Amblyptilia* Huebner, Verz. bek. Schmett., Anz. 72, 1827.  
 Hofmann, Deutsch. Pter. 48, 82, 1895.  
 Tutt, Ent. Rec. XVII, 35, 1905, cites *acanthodactyla* as type.  
 Meyrick, Gen. Ins. C, 9, 1910.
- ‡*Platyptilus* Zeller, Isis X, 764, 1841. New name for *Platyptilia* Hbn.  
 Wallengren, Skand. Fjäd. 11, 1859.  
 Zeller, Stett. ent. Zeit. XXVIII, 331, 332, 1867.  
 Jordan, Ent. Mo. Mag. VI, 120, 1869.  
 Walsingham, Pter. Cal. Ore. 3, 1880.  
 Tutt, Ent. Rec. XVII, 35, 1905, cites *gonodactyla* D. & S. as type.
- ||*Cnucmidophorus* Wallengren, Skand. Fjäd. 10, 1859. Haplotype *rhododactyla* D. & S.  
 Jordan, Ent. Mo. Mag. VI, 120, 1869.  
 Tutt, Pter. Brit. 18, 1896.  
 Id., Ent. Rec. XVII, 35, 1905.
- ‡*Amblyptilus* Wallengren, Skand. Fjäd. 13, 1859. New form for *Amblyptilia* Hbn.  
 Zeller, Stett. ent. Zeit. XXVIII, 331, 335, 1867.  
 Jordan, Ent. Mo. Mag. VI, 121, 1869.  
 Walsingham, Pter. Cal. Ore. 21, 1880.
- Sochchora* Walker, List Lep. Ins. B. M. XXX, 952, 1864. Haplotype *S. donatella* Wlk.  
 Tutt, Ent. Rec. XVII, 36, 1905.  
 Walsingham, Biol. Cent. Am., Lep. Het. IV, 436, 1915.
- ‡*Cnucmidophorus* Zeller, Stett. ent. Zeit. XXVIII, 332, 1865.
- Eucnucmidophorus* Wallengren, Ent. Tidsk. II, 96, 1881. New name for *Cnucmidophorus* Wallengren, preoccupied.  
 Hofmann, Deutsch. Pter. 48, 57, 1895.  
 Tutt, Ent. Rec. XVII, 36, 1905.

*Gilbertia* Walsingham, Ent. Mo. Mag. XXVII, 259, 1891. Orthotype *G. eques* Wlsm.

Tutt, Ent. Rec. XVII, 36, 1891.

*Crocodyoscelus* Walsingham, Trans. Ent. Soc. Lond. 35, 1897. Orthotype *C. ferruginea* Wlsm.

Tutt, Ent. Rec. XVII, 36, 1905.

*Gillmeria* Tutt, Ent. Rec. XVII, 37, 1905. Orthotype *ochrodactyla* D. & S.

*Fredericina* id., loc. cit. Orthotype *calodactyla* D. & S.

Front with a prominent scale tuft in some species, usually with at least a moderate tuft. Palpi short, scarcely exceeding front, to long; second joint oblique, third porrect. Tibiae sometimes with slight scale tufts. Fore wings cleft not more than one-third their length, anal angle evident on both lobes, in some species prominent and in some retreating. Vein  $Cu_2$  well before angle,  $Cu_1$  near angle.  $R_1$ ,  $R_2$  and  $R_3$  separate,  $R_3$  and  $R_4$  stalked. Hindwings trifold, third segment with black scales or scale tuft in fringes of inner margin in most species. Vein  $Cu_2$  from middle of cell,  $Cu_1$  from near angle. (See pl. XLVIII, fig. 3).

As noted by Meyrick in the Genera Insectorum this genus approaches *Stenoptilia* closely. In some of the species which we include here the black scales are lacking, and we retain them in *Platyptilia* only because they seem generally closer to the characteristic species of that genus. Referring again to Meyrick in this connection, we quote his statement that "as the two types are really quite distinct and in general easily separable on a comparison of all the characters, it is desirable to keep them separate."

We are not adopting the grouping proposed for this genus, based, so far as it concerns us, on the scale tuft, because it is likely to prove too confusing in the separation of the North American species.

The identification of these insects is by no means easy, though some of the species are well marked and may be recognized without trouble. Others are difficult to place, even with an abundance of material and authentic specimens at hand. Of these we can only say that careful study of the superficial characters has led us to believe that the species which we retain are all valid, with possibly one or two exceptions. Unfortunately the genitalia are of no assistance in such cases, for throughout the genus they seem to differ in proportion to the other characters. Keying such a genus has naturally been a trying task, and unsatisfactory in its results, but we feel that the key which we present will suffice for the identification of most material.



## KEY TO THE SPECIES

1. Frontal tuft as long as eye or longer, conical ..... 2  
 Frontal tuft usually distinctly shorter and more blunt. Doubtful specimens may be placed by presence of dark triangle on primaries before cleft ..... 4
2. Tuft longer than palpi ..... *albertae*  
 Tuft not longer than palpi. Faint dark scale tuft in fringes of inner margin of third feather, or scattered dark scales..... 3
3. Scale tooth near middle of feather; no other dark scales present ..... *pallidactyla*  
 Scale tooth near end of feather; sometimes not evident..... *carolinae*
4. Palpi short, slightly exceeding front. Third feather with a weak scale tuft near middle ..... *tesseradactyla*  
 Palpi distinctly exceeding front or species otherwise different..... 5
5. Third feather of secondaries with a well marked tuft of dark scales in fringes of inner margin, usually with scattered black scales preceding it ..... 6  
 This tuft entirely absent or faint, and of very slender scales, rarely preceded by other dark scales ..... 16
6. Scale tuft at middle of margin ..... 7  
 Scale tuft beyond middle (in some cases scarcely beyond, beginning at middle) ..... 9
7. Color more or less tawny. Second joint of hind tarsi scarcely dark tipped. Wings usually warm brown ..... 8  
 Color gray-brown. Second joint of hind tarsi as deeply dark tipped as those following ..... *williamsii*
8. Scale tuft strong, triangular, sometimes prolonged..... *carduidactyla*  
 Scale tuft weaker, scarcely triangular, sometimes very faint or even absent ..... *pernodactyla*
9. Scale tuft within distal third of feather..... 10  
 Scale tuft farther from end of feather ..... 13
10. Brown, conspicuously marked with white. Third feather of secondaries chiefly white except opposite scale tooth..... *rhododactyla*  
 Not such species ..... 11
11. Abdomen evenly colored or with faint parallel stripes; a variable number of segments with single dorsal dots on hind margins. A small species ..... *crenulata*  
 Abdomen with oblique stripes and rough vestiture..... 12
12. Size usually large, 19-31 mm. Grayish with conspicuous dark markings. Scales in tuft of about equal length throughout..... *edwardsii*  
 Size moderate, 20 mm. Dark gray with the markings scarcely darker. Scales in tuft becoming more or less perceptibly shorter outward, tuft therefore slightly triangular ..... *aurigata*
13. First lobe of primaries beyond base of cleft with a triangular pale brown spot resting on cleft with apex on costa. Scale tuft about two-thirds from base ..... *marmarodactyla*  
 Triangle vague or absent. Tuft just beyond middle..... 14

- 14 Wings in general warm brown ..... *acanthodactyla*  
Wings of colder shades; grayish or black and white..... 15
15. Contrastingly black and white. Abdomen distally white above and below ..... *pica*  
Rarely with contrasting black and white areas; the white always suffused and powdery. Abdomen without the white areas..... *punctidactyla*
16. With a few slender dark scales very faintly indicating a scale tuft near end of third feather of secondaries, scarcely visible to the naked eye and occasionally lacking. A large species with the dark areas gray. Expanse 27 mm or over..... *albidorsella*  
Dark scales scattered or absent. If grayish, size usually less than 26 mm. .... 17
17. Triangular patch at base of cleft well marked and usually conspicuously darker than wing ..... 18  
Triangular patch never well developed, usually not indicated..... 22
18. Size large, expanse about 35 mm. .... *grandis*  
Smaller, less than 30 mm. .... 19
19. Hind tibiae with dark areas in the form of more or less definite annuli at bases of spurs; sometimes entirely pale..... 20  
Hind legs more evenly suffused with dark shades or inwardly dark and outwardly pale ..... 21
20. Pale areas brownish white to buff white ..... *fragilis*  
Pale areas white to pale gray ..... *albida*
21. Brown, only the dark brown triangular patch conspicuous. Fresh specimens with a powdering of bluish scales on the primaries. Outer margin of second lobe evenly rounded, anal angle retreating..... *albiciliata*  
Ground color buff. Triangular patch brownish black. Outer margin of second lobe slightly wavy, with a median prominence. Anal angle more prominent ..... *orthocarpi*  
General color more grayish ..... *shastae*
22. Costal lobe of primaries with a conspicuous oblique black dash... *petrodactyla*  
Without such a dash ..... 23
23. Inner margin of primaries with two clusters of dark scales in fringes below base of cleft ..... *maca*  
Fringe of this margin without such marks ..... 24
24. Primaries with two brown and two whitish transverse bands of about equal width on first lobe or darker and with a faint scale tuft at middle of third feather of secondaries ..... *albicans*  
Only one narrow pale transverse band, if any..... 25
25. Costal fringes of primaries pale (subapical)..... *xylopsamma*  
Costal fringes dark ..... 26
26. With a dark dot before base of cleft ..... 27  
Without such a dot ..... *albiciliata*

27. With a pale longitudinal dash near costa of primaries above base of cleft in most specimens. Costa usually darker before cleft. Subterminal pale line on first lobe usually traceable. Two spots or a transverse line before cleft in many specimens .....*schwarzii*  
 Costa more evenly colored. Subterminal line rarely faintly marked. A single heavy spot before cleft .....*modesta*

1. PLATYPTILIA RHODODACTYLA D. & S. Pl. XLIII, fig. 3.

*Alucita rhododactyla* Denis & Schiffermueller, Wien. Verz. 146, 1776.

*Pterophorus rhododactylus* Fabricius, Mant. Ins. II, 258, 1787.

Porritt, Ent. Mo. Mag. XII, 88, 1875 (biol.).

*Cnaemidophorus rhododactylus* Wallengren, Skand. Fjäd. 10, 1859.

Tutt, Pter. Brit. 19, 1896 (biol.).

*Platyptilus rhododactylus* Walker, List Lep. Ins. B. M. XXX, 928, 1864.

*Eucnemidophorus rhododactylus* Hofmann, Deutsch. Pter. 58, 1895 (biol.).

*Platyptilia rhododactyla* Meyrick, Handbook 435, 1895.

Dyar, Ent. Rec. XI, 140, pl. 1, f. 4, 1899 (larva).

Meyrick, Gen. Ins. C, 10, 1910.

Id., Wagner's Lep. Cat. pars 17, 11, 1913.

Bright brown, thorax white behind. Antennae dotted with dark brown and white above. Palpi short, scarcely exceeding front. Legs white, femora brown, tibiae with brown tufts, joints of hind tarsi brown tipped. Abdomen without marks.

Primaries crossed by an oblique white band just before cleft. This band widens or turns outward near inner margin, which it does not always reach. First lobe with a slight whitish dash near apex. Disk with vague white spots, one near inner margin one-third from base, and one in cell near middle of wing. Transverse line bordered inwardly opposite cleft by a dark brown dash preceded by an area slightly darker than the ground color. Costa with a few white scales. Outer margin with a dark terminal line, fringes whitish with small tufts of brown scales in their base at apex of both lobes and anal angle of first, and a broad tuft at anal angle of second, gray brown opposite all tufts and in cleft. Hind wings also brown, but of a duller shade than primaries. Third feather white in basal two-thirds with some brown scales. Fringes gray-brown, with white scales along inner margin and at apex of third feather, and a large tuft of brown scales preceding apex. Expanse about 22 mm.

We have been unable to examine the male genitalia of this species, for our series includes only four females.

Distribution: Europe. The only North American specimens which we have seen are the series reared by Miss Murtfeldt at Kirkwood, Mo. Whether the species is actually established on this continent or not, we are unable to say. The series mentioned is dated May and June of several years. We have two of the specimens from

the Kearfott collection, one from Dr. W. T. M. Forbes from the Murtfeldt collection at Cornell, and a single European specimen obtained through Mr. Busck. The Cornell collection contains thirteen other specimens from Miss Murtfeldt and the Fernald collection one.

The life history of the species has been described in a number of places. We reproduce the descriptions of larva and pupa given by Porritt in the Ent. Mo. Mag.:

Larva: "Length about half an inch, and of tolerable bulk in proportion; body cylindrical and strongly attenuated towards the extremities; is considerably retractile, and when at rest has a dumpy appearance; the head is small, globular, smooth and shining, about the same width, or perhaps very slightly narrower, than the second segment; the segmental divisions are distinctly marked; the skin soft, but has a slightly rough appearance, and is sparingly, though conspicuously, clothed with short hairs.

"The ground-colour is a rather bright greenish-yellow, in some specimens yellowish-green; the head is grayish, with the cheeks and mandibles shining black. A very conspicuous purple stripe forms the medio-dorsal line,—from the 2nd to 6th segment this stripe appears as composed of round purplish marks joined at the segmental divisions, consequently the stripe is rather broad; on the remaining segments it is much narrower and more uniform, but equally distinct; the sub-dorsal and spiracular lines are yellow, but only faintly indicated; the segmental divisions are also yellow. The ventral surface and prolegs are uniformly dingy green or yellowish, according to the ground of the dorsal surface; legs black and shining.

"The larvae were found feeding on wild rose, beneath the leaf overlapping the rosebud, eating into the unexpanded bud from the side; others, however, were found feeding in similar positions at the tips of the young shoots. When full-grown those that have been feeding on the buds affix themselves to the side of the leaf close by the bud, and draw the leaf and the bud together by means of a few silken threads; the others draw together in a similar way several leaves at the end of the young shoot.

"The pupa is about three-eighths to half-an-inch in length; pale green, the wing-cases whitish,—the eye- antenna- and leg-cases, also the edging of the wing cases, smoky-black."

Tutt, in the Pterophorina of Britain, quotes these descriptions with a very few additions.

2. *PLATYPTILIA MARMARODACTYLA* Dyar. Pl. XLI, fig. 9. Pl. L, fig. 10.

*Platyptilia marmarodactyla* Dyar, Bull. 52 U. S. N. M. 442, 1902.

Id., Proc. Ent. Soc. Wash. V, 296, 1903.

Meyrick, Gen. Ins. C, 11, 1910.

Id., Wagner's Lep. Cat. pars 17, 13, 1913.

Barnes & McDunnough, Check List 150, 1917.

*Platyptilia pasadenensis* Grinnell, Can. Ent. XL, 317, 1908.

Meyrick, Wagner's Lep. Cat. pars 17, 13, 1913.

Barnes & McDunnough, Check List 150, 1917.

In general brownish-gray, with faint transverse whitish lines on the primaries, producing a wavy appearance. Head and thorax with scales pale edged, the latter with a velvety black area behind, followed by a broad white margin. Abdomen with some whitish scales. Antennae slightly paler below than above, palpi moderate, oblique, exceeding the short blunt frontal tuft. Legs whitish, with dark bands and stripes on fore and mid tibiae. Hind tibiae entirely dark. All tarsi with dark annuli.

Primaries narrow, both lobes crossed near outer margin by a slender, wavy white line. The terminal area is marked with white scales. Transverse line preceded by a dark triangle whose base rests on the costa, and followed by a dark costal dot; in second lobe preceded by a dark shade. A dark transverse line before the cleft is connected to a dark costal triangle, and the space between this and the similar outer mark is pale brownish buff. This pale mark, roughly triangular, is a convenient distinguishing feature of the species. From the apex of the outer dark triangle a dark line usually projects into the pale area. Outer margin crenulate. Fringes greyish, with scattered black scales in cleft and along inner margin, and a basal row of similar scales on the outer margin. Secondaries grey-brown, fringes concolorous, with scattered black scales on inner margin of third feather and a tooth of black scales at two-thirds from base, usually more or less triangular, but variable. Expanse 16-19 mm.

The male genitalia are quite different from those of the species to which *marmarodactyla* seems most closely related. The narrow, regular claspers can readily be examined *in situ* under a binocular.

Distribution: Colo., S. Cal., Ariz., N. M. We have a series of over one hundred specimens from San Diego, Cal., taken from late in April to early June, and late in October. From other California localities we have specimens taken in March, June, July and August; from Arizona, April and July, and from Colorado in July. New Mexico is one of the type localities.

Of the three cotypes submitted to us in the National Museum material, two from Las Vegas Hot Springs, N. M., Aug., were found to represent our conception of this species. The third, from the Santa Rita Mts., Ariz., May 26, 1898, belongs to *crenulata* B. & McD., and bears our label to that effect. The type ♂ of *pasadenensis* Grinnell from Pasadena, Cal., July, proved to be easily referable to this species.

We know nothing of the early stages, except that a label was pinned into the National Museum series saying that the species is

destructive to the flowers of white sage. This may or may not apply to this species, since the label was not attached to a specimen.

3. *PLATYPTILIA CRENULATA* Barnes & McDunnough. Pl. XII, fig. 15. Pl. L, fig. 5.

*Platyptilia crenulata* Barnes & McDunnough, Cont. Nat. Hist. Lep. N. A. II, 185, pl. III, f. 8, 1913.

Id., Check List 150, 1917.

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 135, 1917.

Brownish gray in general appearance, thorax behind and base of abdomen whitish. Abdomen more tawny, with whitish scales and black dorsal dots in posterior margins of some segments. Palpi and antennae concolorous with head, second joint of the former with a slight scale tuft projecting beneath the rather prominent third joint. Fore and mid tibiae brown and white striped, not banded as in *marmarodactyla*; tarsi dark on one side. Hind legs evenly drab.

Primaries tawny gray at base, becoming darker outward, more or less marked with brown and whitish scales. A vague dark triangle on costa before cleft, apically produced. First lobe crossed by a white line at its outer third, whence a heavy dark dash and a dark costal shade run toward base, the latter containing a smaller dash. The region into which these dashes run is pale, as in *marmarodactyla*, but less conspicuous. Terminal area with some whitish scales. Second lobe with whitish scales and a vague indication of a white line. Fringes whitish to grayish tawny, with black scales along inner margin and a basal row on the conspicuously wavy outer margin. Secondaries gray-brown with concolorous fringes. Inner margin of third lobe with scattered black scales and a variable tuft just before apex. Expanse 9-16 mm.

The form of the male genitalia shows that this species is more closely related to *punctidactyla* than to *marmarodactyla*, and this is born out by a close examination of the superficial characters. In general habitus, however, it agrees rather better with the latter species.

Distribution: Described from a series of six specimens, a type ♂ and five "cotypes", from Ft. Myers, Chokoloksee and Everglade, Fla., taken in April and May. We are able to add Arizona and southern California to its range, and it probably occurs in the intervening Gulf States. We have but one Californian specimen from San Diego, and one from Yuma Co., Ariz., May. The cotype of *marmarodactyla* which belongs here was taken in the Santa Rita Mts., Ariz., in May. A superficial examination of the genitalia of this specimen, which is now before us, proves beyond a doubt that we are right in separating it from the remaining cotypes.

Nothing is known of the early stages.

4. *PLATYPTILIA PUNCTIDACTYLA* Haworth. Pl. XLI, fig. 10, 11. Pl. I., fig. 13.

*Alucita punctidactyla* Haworth, Lep. Brit. 479, 1812.

*Alucita cosmодactyla* Huebner, Samml. Eur. Schmett., Aluc. pl. VII, ff. 35, 36, 1823.

*Alucita ulodactyla* Zetterstedt, Ins. Lapp. 1012, 1840.

*Platyptilus cosmодactylus* Walker, List Lep. Ins. B. M. XXX, 929, 1864.

*Platyptilus cosmодactylus* var. *stachydalis* Frey, Mitt. Schweiz. Ent. Ges. III, 290, 1870.

Id., Stett. ent. Zeit. XXXII, 125, 1871.

*Amblyptilus cosmодactylus* Walsingham, Pter. Cat. Ore. 23, pl. 11, ff. 2, 4, 1880.  
Dimmock, Psyche III, 403, 1882.

§*Amblyptilia cosmодactyla* Hofmann, Deutsch Pter. 85, 1895.

*Amblyptilia cosmодactyla* id., op.cit. 89, 1895 (biol.).

*Amblyptilia punctidactyla* Tutt, Pter. Brit. 57, 1896 (biol.).

*Platyptilia cosmодactyla* Fernald, Smith's List Lep. N. A. 87, 1891.

Meyrick, Handbook 433, 1895.

Fernald, Pter. N. A. 25, pl. IX, ff. 1-3, 1898.

Dyar, Proc. Wash. Acad. II, 499, 1900.

Fernald, Bull. 52, U. S. N. M. 442, 1902.

Dyar, Proc. U. S. N. M. XXV, 399, 1902 (biol.).

Id., op. cit. XXVII, 922, 1904 (biol.).

Anderson, Cat. B. C. Lep. 50, 1904.

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Wagner's Lep. Cat. pars 17, 12, 1913.

Barnes & McDunnough, Check List 150, 1917.

Britton, Ins. Conn. 103, 1920.

*Amblyptilia cosmодactyla* ab. *nivea* Bankes, Ent. Rec. XVIII, 39, 1906.

*Platyptilia monticola* Grinnell, Can. Ent. XL, 316, 1908.

Barnes & McDunnough, Check List 150, 1917.

*Platyptilia punctidactyla* Meyrick, Gen. Ins. C, 10, 1910.

Head and thorax clothed with black tipped grayish scales. Antennae dark above and light below, the dark area evidently made up of connected spots. Frontal tuft rather short, bluntly conical, surpassed by the third joint of the concolorous palpi. Legs blackish, with white scales intermixed, and sometimes with imperfect white stripes on the fore and middle tibiae and annulate tarsi. Thorax in well marked specimens black behind with a white W mark. Abdomen very variable in North American specimens, sometimes with a rather evenly colored vestiture of mixed white, tawny and blackish scales, sometimes with a mid dorsal stripe, as in European specimens, made up of paired curved whitish dashes on the several segments, their convex sides together and the included space darker.

Primaries brownish gray to olive-black with a very variable superficial white irroration. Costa with white dots on a blackish ground, running from base to cleft. A black triangle, paler on the costa, reaches just beyond base

of cleft. In some specimens this is reduced or obscured by white scales, leaving a black transverse line before cleft. Beyond this triangle the first lobe is tawny or whitish, often suffused with gray, and blends into a dark shade which precedes the usual transverse white line. Terminal area more or less white-irrorate, apex strongly produced, acute. Second lobe with the transverse line and dark shade in well marked specimens; sometimes even grayish. Fringes white to dark gray, with tufts of black scales along inner margin and a basal crenulate row, sometimes cut with white, on outer margin. Secondaries brownish gray, fringes concolorous. Third feather with black scales along inner margin, a large triangular scale tooth just beyond middle preceded and followed by whitish fringes, and a small tuft at apex. Expanse 20-23 mm.

We have a series from Crater Lake, Oregon, Aug. 1-7, reared by Dr. McDunnough from "*Castilleia* or *Orthocarpus* sp." Most of these specimens are of a very uniform dull gray with white irroration obscuring all marks, and very evenly colored abdomens. In the same series, however, we find specimens which afford us our best comparison with material from Europe. The species is extremely variable with us, and usually much less olivaceous than the European examples which we have seen, tending to black and white.

Distribution: Vancouver Is. to Manitoba, south to N. Ill., Colo. and S. Cal., May to August. Alaska, June, in National Museum. Dyar also records it from Kadiak in July. Europe. The Connecticut record is possible but seems doubtful.

The life history has been worked out by various European entomologists. The food plants on that continent are recorded as *Aquilegia* and *Geranium* (*vide* Tutt) and Frey says that he has reared many from larvae living in the seed capsules of the former. His var. *stachydalis* was described from specimens reared from *Stachys sylvatica*. Tutt expresses doubt that the *Stachys*-feeding species is the same as that on *Aquilegia*. He regards the latter as probably *cosmodactyla* Hbn. and the former as *punctidactyla* Haworth. We follow Meyrick's synonymy, and are unable to say that our North American species is distinct from a specimen of *cosmodactyla* Hbn. from continental Europe, though they are not an exact match in any case. To this confusion we must add Dr. McDunnough's record of "*Castilleia* or *Orthocarpus*" as food plant in Oregon, and Dyar's Colorado record of a larva on *Lonicera involucrata*! We have no mention of Dyar's specimen in our notes on the National Museum material, and so cannot check the identification, but since his is the only description of a North American larva known to us which is even possibly this species, we reproduce it:



"*Larva*.—Head round, vertically bilobed posteriorly, pale testaceous. Body cylindrical, normal, green, a dull crimson dorsal line with a small oblique subdorsal dash on joint 6 and a dash on joints 5 to 12; a white subdorsal line from joint 2 posteriorly to 13 anteriorly and a broken subdorsal one the larger anterior part on each segment oblique. Tubercles small, hairs single, i and ii separate, iv and v approximate, v anterior and dorsal to iv. On thorax ia + ib, iia + iib, iv + v, numerous fine, short, secondary hairs, shorter and easily differentiated from the primary ones, bulbous tipped. Hairs all white, not long, inconspicuous.

"The larva was found resting on the red fruit bract of *Lonicera involucrata*, and was not observed to feed, being matured and pupating immediately. Apparently the larvae do not eat the leaves, but more probably the flowers. Found at Pine Grove, Platte Canyon, altitude about 7000 feet."

A number of pupa cases in the Barnes collection from Crater Lake, Ore., show the following characters: Thorax slender, cylindrical, obliquely truncate in front, with two low, dorsal ridges running back from the head. These are more prominent on the angle of the thorax, and at their posterior ends opposite ends of wing-cases, form prominent leaf-like projections. They are continued on the remaining abdominal segments by rows of low compressed tubercles, acutely produced in front and less so behind. Below the spiracles is a short ridge bearing two small setae on each segment. The sheaths of the appendages are, of course, disarranged, but they show a rather long projection beyond the thorax. The pupa cases are pale, with a reddish tinge about the thorax. They are marked by longitudinal brown lines on the abdomen and two oblique lateral lines on each side of the thorax. We are unable to distinguish them from a European pupa-case of *cosmodactyla*.

We accept Meyrick's arrangement of the synonymy as far as European names are concerned. There seems to be some doubt that *punctidactyla* is the oldest name, so we follow Hagen's dates for Haworth's work. We found the type of *monticola* Grinnell, now in the Southwest Museum, to be a very poor ♂ specimen, scarcely recognizable in this difficult group, and at first referred it to *marmarodactyla* Dyar. A study of the genitalia *in situ* showed us that it did not belong there and subsequent careful examination of the superficial characters convinced us that it was this species.

5. *PLATYPTILIA PICA* Walsingham. Pl. XLI, fig. 12.

*Amblyptilus pica* Walsingham, Pter. Cal. Ore. 21, pl. 11, f. 1, 1880.

*Platyptilia pica* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 24, 1898.

Id., Bull. 52 U. S. N. M. 442, 1902.

Anderson, Cat. B. C. Lep. 50, 1904.

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C, 11, 1910.

Id., Wagner's Lep. Cat. pars 17, 13, 1913.

Barnes & McDunnough, Check List 150, 1917.

Head and thorax clothed with white scales more or less heavily mixed with tawny and brown. Thorax white behind, with two heavy black dashes. Antennae whitish, black dotted above. Palpi concolorous, third joint exceeding the short frontal tuft. All tibiae and tarsi black and white banded, the front and middle tibiae with also a black stripe.

Primaries white to well beyond base of cleft, followed by a black shade which terminates at the usual transverse white lines on the two lobes. Costa black with white spots, and with a heavy black triangle before cleft. Disk with a black spot at one-fourth from base near inner margin, a few black dots near middle of this margin, and a black spot at middle of cell. **Terminal area brownish** with white scales which sometimes cover the darker color. Apex produced, acute; fringes of outer margin grayish, their bases black and white checkered; in cleft blackish, and along inner margin whitish with black tufts. Secondaries gray-brown with concolorous fringes. Inner margin of third lobe with scattered black scales before middle, a large triangular tooth beyond and a small tuft at apex, the tooth preceded and followed by paler fringes. Expanse 17-24 mm.

The abdomen offers the only constant distinguishing feature. Its upper surface is marked with a large white triangle on each segment, apex forward, and the last few segments are almost entirely white. Beneath it is broadly white on its distal half. In some specimens which we refer here the upper surface almost lacks white, but the under surface retains its white patch.

The male genitalia are as in the preceding species (see pl. I, fig. 13).

This description is of typical *pica*. The species varies with a gradual increase in the number of tawny and blackish scales in the white areas, which may be so numerous as to give the insect the appearance of *punctidactyla*. We are inclined to believe that the two are good species, but our material is scanty (eleven specimens) and all from one locality, so we recognize the possibility that *pica* may be merely a form of *punctidactyla*. Meyrick says in a letter of July 17, 1920, that "Scotch examples recently stated to be this are, I think, only vars. of *punctidactyla*; the true *pica* seems to be a good species."

An interesting and valuable piece of biological work for the entomologists of British Columbia lies in the breeding of these species. By that alone can we arrive at really satisfactory conclusions concerning their relationship.

Distribution: Wellington, B. C., May to August. The types were taken at Crescent City, N. Cal., and are in the British Museum. The National Museum collection contains typical *pica* from Mt. Rainier and Seattle, Wash. We have seen one specimen from Vancouver Is. Nothing is known of the early stages.

6. PLATYPTILIA ACANTHODACTYLA Huebner. Pl. XLI, fig. 13. Pl. L, fig. 13a.

†*Pterophorus calodactylus* Fabricius (not D. & S.), Mant. Ins. II, 258, 1787 (*vide* Meyrick).

*Alucita acanthodactyla* Huebner, Samml. Eur. Schmett., Aluc. pl V, ff. 23, 24, 1804-18.

*Platyptilus acanthodactylus* Walker, List Lep. Ins. B. M. XXX, 929, 1864

*Amblyptilia calminthae* Frey, Stett. ent. Zeit. XLVII, 16, 1886.

*Pterophorus acanthodactylus* Porritt, Ent. Mo. Mag. XXIII, 132, 1886 (biol.).

*Amblyptilia acanthodactyla* Fernald, Smith's List Lep. N. A. 87, 1891.

Hofmann, Deutsch. Pter. 85, 1895 (biol.).

Tutt, Pter. Brit 53, 1896 (biol.).

*Amblyptilia acanthodactyla* var. *tetralicella* Hofmann, Deutsch, Pter. 86, 1895.

*Platyptilia acanthodactyla* Meyrick, Handbook 433, 1895.

Fernald, Pter. N. A. 25, 1898.

Id., Bull. 52 U. S. N. M. 443, 1902.

Kearfott, Bull. Am. Mus. Nat. Hist. XXIII, 167, pl. VIII, f. 16, 1907.

Meyrick, Gen. Ins. C, II, 1910.

Id., Wagner's Lep. Cat. pars 17, 12, 1913.

Barnes & McDunnough, Check List 150, 1917.

General color dull brown. Antennae with alternate light and dark spots above in some specimens, usually uniform dull brown. Palpi and frontal tuft concolorous, the latter short, surpassed by third joint of former. Legs whitish with dark bands on tibiae and tarsi; front and middle tibiae also striped; hind pair mostly brown. Abdomen in poor condition in our series, in one specimen brown with a faint trace of a dorsal stripe similar to that of *punctidactyla*. Thorax white behind, with two dark brown dashes.

Costa of primaries dotted with white to the brown triangle before cleft. Disk in some specimens with traces of the wavy white marks found in *punctidactyla* and with the usual vague dark spots near inner margin and in cell. Both lobes with a heavy transverse white line preceded by a dark brown shade. Between this shade and the dark triangle the wing is more or less tinged with tawny, containing a small dark dash on the first lobe. Terminal area tinged

with gray. Outer margin crenulate, apex of first dots acute, produced. Fringes grayish with paler bases, including tufts of dark scales on inner margin and a basal row on outer, sometimes cut with white. Secondaries as in *punctidactyla*. Expanse 18-22 mm.

Male genitalia as in *punctidactyla* (see plate L, fig. 13), with the uncus slightly more slender.

Distributions: Europe. We have ten specimens from Carmel, Cal., taken in April and two from the San Bernardino Mts., Cal., taken in June and July. The species is in the Fernald collection labelled West Farms, N. Y.

The early stages have been studied in Europe, and the following description of the larva is given by Porritt.—After noting that the larva is very like that of *punctidactyla* he writes: "As in that species there are two distinct forms, and intermediate varieties occur partaking more or less of each of these extreme forms:—

"Var. I has the ground color deep purple; head yellowish-grey, or yellowish-brown, marked on the crown and sides with black, the mandibles brown; medio-dorsal stripe smoke-coloured; sub-dorsal lines, and another line of equal width below it, white, but interrupted and not very conspicuous; and below these is another scarcely so pale line along the spiracles; hairs and the distinct tubercles white. Ventral surface and prolegs greenish-olive, anterior-legs shining black, ringed with paler.

"Var. II has the ground color bright pale green; head as in Var. I; the pulsating dark smoky vessel—in some specimens tinged with pink anteriorly—forms the dorsal stripe; sub-dorsal lines indistinct, whitish; below these is another line, but much interrupted and broken into short lengths; there are no lines along the spiracular region; hairs and tubercles white. Ventral surface and prolegs of the bright green of the dorsal area, the legs shining black, ringed with white."

Tutt writes briefly of the pupa as follows:

"The pupa appears to vary in ground colour to the same extent as the larvae, the ground colour varying from pale green to dark purple, but getting darker in the paler forms just before emergence. In this species, as in the next, [*punctidactyla*] the antunae cases are quite detached, and these, with the two curious curved protuberances specially characteristic of this genus [*Amblyptilia*], give it a very strange and curious appearance."

Tutt and Hofmann, in summarizing the biological knowledge of the species, both mention *Stachys*, *Ononis*, *Geranium* and *Pclargonium* as food-plants, and Hofmann adds *Salvia*, *Euphrasia*, *Bartsia*, *Mentha* and a few others. It is mentioned as feeding on the buds of most of these, and in one case on leaves.

## 7. PLATYPTILIA TESSERADACTYLA Linn. Pl. XLI, fig. 17. Pl. L, fig. 8.

*Alucita tesseradactyla* Linnaeus, Faun. Suec. 370, 1761.

*Pterophorus tesseradactylus* Fabricius, Mant. Ins. II, 259, 1787.

*Pterophorus fischeri* Zeller, Isis X, 781, 1841.

*Platyptilus fischeri* Gartner, Wien. ent. Mon. VI, 331, 1862.

*Platyptilia tesseradactyla* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 33, pl. VIII, ff. 8, 9, 1898.

Id., Bull. 52 U. S. N. M. 444, 1902.

Dyar, Proc. U. S. N. M., XXVII, 923, 1904.

Anderson, Cat. B. C. Lep. 50, 1904.

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C, 11, 1910.

Winn, List Ins. Que. 85, 1912.

Meyrick, Wagner's Lep. Cat. pars 17, 13, 1913.

Barnes & McDunnough, Check List 150, 1917.

§*Platyptilia tesseradactyla* Hofmann, Deutsch. Pter. 64, 75, 1895 (biol.).

Vestiture of brownish gray scales, mixed and overlain with whitish scales. Antennae dotted with white above. Palpi small, so that they appear scarcely to exceed the front. Legs whitish tinged with brown on one side. Abdomen with white scales in posterior margins of segments. Thorax white behind.

Primaries rather evenly grayish, the markings produced by variation in the mixture of white scales, and therefore powdery and indefinite. Costa darker, dotted with white, with the usual dark triangle, sometimes very vague, before cleft. This contains two dark dots connected by a transverse shade, variably distinct, just before cleft. Outer transverse white line present, incomplete on second lobe. Sometimes with a vague dark dot in cell and blotch near middle of inner margin. Fringes whitish with gray tips, with dark tufts at apex and anal angle of each lobe, two on inner margin, and a basal row of dark scales along outer margin. Secondaries brownish gray, fringes slightly paler with dark scales at tip of each lobe and a weak tuft of approximately equal dark scales just beyond middle of inner margin of third lobe, sometimes preceded by scattered scales. **Expanse** 16-20 mm.

The male genitalia are very simple.

Distribution: Europe. Quebec to N. Y. and Pa., Colo. We have a series from New Brighton, Pa., taken in May (Merrick), one from Durham, N. H., and a single ♂ from Silverton, Colo., taken early in August. There are New York specimens taken in April and May in the Cornell collection and two Mass. specimens in the Fernald collection. In the last there is also one specimen from Marshall's Pass., Colo., taken July 15, 1888. Dyar lists it from the Kootenai District, B. C.

European specimens in our possession are more brownish and contrasty than North America, but they show no definite superficial differences, and the genitalia are the same in specimens from both continents.

Under the synonym *fischeri* Gartner gives an account of the early stages which we translate as follows:

The egg is pale green, polished and elongate-spherical, and the larva in its first stage (zartesten Alter) cream-white with separate hairs, black head, similar cervical and anal shields; later (in September) it bears dorsal and lateral rows of red-brown dots and after hibernation (middle of March) it has become stout, without having increased much in length. Head, cervical and anal shields dark brown, dorsal stripe carmine-red, made up of three-cornered spots; similar but finer subdorsal and lateral stripes. The ground-color of the body yellowish, belly reddish. In its adult state the larva is small before and behind, cylindrical in the middle; the small head black; the cream-white cervical shield bears a small black shield-shaped spot (? Schildfleck), which is divided with light (shades); the color of the body is dark red-brown, the back has on each segment a white spot with two pairs of black spots, of which the posterior is widely separated; there are also such spots on the sides, upon which stand pale hairs; anal shield and claws (!) dark brown. In addition the larvae vary frequently in the shade of its color.

The slender pupa is tapered behind, the head brownish dark gray, which color extends over the thorax. Eyes dark, with the point of the head between them. On the sides of the back the color of the body is ivory yellow (beingello), the row of dorsal spots and the lateral arched design darker; above the cremaster is a lone, thickly ciliated, somewhat projecting point. The wing cases are light greenish, the projecting leg-cases, which are free for three and one-half segments, brownish; before the hairy cremaster, ventrad, are two points. The older the pupa, the more brownish-gray mottled it is.

The food plant given by Gartner is *Gnaphalium dioicum* L., to which Hofmann adds *G. arcuarium*.

8. *PLATYPTILIA CARDUIDACTYLUS* Riley. Pl. XLIII, fig. 1.

*Pterophorus carduidactylus* Riley, Mo. Rept. I, 180, pl. II, ff. 13, 14, 1869 (biol.).

Id., op. cit. III, 67, 1871.

Murtfeldt, Am. Ent. III, 235, 1880.

*Platyptilus carduidactylus* Zeller, Stett. ent. Zeit. XXXII, 179, 1871.

Dimmock, Psyche III, 403, 1882.

Id., op. cit. 413, 1882.

‡*Platyptilia cardui* Zeller, Verh. z.-b. Ges. Wien XXIII, 318, 1873.

Walsingham, Biol. Cent. Am., Lep. Het. IV, 438, 1915.

*Platyptilus cardui* Walsingham, Pter. Cal. Ore 7, pl. I, f. 6, 1880.

Kellicott, Bull. Buff. Soc. Nat. Sci. IV, 47, 1882 (biol.).

Hy. Edwards, Bull. U. S. N. M. 35, 136, 1889.

- Pterophorus cardui* Riley, Index to Mo. Rept. 83, 1881.  
 ‡*Platyptilia carduidactyla* Fernald, Smith's List Lep. N. A. 87, 1891.  
 Id., Pter. N. A. 26, pl. II, ff. 1, 2; pl. VII, ff. 8-11, 1898.  
 Id., Bull. 52, U. S. N. M., 443, 1902.  
 Dyar, Proc. U. S. N. M. XXVII, 923, 1904.  
 Anderson, Cat. B. C. Lep. 50, 1904.  
 B. C. Ent. Soc. Check List 42, 1906.  
 Meyrick, Gen. Ins. C, 11, 1910.  
 Winn, List Ins. Que. 85, 1912.  
 Meyrick, Wagner's Lep. Cat. pars 17, 13, 1913.  
 Barnes & McDunnough, Check List 150, 1917.  
*Platyptilia hesperis* Grinnell, Can. Ent. XL, 316, 1908.  
 Meyrick, Wagner's Lep. Cat. pars 17, 15, 1913.  
 Barnes & McDunnough, Check List 150, 1917.

Brownish buff, thorax whitish behind. Antennae dotted with brown above. Frontal tuft moderate, blunt, surpassed by third joint of oblique palpi. Front and middle legs brownish inside, dark without, the tarsi distinctly pale. Hind tibiae with two broad brown bands; tarsi with at least the second joint entirely whitish.

Primaries with the costa dark brown dotted with white as far as the usual brown triangle, which is much the darkest part of the wing. Disk with blotches near inner margin at about one-fourth and three-fifths from base, and a spot in cell. The heavy triangle contains a dark transverse dash before cleft which is visible only in paler specimens. Beyond triangle there is a transverse line of ground color, often obsolete except on costa; both lobes thence pale brown, crossed by a vague light line toward outer margin; terminal area usually with some hoary scales. Fringes grayish-buff with a row of brown scales in base along outer margin, gray tufts at apices and anal angles, and two dark brown scale tufts on inner margin. Apex acute, moderately produced. Secondaries gray-brown, fringes slightly paler with short dark scales at apices of first two lobes. Fringes of inner margin of third lobe with a prominent triangular tooth of dark brown scales at middle, its point perhaps slightly before middle of lobe. This tooth is preceded and followed by a variably complete row of short, dark scales, and the lobe is whitish before it. Expanse 20-27 mm.

The species varies to a duller brown, sometimes with a purplish tinge, and reduced contrasts. Darker specimens show some superficial whitish vestiture.

Male genitalia as in *pernodactyla* Wlsm. (see plate L, fig. 14).

Distribution: Laborador (Aug.) to D. C. (May), west to the Pacific Coast. We have it from various localities taken in every month from May to September, inclusive.

Riley, in his initial paper on the species, gives an interesting account of the early stages. According to this account the larvae are gregarious, living in webbed heads of common thistles. Eight to

twelve are said to live together, and different stages may be found in one group. The pupal instar lasts one week. Riley apparently did not learn the stage of hibernation, and we are unable to supply this information. He describes the larva and pupa as follows:

"*Larva*.—Average length 0.60. Largest in the middle of body, tapering thence each way. Color light straw-yellow—greener when young. Somewhat darker, partly translucent, dorsal, subdorsal and stigmatal lines. Two lateral rows of black spots, the lower spots rather smaller and placed behind the upper ones. A third row above these, and others along the back, but so small that they are generally imperceptible with the naked eye, except on the thoracic segments, being especially distinct on segment 2. Head small, black, sometimes inclining to brown. Cervical shield black, divided longitudinally in the middle by a higher line. Caudal plate also black. Segment 11, besides the spots above mentioned, has two transverse black marks, the posterior one the largest. Thoracic legs black, the others of the same color as the body."

"*Pupa*.—Average length 0.45.—Soft, dull yellow, with a lateral dusky line, each side of dorsum, and another, less distinct each side of venter. Also dusky about the head and wing-sheaths."

From two voided pupal skins we are able to add that the pupa is much less angular and rather stouter than that of *punctidactyla* already described. The dorsal ridges are present, but very low, and the leaf-like projections and tubercles are not at all developed. The cases of the appendages form a very short ventral process.

We have had much difficulty in deciding whether or not this and the following species are distinct, and have come to the conclusion that they probably are. The differences are mentioned under *percnodactyla*. The types of *hesperis* Grinnell belong to *carduidactyla* according to our concept.

9. *PLATYPTILIA PERCNODACTYLA* Walsingham. Pl. XLIII, fig. 2. Pl. L, fig. 14.

*Platyptilus percnodactylus* Walsingham, Pter. Cal. Ore. 8, pl. 1, f. 7, 1880.

‡*Platyptilia percnodactyla* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 27, pl. VIII, ff. 14, 15, 1898.

Id., Bull. 52 U. S. N. M. 443, 1902.

Anderson, Cat. B. C. Lep. 50, 1904.

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C. 11, 1910.

Id., Wagner's Lep. Cat. pars 17, 14, 1913.

Barnes & McDunnough, Check List 150, 1917.

The appearance of this species is substantially that of the preceding, and for a time we regarded them as the same. We have con-



cluded, however, that their distinctness is sufficiently probable to warrant the retention of both names. Walsingham, in describing this species, contrasts it with Riley's, and says that it has shorter fore wings with a less prominent apex, and that it is in general less robust. We have carefully studied a large series from all parts of the country, and are convinced that the species cannot always be separated on this basis. Fernald separates them in his monograph on a difference in the extent of the brown bands on the hind tibiae. This we regard as wholly insufficient. The series which we finally retain as *percnodactyla* differs from our *carduidactyla* in the greatly reduced scale tooth. In *carduidactyla*, as noted, this is distinctly triangular. In *percnodactyla* it is often very weak, and is made up of approximately equal length. The two paratypes in the Fernald collection, and, according to Meyrick's comparison of our specimen, Walsingham's own series, have this type of scale tooth.

Distribution: B. C. to Alta., south to Wyo., Utah and S. Cal., June to August.

The early stages are unknown, and may, when studied, clear up the standing of the species.

10. *PLATYPTILIA CAROLINA* Kearfott. Pl. XLI, fig. 16. Pl. I., fig. 15. *Platyptilia carolina* Kearfott, Bull. Am. Mus. Nat. Hist. XXIII, 155, pl. VIII, f. 17, 1907.

Meyrick, Wagner's Lep. Cat. pars 17, 16, 1913.

Barnes & McDunnough, Check List 150, 1917.

Tawny. Frontal tuft prominent, conical. Palpi oblique, exceeding tuft; second joint with a short tuft projecting below third. Antennae dotted with brown above. Legs brownish within, whitish outside; hind pair slightly darker at bases of spurs and ends of tarsal joints. Abdomen with paired white spots in terminal margins of several segments. These are not evident in some of our specimens, probably due to stain.

Primaries colorous with body at base, often darkening toward apex. Outer margin with a few dark scales, costa brown before apex and cleft preceded by two brown dots. Other marks very variable, consisting of the two usual discal spots and dark triangle. Lobes crossed by a pale outer line, poorly marked in most specimens and sometimes absent. Fringes whitish with a basal row of dark brown scales along outer margin, pencils of grayish hairs at apices and inner angles, and two brown scale teeth and some scattered scales on inner margin. Secondaries rather darker than primaries with more grayish fringes. Inner margin of third lobe with scattered brown scales in the fringes and in its outer third a small scale tooth, sometimes lacking. Expanse 18-26 mm.

Distribution: N. J., N. C., Utah, Cal. May to Sept.

Two of the cotypes, a ♂ and a ♀, are in the Barnes collection. These are North Carolina specimens taken in May and June in the Black Mountains, and are the lightest and brightest of our series. Four from New Jersey, taken in June, August and September, differ in the stronger brown markings. The Utah specimens were taken in July and August, and are rather dull and evenly colored, and the one Californian example, from Carmel, June, is similar. We regarded the western specimens as a distinct species for a time, and separated them by the even color and moderate apex of the primaries. In the New Jersey specimens the apex is sharply produced and the outer margin of the first lobe deeply concave, but we note that there is some variation, and that one of the cotypes has the apex nearly the same as the western series.

The remainder of Kearfott's series is in the American Museum.

Some specimens are almost as dull as *albiciliata* Wlsm. but differ in possessing scale teeth on the inner margin of the primaries and in a few minor points. The uncus is more pointed in *carolina* and broadly spatulate in *albiciliata*. In slides of the former it is sometimes flattened so that the tip is somewhat spatulate, but it does not show this form *in situ*.

#### 11. PLATYPTILIA EDWARDSII Fish. Pl. XLIV, fig. 1.

*Platyptilus edwardsii* Fish, Can. Ent. XIII, 72, 1881.

*Platyptilia edwardsii* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 25, pl. VII, ff. 6, 7, 1898.

Id., Bull. 52 U. S. N. M. 443, 1902.

Meyrick, Gen. Ins. C, 10, 1910.

Winn, List Ins. Que. 85, 1912.

Meyrick, Wagner's Lep. Cat. pars 17, 11, 1913.

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 135, 1917.

§*Platyptilus edwardsii* Beutenmueller, Bull. Am. Mus. Nat. Hist. IV, 198, 1892

‡*Platyptilia edwardsii* Barnes & McDunnough, Check List 150, 1917.

Head brownish with a mixture of whitish scales; thorax somewhat hoary, whitish behind; abdomen apparently with a dark mixture of gray-brown and ochreous scales, beneath with converging whitish dashes. Antennae sometimes dotted above. Palpi moderate, oblique, scarcely exceeding the short, conical frontal tuft. Fore and mid tibiae whitish with dark brown stripes, tarsi and hind legs with dark shades.

Primaries buff, frequently tinged with brown and hoary with whitish scales, the buff appearing only in the pale markings and along the inner margin. The usual dark triangle, blackish brown, contains a heavy transverse dash, scarcely visible, before cleft. Brown shade continued along costa to base, toward

which it becomes faint. Brown spot in cell is usually connected with costa. Inner margin frequently with brown shades. Both lobes with pale outer line, incomplete on second, preceded by a heavy brown shade which blends into buff or grayish toward triangle. This shade on first lobe sometimes paler, showing a heavy brown dash near cleft. Terminal area hoary with whitish scales over brown. Fringes whitish with a row of dark brown basal scales cut with white on outer margin. Inner margin with two slight dark scale teeth. Apex moderate. Secondaries gray-brown with concolorous fringes which have pale bases on inner margin of third feather and there contain scattered brown scales and a variable, but always weak tuft of slender, almost equal brown scales within outer third of feather. Expanse 19-29 mm.

The male genitalia resemble those of *carolina* (see plate L, fig. 15).

Distribution: Mass., N. H.; Fernald adds Maine and Winn lists it from Que. in July; B. C., Wash., July and August.

The early stages are unknown.

*Edwardsii* was described from two males and three females taken at Boston by Hy. Edwards and five males and one female from Amherst., Mass., by L. W. Goodell. Of the first five, one male and one female are now in the American Museum, and the remaining three in the Fernald collection. One of these, a male, we have labelled lectotype; the others are a female and a specimen without abdomen. We know nothing of the types from Amherst, though a fragmentary specimen with a type label in the Fernald collection may be one of them. This collection also contains a series of fifteen specimens labelled only "T 6/9" or "T 6/10". One of these is labelled as a type, but the word "type" is crossed out. We have seen several specimens from the Hope Mts. (Day) and Mt. Cheam, B. C. (Blackmore). The one Washington specimen which we include in our series was taken in the third week of July on Mt. Rainier. Its expanse is only 19 mm., seven under the usual minimum, but it seems to be a dwarf of this species without doubt.

Many of the specimens in the Fernald collection are moderate in size and rather dark. We have felt that these may possibly be confused with the following species, and hence selected the large male type as lectotype. There is no reason to believe that the types are not all of the same species, however.

12. *PLATYPTILIA AURIGA* n. sp. Pl. XLIV, fig. 2.

General color gray, with a very slight brownish tinge. Scales of head and thorax with paler bases, thorax whitish behind. Antennae spotted above. Frontal tuft short, conical; palpi rather long, oblique, slender. Fore and mid tibiae black-striped, tarsi with slight dark shades on one side. Hind legs grayish with darker bands, three distal tarsal joints mostly whitish. Abdomen with diverging light and dark stripes above, sometimes obscured (stained?) except in posterior margins of segments, and parallel stripes below.

Primaries dull dark gray, variably, usually slightly, irrorate with white scales. Cleft preceded by a transverse black dash which forms the outer margin of an imperfectly developed triangular patch reaching the costa but fading out basad. Cleft outlined with blackish in its basal half. Both lobes with blackish dashes reaching the outer pale line, which is more or less incomplete. Dashes sometimes obscured in a general dark shade. Fringes white, gray tipped, with black basal scales on outer margin. Apices and anal angles with gray fringes, inner margin with several scale teeth and scattered black scales. Secondaries and their fringes concolorous with primaries. Fringes of inner margin of third feather with pale bases containing numerous black scales and a somewhat triangular tooth just before apex. Expanse about 18 mm.

Holotype ♂, paratype ♂, paratype ♀, and an indeterminate paratype, Essex Co. Park, N. J. (Kearfott), May, June and Sept., in coll. Barnes.

Allotype, Greenwood Lake, N. J., May 30 (Kearfott), coll. Barnes.

Paratype ♂, Black Mts., N. C., May (Beutenmüller), coll. Barnes.

Paratype ♂, Essex Co. Park, N. J., Aug. U. S. N. M. No. 23461.

In addition to the types we have a single broken specimen from Montclair, N. J.

The early stages are unknown.

This species resembles dark specimens of *edwardsii* and is not unlike the female which we are calling *williamsii* Grinn., but the form and position of the black scale-tooth alone suffice to distinguish it. The markings of the abdomen are useful in good specimens. The male genitalia resemble those of *carolina* (see plate L, fig. 15).

13. *PLATYPTILIA WILLIAMSII* Grinnell. Pl. XLI, fig. 14.

*Platyptilia williamsii* Grinnell, Can. Ent. XL, 315, 1908.

Meyrick, Wagner's Lep. Cat. pars 17, 14, 1913.

‡*Platyptilia williamsi* Barnes & McDunnough, Check List 150, 1917.

Head and thorax with mixed ochreous-brown and whitish scales. Antennae brown dotted above; frontal tuft moderate, conical; palpi longer than head, rather stout, almost porrect. Abdomen stained in our one specimen, brown, hoary above, according to Grinnell. Hind legs as described by Grinnell, brown and white banded, but others shaded on one side.

The primaries appear to be gray with blackish marks, but under a lens they are seen to be more ochreous-brown with dark brown patches, with white irroration forming a trace of transverse wavy lines and dotting the brown costa. The brown triangular spot is poorly defined toward base of wing. Cell with a brown spot. Our one female has the basal half of the cleft margined with dark brown and the outer white line preceded by heavy dark patches which are apparently continuous to the naked eye. Terminal area distinctly hoary. Apex rather prominent. Fringes brownish gray with whitish bases containing brown and white scales. Inner margin with numerous scattered black scales and a few small clusters. Secondaries gray-brown with concolorous fringes. Third lobe with a slight triangular scale tooth at middle, as in *carduidactyla*, preceded by scattered black scales.

We have the following note on the type: Unique type lacks the subterminal dark area of the compared specimen, this region being even brown. Otherwise type is less contrasty. The two agree in the form of markings, palpi, and fairly well in the scales of the third feather of the secondaries; here the compared specimen has a more definite tuft.

Grinnell's type was reared from the head of a composite flower at Lake Merced, San Mateo Co., Cal., in May. Our specimen is labelled "Larva in flowers of *Grindelia robusta*. Alameda Co., Cal. Dec." Considering this similarity of larval habit and several peculiarities common to the two imagines, notably the long palpi and position of the scale tooth, we think that the two specimens are of the same species and that the additional data supplied by ours may be applied here without hesitation.

14. *PLATYPTILIA ORTHOCARPI* Walsingham. Pl. XLIII, fig. 4.

*Platyptilus orthocarpi* Walsingham, Pter. Cal. Ore. 11, pl. 1, f. 9, 1880.

Dimmock, Psyche 111, 403, 1882.

Hy. Edwards, Bull. 35 U. S. N. M. 136, 1889.

*Platyptilia orthocarpi* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 29, 1898.

Id., Bull. 52, U. S. N. M. 443, 1902.

Meyrick, Gen. Ins. C, 11, 1910.

Id., Wagner's Lep. Cat. pars 17, 14, 1913.

Barnes & McDunnough, Check List 150, 1917.

Head and palpi brownish ochreous, the latter moderate, oblique, touched with white above and below. Antennae with dark dots above. Thorax mostly whitish in front and behind, brownish ochreous across tips of patagia. Legs whitish with pale brownish shades, the fore and mid tibiae sometimes with traces of stripes lost in the dark areas. Abdomen brownish ochreous with two

black points and some white scales in posterior margin of each segment beyond middle; similar below, with two pale ventral stripes.

Primaries ochreous along inner margin, mixed brown and white with a few ochreous scales toward costa. Costa itself narrowly blackish brown with white dots. Dark triangle before cleft. Terminal area brown, hoary with white scales, preceded by a faint transverse pale line, less complete on second lobe. Spaces between this and triangle ochreous irrorate with white, with an elongate triangular brown dash and costal shade on first lobe and two dashes on second. Cleft margined with a few dark scales. Fringes white, grayish at angles, with the usual basal dark brown scales along outer margin. Inner margin with scattered brown scales and two poorly marked clusters. Secondaries brown, third feather more ochreous. Fringes more grayish with white bases along inner margins and at apices of first two lobes, containing a few brown scales in basal half of third lobe. Expanse 20-26 mm.

We have not examined the genitalia of a typical example. In forms which may belong to this species they are similar to those of *carolina*, but with a broadly spatulate uncus.

Distribution: Type locality N. Ore.; one paratype ♀ is in the Fernald collection. We have a single typical specimen from British Columbia, taken by Mr. C. O. Day in June.

The types were reared from a species of *Orthocarpus*, but we have no knowledge of the early stages beyond this.

We doubtfully associate with this species a number of specimens from Utah, Colo., Nev., Mont. and Cal., taken May to July. Meyrick returned some of these specimens as *orthocarpi* after comparing them with the types in the British Museum, and though they are easy to separate from the typical form, we find it hard to believe that they are not very closely related to it. Together with *fragilis*, *shastae* and *albida* they make up an extremely difficult group which we are inclined to believe in a state of evolution. The named forms can be recognized, but whether to regard them as forms and races of one species or as distinct species is a question which we are unable to decide. We give here a general characterization of the group, and under each name point out the features which we regard as distinctive of that form.

The head, body and appendages are as described under *orthocarpi*, varying in shade from white to dark grayish and ochreous, and with the legs variably marked. The markings of the abdomen are reduced or absent.

The primaries vary from ochreous buff to white or dull grayish. The dark triangle is always present, brown to dark brownish gray, continued in a white-dotted costal stripe toward base. Lobes crossed by pale line and triangle followed by a pale shade, the included space with a brown or gray shade, rarely with the dark dashes of *orthocarpus* indicated by a few dark scales. Terminal area hoary. Fringes as in *orthocarpus*. Spot in cell and near base and middle of inner margin variable. We regard *orthocarpus* as properly included in this group, but give a separate description of it because the typical form is so distinct. As in that species, the genitalia of the three following resemble those of *carolina* but have a broadly spatulate uncus.

15. *PLATYPTILIA FRAGILIS* Walsingham. Pl. XLIII, fig. 5.

*Platyptilus fragilis* Walsingham, Pter. Cal. Ore. 16, pl. I, f. 12, 1880.

*Platyptilia fragilis* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 28, 1898.

Id., Bull. 52, U. S. N. M., 443, 1902.

Anderson, Cat. B. C. Lep. 50, 1904.

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C, 11, 1910.

Id., Wagner's Lep. Cat. pars 17, 14, 1913.

Barnes & McDunnough, Check List 150, 1917.

†*Stenoptilia coloradensis* Grinnell, Can. Ent. XL, 321, 1908 (in part).

In this form the general color is more or less buff or brownish, the marks of the primaries usually all present and well marked. The fore and middle tibiae are definitely striped, and the hind tibiae and tarsi usually with evident dark bands on a whitish ground. Expanse 20-24 mm.

Distribution: Ariz., Cal., Wash. east to Colo. July, Sept.

Brightly marked specimens of this group with buff or brownish appearance and conspicuous maculation may safely be placed here. The doubtful specimens mentioned under *orthocarpus* may belong to this form.

16. *PLATYPTILIA ALBIDA* Walsingham. Pl. XLIII, fig. 6.

*Platyptilus albidus* Walsingham, Pter. Cal. Ore. 10, pl. I, f. 8, 1880.

‡*Platyptilia albida* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 29, pl. VIII, ff. 10, 11, 1898.

Id., Bull. 52 U. S. N. M. 443, 1902.

Meyrick, Gen. Ins. C, 11, 1910.

Id., Wagner's Lep. Cat. pars 17, 15, 1913.

Barnes & McDunnough, Check List 150, 1917.

In *albida* the legs are marked as in *fragilis* and the wings show about the same dark areas, but of a much colder shade of brownish-gray, almost black.

The head and body are whitish above. On the primaries all pale areas are heavily clothed with whitish scales and all dark spots but the large triangle more or less irrorate with white. Expanse about 21 mm.

Distribution: The types were taken on the Rouge River, S. Ore., and in Lake County, Cal., in May and June respectively. We have four specimens from Monache Meadows, Tulare Co., Cal., taken at an altitude of 8000 ft. in July.

There are two paratypes in the Fernald collection. One lacks the wings on one side, and agrees with our specimens as described above. The other is in good condition and is less contrasty.

From some two hundred specimens of this group in the Barnes collection, including a good series from the locality mentioned above, we have picked only the four specimens which seem to us typical of this form. Others from the same locality appear to be nearer *fragilis* and *shastae*.

17. *PLATYPTILIA SHASTAE* Walsingham. Pl. XLIII, fig. 7.

*Platyptilus shastae* Walsingham, Pter. Cal. Ore. 14, pl. I, f. 11, 1880.

Dimmock, Psyche III, 403, 1882.

*Platyptilia shastae* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 28, 1898.

Id., Bull. 52 U. S. N. M. 443, 1902

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C, 11, 1910.

Id., Wagner's Lep. Cat. pars 17, 15, 1913.

Barnes & McDunnough, Check List 150, 1917.

*Shastae* is in general of cold shades, but much darker than *albida*. The legs, as noted in the key, tend more to a variably complete suffusion of gray and the head and body are usually noticeably gray above. The spots near the inner margin of the primaries are completely lacking in the typical form, and that in the cell is fused with the dark costal area. All other marks are as in *albida* and the other forms, but the wings have a vaguely marked, dull-gray appearance. Expanse about 22 mm.

Distribution: California, June and July; Utah, June. The type locality is Mt. Shasta, where the types were taken at an altitude of 6,700 ft.

18. *PLATYPTILIA ALBIDORSELLA* Walsingham. Pl. XLIII, fig. 9.

*Platyptilus albidorsellus* Walsingham, Pter. Cal. Ore. 13, pl. I, f. 10, 1880.

‡*Platyptilia albidorsella* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 30, pl. VIII, ff. 5-7, 1898.

Id., Bull. 52 U. S. N. M. 443, 1902.

Meyrick, Gen. Ins. C, 11, 1910.



Id., Wagner's Lep. Cat. pars 17, 14, 1913.

Barnes & McDunnough, Check List 150, 1917.

†*Stenoptilia coloradensis* Grinnell, Can. Ent. XL, 321, 1908 (in part).

*Albidorsella* is closely related to the several preceding species, but we do not doubt its distinctness. We have two specimens from the Monache Meadows, taken in July, which, with two other Californian specimens in coll. Fernald, are very similar in appearance to *shastae* as already described. One specimen from San Diego is much brighter, approaching *albida* but more heavily marked and with less whitish. The expanse of these specimens ranges from 27 to 30 mm. We regard the faint scale tuft in the fringes of the third feather of the secondaries as the distinguishing feature of the species. This tuft is made up of slender dark scales and is not readily noticed without the aid of a lens. It occurs just before the apex of the lobe, and is preceded by only a few scattered dark scales. Such a tuft appears in a few specimens which we refer to *maca*, but these may be separated by their smaller size and the absence of a well defined costal triangle.

The male genitalia resemble those of the preceding group.

19. *PLATYPTILIA GRANDIS* Walsingham. Pl. XLIV, fig. 6.

*Platyptilus grandis* Walsingham, Pter. Cal. Ore. 6, pl 1, f. 5, 1880.

*Platyptilia grandis* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 30, 1898.

Id., Bull. 52, U. S. N. M. 443, 1902.

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C, 12, 1910.

Id., Wagner's Lep. Cat. pars 17, 15, 1913.

Barnes & McDunnough, Check List 150, 1917.

Buff. Antennae with brown dots above. Frontal tuft very short; palpi moderate. Abdomen with subdorsal and lateral black spots in posterior margins of segments. Triangular spot on primaries light brown with its angle opposite cleft blackish. Spot in cell blackish, light brown shades near inner margin at one quarter from base and at middle. Both lobes with similar shades, crossed by a whitish outer line. Fringes white, containing a row of blackish scales along outer margin and a few clusters on inner. Secondaries pale, dull brown, fringes with paler bases. Third lobe buff along inner margin, with a few light brown scales in fringe. Expanse 36 mm.

Distribution: Siskiyou Co., Cal. The three types were taken on McLeod Creek, near Mt. Shasta, and the one female in our possession at Shasta Retreat, all in August. Its occurrence in British Columbia is not improbable, but we cannot verify it.

This magnificent species is so easily recognized that we give only a brief description of it. One paratype is in the Fernald collection, without abdomen, and is the only specimen which we have seen besides the female mentioned above. Walsingham's figure is rather browner than either of these.

The early stages are still unknown.

20. *PLATYPTILIA ALBICILIATA* Walsingham. Pl. XLIII, fig. 10. Pl. L, fig. 15u.

*Platyptilus albiciliatus* Walsingham, Pter, Cal. Ore. 17, pl. 1, f. 13, 1880.

‡*Platyptilia albiciliata* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 32, pl. IX, ff. 6-8, 1898.

Id., Bull. 52 U. S. N. M. 443, 1902.

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C, 12, 1910.

Id., Wagner's Lep. Cat. pars 17, 16, 1913.

Barnes & McDunnough, Check List 150, 1917.

The paratype in the Fernald collection is, as described by Walsingham, of an even dull brown shade. It has a very faint indication of the dark triangle, and the thorax is somewhat lighter behind. The palpi are moderate, oblique, and the frontal tuft very short and blunt.

We refer five specimens, four from British Columbia and one from Montana, to this species. These differ in having the triangular spot well marked, the outer pale line evident at least on the first lobe, and some irroration of bluish-white scales on the disk. The fringes, as in the paratype, are grayish with pale bases which bear a row of dark scales on the outer margin. The inner margin in the paratype and four of our specimens has only a trace of scale clusters. The secondaries are concolorous, their fringes with pale bases, sometimes conspicuous, and a few scattered brown scales along the inner margin of the third lobe. Expanse about 21 mm.

Distribution: N. Cal. to B. C. Montana? Late May to July.

The specimen which we first took to be this species are those now placed tentatively as *carolina*. They differ in their lighter, more tawny shade of brown, in the two well marked scale tufts on the inner margin of the primaries, and the more pointed uncus. Fernald's figure shows that in his paratype of *albiciliata* the uncus was broadly spatulate at the tip, and our British Columbia series agree in this structure, as well as in the dull ground color. We had set these specimens aside as new, but have little hesitation in applying this name to them, though they are distinctly marked. It is quite likely that Walsingham's series of six, taken on the same day, were an abnormally

dull form, as was the case with one other of his species. Our Montana specimen is more doubtful.

The early stages are unknown.

21. *PLATYPTILIA MAEA* n. sp. Pl. XLIII, fig. 8.

Head and body grayish white with some brown scales. Abdomen with dark subdorsal lines just beyond middle and similar lines below. Antennae brown dotted above; frontal tuft very slight; palpi moderate, slender. Fore and mid tibiae whitish with dark lines. Legs otherwise whitish with gray-brown shading which usually predominates.

Primaries with a dark dot before cleft and a costal shade above which indicate the outer limits of the usual triangle, but in this case they are vaguely connected by a brownish gray shade which runs back along the costa. On the costa it is always followed by a whitish dash which may extend further across the wing as a pale shade. Lobes brownish gray crossed by the usual outer pale line, incomplete on the second. Inner margin paler, especially just inside of the cleft, where it is sometimes whitish buff. Spot in cell and those near inner margin present or absent. Dark areas more or less irrorate with white, but never plentifully. Fringes gray with white bases containing the usual dark basal scales on the outer margin and two clusters on inner; dark at angles. Secondaries more brownish with concolorous fringes; third lobe paler, with a few dark scales in fringes of inner margin. Expanse 19-25 mm.

Male genitalia as in the preceding species. (See plate L, f. 15u.)

Described from nine specimens taken in the Tuolumne Meadows, Tuolumne Co., Cal., in July and August, and disposed as follows:

Holotype ♂, allotype and 4 paratypes ♂, coll. Barnes.

Paratype ♂ and paratype ♀, U. S. N. M. No. 23462.

Paratype ♂ coll. Meyrick.

We associate with these a number of specimens from Wash., Ore., Alta., Utah, Colo. and Cal. which are in general much lighter in color. All agree in lacking a well defined triangular spot before the cleft, and in having the position of the anal angle of this spot marked by a blackish dot, conspicuous in all but the darkest specimens. The form may belong to the *albida* series, but is very readily separated. It is intermediate between those species and *cooleyi* in the development of its pattern.

In a few specimens there is a trace of a subterminal cluster of slender dark scales in the fringes of the third feather of the secondaries which indicates relationship with *albidorsella* as well.

22. *PLATYPTILIA COOLEYI* Fernald. Pl. XLIV, fig. 9.

*Platyptilia cooleyi* Fernald, Pter. N. A. 30, 1898.

Id., Bull. 52 U. S. N. M. 443, 1902.

Meyrick, Gen. Ins. C, 12, 1910.

Id., Wagner's Lep. Cat. pars 17, 15, 1913.

Barnes & McDunnough, Check List 150, 1917.

*Stenoptilia schwarzi* Dyar, Proc. Ent. Soc. Wash. V, 228, 1903.

Meyrick, Gen. Ins. C, 18, 1910.

Id., Wagner's Lep. Cat. pars 17, 28, 1913.

Barnes & McDunnough, Check List 151, 1917.

Vestiture of head and body a mixture of gray brown and tawny, with a few whitish scales. Antennae dark above with a few white scales, giving a vaguely dotted effect. Frontal tuft very slight; palpi moderate, porrect, touched with white above and below. Thorax whitish behind. Fore tibiae brown striped, the stripes often fused into broad shades on inside. Tarsi and hind legs brownish-gray with whitish scales, paler on inside.

Primaries with mixed whitish and brownish gray scales, olive gray in general tone, becoming buff toward inner margin. Costa with a dark stripe, dotted with whitish scales, which terminates above base of cleft. This is preceded by a subcostal whitish line which reaches costa above cleft and usually forms a prominent pale mark. The cleft is preceded by a dark dot, sometimes included in a vague transverse dash, and there is a similar dot in the cell about half way to base. As the ground color is lighter or darker, these markings vary in contrast. Lobes may or may not be crossed by the usual outer pale line. Fringes grayish with pale bases containing a row of gray-brown scales along outer margin. Inner margin without clusters of scales. Secondaries brownish gray. Fringes concolorous with pale bases, sometimes containing a few scattered scales on inner margin of third feather, but these are never dark enough to be conspicuous. Expanse 22-32 mm.

The male genitalia resemble those of the *albida* group.

Distribution: Colo., Ariz., Nev., June to August.

Fernald described *cooleyi* from "seven examples taken in Marshall's Pass, Colo., July 15, 1888, and one taken in Colorado by Bruce." There are now only six specimens labelled "M. Pass. 7-15-88" in the Fernald collection, four labelled cotype, one type, and one with only the name which is evidently another "cotype." The specimen collected by Bruce is in the National Museum, labelled as a cotype of *cooleyi*, but it belongs to *modesta* Walsingham. We have specimens from Silverton, Colo., July, which are almost exact matches for the type, and these are evidently the same as *schwarzi*, though the unique type of *schwarzi* taken at Williams, Arizona, is in too poor condition for really accurate identification. This type expands 32 mm., while

none of our specimens is over 28 mm., but in view of the range of size exhibited by our series of fifteen specimens, we do not regard this as important. Such markings as are still distinguishable correspond with our series.

The early stages are unknown.

23. *PLATYPTILIA XYLOPSAMMA* Meyrick. Pl. XLIV, fig. 5.

*Platyptilia xylopsamma* Meyrick, Trans. Ent. Soc. Lond. 1907, 488, 1908 (Feb.).

Id., Gen. Ins. C, 12, 1910.

Id., Wagner's Lep. Cat. pars 17, 16, 1913.

Barnes & McDunnough, Check List 150, 1917.

*Stenoptilia gorgoniensis* Grinnell, Can. Ent. XL, 321, 1908 (Sept.).

Meyrick, Wagner's Lep. Cat. pars 17, 30, 1913.

Barnes & McDunnough, Check List 151, 1917.

The original description is as follows:

"♀. 28 mm. Head light yellow-ochreous sprinkled with whitish, frontal tuft moderate. Palpi 2 1/3 [X eye], pale yellow-ochreous sprinkled with fuscous, white beneath and at apex. Antennae whitish-ochreous, above with a dark fuscous line. Thorax brownish-ochreous sprinkled with whitish, especially on patagia, which are somewhat expanded towards apex. Abdomen whitish-ochreous, faintly streaked with brownish. Legs whitish, lined with dark fuscous (posterior pair broken). Fore-wings cleft from 3/4, segments broad, termen of first somewhat sinuate, of second very slightly bent, oblique; brownish-ochreous, slightly sprinkled with whitish, dorsal half suffused with pale whitish-ochreous from base to cleft; costal edge very shortly strigulated with dark fuscous on basal third; a small round dark fuscous spot in disc at 1/3, and another tending to form a transverse mark close before and beneath cleft; a mark of dark fuscous suffusion along costa above cleft, followed by a white mark mostly in costal cilia; cilia pale greyish-ochreous, on termen with basal half rather dark fuscous, on dorsum with a greyish bar beneath cleft. Hind-wings cleft firstly from before middle, secondly from 1/5; first segment considerably dilated, second moderate; ferruginous-fuscous; cilia pale greyish, within cleft mostly suffused with very pale ochreous, on termen of first segment darker grey on basal half, on dorsum with a series of short dark fuscous scales from base to 2/3.

"Colorado, U. S., 7000 feet; one specimen."

Our single specimen, which has a broken abdomen and only one leg, is from Stockton, Utah, Sept. 6 (Spalding). Mr. Meyrick has examined this specimen and returned it to us as this species, and we have found personally that it is almost an exact comparison with the types of *gorgoniensis* Grinnell, both of which are males. The type locality of the latter species is South Fork, Santa Ana R., San Bernardino Mts., Cal.

We have no notes on the habits of this species.

24. *PLATYPTILIA MODESTA* Walsingham. Pl. XLIII, fig. 12. Pl. L, fig. 7.

*Platyptilus modestus* Walsingham, Peter. Cal. Ore. 18, pl. 1, f. 14, 1880.

‡*Platyptilia modesta* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 31, 1898.

Id., Bull. 52 U. S. N. M. 443, 1902.

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C, 12, 1910.

Id., Wagner's Lep. Cat. pars 17, 16, 1913.

Barnes & McDunnough, Check List 150, 1917.

Abdomen tawny, thorax and head more brownish-gray with a few white scales. Antennae dark above, pale below. Frontal tuft slight, blunt. Palpi moderate, touched with white above and below. Legs whitish; fore and mid tibiae striped with gray brown, tarsi and hind legs shaded on one side.

Primaries grayish brown or brownish gray, blending to buff or tawny on inner margin and heavily irrorate with whitish scales. At middle of cell and before cleft are black or brown dots. The costa is dark as far as cleft. First lobe sometimes with a very faint trace of the outer pale line. Fringes grayish with pale bases; a basal row of dark scales on outer margin and a few scattered dark scales on inner. Marginal scales on costa of first lobe concolorous with wing. Secondaries brownish gray, fringes with pale bases containing a few inconspicuous scales on inner margin of third lobe. Expanse 21-24 mm.

The male genitalia, as shown in the figure, are similar to those of the *albida* group but have relatively broader claspers and a truncate-spatulate uncus.

Distribution: N. Cal. to Colo., N. M. and Ariz. Apr., June, July, Aug.

We have but four specimens of this species, one from Denver, Colo., one from the Huachuca Mts., Ariz., and two from Ft. Wingate, N. M. Of the last, one has been returned to us by Meyrick as equal to the type of *modesta* in the British Museum, and the other is a good match for the National Museum cotype of *cooleyi* mentioned under that species. As exemplified by these specimens, the species resembles *cooleyi* but differs in its smaller size, the absence of the outer pale line on the lobes of the primaries and of the pale dash above the base of the cleft. It is even closer to *xylopsamma* Meyrick. We should have made the latter a synonym but for the fact that Mr. Meyrick called our attention to the whitish marginal scales on the costa of the first lobe of the primaries. In *modesta*, as noted, these are concolorous with the wing.

Nothing is known of the life history.

## 25. PLATYPTILIA PETRODACTYLA Walker. Pl. XLIV, fig. 7.

*Pterophorus petrodactylus* Walker, List Lep. Ins. B. M. XXX, 940, 1864.

*Platyptilus petrodactylus* Walsingham, Pter. Cal. Ore. 20, pl. 11, f. 15, 1880.

‡*Platyptilia petrodactyla* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 31, 1898.

Dyar, Proc. Wash. Acad. 11, 499, 1900.

Fernald, Bull. 52, U. S. N. M. 443, 1902.

Meyrick, Gen. Ins. C, 12, 1910.

Id., Wagner's Lep. Cat. pars 17, 16, 1913.

Barnes & McDunnough Check List 150, 1917.

Primaries powdery gray. Cleft preceded by a faint transverse dash and a few black scales. Both lobes crossed by a pale outer line, preceded in the second by two dark dashes and in the first by a heavy black dash, very oblique, running toward base of cleft and in turn preceded by a pale costal area. Secondaries concolorous, third feather with a few scattered blackish scales in fringes of inner margin. Expanse about 25 mm.

The male genitalia agree with those of *carolina* and the *albida* group, but in our single slide we are unable to be certain of the shape of the uncus.

This species was described from "Arctic America," and is known to us through two specimens from Dawson, Alaska, taken June 20, 1916. These were presented to the National Museum by Mr. B. P. Clark, and through the courtesy of the staff of that institution, one is now in the Barnes collection. Mr. Meyrick has verified our identification by comparison with Walker's type in the British Museum. Dyar records three specimens taken on Popof Is., July.

Walsingham's figure, presumably drawn from the type, is much paler than the Alaskan specimens, but agrees in essential features. We regard the heavy oblique dash as a sufficient distinguishing feature. It is conspicuous and easily separates this from all of our other species, since they are marked in the same place by either transverse shades or longitudinal dashes.

Nothing is known of the early stages.

## 26. PLATYPTILIA ALBICANS Fish. Pl. XLIII, fig. 11. Pl. L, fig. 12.

*Platyptilus albicans* Fish, Can. Ent. XIII, 71, 1881.

*Platyptilia albicans* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 32, pl. VIIII, ff. 12, 13, 1898.

Id., Bull. 52 U. S. N. M. 443, 1902.

Meyrick, Gen. Ins. C, 11, 1910.

Id., Wagner's Lep. Cat. pars 17, 15, 1913.

Barnes & McDunnough, Check List 150, 1917.

Creamy white, usually more or less discolored. Antennae with brown dots above. Frontal tuft lacking. Palpi rather small and slender, but projecting well beyond front; brownish on sides. Legs with brown stripes, hind pair with brown shades.

Primaries creamy white with white-irrorate brown areas, the two colors about equally extensive. Both lobes with a terminal brown band and one just before middle which fades out toward inner margin of wing. Costa brown as far as base of cleft and inward to a transverse dash before cleft, this area usually almost connected by brown with anal angle. Fringes white with gray tips; brown and white scales in bases along outer margin. Secondaries gray-brown, either without dark scales in fringe or with a faint tuft of slender scales, not visible without lens, near middle of inner margin of third lobe. Expanse 17-24 mm.

The male genitalia are somewhat similar to those of *tesseradactyla*, which agree also with the two following species, but possess distinctive features as illustrated. This relationship suggests that *tesseradactyla* should be associated with this and the other two species, but its superficial characters lead us to leave it elsewhere.

Distribution: Described from Nevada (Morrison). We have five specimens from Verdi, Nev. June, one from Yellowstone Park, Wyo., July, and two from Silverton, Colo. In the Fernald collection, in addition to the unique ♀ type, there is a specimen from California, and we have identified a specimen from British Columbia for Mr. G. O. Day.

The last specimen mentioned, a ♂ taken on Stoker's Mt., July 23, 1909, is anomalous. We place it here with little hesitation, though it is so much darker than the typical form that a casual examination discloses little resemblance. It corresponds in essential features with our series, but differs in having the brown areas darker and more extended, the pale areas consequently narrow and somewhat tinged with brown. The tuft in the fringes of the secondaries is faintly visible to the naked eye.

Nothing is known of the life history.

27. *PLATYPTILLA PALLIDACTYLA* Haworth. Pl. XLIV, fig. 3, 4. Pl. I, fig. 11.

*Melicita pallidactyla* Haworth, Lep. Brit. 478, 1812.

*Pterophorus marginidactylus* Fitch, Trans. N. Y. Agr. Soc. XIV, 848, 1854.

Id., 1st Rep. Ent. N. Y. 144, 1854.

Morris, Cat. Lep. N. A. 54, 1860.

Walker, List Lep. Ins. B. M. XXX, 940, 1864.



- Pterophorus nebuladactylus* Fitch, Trans. N. Y. Agr. Soc. XIV, 849, 1854.  
 Id., 1st Rep. Ent. N. Y. 145, 1854.  
 Morris, Cat. Lep. N. A. 54, 1860.  
 Walker, List Lep. Ins. B. M. XXX, 940, 1864.
- Platyptilus bertrami* Roessler, Wien. Ent. Mon. VIII, 54, 1864.  
 Walsingham, Pter. Cal. Ore. 3, pl. I, f. 3, 1880.  
 Dimmock, Psyche III, 403, 1882.
- Platyptilus bischoffi* Zeller, Stett. ent. Zeit. XXVIII, 333, 1867.
- Pterophorus cervinidactylus* Packard, Ann. Lyc. N. Y. X, 266, 1873.
- Platyptilus adustus* Walsingham, Pter. Cal. Ore. 5, pl. 1, f. 4, 1880.
- Platyptilia bischoffi* Murtfeldt, Am. Ent. III, 235, 1880.
- Pterophorus bertrami* Porritt, Ent. Mo. Mag. XXII, 103, 1885.
- ‡*Platyptilia adusta* Fernald, Smith's List Lep. N. A. 87, 1891.  
 Id., Pter. N. A. 32, pl. V, ff. 7, 8, 1898.  
 Id., Bull. 52, U. S. N. M. 443, 1902.  
 Meyrick, Gen. Ins. C, 12, 1910.  
 Id., Wagner's Lep. Cat. pars 17, 16, 1913.  
 Barnes & McDunnough, Check List 150, 1917.
- †*Platyptilia ochrodactyla* Fernald (not Hbn.) Smith's List Lep. N. A. 87, 1891.
- Platyptilia bertrami* Barrett, Ent. Mo. Mag. XVIII, 177, 1882.  
 Meyrick, Handbook 434, 1895.  
 Hofmann, Deutsch. Pter. 64, 79, 1895 (biol.).  
 Tutt, Pter. Brit. 31, 1896.
- ‡*Platyptilia marginidactyla* Fernald, Pter. N. A. 34, pl. IX, ff. 4, 5, 1898.  
 Id., Bull. 52 U. S. N. M. 444, 1902.  
 Id., Smith's List Lep. N. A., Rev. Ed. 99, 1903.  
 Winn, List Ins. Que. 85, 1912.  
 Britton, Ins. Conn. 103, 1920.
- Platyptilia pallidactyla* Meyrick, Gen. Ins. C, 12, 1910.  
 Id., Wagner's Lep. Cat. pars 17, 15, 1913.  
 Barnes & McDunnough, Check List 150, 1917.

Head and body yellowish white to tawny, abdomen with dorsal and ventral brown stripe. Antennae brown spotted above. Frontal tuft about as long as head, sharply pointed. Palpi long, slender, porrect, noticeably surpassing tuft. Legs white with brown shadings on tibiae, and a trace on tarsi.

Primaries with nebulous bright brown and whitish markings. Cleft preceded by two brown dots. Pale areas a blotch in cell, preceded by a brown dot, one near inner margin about one third from base, and a broader area below base of cleft. Lobes paler brown, crossed by a pale line outwardly and with a pale area on costa above base of cleft, before which costa is narrowly dark brown, dotted with white. All brown areas slightly irrorate with white. Apex of first lobe produced, acute. Secondaries brown. Fringes of inner margin of third lobe with pale bases and usually with a faint cluster of slender dark scales just beyond middle. Expanse 21-26 mm.

Male genitalia similar to those of *albicans* but with broader valves and without the long processes on the juxta.

Distribution: Europe. Ranges apparently over the entire continent of North America north of 37° Lat. May to August.

In North America *pallidactyla* varies from almost pure creamy white to dull brown, the paratype of *adusta* being the darkest specimen known to us. It is not difficult to confuse extremely pale specimens with the following species, but the form of the primaries and the relative lengths of palpi and frontal tuft are very different. We have examined over one hundred fifty specimens from many North American localities.

There is a series in the Fernald collection from St. George and St. Paul Is., Alaska, Aug., which are scarcely recognizable as this species, but which seem to agree in all essential features. The genitalia are similar, the frontal tuft and palpi are similar in those specimens in which they are reasonably well preserved, and the scale tuft in the fringes of the secondaries is the same. The primaries are very dull and evenly coloured, but this occurs in other regions. The only character which is really doubtful is the relatively blunt apex of the primaries. The series is so poor that we hesitate to describe it as new, and place it here until additional material from Alaska can be examined.

Among Fitch's types in the Fernald collection are a number of specimens of *pallidactyla*, of which four are labelled *nebulaedactylus*. Two of these bear Fernald's type labels. Both are badly rubbed, but recognizable. A specimen of *Oedematophorus homodactylus* Walker is also labelled "*P. nebulaedactylus* Type." One badly molded specimen otherwise in fair condition, is labelled "*P. marginidactylus* Type." The paratype of *adusta* Wlsm. in this collection is a very evenly dull-brown specimen of this species. The type of *cervinidactylus* is in the Cambridge Museum, and is a rather dull specimen of *pallidactyla*. The synonymy otherwise follows Meyrick.

The larvae live on *Achillea millefolium* and *ptarmica*, attacking, according to Barrett, "the top of a young shoot, eating out the heart and feeding downwards for a short distance into the tender young stem, then leaves it to attack another young shoot in the same manner."

From various sources we have selected the following descriptions of the early stages:

*Egg*: " \* \* \* elliptical in outline and somewhat flattened. The longer diameter was three-sevenths of a millimeter and the shorter diameter was

three-tenths of a millimeter, and the surface was irregularly corrugated. When first deposited they were of a light cream color or almost hyaline with a glossy surface, but after two days they turned to a deep flesh color." (Fernald, *Pter. N. A.* 35, quoted from Fish, *in litt.*).

*Larva:* "They were of the usual form of larvae of this genus, though perhaps a little more slender than some species; body cylindrical, stoutest in the middle, tapering towards the extremities; head small and polished, considerably narrower than the second segment; segmental divisions well defined, the skin rather glossy.

"When about a quarter of an inch long, the ground colour is pale greyish-olive, but this is almost hidden by dark purplish-brown dorsal and sub-dorsal stripes, which give the larva a very dark appearance; head very pale straw-colour, marked with smoky-brown, the ocelli black, and the mandibles reddish-brown; frontal plate and anterior legs polished black.

"In the next stage, that is, when about three-eighths of an inch long, it has become considerably lighter in colour; the ground is glaucous-green, the dorsal and sub-dorsal stripes purple, but more interrupted, and not so wide as in the earlier stage; head of the same pale straw-colour, but not so clouded with darker, though the ocelli are still black, and the mandibles reddish-brown; the frontal plate is gradually becoming pale like the head, the black being confined to the front in some specimens, in others to a black edging, more or less broken all round. Ground of the ventral area and the prolegs uniformly glaucous-green, the anterior legs now ringed with black only.

"In the adult stage, about half to five-eighths of an inch, the larva has a still paler appearance. Ground-colour bright pea-green; head very pale straw-colour, faintly tinged with green, the large ocelli intensely black, and consequently very conspicuous, the mandibles reddish-brown, frontal and small anal plate of the same bright green as the ground-colour; the dark green (slightly brownish anteriorly) pulsating dorsal vessel forms the dorsal stripe; between it and the spiracular region are two greyish-white stripes, on which the small black tubercular spots may be seen; below the spiracles is a still clearer and more conspicuous white stripe; spiracles black.

"Ventral surface uniformly of the same bright green of the dorsal area; at the front and at the base of each anterior leg, is an intensely black spot; and the prolegs are finely margined with black." (Porritt, *Ent. Mo. Mag.* XXII, 103-4.)

*Pupa:* "The pupa is a little over half an inch long \* \* \* It has 'a longish beak in front, projecting at a slight angle downwards from the head, pointed at the tail; the wing-cases of moderate length, well developed, and the ends of the leg cases projecting free from the abdomen.' The colour is bright pale green, dorsal line darker green, edged on the thorax with white; beak white above, rust colour at the sides; there is also a conspicuous streak of this rust colour on the hind part of the thorax, and the same colour also appears (but more faintly) on the abdominal point, and at the tip of the leg-cases; subdorsal line dark green, lateral line white.

"Ventral surface pale green, with darker green lines and the wing cases with whitish rays." (Porrirt, Ent. Mo. Mag. XXII, 104-5.)

28. *PLATYPTILIA ALBERTAE* n. sp. Pl. XLIV, fig. 8. Pl. I., fig. 6.

White. Antennae dotted above with gray-brown. Frontal tuft as long as head, sharply pointed. Palpi moderate, oblique, surpassing front but not reaching end of tuft. Fore and middle legs white, shaded with blackish inside. Hind legs darker on outside, annulate at bases of spurs and tips of tarsal joints.

Primaries white. Costa narrowly brownish gray to cleft. Cleft preceded by two dark dots; a third similar dot in middle of cell. Lobes with terminal and median grayish shades defining the broad outer white line. Fringes white, basal scales on outer margin also white, grayish in a few spots. Hind wings light brownish gray, fringes and third lobe slightly paler. Fringes with a very faint trace of a median cluster of grayish hair-like scales just beyond middle of third feather in one paratype; entirely without dark scales in the remaining specimens. Expanse 24-27 mm.

The shape of the primaries is distinctive. Toward the apex the costa is abruptly rounded, the apex is very blunt, and the outer margin of the first lobe almost straight. The first lobe, and consequently the entire wing, looks very wide and blunt.

The male genitalia are similar to those of *pallidactyla* but differ in the form of the valves and uncus.

Described from four specimens as follows:

Holotype ♀, Laggan, Alta., Aug. 16-23, and one paratype ♀, Olympic Mts., Wash., in coll. Barnes.

Allotype, Mt. Cheam, B. C., Aug., in coll. E. H. Blackmore.

Paratype ♀, Laggan, Alta., Aug. 16-23, U. S. N. M. No. 23463.

This beautiful species is very distinct from all others. Extremely pale examples of *pallidactyla* resemble it superficially, but the form of the wings and relative size of palpi and frontal tuft are conspicuously different. Unfortunately the wings have a tendency to stain very easily, and three of the types are more or less tawny. Only the holotype is a clean specimen.

We have no data on the life history.

Genus *Exelastis* Meyrick

? Orthotype ——— *atomosa* Wlsm.

*Exelastis* Meyrick, Jn. Bomb. Nat. Hist. Soc. XVII, 730, 1907 (*vide* Meyrick).  
Id., Gen. Ins. C., 17, 1910.

The one North American species which we include in this genus differs from *Marasmarcha* in structure only in the presence of a few

black scales in the fringes of the inner margin of the third feather of the secondaries, and in the great reduction of vein  $R_2$ , of the primaries. This vein is scarcely as well marked as our figure indicates (pl. XLVIII, fig. 8a).

We originally placed *cervinicolor* in *Marasmarcha* but took up the matter with Mr. Meyrick, who agrees with us that *Exelastis* should be retained.

1. EXELASTIS CERVINICOLOR B. & Mc D. Pl. XLII, fig. 8. Pl. XLIX, fig. 12.

*Pterophorus cervinicolor* Barnes & McDunnough, Cont. Nat. Hist. Lep. N. A. II, 185, pl. IV, f. 10, 1913.

Id., Check List 151, 1917.

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 136, 1917.

We reproduce the original description. The head and body are concolorous with the wings, the fore and middle legs whitish with dark stripes inside and the hind pair dark outside, slightly paler within. Spurs long. Palpi upturned.

"Primaries with both lobes narrow, pointed and slightly down-curved at apex, deep grayish fawn-color, a slight sprinkling of blackish scales on inner margin  $\frac{1}{4}$  from base, forming a more or less obvious patch, a dark dot  $\frac{1}{2}$  way between base of wing and incision; two slight black costal dashes near apex of wing and another on inner margin of first lobe near apex; extreme apex of both lobes tipped with black and fringe along inner margin of 2nd lobe rather regularly cut by black; fringes otherwise pale fawn. Secondaries deep smoky with pale fawn fringes. Beneath, smoky, lobes of primaries paler. Expanse 16 mm."

The type appears to be a ♀ and the "cotype" a ♂. Both are from Everglade, Fla., Apr. 8-15. We have in addition a small series from Chokoloskee without dates.

The regular black tufts along the inner margin of the primaries and the scattered black scales in the fringe of the secondaries should remove any difficulty attending the identification of the species. In addition the male genitalia are quite different from any others known to us.

A recent communication from Mr. Meyrick suggests to us that *cervinicolor* is identical with his *crepuscularis*, known from S. Africa and Australia. This is quite possible, of course, but we prefer to retain the present name until the genitalia of specimens from the other continents can be examined.

Genus *Marasmarcha* MeyrickType *Alucita lunadactyla* Haw.*Marasmarcha* Meyrick, Trans. Ent. Soc. Lond. 11, 1886.

Id., op. cit. 488, 1890.

Id., Handbook 437, 1895.

Hofmann, Deutsch. Pter. 48, 115, 1895.

Tutt. Pter. Brit. 81, 1896.

Id., Ent. Rec. XVII, 36, 1905. Fixes type.

Meyrick, Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 26, 1913.

Front sometimes with a tuft of scales. Ocelli absent. Palpi moderate, slender, oblique or upturned. Primaries bifid, cleft about two-fifths; vein  $Cu_2$  from near angle,  $Cu_1$  and  $M_3$  connate or stalked,  $R_2$  and  $R_4$  stalked,  $R_1$  absent. Secondaries trifold,  $Cu_2$  from near middle of cell,  $Cu_1$  and  $M_3$  connate or stalked. (See pl. XLVIII, fig. 8.)

This genus has previously been recorded only from the Old World but *pumilio* is certainly a true *Marasmarcha*. We are reassured in this conclusion by the fact that Mr. Meyrick has recently communicated to us by letter the same opinion, independently reached.

1. *MARASMARCHA PUMILIO* Zeller. Pl. XLII, fig. 7. Pl. XLIX, fig. 13.

*Mimescoptilus pumilio* Zeller, Verh. z.-b. Ges. Wien, XXIII, 324, 1873.*Marasmarcha liophanes* Meyrick, Trans. Ent. Soc. Lond. 1886, 19.

Id., Gen. Ins. C, 18, pl. fig. 15, 1910.

*Stenoptilia pumilio* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 58, 1898.

Id., Bull. 52 U. S. N. M. 447, 1902.

Meyrick, Gen. Ins. C, 18, 1910.

Id., Wagner's Lep. Cat. pars 17, 28, 1913.

Barnes &amp; McDunnough, Check List 151, 1917.

† *Mimescoptilus gilvidorsis* Hedmann (not Zell.), Stett. ent. Zeit. LVII, 8, 1896 (in part, *vide* Wlsm.).

*Stenoptilia* ? *pumilio* Walsingham, Proc. Zool. Soc. Lond. 1897, 58.

——— *griseodactylus* Pagenstecher, Zoologica XXIX, 240, 1900 (*vide* Meyrick).

Head light brown, conocolorous with anterior half of thorax. Antennae with a dark line above. Palpi slender, second joint oblique, third porrect, the sides dark. Posterior half of thorax and abdomen pale yellow, the latter becoming more brownish behind. Abdomen with a brown dorsal and paired ventral lines, inconspicuous, and several others very faint. Fore and middle legs white, striped with brown inside; hind pair whitish, brown without.

Primaries brown, concolorous with thorax; inner margin at base yellowish, like posterior part of thorax, this shade disappearing before middle. Apices of both lobes somewhat darkened. Cleft preceded by a vague blackish spot, or two with vague dashes extending basad. Spot in cell at two-fifths from base and one before this near inner margin, both sometimes faint. Fringes brownish gray with pale bases. At the apex of each lobe, within the cleft and along the inner margin they contain black scales, chiefly collected into tufts at regular intervals, five of these are usually evident on the inner margin. Secondaries gray brown, fringes slightly paler, without dark scales but with a few dark hairs at apices of first and second lobes. Expanse 13.5-16.5 mm.

The male genitalia are very different from any other known to us, but we are able to trace a few slight points of relationship with those of *cervinicolor*.

Distribution: China, India, E. Indies, Africa, etc. In North America it ranges from N. J. to Fla. and west into Mo. and Tex. according to specimens which we have seen. The type locality is Dallas, Tex. Fla. May and Oct., N. J. in Sept., S. C. in June.

For some time we had a series of this species labelled as a new species of *Marasmarcha*, and had just begun to suspect that it was Zeller's species when a note from Mr. Meyrick reached us announcing that *pumilio* and his *Marasmarcha liophanes* were the same species. Later on we received the unique type  $\delta$  from the Cambridge Museum, thus establishing its identity beyond doubt.

Meyrick writes of the species that "it is doubtless artificially introduced into N. America, being of alien character, the larva probably feeding in the pods of a cultivated Leguminous plant, like its allies."

One of Miss Murtfeldt's types of *O. ambrosiac* proved to be this species. It bears the same breeding label as the others, and we should therefore assume that it was reared from *Ambrosia artemisiacifolia*. This is not at all compatible with Meyrick's information regarding the allied species, but of course neither possibility is proven fact.

### Genus *Stenoptilia* Huebner

Logotype *Alucita pterodactyla* Linn.

*Stenoptilia* Huebner, Verz. bek. Schmett. 430, 1826.

Meyrick, Trans. Ent. Soc. Lond. 487, 1890.

Fernald, Smith's List Lep. N. A. 87, 1891 (in part).

Meyrick, Handbook 440, 1895.

Hofmann, Deutsch, Pter. 48, 92, 1895.  
 Fernald, Pter. N. A. 57, 1898 (in part).  
 Id., Bull. 52 U. S. N. M. 447, 1902 (in part).  
 Tutt, Ent. Rec. XVII, 35, 1905. Fixes type.  
 Meyrick, Gen. Ins. C, 18, 1910 (in part).  
 Id., Wagner's Lep. Cat. pars 17, 28, 1913 (in part).  
 Barnes & McDunnough, Check List 151, 1917 (in part).

*Mimaseoptilus* Wallengren, Skand. Fjäd. 17, 1859.

Jordan, Ent. Mo. Mag. VI, 123, 1869.

Tutt, Pter. Brit. 84, 1896.

‡*Mimaseoptilus* Zeller, Stett. ent. Zeit. XXVIII, 332, 337, 1867.

Walsingham, Pter. Cal. Ore. 32, 1880.

Meyrick, Trans. Ent. Soc. Lond. 11, 1886.

*Adkinia* Tutt, Ent. Rec. XVII, 37, 1905. Orthotype *bipunctidactyla* Haw.

Front (in most of our species) with a rounded or conical prominence, not conspicuously large, or a scale tuft. Ocelli present. Palpi various. Primaries cleft one third or a little less;  $Cu_2$  beyond middle of cell, 3 near angle,  $R_3$  and  $R_4$  stalked. Secondaries trifid,  $Cu_2$  before middle of cell,  $Cu_1$  near angle; fringes never contain black scales. (See pl. XLVIII, fig. 9).

While *Stenoptylia* is structurally very close to *Platyptilia*, as pointed out by Meyrick, it is not difficult to place our species properly. From the greater part of *Platyptilia* they differ in the complete lack of dark scales or tufts in the fringes of the secondaries, and from the remaining species in the very retreating anal angles of both lobes of the primaries. The first lobe has this angle scarcely indicated in five of the seven North American species.

#### KEY TO THE SPECIES

1. First lobe of primaries with a heavy black dash or conspicuous dark shade ..... *exclamationis*  
    With a slender pale dash ..... *pallistriga*  
    Without conspicuous marks ..... 2
2. Primaries tinged with yellow ..... *rhynchosiae*  
    Tawny, gray or brown ..... 3
3. Expanse under 17 mm. Abdomen with single dorsal dots or none.  
    Somewhat tawny ..... *parvus*  
    Expanse over 17 mm. Dull gray or with paired dorsal dots, sometimes small and difficult to observe ..... 4
4. Dull gray. Abdomen with or without a single dorsal dot ..... *mengeli*  
    Generally grayish brown. Dorsal dots in pairs ..... *sophodactyla*  
    Brown, inner margin of primaries brightest. Dorsal dots paired but faint ..... *pterodactyla*



1. STENOPTILIA RHYNCHOSIAE Dyar. Pl. XLII, fig. 9. Pl. XLIX, fig. 14.

*Pterophorus rhynchosiae* Dyar, Psyche VI11, 249, 1898 (biol.).

Fernald, Bull. 52 U. S. N. M. 446, 1902.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 22, 1913.

Barnes & McDunnough, Check List 151, 1917.

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 135, 1917.

Pale yellow. Antennae with a broad stripe above. Palpi rather long, slender, a brown stripe on either side; second joint oblique, third porrect. Abdomen with a number of fine brown longitudinal lines. Legs whitish with brown stripes and shades; spurs long.

Primaries yellowish tinged with gray-brown especially toward costa. Cleft preceded by a heavy brown transverse blotch or by two spots, of which the inner may be absent. Cell with a small brown spot just before middle of wing. Tips of veins in both lobes with brown dashes extending through fringes. Fringes of gray-brown and yellowish hairs, the bases pale. Secondaries dark brownish gray with yellowish bases. Expanse about 18 mm.

Distribution: Florida; June, July.

The type in the National Museum is without locality label. It is accompanied by a specimen taken at Miami. In addition to these we have seen only the two specimens from Stemper in coll. Barnes.

The genitalia are very remarkable and lead us to question this placing of the species, but the neuration is distinctly that of *Stenoptilia*. The anal angle of the first lobe of the primaries is scarcely indicated and that of the second slight, but both can be discerned.

The type was reared, and Dyar's original description includes the following notes on the larva:

"*Larva*. Downy, pale green, with short white hairs. Pale green, the body tapering a little posteriorly; no marks except a very faint, whitish subdorsal line along warts i and ii; warts small, i and ii separate, but somewhat approximate; a small wart (iii a) below and behind iii; iv + v distinct with a small wart (iii b) behind; skin densely covered with very short, white, club-tipped secondary hairs. Feet short.

"On the young leaves of a trailing plant (*Rhynchosia*) at Miami, Fla., December."

2. STENOPTILIA PARVA Walsingham. Pl. XLII, fig. 12. Pl. XLIX, fig. 10.

*Lioptilus* ? *parvus* Walsingham, Pter. Cal. Ore. 55, pl. III, f. 12, 1880.

*Alucita* ? *parva* Fernald, Smith's List Lep. N. A. 87, 1891.

*Pterophorus parvus* Fernald, Pter. N. A. 48, 1898.

Id., Bull. 52 U. S. N. M. 446, 1902.

Meyrick, Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 26, 1913.

Barnes & McDunnough, Check List 151, 1917.

Pale tawny or brownish white. Front with a slight prominence. Antennae with a brown line above. Palpi moderate, whitish above; second joint rather thick, oblique, third slender, porrect. Abdomen often with dorsal and lateral dots in hind margin of segments, the former single and often connected by a faint line. Legs shaded with brown inside, spurs rather short.

Primaries concolorous with body, with scattered white and brown scales. The brown scales often form a streak in the first lobe and lines along the veins in the second. There are two brown dots before the cleft, one scarcely inside of it, the other well toward costa. The latter is larger, rather diffuse, often connected with the nearest brown costal spot. From each a line of brown scales runs toward base of wing, the inner usually finer, sharper and longer. Cell sometimes with a brown dot. Costa of first lobe with two vague brown spots and whitish fringes. Fringes otherwise gray-brown with dark tufts at and before apex of first lobe and three on outer margin of second. Anal angle of first lobe indicated, of second fairly well developed. Secondaries and fringes similar to ground color of primaries; slightly darker. Expanse 13-18 mm.

The male genitalia are very simple, much as in *Aciptilia walsinghami*, but the insect is otherwise a *Stenoptilia* in structure.

Distribution: S. Cal. May, June, Oct. Ariz., Apr., June. N. M., July, Aug. (U. S. N. M.). Miss., Sept. (Benjamin). Fla., May. The species was described from a specimen taken near Mt. Shasta in July. Apparently the complete range is that which seems to be common in the family, viz., the West coast south through Arizona and east through the Gulf States into Florida.

The species may be easily recognized from Lord Walsingham's description and figure, but for greater certainty we have had a specimen compared with the unique female type, now in the British Museum.

The life history has never been worked out.

3. STENOPTILIA PTERODACTYLA Linn. Pl. XLII, fig. 13. Pl. L, fig. 9.

*Alucita pterodactyla* Linnaeus, Faun. Suec. 371, no. 1456, 1761.

*Pterophorus fuscus* Retzius, Cor. de Geer Gen. et Spec. Ins. 35, 1783 (*vide* Meyrick).

Walker, List Lep. Ins. B. M. XXX, 937, 1864.

*Alucita fuscodactyla* Haworth, Lep. Brit. 476, 1811.

*Alucita ptilodactyla* Huelner, Samml. Eur. Schmett. f. 16, 1823.

*Mimascoptilus paludicola* Wallengren, Skand. Fjäd. 18, 1859.

‡*Pterophorus pterodactylus* Walker, List Lep. Ins. B. M. XXX, 938, 1864.

*Stenoptilia pterodactyla* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 58, 1898.

Id., Bull. 52 U. S. N. M. 447, 1902.

Meyrick, Gen. Ins. C, 19, 1910.

Id., Wagner's Lep. Cat. pars 17, 30, 1913.

Barnes & McDunnough, Check List 151, 1917.

‡*Stenoptilia fusca* Hofmann, Deutsch. Pter. 97, 106, 1895, (biol.).

*Mimacoseoptilus pterodactyla* Tutt, Pter. Brit. 100, 1896, (biol.).

Head and anterior half of thorax dull brown. A white line over the eye extends along sides of short frontal tuft. Antennae white with a brown line above. Palpi white above; second joint with thick scaly vestiture, obliquely truncate in front, scarcely equalled by the small third joint. Legs white on one side, brown on the other; spurs moderate. Posterior half of thorax bright ochreous brown with whitish dorso-lateral stripes. Abdomen slightly darker with lateral and paired dorsal dark spots, the lateral scarcely distinguishable, and some white scales in posterior margins of segments.

Primaries with costal portion dark, inner light, concolorous with adjacent parts of thorax. Costa vaguely checkered with white scales. First lobe with a vague streak of mixed white and black scales. Cleft preceded by two dark dots connected by lines of scattered blackish scales with a dot near middle of cell. A similar line reaches from below this to the base. Fringes dull gray-brown with paler bases and a few vague dark tufts. Secondaries dark brown with concolorous fringes. Expanse about 25 mm.

The male genitalia are similar to the form which predominates in *Platyptilia* but have a much different uncus.

Distribution: Europe. The only North American specimens which we have seen are those in the Fernald collection from West Farms, N. Y. (Angus).

Tutt quotes a description of the larva and pupa from Porritt, Entomologist XV, 44-5. Since we are not familiar with the original we repeat this quotation in part.

"Length about five-eighths of an inch, and scarcely so stout as seems usual in the genus. Head small, and narrower than the second segment; it is polished, rather flat in front, but rounded on the sides. Body cylindrical, of fairly uniform width, but tapering a little at the extremities, segmental divisions well defined; the skin, with a soft and half-transparent appearance, is sparingly clothed with short hairs. There are two varieties, which are perhaps about equally numerous. In one of them the ground color is a bright grass-green; in the other, it is equally bright yellow-green; in both forms the head is pale yellowish-brown, very prettily reticulated with intense black. The dark green, or in some of the yellow specimens dark brown, alimentary canal forms the dorsal stripe; sub-dorsal lines rather indistinct, greyish white; below there is a still more indistinct waved line of the same colour; there is, again, a similarly

coloured faint line along the spiracular region; and the segmental divisions also are of this pale colour. In some specimens the hairs are grey; in others brown. Ventral surface uniformly of the same colour as the ground of the dorsal area; the legs reticulated, and the pro-legs tipped with black."

The larva is said to feed on Speedwell (*Veronica chamaedrys*). Among the numerous species of *Veronica* found in this country is included this European species, which is now found in the northeast U. S. and southeastern Canada according to Gray's "Manual". The pupa is described as follows:

"The pupa is attached by the tail only, is rather long, but slender. The head, which is the thickest part, is abruptly rounded, and has the snout very prominent; thorax and abdomen rounded above, rather flattened beneath, and attenuated strongly to the anal point; eye, leg, and wing-cases fairly prominent, the last prolonged a considerable distance over the abdominal segments. As in the larva, there are two varieties; in one form, the ground is bright green, and there is little of any other colour, the pale gray abdominal divisions, and two indistinct pale lines on the dorsal area, with several faint purplish spots behind the thorax and on the anal segment, being all that are noticeable. The other form has the ground a dingier green, and there is a distinct purple dorsal stripe, edged on each side with greyish; the abdominal divisions and the tip of the prolonged wing-cases also purple. The pupa is capable of considerable movement, and, on being disturbed, turns up sharply the thorax and higher abdominal segments, so as to bring them quite at right angles with the several posterior segments."

Tutt records the imago in England in July, rarely in June and August.

4. *STENOPTILIA ZOPHODACTYLA* Duponchel. Pl. XLII, fig. 16. Pl. XLIX, fig. 15.

*Pterophorus zophodactylus* Duponchel, Lep. France XI, 668, pl. CCCXIV, f. 4. 1838.

Porritt, Ent. Mo. Mag. XX, 228, 1884 (biol.).

*Pterophorus loewii* Zeller, Isis, p. 38, 1847 (*vide* Hofmann).

Id., Linn. Ent. VI, 364, 1852.

*Pterophorus canalis* Walker, List Lep. Ins. B. M. XXX, 944, 1864.

*Mimesoptilus semicostatus* Zeller, Verh. z.-b. Ges. Wien. XXIII, 323, 1873.

†*Stenoptilia semicostata* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 60, 1898.

Id., Bull. 52 U. S. N. M. 447, 1902.

Meyrick, Gen. Ins. C, 19, 1910.

Id., Wagner's Lep. Cat. pars 17, 30, 1913.

Barnes & McDunnough, Check List 151, 1917.

‡*Stenoptilia zophodactyla* Meyrick, Handbook 440, 1895.

Hofmann, Deutsch. Pter. 105, 1895 (biol.).

Meyrick, Gen. Ins. C, 19, 1910.

Id., Wagner's Lep. Cat. pars 17, 29, 1913.

*Mimaseoptilus zophodactylus* Tutt, Pter. Brit, 93, 1896 (biol.).

Head and body gray brown. Antennae darker above. Palpi slightly paler above, with a terminal tuft on second joint, below, which equals third joint. Fore and middle legs white outside, brown within, hind pair more neutral in color. Terminal half of abdomen with small dorsal dots in pairs in the posterior margins of the segments.

Primaries dull tawny or grayish brown, slightly ochreous brown on inner margin, with scattered dark brown and white scales. These slightly checker the costa and form a dash in the first lobe and lines along the veins of the second. Discal markings as in *pterodactyla*, viz., two variable spots before cleft connected by lines of brown scales with a sharper spot at middle of cell, and a line from below this spot to base. Fringes gray-brown with white hairs, especially in the cleft. Outer margin of first lobe with two or three tufts of blackish basal scales, sometimes connected. Second lobe with such a tuft at apex, sometimes preceded by others along outer margin. Secondaries gray-brown; fringes concolorous with pale bases. Expanse 18-21 mm.

Distribution: Almost cosmopolitan. We have a good series from San Diego, Cal., late June to late Aug. and a single specimen from St. Petersburg, Fla., March. *Zophodactyla* was described from the Pyrenees Mts., *locvii* from Italy, *canalis* from Australia and *semicostata* from Texas.

We treated this species originally as *semicostata*, and we owe the discovery of its synonymy with *zophodactyla* entirely to Mr. Meyrick, whose decision was based on a specimen from our series. We follow Meyrick's synonymy.

The Museum of Comparative Zoology contains two types of *semicostata*, ♂ and ♀, both from Dallas, Tex. (Boll), and both in good condition. These are before us as we write.

The paired dorsal dots, dull color, and inconspicuous markings are distinctive. The anal angles are slight on both lobes of the primaries, a condition which separates the species from *pallistriga*. In this species the first lobe has a rather prominent anal angle, while the color and general appearance scarcely differ.

The only biological notes available to us are Porritt's, which we quote:

" \* \* \* The larva is slightly less than half an inch in length, and of proportionate bulk; head much smaller than the second segment, the lobes rounded

and polished; body cylindrical and uniform, tapering a little posteriorly; segmental divisions fairly defined, and a tuft of several short hairs springs from each of the indistinct tubercles. In colour there are two extreme varieties, and the larva varies between these forms. Var. 1 has the ground colour a delicate pale green strongly tinged indeed with yellow; head pale yellowish-green, the mandibles and ocelli brown; medio-dorsal stripe dark green or purple in different specimens; sub-dorsal stripes yellow, and there are two other fine but very faint yellow lines, one above and the other below the spiracles; segmental divisions also yellow; spiracles black, very narrowly encircled with white. Ventral surface, legs and prolegs uniformly pale yellowish-green.

"Var. 2 has the ground-colour brownish-yellow; head also brownish-yellow, freckled with brown; medio dorsal stripe broad bright purple; sub-dorsal stripes also broad, but of a much less distinct dull pale purple, and having a fine white line running through them; a narrow purple line, edged above with white, extends along the spiracular region. Ventral surface, legs and prolegs uniformly pale yellowish-brown. Feeds on the flowers of *Erythraea centaurea*.

"The pupa is slender, and nearly (if not quite) as long as the full-grown larva; it is of almost uniform width, the last two segments only tapering to the anal point. It is glossy and cylindrical, but there is a depression on the thorax and front abdominal segments; the snout and top of the thorax are prominently and sharply defined; the leg-cases extend a long distance down the front of the abdomen, but before the end, become detached from it. The ground-colour is yellow, but is almost hid with a deep pink, which is suffused all over the surface, and almost forms a stripe from the head through the abdominal segments; wing- and leg-cases dingy olive, tinged with pink."

It is interesting to note that one of our specimens bears the label "on *Erythraea venusta*."

5. STENOPTILIA PALLISTRIGA Barnes & McDunnough. Pl. XLII, fig. 15. Pl. L, fig. 16.

*Stenoptilia pallistriga* Barnes & McDunnough, Cont. Nat. Hist. Lep. N. A. 11 (4), 186, pl. IV, f. 11, 1913.

Id., Check List 151, 1917.

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 137, 1917.

Gray brown. Antennae dotted above. Eye surmounted by a white line. Palpi moderate, whitish above. Abdomen with paired dorsal dots in the distal half. Legs white on one side, the hind pair brownish, dark brown on the other.

Primaries dull brownish or grayish brown, ochreous toward base and inner margin, marked as in the preceding species but with a pale longitudinal dash in the first lobe. Fringes gray brown with paler bases and a mixture of whitish hairs which predominate in the type on the outer margin of the first lobe. Fringes of outer margin with three tufts of black scales on first lobe and two on second in type, damaged in other specimen. Secondaries brownish with concolorous fringes, their bases pale as in *semicostata*. The anal angle of the first lobe of the primaries is more evident than in *semicostata*, and the outer margin therefore more concave. Expanse 16.5-18 mm.

The unique male type from Ft. Myers, Fla., May, is in the Barnes collection, where it is now accompanied by a female from St. Petersburg, Fla., Sept. The pale dash is well marked in both. Neither specimen is reared.

6. *STENOPTILIA MENGELI* Fernald. Pl. XLII, fig. 10. Pl. XLIX, fig. 16.

*Stenoptilia mengeli* Fernald, Pter. N. A. 60, 1898.

Id., Bull. 52 U. S. N. M. 151, 1902.

Meyrick, Gen. Ins. C, 19, 1910.

Id., Wagner's Lep. Cat. pars 17, 28, 1913.

Barnes & McDunnough. Check List 151, 1917.

"Expanse of wings, 20 mm. Head, palpi, thorax, abdomen and legs dark ashy gray. A fine white line occurs over each eye.

"Fore wings ashy gray and glistening; a few dark fuscous scales on the first lobe form an ill-defined longitudinal stripe on the middle; a fuscous spot at the end of the cleft and a less distinct one on the middle of the cell. Hind wings ashy gray. Allied to *S. exclamationis* and *S. semicostata*.

"Early stages and food plant unknown.

"Described from ten specimens, in poor condition, in the collection of the American Entomological Society, taken by Mr. L. W. Mengel at McCormack's Bay, North Greenland. \* \* \*".

This is all that Fernald wrote about the species, and we are able to add only a few notes taken from the three specimens in the Fernald collection. Two of these are "types," both males. The third, also a male, is in the Barnes collection through the kindness of Prof. H. T. Fernald. In all of these we are able to discern a dark dorsal dot in the hind margin of the first abdominal segment. This is scarcely evident against the dark ground color, but we have qualified our key to embrace it. A single male from Colo. (Bruce) in the National Museum is slightly paler than the types, but in our opinion referable to this species without doubt. The primaries show a slight sprinkling of whitish scales, and the abdomen has a trace of the one spot. It would seem from this that the species is arctic and alpine, rather than limited to Greenland, and it may prove to be the same as one of the species described from Arctic Europe. The male genitalia are much like those of *pterodactyla* with a few differences in the valves.

7. *STENOPTILIA EXCLAMATIONIS* Walsingham. Pl. XLII, fig. 11, 14. Pl. XLIX, fig. 11.

*Mimesoptilus exclamationis* Walsingham, Pter. Cal. Ore. 32, pl. 11, f. 10, 1880.

*Stenoptilia exclamationis* Fernald, Smith's List Lep. N. A. 87, 1891.

Id., Pter. N. A. 59, pl. 111, ff. 1, 2; pl. V111, ff. 3, 4, 1898.

Id., Bull. 52 U. S. N. M. 447, 1902.

Meyrick, Gen. Ins. C, 19, 1910.

Id., Wagner's Lep. Cat. pars 17, 30, 1913.

Barnes & McDunnough, Check List 151, 1917.

*Stenoptilia coloradensis* Fernald, Pter. N. A. 61, 1898.

Id., Bull. 52 U. S. N. M. 447, 1902.

Anderson, Cat. B. C. Lep. 50, 1904.

Dyar, Proc. U. S. N. M. XXVII, 924, 1904.

B. C. Ent. Soc. Check List 43, 1906.

Meyrick, Gen. Ins. C, 19, 1910.

Id., Wagner's Lep. Cat. pars 17, 30, 1913.

Barnes & McDunnough, Check List 151, 1917.

Gray brown. White line over eye. Antennae darker above than below. Palpi as in the preceding species, moderate, whitish above; third joint small and not exceeding vestiture of second. Abdomen dark, with mixed blackish, ochreous and white scales. Paired dots in posterior margins of segments above and two parallel white lines below. Legs whitish on one side as in the related species.

Primaries dark brownish gray on costa, blending into ochreous or pale gray on inner margin, and heavily irrorate with white in most specimens and with scattered black scales in the darker forms. The white scales vaguely checker the costa and are heavy, as a rule, on the terminal area of both lobes. Cleft preceded by two blackish dots, usually fused. The first is usually merged into a costal shade which is sometimes extensive enough to form a rather vague discal triangle such as occurs in *Platyptilia*. First lobe with a heavy oblique blackish shade, margined outwardly with white and preceded on costa by a white dash. That part of the shade nearest the cleft is a darker, almost longitudinal, fusiform dash which is sometimes isolated by the surrounding white irroration. The white outer margin of this patch is continued on the second lobe. There is usually a blackish dot near middle of cell. Fringes white in cleft, with grayish clusters before outer margin, elsewhere gray, white below apices of both lobes. On outer margin they contain a basal row of blackish scales. Secondaries brownish gray with concolorous fringes. Expanse 18-24 mm.

Distribution: Colo., July and Aug. N. Cal., June. B. C. east into Ont., July, Aug.

The type series of *exclamationis* was taken in the Siskiyou Mts. "on the borders of California and Oregon", in June, and included seven specimens. The Fernald collection contains one male paratype from this series, which we have examined. It is the most smoothly gray specimen which we have seen, and it is scarcely to be thought strange that, with limited material, Fernald described the same species as *coloradensis*. The type series of the latter includes a male type and



two "cotypes" which lack abdomens, all in the Fernald collection. These are quite different in appearance from the paratype of *exclamationis*, but all come well within the range of variation of our series, and in it there are specimens which approach Walsingham's paratype rather closely. An even more remarkable variation from the normal is found in a specimen in our series from Aweme, Man. (Criddle) which is small and dark, with the discal triangle conspicuous and a very evident powdering of black scales on the primaries. Dr. McDunnough sent us for identification a second ♂ from Aweme and two females from Trenton and Ottawa, Ont., all of this dark, small form and even more extreme than our specimen. The transition shown in our series is so gradual that we think it useless to recognize any of these forms by names.

The specimens listed by Grinnell (Can. Ent. XL, 321, 1908) as *coloradensis* proved to be a series of *Platyptilia fragilis* with a specimen or two of *albidorsella*. We do not know that *exclamationis* reaches southern California.

The early stages have apparently not been studied.

### Genus *Aciptilia* Huebner

#### Logotype *Alucita pentadactyla* Linn.

- ‡*Alucita* Walsingham & Durrant (not Linn.) Ent. Mo. Mag. XXIII, 41, 1897  
 Pseudotype *pentadactyla*.  
 Fernald, Pter. N. A. 36, 1898 (in part).  
 Id., Bull. 52, U. S. N. M. 444, 1902 (in part).  
 Tutt, Ent. Rec. XVII, 34, 1905.  
 Meyrick, Trans. Ent. Soc. Lond. 1907, 488, 1908.  
 Id., Gen. Ins. C, 12, 1908 (in part).  
 Id., Wagner's Lep. Cat. pars 17, 16, 1913 (in part).  
 Walsingham, Biol. Cent. Am., Lep. Het. IV, 439, 1915.  
 Barnes & McDunnough, Check List 151, 1917 (in part).  
 †*Pterophorus* Lamarek (not Geoffroy), Syst. An. Saus. Vert. 288, 1801. *Pentadactylus* cited as example.  
 Curtis, Brit. Ent., Lep. 1, 161, 1827. Pseudotype *pentadactyla*.  
 Westwood, Gen. Syn. 115, 1840. Follows Curtis.  
 Meyrick, Trans. Ent. Soc. Lond. 489, 1890.  
 Id., Handbook 435, 1895.  
 †*Pterophora* Huebner, Tentamen, 1806.  
 Tutt, Ent. Rec. XVII, 35, 1905.

*Aciptilia* Huebner, Verz. bek. Schmett. 430, 1826.  
 Meyrick, Trans. Ent. Soc. Lond. 9, 1886.  
 Tutt, Pter. Brit. 137, 1891 (in part).  
 Hofmann, Deutsch. Pter. 50, 182, 1895.  
 Tutt, Ent. Rec. XVII, 35, 1905. Fixes type.

‡*Aciptilus* Zeller, Isis X, 768, 1841.  
 Wallengren, Skand. Fjär. 23, 1859.  
 Zeller, Stett. ent. Zeit. XXVIII, 338, 1867.  
 Jordan, Ent. Mo. Mag. VI, 150, 1869.  
 Tutt, Ent. Rec. XVII, 35, 1905.

*Merrifieldia* Tutt, Ent. Rec. 37, 1905. Orthotype *tridactyla* Linn.

*Porritia* Tutt, op. cit. 37, 1905. Orthotype *galactodactyla* D. & S.

*Whecleria* Tutt, op. cit. 37, 1905. Orthotype *spilodactyla* Curtis.

Front rounded, without tuft. Ocelli obsolete. Labial palpi moderate, slender. Forewings bifid, cleft from near middle, lobes slender; vein  $Cu_2$  in our species from near angle of cell, obsolete toward inner margin;  $Cu_1$  absent,  $M_2$  to end of second lobe.  $R_2$  to apex of first lobe, remaining branches absent. S. C. to middle of costa. Secondaries trifid; third lobe without black scales in fringes;  $Cu_2$  from middle of cell,  $Cu_1$  absent. (See pl. XLVIII, fig. 6.)

The synonymy of this genus involves one of the most peculiar nomenclatorial tangles which has come to our attention. In using *Pterophora* in the "Tentamen" with *pentadactyla* as the sole species, Huebner actually made a new genus, which would stand in this family together with *Pterophorus* Geoff., according to a literal interpretation of the International Rules. This is so highly absurd that we prefer to depart from the rules and regard *Pterophora* as an emendation. It was probably so intended, though there is nothing in the "Tentamen" to indicate this.

The remaining genera involve only the establishment of the first type fixation, with the exception of Tutt's. We follow Meyrick in assigning these three here.

Of the four species usually referred to this genus in our fauna two belong in *Adaina* and one in *Psechophorus*, leaving only *walsinghami*. This species is conspicuously distinct from all of our others. The long and very slender lobes of the primaries alone suffice to distinguish it, except from *Trichoptilus*.

1. *ACIPTILIA WALSLINGHAMI* Fernald. Pl. XLI, fig. 18. Pl. XLIX, fig. 17.

*Alucita walsinghami* Fernald, Pter. N. A. 36, 1898.

Id., Bull. 52 U. S. N. M. 444, 1902.

Meyrick, Gen. Ins. C, 13, 1910.

Id., Wagner's Lep. Cat. pars 17, 17, 1913.

Barnes & McDunnough, Check List 151, 1917.

Whitish, sometimes stained ochreous. Antennae grayish above, darker below. Palpi concolorous, small, slender, upturned, reaching middle of front. Abdomen with a faint dorsal stripe. Legs whitish, shaded slightly with gray.

Primaries grayish, the vestiture of mixed white and light brownish gray scales, lobes mostly white. The lobes are very long and slender, and the first has a tendency to turn forward in many specimens. Fringes brownish gray on costa of first lobe with two white patches, at base of cleft and on costa of second lobe each with one, and on inner margin with two, and whitish toward basal limit. Secondaries brownish gray with concolorous cilia and very slender lobes.

Distribution: Described from four males from Colo. In coll. Barnes from Chimney Gulch, Colo., one specimen, and Stockton, Utah, (Spalding), a good series taken mostly in June but including one specimen dated May 31.

Of the four specimens in the type series one is now in the National Museum and three in the Fernald collection. Two of the latter are labelled "type" and the others "cotype".

The early stages have apparently not been studied.

In superficial appearance *walsinghami* is closest to *spilodactyla* Curtis but the alternate light and dark patches in the fringes of the primaries are in the opposite order and the insect is more definitely grayish. It is the only true *Aciptilia* in our fauna, and differs from all other species except in *Trichoptilus* in the slender lobes of the primaries, and from the species of that genus in the grayish color and absence of black scales from the fringes of the secondaries.

### Genus *Pselnophorus* Wallengren

Haplotype *Alucita brachydactyla* Treitschke

*Pselnophorus* Wallengren, Ent. Tidsk. XI, 96, 1881. *Brachydactyla* sole species.

Meyrick, Handbook 437, 1895.

Hofmann, Deutsch Pter. 50, 178, 1895.

Meyrick, Trans. Ent. Soc. Lond. 1907, 491, 1908.

Id., Gen. Ins. C, 14, 1908.

Id., Wagner's Lep. Cat. pars 17, 20, 1913.

*Gypsochares* Meyrick, Trans. Ent. Soc. Lond. 488, 1890, Haplotype *baptodactyla* Zell.

Tutt, Ent. Rec. XVII, 36, 1905.

*Crasimctis* Meyrick, Trans. Ent. Soc. Lond. 489, 1890. Logotype *brachydactyla*.  
Tutt, Ent. Rec. XVII, 36, 1905. Fixes type.

Much like the following genus. Ocelli obsolete; palpi moderate, slender, oblique in our species. Primaries cleft from three-fifths (from middle according to Meyrick, but not in our species);  $M_2$  and  $Cu_1$  stalked, connate with  $Cu_2$ ;  $R_4$  and  $R_5$  stalked (very variable in *belfragei*), connate or stalked with  $R_2$ ;  $R_3$  absent;  $R_1$  free in our species. Secondaries trifold, without dark scales in fringes of third feather;  $Cu_2$  from middle of cell,  $Cu_1$  absent. (See pl. XLVIII, fig. 4.)

Judging by Meyrick's characterization of the genus and the structures of the species which we know, *Pselnophorus* is a very poorly defined genus, intermediate between *Oidaematophorus* and *Aciptilia* and about equivalent to *Adaina* in the degree of its development. All the species agree in having  $R_5$  stalked with one or more of the other branches of the radius, while this vein is free in *Adaina* and the anastomosis concerns  $R_4$ . The venation is very variable in *belfragei*. We have specimens in which  $R_2$ ,  $R_4$  and  $R_5$  are short stalked, others in which  $R_4$  and  $R_5$  are long stalked and  $R_2$  separate, and still others in which  $R_4$  and  $R_5$  are short stalked and connate with  $R_2$ .

1. *PSELNOPHORUS BELFRAGEI* Fish. Pl. XLI, fig. 19. Pl. XLIX, fig. 19.

*Aciptilus belfragei* Fish, Can. Ent. XIII, 142, 1881.

*Pterophorus belfragei* Fernald, Smith's List Lep. N. A. 88. 1891.

*Alucita belfragei* Fernald, Pter. N. A. 37, 1898.

Id., Bull. 52 U. S. N. M. 444, 1902.

Meyrick, Gen. Ins. C, 13, 1910.

Id., Wagner's Lep. Cat. pars 17, 17, 1913.

Barnes & McDunnough, Check List 151, 1917.

This species is so variable that no accurate description can be given, so we merely call attention to the various features and point out the extent to which they vary.

The palpi are brown on the sides, white above and below. Head with some white between antennae. Legs white with or without brown shading; fore and middle femora and tibiae striped with dark brown. The abdomen is most distinctive. It varies from pale ochreous to dark gray brown, due to a variable mixture of dark scales. In the most heavily marked specimens it bears two conspicuous silky white lines above, margined more or less with black dashes. There are similar lines on the sides and a pair below, all less conspicuous, and many black scales, especially on the sides in the posterior half of the abdomen. In the paler specimens some black scales remain and the dorsal stripes are usually faintly marked.

The primaries vary from white with scattered brown and gray scales to dark gray-brown with some whitish scales. The marks are very variable, and

consist of a dark brown dot in middle of cell, oblique patch before cleft, two spots on costa of first lobe, one at apex and one before, and a spot before apex of second lobe. Fringes gray brown, approximately concolorous; whitish patches before apices of both lobes, on costal margins, and occasionally on inner margins. Expanse 13-19 mm.

The male genitalia are somewhat variable, and an average form is figured. (Plate XLIX, fig. 19.)

Distribution: Fla., Apr. Texas, Mar., May, June. Ariz.

The type is a female from Clifton, Tex., May 16, now in coll. Fernald. It is in excellent condition, aside from the lack of hind legs, and is a moderately pale example. We first made the acquaintance of the species through our smallest and darkest specimen (from Texas), and labelled pale specimens from Florida as a new species. The type is nearer to the Florida specimens, but in spite of its generally light color, the dorsal stripes are quite noticeable, while in the others they are very faint. The only series of reasonable size which we have examined is in the Cambridge Museum. It contains twelve specimens from Shovel Mt., Tex., and seven from Fedora, Tex., all collected by Dr. Dietz. Several of these are being retained in the Barnes collection. This series includes only the darkest form, which we judge to be the most common. A number from Victoria, Tex., in the National Museum are decidedly pale gray, and a single Arizona specimen in our series is rather smoothly gray with darker fringes and only the costal spots heavily marked. The species is not difficult to recognize except in its paler forms which have faint dorsal stripes. In some of these an examination of the structural characters of the genus must be depended upon.

We know nothing of the life history.

### Genus *Adaina* Tutt

Orthotype *Alucita microdactyla* Huebner

*Adaina* Tutt, Ent. Rec. XVII, 37, 1905.

Meyrick, Gen. Ins. C, 15, 1908.

Id., Wagner's Lep. Cat. pars 17, 21, 1913.

Barnes & McDunnough, Check List 151, 1917.

Very similar to *Oidaematophorus*. Ocelli obsolete. Palpi moderate, ascending, slender. Primaries cleft from two-thirds or before; vein  $Cu_2$  from near angle of cell,  $Cu_1$  and  $M_2$  connate or stalked;  $R_2$  absent,  $R_2$  and  $R_1$  stalked, sometimes very shortly (see *A. buscki*). Hindwings trifid, third segment without black scales in fringes; vein  $Cu_2$  from middle of cell,  $Cu_1$  absent. The

species included are not unlike those in *Oidacmatophorus*, but differ in having  $R_2$  and  $R_4$  of the primaries at least short-stalked. In the genotype they are long stalked. (See pl. XLVIII, fig. 5.)

We have felt some doubt about placing several of the species included here, for they seem to make a rather heterogeneous group. They agree, however, in the stalked second and third branches of the radius. *Bipunctata* and *zephyria* are the most nearly typical, and both have genitalia of the usual *Oidacmatophorus* form, yet the others, in which  $R_2$  and  $R_4$  are only short stalked, have genitalia of a different and definite type, with the exception of *cinerascens*. In none of them are the genitalia similar to those of *Oidacmatophorus*. These species satisfy Meyrick's characterization of *Adaina*, however, and even after careful examination of a long series we are unable to find characters on which we are willing to base a new genus. We are at a loss to account for the peculiar discrepancies which exist in the genus as it stands.

#### KEY TO THE SPECIES

1. Terminal fringe of first lobe of primaries with a pencil of whitish scales separating dark areas ..... 4  
    Terminal fringe without such marks; not more than one dark area present ..... 2
2. Middle and hind tibiae without tufts ..... 3  
    Middle tibiae with large terminal tuft, both with median dorsal tufts, that of the hind legs small and spur-like..... *buscki*
3. Expanse not over 11.5 mm. Wings whitish. Antennae evenly colored ..... *bipunctata*  
    Expanse 14 mm. or more. Wings grayish, more or less powdered with brown. Antennae dotted above ..... *zephyria*
4. Hind tibiae and tarsi with dark annuli..... *ambrosiae*  
    Hind tibiae pale, without rings, though with a few dark scales in darker examples ..... 5
5. Ground color of primaries pure white; brown irroration often heavy, especially in apex of first lobe ..... 6  
    Yellowish. Irroration slight, not noticeably heavy in first lobe..... *cinerascens*
6. Shining white powdered with scattered brown scales, with a brown spot at base of cleft and one on costa above it..... *montana*  
    Similar but frequently almost completely covered with dense brown irroration. Spot at base of cleft more or less definitely connected with costal spot and with one on inner margin, forming a variably complete oblique band ..... form *declivis*

1. *ADAINA BIPUNCTATA* Moeschler. Pl. XII, fig. 20. Pl. XLIX, fig. 18.

*Pterophorus bipunctatus* Moeschler, Abh. Senck. Nat. Ges. XVI, 346, 1890.

Fernald, Bull. 52 U. S. N. M. 445, 1902.

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 135, 1917.

*Alucita bipunctatus* Walsingham, Proc. Zool. Soc. Lond. 1891, 496, 1892

†*Leioptilus microdactylus* Hedemann, Stett. ent. Zeit. LVII, 9, 1896 (*vide* Fernald).

‡*Adaina bipunctata* Meyrick, Gen. Ins. C, 15, 1910.

Id., Wagner's Lep. Cat. pars 17, 21, 1913.

*Adaina bipunctatus* Barnes & McDunnough, Check List 151, 1917.

*Pterophorus simplicius* Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 136, 1917.

Entirely pale yellowish white. Head touched with pale brownish above and on front. Palpi rather long, slender; second joint oblique, third almost as long, slightly drooping. Fore and mid tibiae and femora with brown stripes. Abdomen with a faint dorsal ochreous stripe.

Primaries with a few brown scales and several brown spots, one at base of cleft, one beyond on costa, followed by a second, one on inner margin of first lobe before apex and two on inner margin of second lobe before apex. Fringes slightly tinged with gray, similar to secondaries and their fringes. Expanse 9-11.5 mm.

The primaries frequently lack part of the spots mentioned, but we have yet to see an immaculate specimen.

The male genitalia are of the form found in *Oidacmatophorus*.

Distribution: We have five specimens from various localities in Florida, one dated April, and have seen a few others dated March and May. The Cornell collection contains one from Biloxi, Miss., June. Described from Porto Rico.

The type of *bipunctata* should be at Berlin. We have not verified the identification by reference to the type but see no reason to doubt that Moeschler's description applies to our Florida species. If an examination of his specimen should show that this is not the case, *simplicius* Grossbeck will be applicable. The type of this species is .5 mm. larger than any other specimen which we have seen, according to the original description, but this is negligible. Mr. Frank E. Watson of the American Museum has very kindly compared specimens for us with the types of both of Grossbeck's species, and says that "although not an exact match", he considers our specimen labelled *simplicius* to be the same species as Grossbeck's type.

The life history is unknown.

2. *ADAINA ZEPHYRIA* n. sp. Pl. XLI, fig. 21. Pl. XLIX, fig. 20.

Brownish white. Head slightly darker in front and above, pale between antennae. Antennae dotted with brown above. Palpi rather long and slender, brown above; second joint oblique, third porrect, as in *bipunctata*. First two pairs of legs brown inside, tibiae striped. Hind tarsi annulate.

Primaries with brown irroration, forming a vague spot in middle of cell. First lobe with a brown spot on costa above base of cleft, a smaller one beyond and another at apex; inner margin with one spot. Second lobe with a brown dot at apex preceded by two or three at ends of veins, along inner margin. There is a less definite spot at the base of the cleft. Secondaries and all fringes approximately concolorous with primaries. Expanse 14-17 mm.

Aside from the left clasper, which is figured, the male genitalia are very similar to those of the preceding species.

Described from a series of thirty-two specimens from San Diego, Cal., August. The types are as follows:

Holotype ♂, allotype, 7 paratypes ♂ and 3 paratypes ♀ in coll. Barnes.

Paratype ♂ and paratype ♀ U. S. N. M. No. 23464.

Paratype ♂ in coll. Meyrick.

In superficial appearance, depending on the amount of irroration, this species bears some resemblance to *Oedematophorus cadmus*, *lobates* and *venapunctus*, but the two branches of the radius are so long stalked that no difficulty should be encountered in placing it as an *Adaina*.

The early stages are not known.

3. *ADAINA MONTANA* Walsingham. Pl. XLII, fig. 1.

*Acitilus montanus* Walsingham, Pter. Cal. Ore. 59, pl. 111, f. 14, 1880.

Kellicott, Can. Ent. XII, 106, 1880. (Mentions larva without name.)

Fish, Can. Ent. XIII, 141, 1881, (Names Kellicott's larva.)

Dimmock, Psyche III, 404, 1882.

Id., op. cit. 413, 1882.

Kellicott, Bull. Buff. Soc. Nat. Sci. IV, 51, 1882 (biol.) (*vide* Hy. Edw.)

Hy. Edwards, Bull. 35 U. S. N. M. 137, 1889.

*Pterophorus montanus* Fernald, Smith's List Lep. N. A. 88, 1891.

*Mucita montana* Fernald, Pter. N. A. 37, 1898.

Id., Bull. 52 U. S. N. M. 444, 1902.

Meyrick, Gen. Ins. C, 13, 1910.

Id., Wagner's Lep. Cat. pars 17, 17, 1913.

Barnes & McDunnough, Check List 151, 1917.

"Head white; antennae white, faintly dotted above with brownish.

"Forewings cleft to nearly half their length, snow-white, sparsely dusted with ferruginous-brown scales, especially towards the costa; a blotch of these lies immediately before the base of the fissure, and is connected obliquely with a similar or rather darker blotch on the costa above it, which is scarcely sepa-



rated from another costal blotch beyond it, nearer to the apex. The cilia are white, except immediately beneath the extreme apex, where they are dark ferruginous brown. The outer half of the costal margin of the second lobe is dark ferruginous brown, and this colour runs thence through the cilia immediately beneath the extreme apex of this lobe; all of the remaining cilia are snow-white.

"Posterior wings dusted with cinereous brown; the cilia of the same colour, the third lobe only being slightly paler towards the base.

"The abdomen and legs snow-white, the two anterior pairs tinged with brown on their inner sides.

"Expanse 16 millims."

Distribution: Type locality Mt. Shasta, Cal. The types were taken in August. The only other specimens we have seen were taken by Kellicott, in New York. There is one in the Fernald collection and one in the National Museum, the latter dated March.

There are four "types" in the Fernald collection, all males, and one other specimen which appears to be from Walsingham. The single specimen without data which is labelled with Kellicott's name completes the series. We have at hand the single specimen belonging to the National Museum which was also collected by Kellicott, and which presumably came from Buffalo, N. Y., though it is without a locality label. This distribution seems very peculiar, but the species will probably be found more widely distributed in Canada than is now known, or it may be the form taken in the southern extremities of the range. The known distribution of *declivis* Meyrick does not substantiate the latter alternative, and influences us to treat *declivis* as a form.

Kellicott reared the species from larvae eating the leaves of *Solidago* sp., and at length published a description of the larva and pupa. This is quoted by Fernald in the "Pterophoridae of North America," apparently from the Bulletin of the Buffalo Society. We have no original copy of Kellicott's description and so repeat Fernald's quotation. We have carefully verified the identification of Kellicott's species by sending the National Museum specimen to Meyrick for comparison with Walsingham's type, and also by personal comparison with the paratypes in the Fernald collection.

"The larva feeds upon different species of *Solidago*. The first examples were noticed on May 30. At this time they were found only on the under side of the leaves, later they occur on the upper as well. As a rule, they lie close to and parallel with the mid-vein. At least while young they eat out the parenchyma, leaving the epidermis.

"May 30 the larvae were .1 of an inch and less in length; entirely white, except claws and mandibles. The body is not flattened at this stage. The first ring is broad, and the head may be well withdrawn into it. The tubercular hairs are spined, plainly seen under a moderate magnifying power.

"June 3 the largest had evidently moulted, length then .2 of an inch, pale green, eighth and ninth rings yellow. Lateral tufts more conspicuous. Dorsal line faint. Subsequent changes not noted until full-grown larva was described the latter part of June. Length .34 to .4 of an inch. Pale pea green, head paler; dorsal stripe of three white lines, the middle one the finest and most clearly defined. The seventh, eighth and ninth rings yellow. The posterior subdorsal papilla of the body rings bears two unequal hairs, the anterior but one; above the spiracles and in front of them also is a papilla; below the same there are two, from which arise long hairs, five from posterior and ten or twelve from anterior, these are spread out fan-like; below these a prominent longitudinal fold. From the first ring proceed long hairs reaching over and beyond the head. Hairs all unbranched and plumose. The body is considerably flattened, so when looking down upon it the spiracles from either side may be seen at once, spiracles conical, rings black.

"The *pupa* is .3 of an inch in length; light green, some of them have a reddish stripe along dorsal part of the abdomen, the conical spiracles of such have the same hue. The upper part of the rings well clothed, especially at extremities and along the lateral ridges. Pupa fastens to a tuft of silk by means of the hooks of the last ring. Moth appears through greater part of July."

Form DECLIVIS Meyrick. Pl. XLII, fig. 2. Pl. L, fig. 2.

†*Alucita cinerascens* Dyar (not Wlsm.) Proc. U. S. N. M. XXV, 399, 1902 (biol.).

*Pterophorus declivis* Meyrick, Exot. Microlep. 1, 112, 1913.

id., Wagner's Lep. Cat. pars 17, 25, 1913.

Barnes & McDunnough, Check List 151, 1917.

*Declivis* differs from *montana* in that the primaries are more or less heavily irrorate with brown scales and the brown marks are heavier. The abdomen in some specimens has a few dorsal dots. Expanse 14-16 mm.

Distribution: Ont., July (N. M.); Man., Mar.; Colo., June.

We have before us two of the specimens reared by Dyar and Caudell in Colorado. These are darker than the paratypes of *montana* in the Fernald collection and lighter than our Manitoba examples, but Mr. Meyrick returned one to us as *declivis* after comparing it with the type, and at the same time noted its apparent relationship with *montana*. The differences in larval habit noted by Dyar and Kellcott have led us to make a very careful examination of these two specimens, *montana* Kellcott, and Walsingham's paratypes, but minute comparison fails to disclose any differences of specific value.

Dyar's account of the life history is as follows:

"*Larva*.--Head long, the mouth pointed, apex under joint 2; whitish. Body flattened, narrow, not tapering. Tubercles i and ii approximate with one long and several short hairs, iii single haired, iiib several haired, iv + v large, many haired, the others retracted subventrally. Translucent green, with obscure, straight, subdorsal and broken lateral lines, the latter above tubercle iii. Warts black, i + ii largely so, and forming a double row of distinct spots separated by a straight line of the ground color. Anterior edge of joint 2, posterior rim of reduced cervical shield and warts of anal flap also black marked. Hairs white, spinulose; none secondary. Pupa free, not in a cocoon.

"*Larvae* in the heads of *Helianthus pumilus*, near Boulder Creek Canyon. May 23; moths issued June 12. Eggs were obtained from these which passed the winter without hatching, showing the species to be single brooded with hibernation in the egg state.

"*Egg*.--Oviform, elliptical, one end more pointed than the other, both slightly truncate at the extreme tips, strongly and sharply flattened on two sides, like cakes cut out of dough; pale yellow, opaque, not shining, the surface slightly shagreened, not sculptured. Size, 0.55 by 0.4 by 0.15 mm."

4. *ADAINA CINERASCENS* Walsingham. Pl. XLII, fig. 3. Pl. L, fig. 3.

*Aciptilus cinerascens* Walsingham, Pter. Cal. Ore. 57, pl. III, f. 13, 1880.

*Pterophorus cinerascens* Fernald, Smith's List Lep. N. A. 88, 1891.

*Aucita cinerascens* Fernald, Pter. N. A. 39, pl. II, ff. 5, 6; pl. IX, ff. 9-11, 1898.

Id., Bull. 52 U. S. N. M. 444, 1902.

Meyrick, Gen. Ins. C. 14, 1910.

Id., Wagner's Lep. Cat. pars 17, 20, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head very slightly touched with brown above and in front. Palpi very short and slender. Antennae whitish. Thorax and abdomen whitish, legs concolorous, the first pair fuscous inside and middle pair with some fuscous.

Primaries in good specimens distinctly yellowish, very slightly irrorate with brown. Costa with a brown patch just beyond base of cleft and another beyond middle of first lobe. Cleft preceded by a brown spot slightly produced toward first costal spot but not connected with it. Second lobe with costa at apex brown. Fringes white on costa, grayish elsewhere with two darker patches before apex of first lobe, in cleft, and one below apex of second. Secondaries and their fringes pale brownish gray. Expanse 16.5-19 mm.

The male genitalia have a remarkably developed juxta, and are very distinct from any others known to us.

Distribution: Described from Mendocino and Lake Co., Cal., June. Nevada, June. Utah, July. S. Oregon.

The Fernald collection contains four paratypes in good condition. These differ from Walsingham's figure in the two dark areas

before the apex of the first lobe of the primaries in place of one. The marks on the costa are much less extensive than in the figure.

The yellow color of fresh specimens renders this species very distinct from the preceding, but worn specimens of small size are frequently difficult to distinguish. The differences in pattern noted in the key suffice in all of the few specimens which we have seen, and the heavily brown-marked apex of *montana* seems to us the most salient difference in that species. The wings, in our opinion, do not show the marked difference in shape which appears in Walsingham's figures, though we have compared his own paratypes in the Fernald collection.

The early stages are unknown.

5. *ADAINA* BUSCKI n. sp. Pl. XLII, fig. 4. Pl. I., fig. I.

Tawny or brownish white. Antennae and palpi concolorous, the latter moderate, slender, upturned or oblique. Abdomen with a slight brown dorsal stripe and some brown scales on the sides and below. Legs concolorous, shaded with brown. Mid-tibiae with brown scale tufts at end and middle. Hind tibiae with a distinct tuft at end, a slight tuft below at base of first pair of spurs, and a short, spur-like tuft above at middle, well before spurs.

Primaries, whitish tawny with scattered brown scales forming a dot in cell and a dash before cleft which projects toward a costal spot beyond base of cleft. First lobe with costal dot beyond middle, an apical dot, and one before apex on inner margin. Second lobe with some brown scales in apex and at end of vein  $Cu_1$ . Fringes gray brown with a darker cluster at spot on inner margin of first lobe. Secondaries and fringes gray-brown. Expanse 20-21 mm.

Holotype ♀, Coconut Grove, Fla. (E. A. Schwarz), and paratype in poor condition, Miami Fla. (Coll. Schaus), U. S. N. M. No. 23465.

Allotype ♂, same source as holotype, coll. Barnes.

The tufted tibiae of this species do not agree with Mr. Meyrick's diagnosis of *Adaina*, but in venation it corresponds with most of the other species which we place in the genus. Veins  $R_2$  and  $4_4$  of the primaries are short stalked and  $R_5$  free. We examined a specimen in the American Museum collection which appeared to be this species, and found  $R_2$  and  $R_4$  only connate. The genitalia of the allotype seem most closely related to those of *ambrosiac*.

The types were found in the National Museum collection, and in recognition of his services in connection with the loan of this material we take pleasure in naming the species after Mr. August Busck.

We have no data on the life history.

6. *ADAINA AMBROSIAE* Murtfeldt. Pl. XLII, fig. 5, 6. Pl. L, fig. 4.  
*Oedematophorus ambrosiae* Murtfeldt, Am. Ent. 111, 236, 1880 (biol.).  
 Dimmock, Psyche 111, 403, 1882.  
 Hy. Edwards, Bull. 35, U. S. N. M. 137, 1889.  
*Alucita ambrosiae* Fernald, Smith's List Lep. N. A. 87, 1891.  
 §*Oedematus ambrosia* Murtfeldt, Proc. Nat. Sci. Club 13, 1896.  
 †*Pterophorus inquinatus* Fernald, Pter. N. A. 56, 1898 (in part).  
 Id., Bull. 52 U. S. N. M. 447, 1902 (in part).  
 Meyrick, Gen. Ins. C, 17, 1910 (in part).  
 Id., Wagner's Lep. Cat. pars 17, 25, 1917 (in part).  
 Walsingham, Biol. Cent. Am., Lep. Hct. IV, 446, 1915 (in part).  
 Barnes & McDunnough, Check List 151, 1917 (in part).  
*Pterophorus ambrosiae* Fernald, Pter. N. A. pl. VI, ff. 14-17, 1898.  
*Pterophorus perplexus* Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 136, 1917.

Head brownish, pale grayish white between antennae. Antennae with a dark line, sometimes broken, above. Palpi, small, slender, oblique, brown on sides. Thorax whitish to gray-brown. Abdomen similar, somewhat tawny in our series but this may be due to stain. There are single black dorsal dots on the posterior margins of most segments and a few blackish streaks, all sometimes obscured by a variable mixture of brown scales. Sides roughened, with many brown scales. Under surface with a central stripe forming dots on hind margins of segments. Front legs white, tarsi brown inside, femora and tibiae striped. Middle pair similar, tibia with a slight trace of median tuft. Hind legs with scattered brown scales and annuli.

Primaries gray, frequently tawny in first lobe and a little before. Entire wing irrorate with brownish black scales which tend to collect along the veins and in blotches near inner margin, often reduced on first lobe and increased on second. A few pale scales before cleft are preceded by a black dash, somewhat triangular, outwardly concave, and often produced toward the nearest costal spot. This is heavy and usually conspicuous, and is followed about half way to the apex by a smaller black spot. These are continued through the otherwise pale costal fringes. In addition the costa of the first lobe is sometimes marked with two dots, one before and one beyond the outer spot, which do not enter and fringes. Apex of first lobe and inner margin before apex with black dots. Fringes of inner margin of first lobe pale with two dark patches at outer end which contain a basal row of black scales. Fringes of second lobe gray brown, cut with four pale areas at apex and before it on inner margin. The two outer dark areas thus formed have black basal scales. Secondaries and their fringes brownish gray. All characters except the larger spots of the primaries are more or less variable. Expanse 14-20 mm.

Distribution: Fla. to Pa., west to S. Cal. and Ariz. In the northern parts of its range it appears chiefly in Aug. and Sept., in the south and on the Pacific Coast March to July, Sept., Nov. according

to our series. We have the species in good series from intermediate localities, including specimens reared by Dr. McDunnough at Decatur.

The Murtfeldt collection, now at Cornell University, contained three specimens labelled as types of this species, which were submitted to us for examination. All bore the same rearing number and the locality Mo. One proved to be a specimen of *Marasmarcha pumilio* Zell., the others corresponded to our idea of *ambrosiac*. We labelled a ♂ lectotype and the other, a ♀, which is in the Barnes collection through the kindness of Dr. J. C. Bradley, may be regarded as a paratype. One specimen in the Fernald collection bore type and breeding labels in Miss Murtfeldts handwriting, and we have therefore labelled it as a paratype.

We have not been able to examine the types of *perplexus* Grossbeck, but placed it as a synonym of *ambrosiac* by means of the description. A comparison of specimens with the type, which Mr. Frank E. Watson has very kindly made, confirms this opinion.

*Ambrosiac* is an extremely variable species in most details of color and pattern, and can be confused rather readily with some species of *Oidacmatophorus* in a casual examination. The stalked radial branches, however, place it with a group of species from which it is readily separable. The single dorsal dots on the abdomen distinguish it from *inquinatus*, of which it has so long been regarded as a synonym. In *inquinatus* the dorsal dots are paired.

Miss Murtfeldt reared the species before describing it, and in her original paper gives the following account of larva and pupa:

"*Larva*: Length 0.35; diameter, 0.09. Form depressed. Color pale greenish gray, with very characteristic dark markings and lateral tufts of long, white, silken hairs. Head small, light brown, cornicous, retractile. Segment 1 with a dilated, partially free, shield-like collar covering top and projecting over the head. The ornamentation of this collar consists of five central minute brown dots, with four still smaller black ones on each side, from each of which proceeds a short, curved bristle. The projecting edges are fringed with soft, light hairs. Segments 2 and 3, gradually broadening backward, ornamented on dorsum with two oblong, pale-brown spots on either side of a triangle of very minute black dots, and having a larger black dot on each outer side. Two short bristles arise from each of the more conspicuous spots. Abdominal segments, each with four, somewhat elevated, brown spots, from which proceed single, short, backward-curving bristles. Between the posterior pair of brown spots are two smaller black ones, each of which forms the base of a very short clubbed piliferous process, which turns backward, resting flat upon the surface.

"The stigmata are annulated with black, and obliquely above and forward of each are two small brown dots. The lateral tufts are below the stigmata, and each is composed of from seven to nine long hairs, which, under the lens, are remotely pectinate. A little above and back of each of these tufts is a semi-circle of fine, scale-like bristles. The prolegs are very short.

"*Pupa*: Length, 0.25. Swollen and blunt anteriorly. Color pale fulvous, with a roseate hue on dorsum. Dorsal surface beset with tufts of dingy hairs, with a lateral fringe of single straight hairs, which serve to secure it more firmly to the mat of silk upon which it rests. Dorsum marked, near the head, with two large dull-brown spots, and an indistinct longitudinal stripe of same color on the abdomen. On either side of the thorax is a small, velvety dark brown dot.

\* \* \* \* \*

"It feeds on the Rag-weed (*Ambrosia artemisiifolia*), and I have only found it late in the season."

Dr. McDunnough has communicated to us the following notes:

"Murtfeldt's description is, on the whole, good. Tubercles I and II are raised, conical, brown, with short recurved setae. The two black dots between tubercles II are characteristic but piliferous process mentioned could not be seen; there is a short seta projecting forward and lying flat on the body surface, arising from just before tubercle I and there is often another behind II, but none arising from the spots themselves. Area around tubercles often with numerous round minute glandular processes, much like mushrooms. Tubercle III anterior to and well above spiracle with minute seta, pointed forward and recumbent, above it a black lenticle (these two arising from the two black spots mentioned by Murtfeldt). Spiracle raised, black, forming on prothorax a large conical process, much raised. Lateral tufts as stated. Tubercle IV is a tuft of 4 or 5 rather short broad setae, situated above and posterior to the lateral tuft which represents V and contains 7-8 very long setae and numerous short ones. Skin, especially near lateral flange, shagreened; faint traces of yellow dorsal line behind II with V shaped oblique extensions pointing forward. All setae strongly barbed. Thoracic tubercles with two short setae and with the spot above larger than on abdominal segments, oblong (not round) and consisting apparently of fusion of lenticles.

"*Pupa*. Wing-sheaths pale green with rows of minute setae and lateral fringe of longer ones. Dorsally whitish-green, thoracic segments with purple-brown markings and geminate fine dorsal line terminating in a large black-brown patch. A faint dark dorsal line on abdominal segments broadening on the 4th to a stripe which is continued to anal segment; traces of oblique lateral lines, reaching to spiracle and most distinct on the two segments posterior to the dark dorsal patch. Spiracles black, the first visible one being raised, conical and arising from a black brown lateral patch. Setae of primary tubercles as in the larvae; dorsal ones however are not single but have clusters of shorter hair around the base."

Genus *Oidaematophorus* WallengrenHaplotype *Alucita lithodactyla* Treitschke

- Oidaematophorus* Wallengren, Skand. Fjäd. 19, 1859.  
 Jordan, Ent. Mo. Mag. VI, 125, 1869.  
 Tutt, Pter. Brit. 103, 1896.  
 Id., Ent. Rec. XVII, 35, 1905.
- †*Pterophorus* Wallengren (not Geoff.) Skand. Fjäd. 20, 1859.  
 Walsingham, Pter. Cal. Ore. 39, 1880.  
 Meyrick, Trans. Ent. Soc. Lond. 10, 1886.  
 Hofmann, Deutsch. Pter. 49, 155, 1895.  
 Tutt, Pter. Brit. 110, 1896.  
 Fernald, Pter. N. A. 39, 1898.  
 Id., Bull. 52 U. S. N. M. 444, 1902.  
 Meyrick, Gen. Ins. C, 15, 1910.  
 Id., Wagner's Lep. Cat. pars 17, 21, 1913.  
 Walsingham, Biol. Cent.-Am., Lep. Het. IV, 439, 1915.  
 Mosher, Class. Lep. Pupae 70, 1916.  
 Barnes & McDunnough, Check List 151, 1917.
- Leioptilus* Wallengren, Skand. Fjäd. 21, 1859. Logotype *tephrodactylus* Hbn  
 Zeller, Stett. ent. Zeit. XXVIII, 331, 338, 1867.  
 Jordan, Ent. Mo. Mag. VI, 149, 1869.  
 Hofmann, Deutsch. Pter. 49, 160, 1895.  
 Tutt, Pter. Brit. 114, 1896.  
 Id., Ent. Rec. XVII, 30, 1905. Fixes type.  
 Meyrick, Gen. Ins. C, 15, 1910. Under *Pterophorus*. Pseudotype *scar-*  
*odactylus* Hbn.
- ‡*Oedematophorus* Zeller, Stett. ent. Zeit. XXVIII, 331, 337, 1867.  
 Walsingham, Pter. Cal. Ore. 34, 1880.  
 Meyrick, Trans. Ent. Soc. Lond. 10, 1886.  
 Hofmann, Deutsch. Pter. 49, 148, 1895.
- ‡*Liopitilus* Zeller, Stett. ent. Zeit. XXVIII, 331, footnote, 1867.  
 Walsingham, Pter. Cal. Ore. 41, 1880.  
 Meyrick, Trans. Ent. Soc. Lond. 10, 1886.
- ‡*Alucita* Meyrick (not Linn.) Trans. Ent. Soc. Lond. 437, 1890  
 Fernald, Smith's List Lep. N. A. 87, 1891.  
 Meyrick, Hand-book 438, 1895.
- Ovendenia* Tutt, Ent. Rec. XVII, 37, 1905. Orthotype *septodactyla* Treitschke.  
*Helinsia* Tutt, loc. cit. Orthotype *osteadactylus* Zell.  
*Enamelina* Tutt, loc. cit. Orthotype *monodactyla* Linn.

Front rarely with tuft. Ocelli obsolete. Palpi short to long, usually slender and more or less oblique. Tibiae with or without conspicuous scale tufts. Primaries bifid, cleft two-fifths or less; vein  $Cu_2$  about three-fourths length of cell from base,  $Cu_1$  and  $M_2$  connate or stalked; radials free,  $R_3$  absent. Secondaries trifid, fringes without black scales.  $Cu_2$  from middle of cell,  $Cu_1$  absent. (See pl. XLVIII, fig. 7).



*Cretidactylus* Fitch and allied species in the North American fauna are very similar to the type of *Oidacmatophorus*, while *paleaceus* Zell. and others are nearer to the type of *Lcioptilus*, but we find such a complete transition of structure that we agree with Meyrick in regarding them all as congeneric. Tutt's genera demand little remark with the exception of *Emmelina*, type *monodactylus*. This genus is identical with the †*Pterophorus* Auct., and in our opinion is not worthy of separation, in spite of the rather distinct habitus of *monodactylus*.

The species of *Oidacmatophorus* are not at all difficult to identify when one has gained some familiarity with them. Usually some one or two characters suffice, but we have found that very nearly all characters of color and pattern are subject to such variation that the construction of a key is very difficult. In order that the one presented here may offer the fewest possibilities of confusion we have inserted a number of species in two categories. Only in this way have we been able to make use of salient features of many species which are not entirely constant.

## KEY TO THE SPECIES

1. Palpi porrect, conspicuously longer than head, frontal tuft long. Very attenuate insects ..... *longifrons*  
Palpi not conspicuously longer than head..... 2
2. Primaries with a dark costal dot or patch above or just beyond base of cleft, sometimes connected with spot at base of cleft to form an oblique patch ..... 3  
Without such a mark; costa without spots or first spot near middle of first lobe ..... 35
3. Primaries lemon yellow; hind wings dark. Expanse about 24 mm. Costal spot very small .....some *sulphurcodactylus*  
Primaries not lemon yellow; if yellowish, expanse of insect less than 24 mm or with conspicuous dark marks ..... 4
4. Gray or whitish species; posterior margins of at least part of the abdominal segments with paired dorsal black dots..... 5  
Various. Abdominal segments with single spots if any; sometimes immaculate or with a different pattern ..... 7
5. General appearance dull brownish gray with some white scales on primaries ..... *inquinatus*  
General appearance whitish or light gray with dark markings..... 6
6. Smaller, 14-18 mm. Wings predominantly greyish below.....*cross*  
Larger, 17-24 mm. Secondaries usually more or less whitish below....*pan*

7. Ground color pure white. Mid tibiae with a well developed median tuft ..... *elliottii*  
 Ground color otherwise or mid tibiae with only a trace of the median tuft ..... 8
8. Primaries tawny, yellowish, or grayish ochreous, expanse less than 20 mm. or with spot at base of cleft small, usually rounded, and the only conspicuous discal mark. If gray powdered and small, abdomen with dorsal dots. Secondaries not contrastingly dark..... 9  
 Not such species ..... 13
9. Fringes dark at apex of lobes of primaries..... 10  
 Fringes evenly colored ..... some *occidentalis*
10. Palpi with dark scales on outer surface..... 12  
 Palpi entirely whitish ..... 11
11. Primaries yellowish. Expanse under 18 mm. Blackish-brown fringes at tip of first lobe conspicuous, apex of second lobe with fringes scarcely darkened ..... *tinctus*  
 Primaries more tawny. Expanse 18-22 mm. Dark fringe at tips of both lobes ..... *cochise*
12. Expanse usually under 20 mm. Dark fringes at apex of second lobe almost equally extensive on costal and outer margins..... some *iobates*  
 Expanse usually well over 22 mm. Dark fringes of second lobe mostly on costal margin ..... some *helianthi*
13. Small or moderate species, primaries whitish, yellowish, grayish or ochreous, usually rather coarsely powdered with dark scales. Either pale, without extensive and contrasting pattern, or with dot at base of cleft the only conspicuous discal mark. Mid tibiae with no more than a trace of median tuft ..... 14  
 Not such species. Either over 25 mm. expanse, with an evident median tuft on mid tibiae, or with nebulous, contrasting gray brown marks on primaries ..... 21
14. Inner margin of first lobe of primaries rather broadly white, contrasting with the dark fringe ..... *integratus*  
 Without such a stripe, but sometimes with entire lobe paler than fringe 15
15. Secondaries dark, primaries yellowish with discal dot, varying to dark, smooth gray with yellowish subcostal line ending opposite base of cleft. This species has no definite costal spot over base of cleft, but the dark shade at this point sometimes approximates a spot..... some *corvus*  
 Not such species ..... 16
16. Longer spur of first pair on hind tibiae reaching over half way to end of joint ..... 17  
 This spur reaching less than half distance to end of tibia..... 18
17. Primaries white with scattered brownish scales..... *cadmus*  
 Primaries more or less ochreous with dark brownish irroration, discal dot conspicuous ..... some *iobates*
18. Head with a definite white patch between antennae..... 19  
 Without such a patch; head evenly coloured or nearly so..... 20

19. Gray. Spot contiguous to base of cleft..... *medius*  
 White, coarsely irrorate with gray. Spot conspicuous, slightly before  
 base of cleft ..... *linus*
20. Fringes in cleft of primaries dark..... some *arion*  
 Fringes not dark; in general about same shade as wing, with light and  
 dark areas ..... *fishii*
21. Primaries pure white with variably extensive dark marks, cloudy with  
 exception of oblique patch. Median tibial tuft very slight..... *brucei*  
 With strong median tuft on mid tibiae or not pure white..... 22
22. Dorsal surface of abdomen with slightly diverging light and dark  
 streaks. Primaries with subcostal pale line, usually conspicuous, reach-  
 ing costa on each side of dark costal dot over base of cleft..... *auster*  
 Not such species ..... 23
23. Ground color of primaries even yellowish white or whitish with black  
 marks, pattern simple. Secondaries contrastingly dark. Western species 24  
 Ground color never tinged with yellow, sometimes more or less cream  
 colored or tawny but rarely whitish. Secondaries not conspicuously  
 darker ..... 25
24. Fringes in cleft of primaries very dark. Mid tibiae with median tuft  
 ..... *castor*  
 Fringes of cleft pale. No tuft ..... *pollux*
25. Slender winged gray insects. Primaries finely powdered with brownish  
 black and white. Inner margin usually with an underlying brown shade  
 of variable extent ..... *griseus*  
 Primaries blackish brown or blackish, conspicuously streaked with pure  
 white ..... 26  
 Primaries creamy white to tawny brown with brown marks, if any.  
 Never extensively irrorate with blackish scales, and with little or no  
 white ..... 27  
 Not such species ..... 29
26. Smaller, expanse rarely as great as 25 mm. Front of thorax and basal  
 half of patagia white, this shade definitely limited behind. Palpi gray-  
 brown above ..... *meyricki*  
 Larger, rarely as small as 25 mm. White on thorax and patagia more  
 extensive and less definitely limited. Palpi mostly white..... *nizar*
27. With a brown streak in apex of second lobe of primaries, extending  
 through fringe ..... 28  
 Without such a streak ..... some *occidentalis*
28. Thorax and patagia pale ..... *citrites*  
 Thorax and patagia pale in front only, this area sharply limited..... *fieldi*
29. Fringes on inner margin of primaries neither white nor with conspicu-  
 ous clusters of white scales, sometimes with a very faint cluster and  
 pencil of pale or whitish hairs..... 30  
 These fringes sometimes almost white, always with one or more evi-  
 dent clusters of white hairs ..... 33

30. Predominating color of primaries some pale, dull shade bordering on clay-color ..... 31  
 Primaries very dark with some whitish scales; abdomen with two heavy black dashes following pale terminal area of thorax.....*alaskensis*
31. Western species. Primaries narrow, colors usually dull and contrasts slight. Expanse over 25 mm. .... 32  
 Western. Primaries normal, with blackish-brown irroration, more or less longitudinally streaked. Expanse under 25 mm. ....*gratiosus*  
 Eastern. Primaries normal, more or less tinged with brown shades and sprinkled with dark brown scales. Triangle at base of cleft powdery dark brown, in sharp contrast with ground color .....*cretidactylus*
32. Spot before cleft small, sometimes preceded by some dark scales forming a vague streak, and weakly connected to costal spot. Ground color of primaries even, scantily powdered with dark scales.....*rileyi*  
 Spot usually forming a dark triangle reaching costa. Primaries usually somewhat striate, due to pale veins. Dark powdering usually abundant .....*cineraceus*
33. Tarsi heavily annulate. Abdomen with two heavy black dashes above on first segment .....*alaskensis*  
 Fore and mid tarsi with a dark annulus about the end of each joint, broken on one side on the former. No heavy black dashes on first abdominal segment above .....*guttatus*  
 Fore and mid tarsi white, faintly banded on one side only in the darkest specimens ..... 34
34. Hind legs usually white, sometimes with faintly darker annuli. Tufts of mid tibiae moderate. Primaries evenly pale.....some *mathewianus*  
 Hind legs with dark terminal annuli on tibiae and tarsal joints. Tufts of mid tibiae large and bushy. In pale specimens the primaries are conspicuously lighter in costal portion .....*eupatorii*
35. Costal half of primaries soft grayish to purplish, blending into ochreous of inner margin. Expanse over 25 mm. ....*baroni*  
 Not such species ..... 36
36. Greatest width of primaries about one sixth length. Longest fringes of second lobe exceed line width of lobe. Mid tibiae with two weak tufts. Hind tarsi usually with a conspicuous dorsal crest.....*monodactylus*  
 Wings usually wider, with moderate fringes. Crest on hind tibiae never present ..... 37
37. Ground color snowy white. Mid tibiae without definite median tuft.... 38  
 Creamy white or darker ..... 39
38. With or without a rounded dark dot before base of cleft.....*homodactylus*  
 With an oblique mark before cleft at least faintly indicated.....  
 .....some ♀♀ of *fishii*
39. Yellowish with contrasting dark secondaries to dull gray, the primaries with a subcostal yellowish line terminating opposite base of cleft. Expanse 17-20 mm. ....some *corvus*  
 Sulphur yellow with dark secondaries; expanse 24 mm. or over.....

- ..... some *sulphureodactylus*  
 Not such insects ..... 40
40. Spot before cleft on primaries more or less conspicuously continued in an oblique shade toward costa ..... 41  
 Spot usually rounded, sometimes continued into a shade in first lobe, sometimes doubled, and sometimes included in a transverse dash or lacking ..... 42
41. Fringes of primaries uniformly tawny.....some *occidentalis*  
 Fringes more grayish with white hairs included.....some *mathezeianus*
42. Fringes conspicuously darker at apices of lobes of primaries..... 43  
 Fringes not conspicuously darker; if somewhat darker, with the transition very gradual ..... 44
43. Dot at base of cleft on primaries ..... *ares*  
 Dot well before cleft ..... some *helianthi*
44. Fringes in cleft of primaries dark throughout, in contrast to wing..... 45  
 Fringes concolorous at least toward base of cleft, darker than wing apically in some species ..... 47
45. With whitish scales in fringes of primaries near apices of lobes..... 46  
 Without pale scales; fringes uniformly dark.....*phoebus*
46. Head evenly pale gray.....some *arion*  
 With a light band between antennae ..... *triton*
47. Expanse over 30 mm. (rarely dwarfed). Wings brownish ..... 48  
 Expanse less than 30 mm. or wings not conspicuously brownish..... 49
48. Terminal dots inconspicuous. Discal dot usually lacking and never more than vaguely indicated. Known only from Cal. .... *grandis*  
 Discal and terminal dots usually conspicuous but often at least partly lacking. A dark basal dash usually present. Discal dot sometimes preceded by another nearer to inner margin which may be the more conspicuous. Known only from Fla. to Tex. and Ariz..... *balanotes*
49. With a dark dot near base of cleft ..... 50  
 This dot usually absent, in some cases vaguely indicated..... 55
50. Discal dot before base of cleft or terminal dots of second lobe lacking 51  
 Discal dot contiguous to base of cleft ..... 54
51. Terminal dots on second lobe well marked.....*venapunctus*  
 Terminal dots rarely incompletely indicated, usually completely lacking 52
52. Primaries pale, whitish to luteous, secondaries more grayish. A fine dark point on inner margin of first lobe before apex..... *luteolus*  
 This dot lacking ..... 53
53. Wings tawny, secondaries sometimes tinged with gray....some *occidentalis*  
 Primaries variable, usually with a visibly darker shade from base into first lobe. Secondaries grayish ..... *paleaceus*
54. Primaries usually more or less tinged with clear yellow. Usually without terminal dots but sometimes with one in apex of second lobe ..... *stramineus*  
 Primaries with no trace of clear yellow. Terminal spots on both lobes more or less evident, sometimes conspicuous..... *kellicottii*

55. Outer margin of primaries with dark dots, sometimes continued inward along veins and sometimes scarcely evident..... *lacteodactylus*  
Veins sometimes dark on inner half of wing but not conspicuously darker at outer margin..... 56
56. Primaries strongly grayish ..... 57  
Primaries whitish to yellowish, sometimes with dark shades but not conspicuously gray ..... 61
57. Costa of primaries narrowly yellowish..... 58  
Costa not yellowish ..... 59
58. Expanse 25 mm. or less. Second lobe of primaries with the veins dark except in the darker specimens ..... *perditus*  
Expanse 28 mm. or over. Second lobe with the veins not dark-lined.. ..... *costatus*
59. Ground color of primaries of mixed gray and whitish scales..... 60  
Ground color otherwise, usually tinged with yellow.....some *inconditus*
60. Part of veins dark-lined ..... *varius*  
Color even. See notes on *varius* ..... some *falsus*
61. Veins of second lobe of primaries at least partly dark-lined on upper or both surfaces ..... 62  
Veins not dark lined ..... 64
62. Expanse 15 mm. Fla. Known only from type ♀ ..... *unicolor*  
Expanse 20 mm. or over ..... 63
63. Primaries usually somewhat yellowish with dark shade of a brownish hue. Dark lining of veins in lobes usually inconspicuous. Tips of fringes usually about as dark as primaries ..... *catalinae*  
Primaries usually paler with the shade less conspicuous and the dark lined veins conspicuous at least in the second lobe. (Some specimens cannot be separated from *catalinae* by superficial characters)....*caudelli*
64. Primaries yellowish with costal area darker. Secondaries grayish, usually conspicuously dark. Palpi long, distinctly exceeding greatest diameter of eye ..... *serenus*  
Not such species. Length of palpi less than or equal to greatest diameter of eye ..... 65
65. Primaries ochreous-whitish with a pale red-brown shade running from costa at middle of first lobe inward and basad as far as middle of cell in well marked specimens. Under surface but slightly infuscated toward base ..... *subochraceus*  
Shade extending basad along costa or more grayish, sometimes absent 66
66. Head, thorax and abdomen chalky white. (Most specimens require degreasing to show their true color) ..... some *falsus*  
These parts more or less yellowish or creamy..... 67
67. Expanse rarely as great as 22 mm. Primaries pale, usually more or less yellowish ..... some *inconditus*  
Expanse usually over 24 mm. Primaries cream-colored with a faint subcostal shade of dull brown ..... *australis*

1. *OIDAEMATOPHORUS OCCIDENTALIS* Walsingham. Pl. XLV, fig. 7,  
8. Pl. LI, fig. 1.

*Oedematophorus occidentalis* Walsingham, Pter. Cal. Ore. 37, pl. II, ff. 13, 14,  
1880.

Dimmock, Psyche III, 403, 1882.

Hy. Edwards, Bull. 35, U. S. N. M. 137, 1889.

†*Alucita cretidactyla* Fernald, Smith's List Lep. N. A. 87, 1891 (in part).

†*Pterophorus cretidactylus* Dyar (not Fitch), Psyche VIII, 250, 1898 (biol.).

Fernald, Bull. 52 U. S. N. M. 446, 1902 (in part).

Dyar, Proc. Ent. Soc. Wash. V, 228, 1903.

Meyrick, Gen. Ins. C, 17, 1910 (in part).

Id., Wagner's Lep. Cat. pars 17, 25, 1913 (in part).

Barnes & McDunnough, Check List 151, 1917 (in part).

*Stenoptilia californica* Grinnell, Can. Ent. XL, 321, 1908.

Meyrick, Wagner's Lep. Cat. pars 17, 30, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head, thorax and abdomen creamy white to dull tawny-brown; head with a pale patch between antennae, otherwise the darkest part; thorax paler behind, with whitish lateral stripes; abdomen laterally darker near middle. Antennae with brown dots above. Palpi rather small, oblique, whitish below at base; second joint thickened, white tipped. Legs whitish with more or less evident bands at tips of joints, lacking in very pale specimens. Front tibiae with a heavy double tuft of brown scales in terminal half, mid-tibiae with heavy median and terminal tufts of the same color. Inner spur of median pair on hind tibiae almost twice as long as outer.

Primaries concolorous with thorax, normally with a heavy brown costal mark over base of cleft, preceded and followed by a few whitish scales. This patch is connected with a small brown triangular shade before cleft. The wing is marked with cloudy brown areas and the first lobe is light brown, but these areas are not conspicuously powdery, due to the lack of contrast between the brown scales and tawny ground color. Fringes even tawny-gray. Secondaries brownish, shining, with paler fringes.

The species is extremely variable, the primaries being creamy-white in some specimens with only the oblique shade before the cleft evident, and sometimes without the costal dash. One which we include here has tawny-brown primaries with no definite mark but otherwise shows the characters of this species. Normal series show a wide range of variation of the ordinary markings. Expanse 26-29 mm.

Distribution: B. C., Cal., Ariz., Utah, June to Sept.

The type series of *occidentalis* was taken in Colusa, Shasta and Siskiyou Co., Cal., in July and Aug. Four of the "types" are in the Fernald collection. Grinnell's series of *californica*, now in the South-west Museum, contains specimens from the San Bernardino Mts. and

Pasadena. There is no doubt that these are the same as Walsingham's species and not a *Stenoptilia*, as described.

We are unable to agree with the commonly accepted placing of this name as a synonym of *cretidactylus*. It is difficult to point out single characters to separate the two, yet they are very distinct in general appearance. The dark markings of the primaries in *occidentalis* are not distinctly powdery, these wings are slightly narrower, their color is much more brown or tawny, and, as noted, the first pair of spurs on the hind tibiae show a greater difference in length. The genitalia of the two species are rather similar. Since this species appears to be confined to the western states, and *cretidactylus* to the east, little difficulty should be encountered in separating them.

Basing our judgment on the food plant and locality we have no doubt that Dyar's larvae described as *cretidactylus* belonged to this species. His description is as follows:

"Head rounded, higher than wide, partly retracted; green, ocelli black. Body a little thickest in the middle, uniform green with a whitish dorsal line. Warts round, concolorous, i and ii near each other but separate, a small wart (iii a) below and behind iii; another (iii b) behind iv+v, vi and vii not large. Feet normal, the abdominal ones slender, wider at the claspers.

"*Pupa* suspended by the cremaster, slender; cases projecting over the abdomen half way to the tip. Uniformly green, covered with tufts of sparse radiating hairs, arranged roughly as in the larvae. Length 11 mm., width 2.5 mm. On Aster, Yosemite, Cal. June." In a footnote it is stated that the food plant was not identified with certainty.

Walsingham notes that one specimen in the type series was reared from the leaves of "a species of sunflower".

## 2. OIDAEMATOPHORUS CRETIDACTYLUS Fitch, Pl. XLV, fig. 13. Pl. LI, fig. 2.

*Pterophorus cretidactylus* Fitch, Trans. N. Y. Agr. Soc. XIV, 849, 1854.

Id., 1st Rept. Ent. N. Y. 145, 1854.

Morris, Cat. Lep. N. A. 54, 1860.

Walker, List Lep. Ins. B. M. XXX, 940, 1864.

Fernald, Pter. N. A. 52, pl. VI, ff. 9, 10, 1898.

Id., Bull. 52 U. S. N. M. 446, 1902 (in part).

Meyrick, Gen. Ins. C, 17, 1910 (in part).

Id., Wagner's Lep. Cat. pars 17, 25, 1913 (in part).

Barnes & McDunnough, Check List 151, 1917 (in part).

Britton, Ins. Conn. 103, 1920.

*Ocidematophorus gypsodactylus* Walsingham, Pter. Cal. Ore. 35, footnote, 1880

‡*Alucita cretidactyla*, Fernald, Smith's, List Lep. N. A. 87, 1891 (in part).

§*Pterophorus aretidactylus* Grinnell, Can. Ent. XL, 319, 1908.



Brownish or creamy-white. Head brown except between antennae. Antennae with brown dots above. Palpi rather short, brown on sides. Legs whitish, front and middle femora brown inside; fore tibiae with heavy double brown tuft as in *occidentalis*, mid tibiae with two tufts. Hind legs entirely whitish, scarcely touched with brown along tibia, at bases of spurs, on their tips, and in dark specimens on tarsi, never conspicuously banded. Inner spur of median pair much less than twice as long as outer. Abdomen brownish at sides.

Primaries brownish white with a variable sprinkling of dull brown scales darkening the first lobe, apex of second, inner margin and patches of discal area. A dark brown costal dash over base of cleft is incompletely connected with a similar oblique, roughly triangular mark before cleft. All dark areas with the rather rough powdering of dark scales evident. Fringes pale ochreous gray, sometimes with a slight pale area before apex of first lobe in cleft but without definite pale pencils. Secondaries gray-brown, shining; fringes concolorous. Expanse 22-25 mm.

Distribution: Described from N. Y. We have a small series from Essex Co. Park, N. J., June and July (Kearfott).

The type of *cretidactylus* is among Fitch's specimens in the Fernald collection. It is a ♀ in fair condition, rather faded, and bears no type label beyond the general label applied to this group of specimens.

As mentioned under *occidentalis*, it is not easy to point out definite differences between these two species, though they seem very distinct. The whiter ground color, more roughly powdered dark areas, and relative lengths of the median spurs of the hind tibiae distinguish *cretidactylus*, in our judgment. The primaries are relatively broader, but the difference is too slight for actual measurement. A reference to the figures will show this distinction. We have seen no western specimens, and feel that all such records undoubtedly deal with *occidentalis*.

Although two accounts of early stages have been published under the name we are still in ignorance of the life history of the true *cretidactylus*.

3. OIDAEMATOPHORUS MATHEWIANUS Zeller. Pl. XI.V, fig. 14. Pl. LI, fig. 3.

*Leioptilus mathewianus* Zeller, Verh. z.-b. Ges. Wien. XXIV, 445, pl. XII, f. 13, 1874.

*Athecla mathewiana* Fernald, Smith's List Lep. N. A. 87, 1891.

- Pterophorus matheviannus* Fernald, Pter. N. A. 45, 1898.  
 Id., Bull. 52 U. S. N. M. 445, 1902.  
 Anderson, Cat. B. C. Lep. 50, 1904.  
 B. C. Ent. Soc. Check List 42, 1906.  
 Meyrick, Gen. Ins. C, 16, 1910.  
 Id., Wagner's Lep. Cat. pars 17, 23, 1913.  
 Barnes & McDunnough, Check List 151, 1917.
- Pterophorus gorgoniensis* Grinnell, Can. Ent. XL, 318, 1908.  
 Meyrick, Wagner's Lep. Cat. pars 17, 25, 1913.  
 Barnes & McDunnough, Check List 151, 1917.
- Pterophorus hilda* Grinnell, Can. Ent. XL, 320, 1908.  
 Meyrick, Wagner's Lep. Cat. pars 17, 25, 1913.  
 Barnes & McDunnough, Check List 151, 1917.

Head and body white, frequently light brown, probably due to stain. Head usually with an evident pale patch between antennae, brownish above and in front. Antennae with brown dots above. Palpi short, oblique, brown speckled, usually mostly brown on sides. Legs white; front tibiae with a large brown scale tuft, tarsi with slight brown annuli at ends of joints, marked only on one side; mid tibiae with two heavy brown tufts, tarsi as in fore legs; hind legs white, in dark specimens somewhat brownish before first spurs and with brown at bases of spurs. Abdomen sometimes with dorsal dots, often immaculate.

Primaries white with variably extensive tawny brown shades, usually confined to inner half but sometimes encroaching on first lobe. Costa with scattered dark brown scales forming a long spot over base of cleft and two dots beyond. Cleft preceded by a white area, and this by a dark brown spot or dash continued obliquely to costal spot by a light brown shade. There is sometimes a dark dot near middle of cell and some scattered patches of dark brown irroration. Inner margin of first lobe with a brown dot before apex, followed by a white pencil in the fringe. Second lobe with such a dot in apex preceded by two in outer margin which mark the limits of a white area in the fringes. This is preceded by a white pencil at some distance. Otherwise the fringes are light brownish gray with some white hairs. Secondaries brownish gray, fringes similar. Expanse 21-27 mm.

The valves of the ♂ genitalia appear to lack the long tufts of hair on their outer surface, such as are present in *eupatorii*.

Distribution: Type locality Vancouver Is., B. C. to S. Cal. July and Aug. Colo.? Me.? N. M.?

We sent specimens to Mr. Meyrick as *guttatus* Wlsm. and he returned them with the note that he could see no reliable distinction between them and Zeller's four types of *matheviannus*, in poor condition, in the British Museum. The apparent confusion of the two species is discussed in detail under the former. The type series of *hilda* and *gorgoniensis* Grinnell, both from S. Cal., contain numerous

specimens of *fishii* Fern., but the types appear to be small pale examples of *mathewianus*. The genitalia of similar specimens corroborate this.

The species is very variable in all features, but its generally pale appearance, with more or less pure white on the primaries, separates it from the allied forms. The two specimens from Colo. and Sebec Lake, Me., which we refer to it are extremely pale. That from Colo. is white with brown irrorations, and that from Maine somewhat darker and with a trace of brownish shades in addition to the irrorations. We are unable to place these specimens elsewhere, and in all essential features they agree with *mathewianus*. Both are males, so we have the additional evidence of genitalia to verify the identification. There is one lightly marked and faded specimen in the National Museum from Beulah, N. M., 8000 ft., which we think belongs here.

The life history is unknown.

4. *OIDAEMATOPHORUS EUPATORII* Fernald, Pl. XLV, fig. 15. Pl. LI, fig. 4.

*Alucita eupatorii* Fernald, Smith's List Lep. N. A. 87, 1891 (in part).

Id., Can. Ent. XXV, 96, 1893 (in part).

*Pterophorus eupatorii* id., Pter. N. A. 52, pl. V, ff. 15, 16, 1898 (in part).

Dyar, Psyche VIII, 250, 1898 (biol.).

Fernald, Bull. 52 U. S. N. M. 446, 1902 (in part).

Meyrick, Gen. Ins. C, 17, 1910.

Winn, List Ins. Que. 86, 1912.

Meyrick, Wagner's Lep. Cat. pars 17, 25, 1913 (in part).

? Walsingham, biol. Cent. Am., Lep. Hct. IV, 444, 1915 (in part).

Barnes & McDunnough, Check List 151, 1917 (in part).

McDunnough, Can. Ent. LII, 92, pl. II, f. 4, 1920 (biol.).

Head whitish between antennae, tinged with brown in front and above; sometimes darker. Thorax whitish with a brown band, including tips of patagia; sometimes suffused with brownish. Abdomen whitish with brown on sides and across fifth segment, to ochreous with scattered brown scales, a few dorsal dots, and much darker brown areas; vestiture roughened on hind margins of segments in posterior half. Antennae dotted with brown above. Palpi brown on sides; moderate, slender, oblique with third joint porrect. Legs with heavier tufts on fore and mid tibiae than in the foregoing species. Front and middle tarsi white without brown scales except a trace in the darkest specimens. Hind legs whitish or suffused with brown, variably annulate with brown at bases of spurs and tips of tarsal joints.

Primaries with costal area usually whitish, always paler than inner part. Inner half of wing with dull brown shades, the veins with paler, often whitish.

lines in second lobe. A small blackish oblique spot similar to that in *matheuanus* occurs before cleft, continued toward costal spot by a light brown shade. Costa marked with a faint shade at middle, a long blackish spot above base of cleft and two beyond, the outer larger and continued into a white patch in the fringes. Apex of first lobe with a black dash, preceded by another on inner margin, the two connected in dark specimens. Inner lobe with black dot at apex and two on outer margin, the outer followed by a white pencil in the fringes and the inner by a broader white cluster. Fringes otherwise gray-brown. The white areas have a variable number of blackish basal scales. Entire wing more or less heavily irrorate with blackish scales which tend to form longitudinal lines. Secondaries gray-brown with concolorous fringes. Expanse 23-25 mm.

The male genitalia are provided with a heavy tuft of long hairs on the outside of each valve. Otherwise they are rather similar to those of the preceding species.

Distribution: Que. to Man. and W. Ia., south to N. J. and Ill. June and July.

Fernald's types are four specimens from New York, one ♂, two ♀ and a broken specimen.

We have seen no western specimens which we regarded as true *eupatorii*, and so feel that Walsingham's records in the *Biologia*, Zeller's western "*crctidactylus*" and later references pertaining to the latter probably concern other species. Its possible relation to the allied western species as treated in the literature is discussed under *guttatus*.

The species may be recognized most readily by the tarsi, but average specimens are conspicuous in that the costal and inner areas of the primaries are in such sharp contrast. Very dark specimens, of which we have several from Maine and Quebec, are much like *guttatus* in appearance.

The larvae feed on *Eupatorium*, and are gregarious. They occur in considerable numbers on the terminal shoots of the plants, which they render conspicuous by their mutilations of the leaves and moderately extensive spinning. We have selected Dr. McDunnough's account in the *Canadian Entomologist* to quote. Preserved specimens in our possession agree very well with his description of both larva and pupa.

"*Larva* (full grown).—Head pale reddish ochre. Body pale green, becoming dorsally broadly suffused with purple-red when fully developed; a narrow ochreous dorsal stripe slightly broken centrally on each segment by a

triangular green dot; traces of a broad pale subdorsal band crossing tubercles I and II; a narrow lateral line midway between tubercles I and III, bent downward posteriorly; a broken spiracular line. The principal setae from tubercles I-III are blackish, very slightly spiculate, long and subequal. On the abdominal segments tubercles I and II are in line, bearing two shorter anterior hairs, the latter with two similar posterior ones and two very minute ones situated one posteriorly and one anteriorly. Tubercle III bears two long black setae and one or two short white hairs. Behind the spiracle on the posterior margin of the segment is a minute white hair. Tubercle IV + V bears five long central white hairs and about the same number of shorter ones arranged as a rosette around the central hairs; two short white hairs directed backward are found posterior to this tubercle; VI is very similar in arrangement of setae to IV + V and VII is as usual represented by several hairs at base of prolegs. On the prothorax a fringe of white hairs overhangs the head; behind this is a row of five black hairs and behind this row again are six black hairs arising from three tubercles, the middle one of which is centrodorsal. On the meso- and metathoracic segments tubercle I + II bears five long black hairs, and two or three short anterior white ones; posterior to this group are two short white hairs arising from a small tubercle; tubercle III has two long black hairs and several shorter white ones. Length 13 mm.

"Dr. Dyar's statement (*Psyche*, VIII, p. 250) that *cupatorii* larvae feed on the underside of the leaf, concealed, whereas *elliotti* larvae feed exposed on the upper side, was not verified, by my observations; both species may be taken on either the upper or underside of the leaf, a favourite place being among the terminal half-opened leaf-buds.

"*Pupa* (Fig. 4).—Apple green with purple-red suffusion each side of a pale centro-dorsal stripe; the lateral portions below the subdorsal ridge prominently purple-red with two oblique pale lateral lines and a similar spiracular one. Subdorsal and subspiracular flanges well-developed. Wing sheaths with lateral fringe of hair and further rows of short hair along the antennal and leg sheaths as in *elliotti*. Tubercles I and II on abdominal segments each with five or six finely spiculate white hairs, arranged more or less longitudinally, the central hair being longest. Dorsad to tubercle II is a single minute hair; on the first three abdominal segments dorsally is a small tuft of short hair anterior to tubercle I. Tubercle III, situated on anterior portion of the lower lateral stripe, bears only a single short white seta; posterior to it are two short hairs near rear portion of segment and arranged in line parallel to the segmental incision. Tubercle IV + V, situated on the lateral flanges, is prominent, with about twelve long white spiculate hairs, and immediately anterior to it and close to the spiracle are two minute hairs arising from a small tubercle. Tubercles IV and VII are each represented by a couple of short hairs. The thoracic segments show the usual modifications in respect to the number of tubercular setae."

5. OIDAEMATOPHORUS GUTTATUS Walsingham. Pl. XLV, fig. 16. Pl. LI, fig. 5.

†*Oedematophorus cretidactylus* Zeller (not Fitch), Verh. z.-b. Ges. Wien, XXIV, 444, 1874.

Walsingham, Pter. Cal. Ore. 35, 1880.

*Oedematophorus guttatus* Walsingham, Pter. Cal. Ore. 36, pl. II, f. 12, 1880.

‡*Alucita guttata* Fernald, Smith's List Lep. N. A. 87, 1891.

*Pterophorus guttatus* Fernald, Pter. N. A. 53, pl. IX, ff. 12, 13, 1898.

Id., Bull. 52 U. S. N. M. 446, 1902.

Meyrick, Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 25, 1913.

Barnes & McDunnough, Check List 151, 1917.

The description of *mathewianus* applies equally well to *guttatus* as regards pattern. The dark markings in *guttatus*, however, are all of a deeper shade and therefore in much greater contrast with the white areas, and are rather conspicuously sprinkled with blackish scales on the primaries. This irroration tends to form longitudinal streaks. The legs differ from the two preceding species in that the tarsi are provided with well marked, though often broken, brown annuli. The abdomen is much like that of *cupatorii* but has the transverse brown shade less conspicuous and the dorsal dots more numerous, in the form of a row of median tufts of brown scales, the largest on the fourth segment and the others decreasing in size away from it. Expanse 23-25 mm.

The male genitalia differ from those of *cupatorii* in the absence of tufts from the outside of the valves and from those of *mathewianus* in the form of the left harpe, which appears to be constantly different.

Distribution: Type locality Pit River, Cal. We have the species from the San Bernardino and San Gabriel Mts., Cal., June and July, and Colo. and Utah, July. A specimen in the Cambridge Museum from Phoenix, Ariz., appears to belong here.

In general appearance the species might be confused with dark specimens of either *mathewianus* or *cupatorii*, but such cases should be relatively few. The tarsi and abdomen are excellent distinguishing features, and the nine slides which we have made of the genitalia of the three species indicate differences which may reasonably be regarded as constant.

The confusion in the literature regarding *cretidactylus* and *cupatorii*, and our own confusion of *guttatus* and *mathewianus* has led to a very careful study of these species with the results as presented here. In the first place it is generally agreed that Zeller's *cretidactylus* was not that of Fitch, and since it came from Vancouver Is. it is a safe

premise that it was one of the allied western species. Our researches have led us to believe that *cupatorii* is not western, hence we have only two species, *matheviannus* and *guttatus* which can be *cretidactylus* Zell. For the same reason true *guttatus* can hardly be *cupatorii*, as placed in the Walsingham collection. Zeller identified his conception of Fitch's species from Walsingham's material, and we should be inclined to believe that he was capable of separating it properly from his own *matheviannus*. At the same time it seems unlikely that Walsingham would have failed to recognize it as conspecific with his *guttatus* if such were the case. Apparently then there is a third species from the west which we do not know, or one of the two men was confused by the variation of the species, which seems the more likely. As to the actual identity of *guttatus*, we first regarded *matheviannus* as this species. Meyrick corrected us in this, and noted that the types of *Guttatus* in the Walsingham collection were placed in the series of *cupatorii*. Later we were able to examine three paratypes of *guttatus* in the Fernald collection, and at first thought them to be a true *matheviannus*. A more careful examination convinces us that they are pale and rather faded specimens of what we now call *guttatus*, so it seems likely that Walsingham had a variable series of this species under two names, *cretidactylus* and *guttatus*, and we place the references accordingly. On the other hand, Walsingham's mention of *cretidactylus* Zell. as a pale form of *griseescens* suggests *matheviannus* rather than *guttatus*. Unfortunately the abdomens of the paratypes in coll. Fernald are lacking, so we are unable to examine either the genitalic structure or the abdominal markings. Fernald's figures of the genitalia do not show the distinctive structure, viz., the left harpe.

The early stages are unknown.

6. OIDAEMATOPHORUS ALASKENSIS n. sp. Pl. XLV, fig. 17. Pl. LI, fig. 6.

*Alaskensis* is almost identical in pattern with *guttatus*, but is extremely dark. The description of *matheviannus* will therefore apply to the body and wings, but the parts mentioned as whitish are brownish, and the white is limited to a thin superficial scaling over the paler areas. The fringes have only a pale pencil on each lobe before apex in place of the extensive white areas. The abdomen has dorsal tufts as in *guttatus*, but less prominent, and on the first segment has two heavy black dashes following the white terminal area of the thorax. The tarsi are heavily annulate with brown and the hind tibiae are brown with two pale annuli. Expanse 26-28 mm.

The male genitalia have well developed tufts on the outer surface of the valves, and other features as well indicate closer relationship to *cupatorii* than to *guttatus*.

Holotype ♂, Ramparts, Alaska, July 17, 1916, U. S. N. M. No. 23472.

Paratype ♂ Ruby, Alaska, July 22, 1916, coll. Barnes.

This species cannot, for various reasons, be involved in the confusion attending those preceding it.

7. *OIDAEMATOPHORUS GRISESCENS* Walsingham. Pl. XLVII, fig. 13.  
Pl. LIV, fig. 4.

*Oedematophorus griseus* Walsingham. Pter. Cal. Ore. 34, pl. 11, f. 11, 1880.  
Dimmock, Psyche III, 403, 1882.

Hy. Edwards, Bull. 35 U. S. N. M. 136, 1889.

*Alucita griseus* Fernald, Smith's List Lep. N. A. 87, 1891.

*Pterophorus griseus* Fernald, Pter. N. A. 55, 1898.

Id., Bull. 52 U. S. N. M. 447, 1902.

Dyar, Proc. Ent. Soc. Wash. V, 228, 1903.

Meyrick, Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 25, 1913.

Walsingham, Biol. Cent.-Am., Lep. Het. IV, 446, 1915.

Barnes & McDunnough, Check List 151, 1917.

*Pterophorus acrius* Meyrick, Trans. Ent. Soc. Lond. 500, 1908.

Id., Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 25, 1913.

Barnes & McDunnough, Check List 151, 1917.

*Pterophorus behrii* Grinnell, Can. Ent. XL, 319, 1908.

Meyrick, Wagner's Lep. Cat. pars 17, 25, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head clothed with gray-tipped white scales, white between antennae. Antennae with brown bars above. Palpi short, oblique, each joint white-tipped. Thorax similar to head, dark tips of scales forming a band across thorax and tips of patagia. Abdomen mostly white above and below, varying to light gray; in brighter specimens with parallel black dashes above. Hind margins of segments with brown tipped scale tufts, forming the points of V-shaped brown marks on fourth and fifth segments; sides brownish. Legs white, fore and mid tibiae with conspicuous blackish tufts; tarsi variably annulate with dark brown.

Primaries narrow, heavily sprinkled with white and with some scattered blackish scales. Ground color of inner half brown, of costal half apparently gray brown, the scales tipped with white, but this area of the wing is grayish white because of the predominating white scales in most specimens. Costa with a gray-brown dash over base of cleft and two spots beyond. Cell preceded by a white patch and this by a small blackish spot curving forward toward costal dash in slender line. Remainder of wing with variable vague streaking and spotting of gray and white. First lobe with a black dot before



apex followed by a white pencil in the fringes; second with two vague outer marginal dots. Fringes brownish gray with a very variable mixture of white hairs, usually most numerous on second lobe. Expanse 23-30 mm.

Distribution: B. C. (June) through Colo. and Cal., (June to Sept.) to Ariz. (May to Sept.) and southward. Type localities: *grise-scens*, Rogue R., S. Ore., *acrias*, Colo.; *behrii*, San Bernadino Mts., Cal.

From Meyrick's comparisons and our own examination of the types of *behrii* we are satisfied that the above synonymy is correct. We know no species which can be confused with this. Two of Walsingham's types are in the Fernald collection.

Aside from Walsingham's note that the eight specimens of the type series were reared from *Artemisia* sp. in May, we know nothing of the early stages.

8. OIDAEMATOPHORUS CINERACEUS Fish. Pl. XLV, fig. 9, 10.

*Oedematophorus cineraceus* Fish, Can. Ent. X111, 73, 1881.

*Oedematophorus lugubris* Fish, op. cit. 140, 1881.

‡*Alucita cineracea* Fernald, Smith's List Lep. N. A. 87, 1891.

*Alucita lugubris* Fernald, loc. cit.

*Pterophorus cineraceus* Fernald, Pter. N. A. 54, pl. V, ff. 5, 6, 1898.

Id., Bull. 52 U. S. N. N. 446, 1902.

Meyrick, Gen. Ins. C. 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 23, 1913.

Barnes & McDunnough, Check List 151, 1917.

*Pterophorus lugubris* Fernald, Pter. N. A. 55, pl. IV, ff. 12, 13, 1898.

Id., Bull. 52 U. S. N. M. 447, 1902.

Meyrick, Gen. Ins. C. 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 23, 1913.

Barnes & McDunnough, Check List 151, 1917.

Brownish white to grayish, often darker toward the costa; head tinged with brown above and in front, thorax usually darker across tips of patagia and abdomen sometimes darker except a dorsal band containing central dark dots and slender black dashes in terminal half; scales raised at posterior margins of segments. Fore and mid tibiae tufted. Tarsi with dark annuli, very variable in extent and shade and sometimes lacking. Antennae with or without dark dots above. Palpi short, oblique.

Primaries rather slender, lutenous to brownish white. Veins in lobes and radial stem frequently pale. There is a variable irroration of blackish scales which tends to collect between the veins and in the basal half of the wing; these scales are often very few and widely scattered. Wing at base of cleft whitish, preceded by a black or brown dash which curved outward toward costal blackish dash above base of cleft. Darker specimens may also have two dots

on costa of first lobe and some whitish over-scaling before the discal dash. Inner margin of first lobe with a faint dot before apex and outer margin of second sometimes with two. That on the first lobe marks the location of a faint whitish pencil in the fringes. Fringes otherwise brownish gray with a few white hairs in some examples. Secondaries gray-brown with concolorous fringes. Expanse 27-29 mm.

The  $\delta$  genitalia are similar to those of *mathewianus* (see pl. LI, fig. 3) but are slightly more slender in all parts.

Distribution: Vancouver Is. to Colo. and Utah, June to Sept. Manitoba and Pa., Aug. Cal., June.

The Fernald collection contains two types of *cineraccus*, without abdomens, from Washington and three of *lugubris*, one  $\text{♀}$  and two without abdomens, from California. These series would hardly be taken for the same species even by a careful observer, and it requires the transition shown in our series of nineteen specimens from various localities to convince us that the synonymy is correct. Typical *lugubris* is the darker form, with heavier markings, whitish scaling through the cell, and very evident blackish irroration. Typical *cineraccus*, on the other hand, has a light brownish ground color, rather even, with only a dot in the cell and the oblique patch before the cleft conspicuous; the black irroration is almost lacking. There is also a  $\delta$  in the Cambridge Museum which may be regarded as a paratype. It is labelled type.

One specimen in our series from Aweme, Man. (Criddle), bears Kearfott's label "*Pterophorus baroni* Fish" and another from Rounthwaite "compares most closely with *baroni* Fish". The former seems to us to be an immaculate specimen of *cineraccus*, though the absence of discal marks does, indeed, result in an appearance remarkably like *baroni*. The primaries are slightly broader, however, and we think it best to place the specimen in this way for the present. The second specimen strengthens this opinion, in that it is intermediate between the first and typical *cineraccus*, though with the markings only slightly reduced. Our two Californian specimens are also very lightly marked.

The life history is unknown.

9. OIDAEMATOPHORUS RILEYI Fernald, Pl. XLV, fig. 11. Pl. LI, fig. 7.

*Pterophorus rileyi* Fernald, Pter. N. A. 50, 1898.

Id., Bull. 52 U. S. N. M. 446, 1902.

Meyrick, Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 25, 1913.

Barnes & McDunnough, Check List 151, 1917.

Ground color brownish white to pale brown, head slightly darker except between antennae. Antennae with brown dots above. Palpi moderate, slender, oblique. Abdomen with black dots above in hind margins of some segments; scales in posterior half roughened on these margins. Legs similar, evenly colored with a touch of black beneath hind tibiae at bases of spurs and brown scale tufts on fore and mid tibiae.

Primaries same shade as body with a brown costal dash over base of cleft and an oblique dash before cleft, continued by a faint shade toward costal spot. First lobe with a black point on inner margin before apex. A few scattered black scales are present, forming a slight streak before discal dot and rather dense along basal half of costa, but elsewhere very scarce. Fringes slightly darker and more grayish than wing, with scarcely a trace of pale hairs, even at black point on first lobe. Secondaries gray-brown with concolorous fringes. Expanse about 32 mm.

Distribution: Cal., Sept. Described from Placer Co.

The form of this species is much like that of *cineraccus* and *baroni*, and for a time we were inclined to doubt its distinctness from the former. We now believe, however, that its large size and even color are a sufficient basis for the retention of the species. Unfortunately we have seen only one specimen in addition to the type series, and the genitalia afford no definite assistance. Our material in these three related species is too meager to allow us to work out the possible variations of genitalia, and such as appear in our few slides must therefore be discounted, perhaps unduly.

Fernald says in his original description that the species was "described from seven examples taken in September, in Placer County, California, and presented to the National Museum by the late Dr. C. V. Riley". We found five of these specimens in the National Museum material, labelled by Fernald but not as types. In the Fernald collection there are two specimens labelled type. We are designating one lectotype ♂. The other may be regarded as the allotype, and we see no reason at all why the remaining five should not be paratypes. We have accordingly written labels for them under the U. S. N. M. type No. 23496. One of these five, a ♀, is now in the Barnes collection through the kindness of the Museum authorities.

None of the specimens examined were reared.

10. *OIDAEMATOPHORUS BARONI* Fish. Pl. XLV, fig. 12.

*Oedematophorus baroni* Fish, Can. Ent. XIII, 73, 1881.

*Alucita baroni* Fernald, Smith's List Lep. N. A. 87, 1891.

*Pterophorus baroni* Fernald, Pter. N. A. 54, 1898.

Id., Bull. 52 U. S. N. M. 446, 1902.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 23, 1913.

Barnes & McDunnough, Check List 151, 1917.

Grayish to slightly tawny, head brownish except between antennae. Otherwise as in preceding species, with abdominal spots less conspicuous and upper surface of abdomen very vaguely streaked with black scales in some specimens. Tufts on tibiae with a generous mixture of white scales. Front and middle tarsi sometimes faintly annulate.

Primaries buff to ochreous along inner margin, blending into the whitish mauve to purplish brown costal region. There are a very few black scales and the base of the costa is darkened. Cleft preceded by a very faint trace of a dark spot. Veins in first lobe pale in the darker specimens. Inner margin of first lobe with a fine black point before apex. Apex of both lobes with one and outer margin of second with two very faint black points in some specimens. Fringes grayish ochreous with some white hairs but without white pencils in the specimens we have examined except a trace at dot before apex of first lobe. Secondaries gray brown with concolorous fringes. Expanse about 32 mm.

Distribution: Cal. We have it from Alameda Co. and Warner's, June and July.

The immaculate primaries with their pronounced purplish or mauve tint render this a very striking species. We have seen only four specimens, all females, including the two types, but have no doubt that it is a good species. In general form it is identical, so far as we have observed, with *rileyi*. The two types are in the Fernald collection.

We have no information regarding the early stages.

11. *OIDAEMATOPHORUS CASTOR* n. sp. Pl. XLVII, fig. 10. Pl. LI, fig. 8.

Whitish, faintly tinged with light brown. Head darker except a broad patch between antennae. Antennae banded with brownish black above. Palpi moderate, oblique, blackish touched with white above. Abdomen with a broad brown dorsal stripe including black bars on hind margins of several segments in holotype and allotype. Legs white. Fore tibiae with one and middle with two moderately heavy tufts of blackish scales, including a few white. Mid tarsi touched with brown on one side at tips of joints.

Primaries whitish, delicately shaded with pale brown along the veins in the lobes and in a few vague areas on disk and inner margin. Costa with a brown dash above base of cleft, sometimes followed by a fine brown dot. This dash is preceded by a broad shade sprinkled with black scales, heaviest toward base. Cleft preceded at a short distance by the usual oblique black patch which

curves outward toward costal patch and is preceded by some black scales. Other black scales form a broken basal dash below cell and line the margins of both lobes near base of cleft, the inner rather slightly, the costal usually heavily. Fringes whitish on costa, with a light brown patch at apex preceded by a similar but smaller patch; on inner margin ochreous-gray, in cleft dark brownish gray in marked contrast with wing. Secondaries and their fringes gray-brown, very evidently darker than primaries. Expanse 29-30 mm.

Described from three specimens. Holotype ♂, Redington, Ariz., in coll. Barnes. Allotype and paratype ♂, Bear Wallow Trail, Santa Catalina Mts., Ariz., July, in Am. Mus.

The type is in rather good condition but lacks hind legs, while the allotype and paratype are in poor condition, but supply this deficiency. The species is very similar in appearance to *pollux*, but is at once distinguished by its tufted tibiae and the dark fringes in the cleft of the primaries. None of the types bear biological data.

12. *OIDAEMATOPHORUS POLLUX* n. sp. Pl. XLVII, fig. 11. Pl. LII, fig. 1.

Head, thorax and abdomen whitish, tinged with gray-brown, sometimes distinctly yellowish. Abdomen with two subdorsal parallel white stripes, sometimes inconspicuous. Antennae and palpi white, the latter moderate, oblique. Legs white. First two pairs with tibiae and femora, and to a certain extent tips of tarsal joints, infuscated. No tibial tufts.

Primaries white to pale yellowish white, costa from base to apex tinged with gray-brown and with a blackish dash above base of cleft, followed by one or two dots in a few specimens. Extreme apex of first lobe blackish, sometimes continued through fringes in a dark pencil. Apex of second lobe with a blackish streak along vein  $M_2$ , continued through fringes. At a short distance before cleft is a small subtriangular brownish black spot, concave outwardly as it curves toward costal spot. There is sometimes a dot at middle of cell. The wing is sparsely sprinkled with dark scales which tend to collect along the veins and inner margin, and to obscure the base of the costa. Fringes concolorous except as mentioned. Secondaries and fringes gray brown, as a rule conspicuously darker than primaries. Expanse 27-33 mm.

Described from 25 specimens.

Holotype ♂ and allotype from Paradise, Cochise Co., Ariz., Sept. and Aug., in coll. Barnes.

Twenty-three paratypes, three ♂ and twenty ♀, from Mohave Co., Paradise, Palmerlee and Prescott and the Baboquiviri and Chiricahua Mts., Ariz., Apr., July to Oct. distributed as follows: 1 ♂ and 1 ♀ U. S. N. M. type No. 23466, 1 ♀ coll. Fernald, 1 ♀ coll. Meyrick, 1 ♀ Cambridge Museum; remainder in coll. Barnes.

This beautiful species is placed here with some misgivings, since the smooth tibiae would seem to indicate a lower position in the genus.

In general characters, however, it seems closely related to *castor* and *mizar*, and with them to stand most satisfactorily in this place. It is very different from any other species known to us, though it resembles *castor* superficially as we have already noted.

We know nothing of the early stages.

13. OIDAEMATOPHORUS MIZAR n. sp. Pl. XLVII, fig. 12. Pl. LII, fig. 2.

Brownish gray, front of thorax and head largely white. Thorax tipped behind with a V-shaped white mark. First two segments of abdomen with some black on posterior margin, followed by white on following segment; remainder with white posterior margins; a lateral white line is present. Palpi moderate, oblique, white, touched with gray-brown below at tip of second segment. Antennae white with dark dots above. Legs white; fore tibiae with brownish black stripes inside and a moderate tuft of mixed dark and light scales; mid tibiae with two such tufts; fore and mid tarsi with slight dark annuli at tips of joints; hind legs with dark bands at bases of spurs, a broad terminal annulus on first tarsal joint and slight annuli on remaining four.

Primaries brownish gray with white streaks, the restricted areas of ground color usually sprinkled with blackish scales. The white vestiture clothes the wing at base of cleft, where it is inwardly limited by the usual subtriangular spot which is here broadly connected with the costa, and spreads out over the first lobe. This spot also sends a variably broad streak toward outer margin of second lobe. On each side of the base of the cleft is a fine black streak, fading outwardly into the grayer lobes, and in the first lobe a second heavier streak in basal half, two dots on costa, one at apex, and one before it on inner margin. In the second lobe there may be a black apical dot, a subapical dot or streak on outer margin and a few other black scales. In the disk there is a subcostal white line, rather vague, a dash in the cell, preceded by a spot rather darker than the ground color, a large white spot between cell and inner margin about one-third from base of wing, and an almost longitudinal white line, presumably on the base of  $Cu_2$ . In addition the dark areas, particularly toward the base, are more or less irrorate with white. Fringes variable, but always brownish gray cut with white, with darker bases. Secondaries and their fringes brownish gray. Expanse 24-29 mm.

Described from fifteen specimens from Arizona and N. M. Holotype ♂, Chiricahua Mts., Cochise Co., Sept. 1-7 and allotype, Palmerlee, in coll. Barnes. Thirteen paratypes, 3 ♂ and 10 ♀, from Redington, Palmerlee, Herford, White and Chiricahua Mts. and Mohave Co., and a single ♀ from Jemez Springs, N. M., distributed as follows: ♂ and ♀, U. S. N. M. No. 23467, 1 ♀ coll. Fernald, 1 ♀ coll. Meyrick, 1 ♀ Cambridge Museum; remainder in coll. Barnes. We have also a specimen from Mohave Co. taken in October.

This and the following species are superficially rather similar, but *mizar* is larger and the thorax differs as noted in the key. The four

distal joints of the hind tarsi appear to be relatively more widely annulate in *meyricki*, but in lightly marked specimens this is likely to be confusing. The lateral marks of the abdomen also differ in the two species, but we have had such difficulty in finding specimens with recognizable abdominal vestiture, even in our long series, that we have thought it inadvisable to use the character in the key. The difference in palpi appears to be constant. The distribution as represented by our series is different, but *mizar* occurs in Mohave Co., Ariz., and *meyricki* in S. Cal., and it is reasonable to expect them to overlap in these regions. The male genitalia are very different.

We know nothing of the life history.

14. OIDAEMATOPHORUS MEYRICKI n. sp. Pl. XLVI, fig. 10. Pl. LIV, fig. 1.

The description of the wings of *mizar* will apply also to this species; the markings differ slightly in form, but otherwise are the same. The head differs in having a contrasting white patch between the antennae. The palpi are brown touched with white below. Thorax with the anterior half white, sharply limited, and with some white behind. Posterior margins of abdominal segments whitish above. The abdomen is marked laterally with alternating oblique stripes of dark gray-brown and white and has a lateral white line in the posterior half. Legs as in *mizar*, the tibial tufts very slight and rather darker than in that species. Tarsi usually more broadly annulate with gray-brown and with a less conspicuous difference between the first and outer joints on the posterior pair.

Described from thirty specimens taken at San Diego, Cal., in April, May and June. Holotype ♂ and allotype in coll. Barnes. All of the paratypes, whose total is 3 ♀ and 22 ♂, are also in coll. Barnes with the exception of the following: ♂ and ♀, U. S. N. M. No. 23468, ♂ coll. Fernald, ♂ and ♀ coll. Meyrick, 1 ♂ of Cambridge Museum.

Since we have described *meyricki* by pointing out the differences between it and *mizar*, no further discussion of this matter is necessary. We take this opportunity, however, to mention the apparent difference in seasonal occurrence of the two.

15. OIDAEMATOPHORUS GRATIOSUS Fish, Pl. XLVI, fig. 11.

*Oedematophorus gratiosus* Fish, Can. Ent. X111, 73, 1881.

‡*Alucita gratiosa* Fernald, Smith's List Lep. N. A. 87, 1891.

*Pterophorus gratiosus* Fernald, Pter. N. A. 54, 1898.

Id., Bull. 52 U. S. N. M. 447, 1902.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 23, 1913.

Barnes & McDunnough, Check List 151, 1917.

Fish described the body and minor appendages thus:

"Head and palpi rather dark brown, scarcely lighter between antennae. Antennae pale brownish, dotted above with white and dark brown scales. Thorax brown gray, anterior portion lighter. Abdomen fawn brown; scales somewhat raised at extremity of segments. Legs grayish brown, spurs concolorous, not tipped with darker color, tarsi pale cinereous, slightly browned at extremities of joints. Middle band of middle tibiae inconspicuous, consisting of a few raised scales on one side."

Primaries brownish white, more brownish toward costa and paler just before cleft. The dark patch before the cleft is powdery, of blackish brown scales, and is prolonged about half way toward base of wing and connected with a rather vague costal spot over base of cleft. The remainder of the wing is streaked with scattered brown scales, forming one dash in the first lobe and two in the second. All powdery dark areas bear a few white scales. Fringes tawny-gray, slightly darker at apices and in cleft, the dark apical tufts preceded by paler, but not whitish, patches. Secondaries brownish gray with slightly paler fringes. Expanse about 22 mm.

We would call attention to the fact that the front tarsi are noticeably pale, and that they are only very slightly darker on one side at the tips of the joints. This character is useful to separate the species from *meyricki*. Judging by our three poor specimens, the middle tuft of the middle tibiae is probably well developed in fresh specimens. The thorax has dorso-lateral white stripes behind, connected dorsally at their middles.

Distribution: California. We have it from Carmel, June (Vachell).

The type in coll. Fernald has no head and only one pair of wings, but is supplied with one leg of each pair and the abdomen is in good condition, which cannot be said of our specimens. Of our three, none are good, but one is sufficiently good to enable us to form a reliable idea of the species and a second compares very closely with the type as it is at present. We are unable to observe any differences between the genitalia of this species and *meyricki*, (see pl. LIV, fig. 1) and so for a time thought that our series of *meyricki* was merely *gratiosus* in good condition. The affinities of the species with *fieldi* are also worthy of consideration, but these species are genitally distinct and easily distinguished by superficial characters. To facilitate the separation of the three we have constructed the following key, supplementary to the main key to the genus. Fresh specimens should give no trouble.

1. Fore tarsi white, distinctly annulate. Primaries brownish gray with white streaks ..... *meyricki*
- Fore tarsi white or whitish, indistinctly or incompletely annulate, or without dark bands ..... 2



2. Dark areas of primaries bright red-brown..... *fieldi*  
 Dark areas of brownish black scales, more or less powdery, with a few  
 white scales ..... *gratiosus*

We have seen only four specimens of *gratiosus*, and none of these was reared.

16. OIDAEMATOPHORUS FIELDI Wright, Pl. XLVI, fig. 12.

*Pterophorus fieldi* Wright, Ent. News, XXXII 6, 1921.

The original description is as follows:

"Expanse 21 to 26 mm.

"Palpi, front and vertex mottled light brown and white; antennae whitish with very fine brown annulations.

"Anterior part of thorax buff, this color spreading out into the base of costa of primaries, somewhat darker and narrower in females than males. Thorax dorsally brown, becoming lighter basally. Abdomen light brownish buff on anterior part with a red-brown squarish spot close to base, becoming quite dark, almost seal brown, mottled with lighter on the anal segments.

"Fore-wings: Ground color white, the costal edge, discal area from base to cleft, and inner margin broadly brown-streaked, the spaces between being more or less suffused with light brown scales. A dark brown costal streak just above the base of the cleft, connected broadly with the outer end of the discal streak, preceded and followed by white; another brown costal streak at the base of the first lobe occupying about one-half the space then narrowly white to apex. Extreme tip dark, two short dark longitudinal streaks, rather faint, near the base of the lobe. A white spot resting on the base of the cleft connected obliquely by a fine white line to the outer costal white spot. Second lobe brown at tip, a faint brown line down the center, a small rectangular white spot on vein 1b at about one-third from the base. Fringe smoky, a whitish spot at anal angle, darker within the cleft, a very dark spot a little inward from tip of first lobe.

"Hind wings dull smoky brown with a faint reddish tinge and darker fringes.

"Legs white more or less mottled with light brown, a small brush of appressed brown scales at end of fore tibia. The middle tibia shows the same development and in addition has a small cluster of long scales at the center. Hind tibia as the middle, but a little more prominent. Spurs light at base, smoky at tip.

"In many specimens the scale clusters on tibiae become more or less obsolete, being represented by a slight swelling of the member at middle and end."

The type series was taken at San Diego, Cal., in May and June. We have one specimen from San Diego, Apr. 24-30, one pale specimen from Wellington, B. C., June, and three from Mohave Co., Ariz., Sept.

The markings are very variable, but their variability is relatively unimportant. The hind tibiae are scarcely tufted, as the description suggests, but are conspicuously banded with brown. The important features of the species are the bright brown markings, the sharply limited buff-white anterior area of the thorax, and the light colored front tibiae.

In addition to the type series mentioned by Mr. Wright in his own collection and that of Mr. Field, there are two male and one female paratypes in coll. Barnes.

17. OIDAEMATOPHORUS CITRITES Meyrick. Pl. XLVI, fig. 9.

*Pterophorus citrites* Meyrick, Trans. Ent. Soc. Lond. 1907, 502, 1908.

Id., Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 26, 1913.

Barnes & McDunnough, Check List 151, 1917.

Meyrick's description is as follows:

"♂ ♀. 24-27 mm. Head ochreous-whitish, face and back of crown more ochreous-tinged. Palpi and antennæ whitish-ochreous. Thorax whitish-ochreous, patagia sometimes more whitish. Abdomen whitish-ochreous, sides more ochreous. Legs ochreous-whitish, anterior and middle femora and tibiae ochreous. Fore-wings cleft from 2/3, first segment moderate, long-pointed, second much broader, shorter-pointed; ochreous, partially tinged with whitish; an undefined patch of light brownish suffusion with a few dark fuscous scales towards dorsum about 1/4; a small spot of similar suffusion in disc at 1/3; an oblique dark fuscous mark a little before base of cleft, preceded by some yellow-brownish suffusion which is extended upwards as an indistinct oblique streak to costa above base of cleft, posteriorly edged with white suffusion; a short longitudinal streak of yellowish-brown suffusion sprinkled with dark fuscous in apex of second segment, and another less distinct and sometimes obsolete beneath apex of wing; cilia whitish, beneath apex with a pale ochreous patch, within cleft tinged with ochreous and on upper margin of second segment with fuscous, on dorsum tinged with whitish-ochreous. Hind-wings cleft firstly from before middle, secondly from 1/4, segments rather narrow, second long pointed; grey, sometimes much suffused with whitish ochreous; cilia whitish-ochreous-gray or whitish-ochreous.

"Colorado, U. S., 5000-7000 feet, three specimens."

Through the generosity of Mr. Meyrick a paratype ♀ is now in the Barnes collection. In addition we have a single specimen, much more heavily marked, from Boulder, Colo. There are examples in the National Museum from Colo. and New Mexico, Aug., and a single specimen expanding 30 mm. from Ariz. which may belong here. It is rather badly broken, so we can be certain of the markings of the primaries only, and these are as in *citrates*.

The species is similar to pale specimens of *feldti* but the evenly colored thorax separates it at once from that species. Paler examples, as the paratype in our possession, are easily confused with *occidentalis*, but differ in having only slight terminal tufts, no median, on fore and mid tibiae.

We have had no opportunity to examine the male genitalia, and can give no data on the life history.

18. *OIDAEMATOPHORUS BRUCEI* Fernald. Pl. XLVI, fig. 8. Pl. LII, fig. 14.

*Pterophorus brucei* Fernald, Pter. N. A. 42, 1898.

Id., Bull. 52 U. S. N. M. 445, 1902.

? Forbes, Psyche XVI, 136, 1909.

Anderson, Cat. B. C. Lep. 50, 1904.

Dyar, Proc. U. S. N. M. XXVII, 924, 1904.

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 25, 1913.

Barnes & McDunnough, Check List 151, 1917.

*Pterophorus chionastes* Meyrick, Trans. Ent. Soc. Lond. 1907, 501, 1908.

Id., Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 25, 1913.

Barnes & McDunnough, Check List 151, 1917.

White, palpi moderate, oblique, rather slender. Legs touched with fuscous inside and at bases of spurs. Only a trace of scale tufts on fore and mid tibiae.

Primaries pure white with some scattered gray-brown scales. Costa with a dash over base of cleft and a lighter one at middle of first lobe which does not enter the fringes. Cleft preceded by a small elongate-triangular spot, sometimes connected with costal dash. There is a powdery spot in middle of cell and three more or less vague powdery dashes in inner half of wing, the last extending into second lobe from below triangular spot. Inner margin of first lobe with a dot before apex. Outer margin of second lobe with some dark scales. Fringes whitish, brownish gray in cleft except a white cluster before apex of first lobe. The dark areas are sometimes greatly extended, and the white parts touched with gray-brown, but all marks remain more or less powdery, cloudy and indefinite except the triangular spot and accompanying costal dash. Secondaries pale brownish gray, sometimes almost whitish, with slightly darker fringes. Expanse 22-27 mm.

Distribution: Alaska to Ariz., Colo., Manitoba. June to Aug. Mass. (Forbes). Pa. (Cambridge Mus.) Vancouver Is. (Dyar).

The three types of *brucei* are in the Fernald collection. One is a male, and the others have broken abdomens. They were taken in Colo. by Bruce. *Chionastes* was also described from Colorado speci-

mens, the four types being in Meyrick's collection. We have one specimen from Boulder, Colo., which Meyrick identified as his species, and our personal comparison shows it to be almost exactly the same as Fernald's types. Our one Alaskan specimen is the darkest which we have seen, but retains the pure white and nebulous dark marks of typical *brucei*.

The life history is unknown.

19. *OIDAEMATOPHORUS INQUINATUS* Zeller. Pl. XLVI, fig. 1. Pl. LI, fig. 9.

*Oedematophorus inquinatus* Zeller, Verh. z-b. Ges. Wien XXIII, 325, 1873.

Murtfeldt, Am. Ent. III, 235, 1880.

Coquillett, Papilio 11, 61, 1882 (biol.).

Dimmock, Psyche III, 403, 1882.

Hy. Edwards, Bull. 35 U. S. N. M. 137, 1889.

Hedemann, Stett. ent. Zeit. LVII, 9, 1896.

‡*Alucita inquinata* Fernald, Smith's List Lep. N. A. 87, 1891.

§*Oedematus infuinatus* Murtfeldt, Proc. Nat. Sci. Club 13, 1896.

*Pterophorus inquinatus* Fernald, Pter. N. A. 56 (in part), pl. III, ff. 5, 6; pl. IV, ff. 3, 4, 1898.

Id., Bull. 52 U. S. N. M. 447, 1902 (in part).

Meyrick, Gen. Ins. C, 17, 1910 (in part).

Id., Wagner's Lep. Cat. pars 17, 25, 1913 (in part).

Walsingham, Biol. Cent. Am., Lep. Het. IV, 446, 1915 (in part).

Barnes & McDunnough, Check List 151, 1917 (in part).

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 136, 1917.

Britton, Ins. Conn. 103, 1920.

Vestiture of mixed gray-brown and whitish scales, the front of the thorax and a space between antennae more whitish. Antennae white or whitish with dark dots above. Palpi rather small, oblique. Abdomen with scales on posterior margins of segments slightly roughened, bearing a pair of black dots at least on a few segments near middle. Legs whitish; fore and mid tibiae striped with dark gray-brown and provided with traces of scale tufts; tarsi white, usually finely annulate at tips of joints.

Primaries white and gray brown, usually so evenly mixed as to produce a gray ground color on which the whiter and blacker areas are more or less conspicuous. Costa normally marked with a dash above base of cleft and a shorter one just beyond middle of first lobe, both of which include the fringes. The latter is preceded and followed by small dark dots, which scarcely enter the white fringes. Either or both may be lacking. There is a blackish spot in cell and a dash before cleft which is prolonged toward costal dash and sometimes connected to it by a fainter shade. Inner margin of first lobe with a dot before apex, and second lobe with one to four such dots at apex and on outer margin. The more evident whitish areas are a subcostal line before cleft, a

spot at one-third from base near inner margin, followed by a dash on vein Cu and a patch at base of cleft. Fringes dark brownish gray, slightly darker in cleft; cut by a whitish pencil before apex of first lobe and by three or less, often grayish and inconspicuous, on outer margin of second. Secondaries brownish gray with concolorous fringes. Expanse 15-22 mm.

Distribution: Atlantic Coast to Cal., south into Mexico. March to Sept. We have no Canadian records, and the most northern localities represented in our series are N. Iowa and Pa.

The paired dorsal dots on the abdomen and the general grayish color distinguish this common species. The dots are not particularly small, but are set close together and are frequently inconspicuous in dark specimens. Crumpling and shrinking of the abdomen, which unfortunately is frequent in this family, may render it almost impossible to discern the dots and their position, but we have seen very few specimens in which it was impossible to see one pair, at least.

*Inquinatus* is very closely related to the two following species, both of which may be mere races or forms. The evidence at our disposal leads us to believe that all are worthy of specific rank, and this opinion is strengthened by certain genitalic differences, slight it is true, but as great as can be expected between closely related species in this genus. These differences are found in the left harpe. This structure is long and slender, and divided by more or less sharp curves into three regions, which may be termed basal, median and terminal. In *inquinatus* the terminal portion is evidently shorter than the median, and the outer band is relatively sharp. The remaining species may be separated from *inquinatus* on this basis by the following key:

1. Terminal portion of harpe as long as median..... 2  
Terminal portion shorter than median.....*inquinatus*
2. Harpe broadly rounded, regions indefinite ..... *eros*  
Harpe more definitely bent into three portions..... *pan*

All are subject to variation, but the difference as expressed here seems to be constant.

We have not verified the identification of *inquinatus* by comparison with the types. When we sent species to England we were under the impression that these types were in the Cambridge Museum, but it now seems that they are in the British Museum. Three specimens labelled by Zeller in the Cambridge Museum collection remove all reasonable doubt of the accuracy of our use of the name, however. A fourth specimen, Zeller's var. b., may be a pale *inquinatus* or a dark

*pan*. We favor the latter view, but the matter is so unimportant as scarcely to warrant the complication of the synonymy.

Coquilett's brief descriptions of the larva and pupa are the only ones known to us. They are as follows:

"*Larva*.—Body green, sparsely covered with raised white dots; warts concolorous, each bearing from two to six stiff, curved, diverging white bristles of different lengths; spiracles raised, whitish; head partially retractile into segment one, green, tinged with brown and marked on each side with a black spot above the jaws; venter green, unmarked; length 12 mm. Two specimens. Lives on *Ambrosia artemisiacifolia*. One pupated July 27, producing the imago August 3; the other pupated July 30 and the imago emerged August 6.

"*Chrysalis*.—Of the usual shape, pale ash color, marked with a large pink spot near the middle of the upper side; on this spot is large brownish-black spot; length 7 mm. The chrysalis is fastened by its posterior end to the upper side of some object, from which it stands in an oblique direction, the abdomen being slightly curved."

We have no way of telling whether the species which Coquilett reared was true *inquinatus* or *ambrosiae* Murt. The descriptions quoted by Fernald in the "Pterophoridae of North America" apply to the latter.

20. OIDAEMATOPHORUS EROS n. sp. Pl. XLVI, fig. 2. Pl. LI, fig. 11.

Head and thorax white, the former with some gray-brown scales above and in front and the latter with a cluster of blackish-brown scales behind. Abdomen mostly white but with a few gray-brown scales. Posterior margins of segments with paired dorsal dots, as in *inquinatus*, but with the vestiture not visibly roughened in the type series. Antennae white with gray-brown dots above. Palpi white with scattered gray-brown scales, especially on sides. Legs white, marked as in *inquinatus* but less heavily.

The primaries are marked exactly as in *inquinatus*, but are much lighter. Their appearance is definitely whitish with gray-brown irroration and spots, instead of generally grayish as in the other species. The secondaries are also of a much lighter shade of brownish gray. Expanse 14-17.5 mm.

Described from ten specimens taken in Mohave Co., Ariz., Sept. 8-15 (Poling).

Holotype ♂, allotype and 6 paratypes ♂ in coll. Barnes.

Paratypes ♂ and ♀. U. S. N. M. No. 23469.

The series to which we apply this name is undoubtedly very closely related to *inquinatus* and *pan*, and may be only a small pale race of the former. Until we are able to link them definitely with specimens such as we have not at present, we are inclined to believe that it is worthy of specific rank. As one would expect, the genitalia of all three are quite similar, but there is a general form of the left harpe in

each which appears to be constant. In *eros* this structure is much more broadly curved than in the other two, lacking definite bends between the several regions. The supplementary key under *inquinatus* tabulates these differences.

None of our specimens was reared.

21. OIDAEMATOPHORUS PAN n. sp. Pl. XLVI, fig. 3. Pl. LI, fig. 10.

Head, body and legs white, marked as in *eros*. The paired spots on the abdomen are more conspicuous than in either *inquinatus* or *eros*. Scales on terminal margins of abdominal segments raised.

Primaries white with scanty gray-brown irroration. In the most heavily marked specimens this irroration darkens the costa in its basal half and streaks the remainder of the wing. The black costal dash over the base of the cleft is conspicuous and usually definitely separated from the discal area by a clear white subcostal line. Spot before cleft small, scarcely produced toward costa. Remaining marks as in *inquinatus* and *eros*. Fringes contrastingly dark but with extensive white areas. Secondaries whitish to light gray, usually with much more white below than in the other species. Expanse 17-24 mm.

Described from twenty-seven specimens taken by O. C. Poling *en route* Dewey to Salome, Ariz., April and May 8-15 and three (♀ paratypes) from Palm Springs, Riverside Co., Cal., March 16-23.

Holotype ♂, allotype and 22 paratypes, 11 ♂, 11 ♀, in coll. Barnes.

Paratypes ♂ and ♀ U. S. N. M. No. 23470.

Paratypes ♂ and ♀ Cambridge Museum.

Paratype ♂ coll. Fernald.

Paratype ♀ coll. Meyrick.

With these we associate a number of specimens from other localities in Ariz. and S. Cal.

The species differs from *inquinatus* and *eros* in its larger size, lighter color and the form of the left harpe. This, as pointed out under *inquinatus*, is rather broadly bent into three regions, the terminal approximately equal to the median. With a good series at our disposal we feel that these differences warrant the treatment of *pan* as a good species. It is possible that it is Zeller's *inquinatus* var. b, but the specimen labelled by Zeller in the Cambridge Museum collection is not sufficient to establish this.

We have no knowledge of the life history. We should expect to find the larvae of *eros* and *pan* on *Ambrosia* with *inquinatus* or on closely related plants, and hope that some entomologist in the Southwest will be able to rear them and apply the evidence of life history to the separation of the three.

22. OIDAEMATOPHORUS PHOEBUS n. sp. Pl. XLVI, fig. 5. Pl. LII, fig. 15.

Head brown with a whitish band between antennae. Antennae faintly brown-dotted above. Palpi small, oblique, whitish with traces of brown on third joint. Thorax whitish in front, becoming tawny to brownish behind. Fore and middle legs infuscated, white outside, without tufts. Hind legs whitish to pale gray brown in the darkest specimen at hand, spurs moderate. Abdomen apparently concolorous with posterior part of thorax, with a variable number of single dark gray-brown dorsal dots on posterior margins of segments.

Primaries whitish to light tawny brown, the palest area in the second lobe and along inner margin of first. Costa whitish toward base, sprinkled with blackish scales, otherwise immaculate, paler toward apex. Cleft preceded at a short distance by a faint dark dot. Entire wing usually with some scattered black scales, less numerous on the disk and tending to form streaks in the lobes and near the inner margin. Fringes pale on costa, elsewhere brownish gray to brownish black, contrastingly darker than wing. Secondaries brownish gray with concolorous or slightly darker fringes. Expanse 21-23 mm.

Described from four specimens as follows:

Holotype ♂, Carmel, Cal., June 10 (Williams), paratype ?, Carmel, Cal., Apr. (Vachell) and paratype ?, Deer Park Springs, Lake Tahoe, Cal., July 8-15, coll. Barnes. Paratype ?, San Luis Obispo, Cal., Mar. (Vachell), U. S. N. M. No. 23473. The abdomens of all the paratypes are broken. With these specimens we associate one ♀ from Palmerlee, Ariz., and one from Westminster, B. C. The latter is our palest specimen, but we see no reason to doubt that it belongs here.

23. OIDAEMATOPHORUS TRITON n. sp. Pl. XLVI, fig. 4.

Head brown with a whitish patch between antennae. Antennae whitish; palpi small, oblique; third joint touched with blackish on outside. Thorax whitish. Abdomen light brown in the types, but this is apparently due to the usual discoloration. In the holotype there seems to be a trace of dorsal brown spots. Vestiture roughened on posterior margins of segments. Legs whitish, fore and middle pair infuscated within. Spurs of hind pair moderately long. Tibial tufts absent.

Primaries white suffused with light gray brown excepting a band around base of cleft and along inner margin of first lobe, and a variably extensive area along inner margin to apex of second lobe. Disk with a faint whitish streak leading basad from cleft and a faint subcostal whitish line, meeting costa just before base of cleft. Before and beyond this point the costa is darker. Cell with a small dark spot at middle, sometimes absent. Before white band at base of cleft there may be either one, two or no spots, if two the inner is darker. First lobe with a dark dot before apex on inner margin; second with a dot or dash at apex and three dashes on tips of preceding veins. In this lobe the gray-brown suffusion sometimes marks the veins for a short distance. Fringes on costa white with a few grayish scales, elsewhere brownish gray,



darker in the cleft. Secondaries entirely brownish gray. Expanse 18-20 mm.

The male genitalia resemble those of *mizar* (see Pl. LII, fig. 2) but the left harpe is shorter than the clasper, and the small lobe (ampulla?) is lacking on the right clasper.

Described from four specimens taken at Palmerlee, Cochise Co., Ariz. Holotype ♂, allotype and one paratype ♂ coll. Barnes. Paratype ♂ U. S. N. M. No. 23471.

This species is apparently related to *integratus* Meyr., from which it differs in the absence of a costal spot over the base of the cleft.

Life history unknown.

24. OIDAEMATOPHORUS INTEGRATUS Meyrick. Pl. XLVI, fig. 6. Pl. LII, fig. 7.

*Pterophorus integratus* Meyrick. Exot. Microlep. I, 113, 1913.

Id., Wagner's Lep. Cat. pars 17, 24, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head brown, white between antennae. Antennae without dots above. Palpi moderate, slender, oblique. Thorax white, brownish across tips of patagia. Abdomen apparently whitish, with gray-brown dorsal and lateral dots. Legs in poor condition in our series, but whitish and apparently lightly infuscated on one side. Fore and middle tibiae without tufts.

Primaries light brownish gray with a vague streak from base to cleft and a well marked band around base of cleft and along inner margin of first feather, apex white. Second feather sometimes vaguely whitish outwardly, with slightly darker veins on its gray portion. White band at base of cleft sometimes preceded by a dark dot or curved line. Middle of cell with a small dot. Costa with a gray-brown dash above base of cleft, preceded and followed by white. Costa of first lobe sometimes with one or two dark dots, apex with one, and inner margin with one near apex. Apex and outer margin of second lobe with four dark dots at tips of veins. Entire wing with scattered gray-brown scales, usually clustered in various areas. Fringes brownish gray with a white pencil in cleft before apex of first lobe and more extensive white clusters on outer margin of second. Secondaries very pale brownish gray, fringes similar. Expanse 17-19 mm

Distribution: Ariz. Type locality Nogales. We have it from the Baboquivari Mts., July, and Palmerlee, Cochise Co.

The early stages are unknown.

25. OIDAEMATOPHORUS AUSTER n. sp. Pl. XLVI, fig. 7. Pl. LII, fig. 8.

Head blackish-brown, white between antennae, which are dark with a white line above, sometimes broken into dots. Palpi moderate, oblique, gray brown on the sides and mostly white above and below. Thorax whitish, scales lightly tipped with gray-brown, more heavily in a band which crosses thorax

and tips of patagia. Legs white; fore and mid femora and tibiae with blackish-brown stripes and without tufts; tarsi and hind legs touched with blackish brown at tips of joints and more or less suffused with brownish gray. Abdomen gray brown with a few white scales. Above it is marked with two white stripes which contain a pair of diverging black streaks on each segment. In the posterior half of the abdomen the bases of each pair of streaks are connected by a broad dorsal dash in the posterior margin of the preceding segment. There are also some blackish lateral dashes and two pale ventral stripes.

Primaries clothed with mixed white and brownish gray scales and more or less sprinkled with black. They are more or less whitish basad and along inner margin of first lobe, and have a few whitish streaks near the inner margin and in the second lobe. There is a small dark dot, sometimes scarcely evident, near middle of cell, and a spot before cleft. The latter is usually scarcely more than a curved transverse shade, sharply limited outwardly by whitish or light gray scales at base of cleft. Costa with a heavy blackish dash over base of cleft and shaded with black in basal half. Costa of first lobe with two black dots, opposite which there are whitish areas in the fringes. There is a pale brown subcostal line which reaches the costa in white patches before and after the black costal dash, fades out toward base of wing, and forks in the first lobe, the two branches fading out near the middle of the lobe. Between them is usually a blackish dash. Apex of first lobe and inner margin before apex with black dots. Tips of veins in second lobe touched with black. Fringes brownish gray, on the second lobe cut with white at tips of veins, at least toward apex. On the first lobe they are white from the preapical dot on the inner margin to the apex, with a few dark basal scales. Secondaries and their fringes brownish gray. Expanse 20-27 mm.

Described from fourteen Arizona specimens.

Holotype ♂, allotype and four paratypes ♀ from Mohave Co., Aug. and Sept., two paratypes ♂ and one ♀, Yavapai Co., and one paratype ♀ each from Redington and Paradise, May, in coll. Barnes.

Paratypes ♂ and ♀, Mohave Co., Sept., U. S. N. M. No. 23474.

Paratype ♀, Mohave Co., Sept., in coll. Meyrick.

This beautiful species is unlike any other known to us, and may be recognized very easily by the abdominal markings and the subcostal stripe on the primaries.

The life history is unknown.

26. *OIDAEMATOPHORUS MEDIUS* n. sp. Pl. XLVII, fig. 1. Pl. LII, fig. 4.

Head brownish, creamy white between antennae. Antennae pale above, dotted with brown. Palpi small, slender, oblique, whitish; third joint and tip of second touched with brown. Thorax whitish with light brown band across tips of patagia. Abdomen gray brown with white scales, whiter above toward base, and on posterior margins of segments, which are also marked with single dorsal brown dots. Fore and mid tibiae with brown stripes and faint indica-

tions of the usual tufts; tarsi touched with gray brown at tips of joints. Hind legs more grayish, tibiae apparently with a white dorsal line; darker at bases of spurs and paler at bases of tarsal joints. Spurs rather short. The hind legs are present in only one specimen of the type series.

Primaries pale dull gray-brown with some whitish scales and a variable sprinkling of black ones. There is a rather heavy oblique black dash or spot contiguous to base of cleft and a costal spot above it, preceded and followed by whitish fringes. The first lobe has two faint black costal dots, one apical and one preapical on inner margin, and both it and the second are more or less streaked with the black irroration. There is a subcostal line as in the preceding species, but in this case it is merely an area of the ground color free from both black and white scales, and hence is very inconspicuous. Secondaries and fringes of both wings gray-brown. Expanse 17-19 mm.

Described from five specimens from Texas.

Holotype ♂, and two paratypes ♂ from San Benito, March 16-23 and allotype, Brownsville, in coll. Barnes.

Paratype ♂, San Benito, Mar., U. S. N. M., No. 23487.

We have three other specimens in poor condition from the San Benito series.

*Medius* is rather distinct by reason of its extreme dullness of color, lack of conspicuous pattern other than the one discal dot, and by the fact that this dot is contiguous to the base of the cleft and not separated from it by pale scales. We think that no difficulty will be experienced in placing it by means of the key.

The life history is not yet known.

27. OIDAEMATOPHORUS LINUS n. sp. Pl. XLVII, fig. 2. Pl. LII, fig. 9.

White. Head with some gray-brown scales above and in front. Antennae dotted with brown above. Palpi small and slender, third joint and tip of second gray-brown. Fore and middle legs with some slender gray-brown stripes, no trace of tufts. Hind legs with gray-brown lines on spurs and just a trace at tips of some tarsal joints; spurs moderate. Abdomen with single dorsal dots in posterior margins of segments, sometimes faintly connected by a dorsal line; also with a gray-brown ventral line and lateral spots or dashes.

Primaries white, more or less heavily irrorate with brownish black scales which are more numerous toward inner margin and apices of lobes. Costa with a dark dash over base of cleft and another beyond middle of first lobe. Apex of first lobe, inner margin just before apex, and tips of veins in second lobe with brownish black dots. Those on the second lobe are usually indistinguishable from the scattered black scales which surround them. There is a dark spot a short space before the cleft which is produced obliquely toward the costal dash. Fringes brownish gray with whitish pencils at tips of veins

of second lobe and one before apex of first. Secondaries and their fringes brownish-gray. Expanse 21-22 mm.

Described from seven specimens.

Holotype ♂ and one paratype ♂, New Brighton, Pa., June (Merrick) in coll. Barnes.

Allotype Hampton, N. H., July (Shaw) and one paratype ♂, Wapakoneta, Ohio, U. S. N. M. No. 23475.

Paratype ♂, Mass. and one paratype with broken abdomen from Jamesville, Md., Cambridge Museum, together with a fragmentary specimen from Hazleton, Pa.

Paratype ♀, Hatch Exp. Sta., Mass., July 2, 1897, coll. Fernald.

*Linus* is also a very distinct species, with its rather narrow primaries coarsely powdered with blackish scales over the white ground color. None of the types is in perfect condition, but the species appears to be rare so we have added as many as possible to the type series.

We have no information about the life history.

28. *OIDAEMATOPHORUS FISIII* Fernald. Pl. XLV, fig. 1, 2. Pl. LIII, fig. 7.

*Abucita fishii* Fernald, Can. Ent. XXV, 95, 1893.

*Pterophorus fishii* Fernald, Pter. N. A. 40, 1898.

Id., Bull. 52 U. S. N. M. 444, 1902.

Meyrick, Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 25, 1913.

‡*Pterophorus fishi* Barnes & McDunnough, Check List 151, 1917.

♂. Pale brownish gray. Palpi with a few darker scales toward tip; small and oblique. Antennae very faintly dotted above. Legs mixed gray and whitish, tarsi darker at tips of joints. Fore and mid tibiae with slight scale tufts. Spurs of hind tibiae short.

Primaries light gray-brown, sometimes mixed with white scales. Costa with a gray-brown dash over base of cleft and a longer one, sometimes divided into two, beyond. Cleft preceded at a short distance by a slight dark spot, obliquely prolonged in a faint shade toward costal dash. This spot is sometimes no darker than the ground color, indicated by the paler scales which follow it. There are a few darker gray brown scales scattered over the wing. Fringes very pale gray brown with a few whitish areas. Secondaries and their fringes scarcely darker than primaries.

♀. Much paler than ♂. White with the darker marks of the ♂ present but pale brownish gray. Fringes of primaries extremely pale, whitish. Under a lens normal specimens show pure white clusters in the fringes, but in the palest specimens they are entirely pure white. The secondaries are faintly tinged with gray. Some specimens are almost pure white, but none in our possession fails to show the costal dash over base of cleft and mark before cleft under a lens. Expanse 17-23 mm.

Distribution: Described from Nevada. Ariz., S. Cal., Utah, July to Sept. Dr. McDunnough sent us one ♂ taken at Aweme, Man., July 13, 1904, which appeared to be *fishii*, but it was in such poor condition that we could not be certain of its identity.

This is the only species known to us in which the sexes differ. A good series in the Grinnell collection from the San Bernardino Mts., Cal., convinced us of this, for it was possible to separate the males and females of this series, without an exception, without examining the sexual organs. Our own material was too limited to bring us to this conclusion, but it is significant that we had set aside a series of males from Cal. and Ariz. as a new species, and a series of females from Utah as *fishii* before seeing Grinnell's series.

In order to avoid confusion which might have arisen from the extreme paleness of the markings in some females, we are including the species in the key both in the group having a costal mark over the base of the cleft and in the one which lacks this mark, though it appears to be at least faintly developed in all of our specimens, as already noted.

The unique ♀ type is in the Fernald collection. It now consists of the thorax and left secondary only, but in the pale color of the wing it corresponds with our females.

The early stages are unknown.

29. OIDAEMATOPHORUS CADMUS n. sp. Pl. XLVII, fig. 3. Pl. LII, fig. 5.

Head brown in front, slightly brownish above, white between antennae. Antennae and palpi white, the latter rather short, slender and oblique. Thorax and abdomen whitish, the latter with three brown stripes below and sometimes vague traces of two above. Legs white, fore and mid tibiae and all spurs with fine brown stripes. Spurs long, first pair on hind tibiae reaching well over half way to terminal pair, and these about half as long as first joint of tarsi.

Primaries white, irrorate with brown. The brown scales darken the first lobe rather evenly, but are more or less blotchy elsewhere. At base of cleft is a white space preceded by a curved, powdery brown line which margins a patch of brown irroration extending slightly basad and joining a costal brown dash over base of cell. Beyond this is one other costal spot. Apex of first lobe, inner margin before apex and sometimes tips of veins in second lobe with small brown dots. Fringes white or whitish in cleft with brownish gray tufts at and before apex of first lobe; white on costa, gray brown at spots; brownish gray mixed with white elsewhere, with two white patches on outer margin of second lobe. Secondaries and their fringes very pale brownish gray. Expanse 14-16 mm.

Described from ten males, nine from Palmerlee, Ariz., and one (paratype) from Camp Baldy, San Bernardino Mts., Cal., all taken in July.

Holotype and eight paratypes coll. Barnes.

Paratype U. S. N. M. No. 23476.

This little species is not unlike our *Adaina zephyria* in superficial appearance, but differs in having the discal spot separated from the base of the cleft by a white area, and in the much less prominent spots on the margins of the lobes of the primaries.

Nothing is known of the life history.

30. OIDAEMATOPHORUS IOBATES n. sp. Pl. XLVII, fig. 16. Pl. LIV, fig. 12.

Head brown above and in front, brownish white between antennae. Antennae with a slender, somewhat broken brown line above. Palpi moderately long, very slender, white with a brown line outside. Fore and middle legs white with brown stripes, the tarsi with dashes on one side or merely brown shading. Hind legs whitish, sprinkled with brown scales, sometimes very heavily. Tarsi with the joints tipped and slightly shaded with brown. Spurs long, the inner spur of first pair reaching well over half way to end of tibiae, the rest relatively shorter than in *cadmus*. Thorax and abdomen brownish white, the latter sprinkled with brown scales about as heavily as primaries and usually marked with single brown dorsal dots in posterior margins of segments, and a powdery ventral line.

Primaries brownish white to pale tawny, in the first case a little ochreous in first lobe and in the second more whitish toward base. The wings are sprinkled with dark brown scales, most heavily in second lobe and along inner half. The irroration is limited to these areas in some specimens. Costa usually darkened with these scales in basal half, always with a long dash over base of cleft and one or two spots beyond, the outer one larger. The irroration forms a poorly defined spot at base of cleft, its nucleus apparently separated from the cleft, and sometimes a smaller spot near middle of cell. Apex of first lobe, inner margin before apex, and tips of veins in second lobe with brown dots. Those on the second lobe are often obscured by the brown irroration. Fringes concolorous with wing or nearly so on inner margin and in base of cleft, becoming much darker toward apices of both lobes. The dark areas contain brownish black basal scales at the apices of the lobes, and a few clusters of pale scales before apices. Secondaries and fringes pale gray-brown. Expanse 17-20 mm.

The male genitalia have no tufts on the claspers, as is the case in the two following species.

Described from nineteen specimens taken by O. C. Poling in April and May 8-15, en route from Dewey to Salome, Ariz.

Holotype ♂, allotype and 12 paratypes, ♂ and ♀, in coll. Barnes.

Paratypes ♂ and ♀, U. S. N. M. No. 23477.

Paratype ♀ Cambridge Museum.

Paratype ♀ coll. Fernald.

Paratype ♀ coll. Meyrick.

*Iobates* appears to be related to *cadmus*, and is even more closely related to *ares*. Some specimens of the last named may be easily confused with it, but these can be distinguished by the more sharply defined spot almost contiguous to the base of the cleft and by the unstriped palpi. In *iobates* the dark stripe is present in all of the type series, while in the related species we are unable to see even a trace of dark scales.

31. OIDAEMATOPHORUS COCHISE n. sp. Pl. XLVII, fig. 17. Pl. LIII, fig. 4.

Head brown, with a whitish patch between antennae. Antennae whitish with a brown line above. Palpi moderate, slender, whitish. Legs as in *iobates*. Thorax and abdomen brownish white, the latter with a few dorsal and lateral brown dots.

Primaries pale tawny, sometimes more whitish toward base. Costa brown from base almost to cleft, then with a brown dash, sometimes no more conspicuous than the first line, which is preceded and followed by some whitish scales. First lobe with two dark brown costal dots, usually conspicuous, an apical dot, and one before apex on inner margin. Second lobe with or without a few dark dots at tips of veins. Cleft preceded by a brown spot, the intervening space often filled with scales of the same color. There is also a small dot near middle of cell, some scattered brown scales, less numerous toward costa, and sometimes a few white scales in the apices of the lobes. Fringes tawny-gray along inner margin, a little darker around apex of second lobe and in cleft, and dark brownish gray before apex of first lobe with a white pencil at marginal dot. There are some white hairs along the fringes and a few pale areas, especially on the outer margin of the second lobe where there are two, often whitish. Secondaries brownish gray to grayish tawny, with concolorous fringes. Expanse 17-19 mm.

Described from five specimens from Palmerlee, Cochise Co., Ariz., without dates and one ♂ (paratype) from Jemez Springs, N. M., July 1-7.

Holotype ♂, allotype and 3 paratypes ♀ in coll. Barnes.

Paratype ♀ U. S. N. M. No. 23478.

*Cochise* is very similar to *iobates* but is distinct in several small superficial features, as well as in genitalia. The whitish palpi without a lateral dark stripe are a convenient character for its separation. The genitalia are very close to those of *ares*, but we cannot regard the superficial features of the two as mere varietal differences, and this suggests that the different position of the hair tuft on the claspers

may be of some value. Unfortunately our series are too small to allow proper investigation of this feature in the two species.

The life history is unknown.

32. *OIDAEMATOPHORUS ARES* n. sp. Pl. XLVII, fig. 18. Pl. LIII, fig. 1.

Head brown, tawny-white between antennae. Antennae with a row of variably heavy brown dots above. Palpi moderate, slender, whitish. Fore and middle legs white with brown lines, continued onto first joint of tarsi; tarsi also shaded with brown. Hind legs light brownish, tarsi slightly paler. Spurs rather long. Thorax and abdomen tawny, the latter with some single dorsal brown dots in posterior margins of segments, otherwise immaculate.

Primaries even ochreous-tawny. Cell with a brown dot near middle and cleft preceded by a heavy but not large brown spot, from which a few scales sometimes extend to embrace the extreme base of the cleft. Costa without a patch over base of cleft, but sometimes with its position indicated by two pale areas. First lobe with two brown dots on costa, one near middle, sometimes absent, and one beyond, a more elongate spot at apex and a heavier one before apex on inner margin. Second lobe sometimes with a few dark scales at tips of veins. There are a few scattered brown scales on the wing, chiefly along the inner margin near the base. Fringes grayish tawny with a dark brownish gray patch preceding apex of first lobe with a few pale hairs at the marginal dot, and a similar but paler and less conspicuous dark region at apex of second lobe. Secondaries gray-brown, their fringes a little more tawny. Expanse 20-22.5 mm.

Described from five specimens, of which we have made four types as follows:

Holotype ♀, Stockton, Utah, July 30 (Spalding) allotype and one paratype ♀, Provo, Utah, Aug. 12 (Spalding) in coll. Barnes.

Paratype ♀, Beulah, N. M., 8000 ft., July (Cockerell) U. S. N. M. No. 23479.

*Ares* is closely related to *cochise* but is much more evenly colored and has less blackish-brown irroration. The absence of the costal dash over the base of the cleft appears to be constant, and is in itself enough to distinguish the species.

33. *OIDAEMATOPHORUS TINCTUS* Walsingham. Pl. XI.V, fig. 3. Pl. L.II, fig. 3.

*Pterophorus tinctus* Walsingham, Biol. Cent. Am. Lep. Het. IV, 443, 1915.

We reproduce all that the "Biologia" says about the species:

"Antennae whitish. Palpi slender, porrect, reaching half the length of the head beyond it; whitish. Head and face ochreous, whitish on the crown. Thorax pale ochreous. Forewings pale ochreous, strongly tinged with brownish



ochreous on the costal half, along the cell, and nearly to the apex; on the apical lobe an obliquely curved reddish brown spot at the base of the fissure, an elongate dark fuscous spot on the costa, above the basal half of the fissure, separated by a pale spot from a few fuscous scales beyond it; a minute blackish spot on the lower edge of the apical lobe, between which and the apex the cilia are reddish brown, the remaining cilia above and below the lobe being pale ochreous; the dorsal cilia of the tornal lobe are also tinged with reddish brown. *Exp. al.* 15 mm. *Hindwings* and cilia shining, yellowish brown. *Abdomen* pale ochreous. *Legs* whitish, the hind tibiae and tarsi smeared with brownish fuscous.

"Type ♀ (65514) Mus. Wlsm. (*Godm.-Satz. Coll.*) B. M.

"*Hab.* Mexico: Guerrero: Amula, 6000 ft., VIII-IX (H. H. Smith). Two specimens, one much injured."

We have three specimens, two ♂ and one without an abdomen, from Paradise, Cochise Co., Ariz., August. One of these was compared by Mr. Meyrick with the type of *linctus* and returned as that species. From this series we note that the color is rather more yellowish than ochreous, and that the secondaries are what we have called pale brownish gray in our descriptions. The first lobe of the primaries may have either one or two costal dots beyond the first brown mark. Our smallest specimen expands about 15.2 mm. and our largest 17 mm.

34. *OIDAEMATOPHORUS HELIANTHI* Walsingham. Pl. XLVII, fig. 6.  
Pl. LII, fig. 12.

*Lioptilus helianthi* Walsingham, Pter. Cal. Ore. 54, pl. III, f. 11, 1880.

Dimmock, Psyche III, 404, 1882.

Hy Edwards, Bull. 35, U. S. N. M. 137, 1889.

*Alicata helianthi* Fernald, Smith's List Lep. N. A. 87, 1891.

*Pterophorus helianthi* Fernald, Pter. N. A. 43, 1898.

Id., Bull. 52 U. S. N. M. 445, 1902.

Anderson, Cat. B. C. Lep. 50, 1904.

Dyar, Proc. U. S. N. M. XXVII, 924, 1904.

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 23, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head brown, whitish between antennae. Antennae whitish with brown dots above. Palpi moderate, slender, whitish with gray-brown scales on outer side. Fore and middle legs whitish, heavily shaded with gray-brown on one side. Hind legs whitish, shaded at bases of spurs and tips of tarsal joints. Thorax concolorous with primaries. Abdomen similar above with dark gray brown dorsal dots, more or less elongate, forming a broken dorsal line; beneath heavily shaded near middle and with an obscure dark ventral line.

Primaries brownish white to tawny with some scattered dark brown scales. There is sometimes a small dot near middle of cell and a dark dash on costa over base of cleft, but both are often lacking. A short distance before the cleft and slightly toward inner margin there is a rounded dark brown spot, rather well defined, which may be extended as much as half way to the costa by an oblique line of dark scales, and occasionally the anterior extremity of this mark alone is evident as a spot much more vague than the first and preceded by some of the dark scales, grouped into a vague line. Apex of first lobe, inner margin before apex, and sometimes tips of veins of second lobe with dark dots. Fringes concolorous, those in cleft with dark areas, not abruptly limited, just before apices of both lobes. In some specimens these areas are not actually very dark, but they are always noticeably darker than the wing. Secondaries gray brown, bases paler; fringes slightly more tawny. Expanse 21-29.5 mm.

Distribution: Type locality Siskiyou Mts., S. Ore. Cal., July and Aug. Colo., Aug. The type series was taken in June. Dyar records one specimen, with doubt, from South Fork Creek, B. C.

The large size and broad wings of *helianthi* separate it at once from the related species. We have a single specimen whose expanse is about 21 mm., but this is very unusual; the expanse is usually at least 24 mm. The general habitus is very distinctive when once the species is seen.

Our Colorado specimens are from Denver and S. Park (Osler) and average smaller than Californian examples but are otherwise about the same.

Walsingham described *helianthi* from seven specimens "bred from larvae feeding on a species of *Helianthus*." One of these, now without an abdomen, is in the Fernald collection, and the actual type in the British Museum.

35. OIDAEMATOPHORUS HOMODACTYLUS Walker. Pl. XLV, fig. 4. Pl. LIII, fig. 5.

*Pterophorus homodactylus* Walker, List Lep. Ins. B. M. XXX, 941, 1864.

Dyar, Psyche VIII, 250, 1898.

Fernald, Pter. N. A. 41, pl. IV, ff. 1, 2, 1898.

Id., Bull. 52 U. S. N. M. 445, 1902.

Kearfott, Can. Ent. XXXVII, 294, 1905.

Winn, List Ins. Que. 80, 1912.

Meyrick, Wagner's Lep. Cat. pars. 17, 24, 1913.

Walsingham, Biol. Cent.-Am., Lep. Het. IV, 440, 1915.

Barnes & McDunnough, Check List 151, 1917.

McDunnough, Can. Ent. LII, 89, pl. 11, f. 2, 1920, (biol.).

Britton, Ins. Conn. 103, 1920.

? *Lioptilus homodactylus* Walsingham, Pter. Cal. Ore. 50, pl. III, f. 9, 1880.

*Lioptilus homodactylus* Coquillett, Papilio 11, 62, 1882, (biol.).

Kellicott, Bull. Buff. Soc. Nat. Sci. IV, 48, 1882.

Dimmock, Psyche 111, 404, 1882.

Id., op. cit. 413, 1882, (biol.).

Hy. Edwards, Bull. 35 U. S. N. M. 137, 1889 (in part).

‡ *Alucita homodactyla* Fernald, Smith's List Lep. N. A. 87, 1891.

§ *Pterophorus homodactylus* Meyrick, Gen. Ins. C, 16, 1910.

Entirely snowy white. Palpi small, slender, appressed, with a few fuscous scales outside. Front femora slightly infuscated, and under side of primaries with a trace of similar color. Primaries above with a slight irroration of brownish gray in costal half, sometimes scarcely perceptible except in first lobe, and a small dot well before base of cleft. The tips of the veins in both lobes usually bear slight dots or dashes but in most specimens these are very inconspicuous. Secondaries tinged with grayish. Expanse 24-26 mm.

The mid tibiae have a fringe of scales down the inside, but no tufts, as in the following species.

Distribution: Que. to B. C., south into N. J., Ill. and Cal., June to Aug.

The almost immaculate snowy whiteness of this species distinguishes it from all save pale examples of *elliottii*, with which it has been regarded as synonymous by some writers. We find the markings of *elliottii* variable, but the two species can always be separated by the vestiture of the mid tibiae. The genitalia are indistinguishable as far as we can observe.

A single specimen from the Hope Mts., B. C., July, sent in for identification by Mr. G. O. Day suggested an interesting difficulty connected with the identification of these species. It is very common for the body of a white Pterophorid to be stained "café-au-lait" color, but in this specimen almost the entire wings were also stained, and only a close examination with a lens disclosed the fact that the tips of the primaries bore asymmetrical white areas. The tips of the veins in this specimen were also unusually heavily marked.

The life history has been treated by various writers, and some have doubtless confused the species with *elliottii*. Dr. McDunnough has worked out the early stages of both species with his usual care, and we quote his descriptions of larva and pupa. We have specimens reared by Dr. McDunnough, and find that his identifications agree with our own, based upon Meyrick's comparison with the type of *homodactylus* and our own examination of Fernald's types.

*"Larva* (full-grown).—Head pale greenish ochreous. Body light green with dorsal ochreous line broken in the centre of each segment so that the anterior portion tends to form a short inverted Y, and the posterior portion, commencing as a fine line, thickens into a small elongate diamond-shaped patch, again narrowing at the rear of each segment. A broken, subdorsal, ochreous line is also present, situated dorsad to tubercle III and curved downward on the posterior portion of each segment; traces of a spiracular line are present on the thoracic segments.

"The hair arising from the tubercles is long, dull-white and slightly barbed; the normal arrangement of setae on an abdominal segment is as follows:—tubercles I and II are distinct but contiguous; I has four long subequal setae, II bears two similar ones and a further short posterior one, pointing backward. Tubercle III shows one long central seta and two shorter anterior ones, bent forward. On the first seven abdominal segments a single hair on the posterior margin of the segment dorsad to the spiracle probably represents III a. Tubercle IV + V is very large and situated directly on the lateral flange; it bears about twelve hairs, mostly long. Directly behind them is a tubercle bearing two medium-sized hairs and two short ones; this is presumably III b of Dyar. Tubercle VI, below the flange, bears ten to twelve hairs and VII is represented by several hairs at the base of the prolegs. The thoracic segments show the usual modifications: on the mesothorax I + II bears three long, subequal hairs and one short anterior hair and on the metathorax this number is increased by a single moderately long hair; both segments show a single hair directly posterior to this group. Tubercle III shows four setae of which the central one is the longest; in line with the abdominal spiracles near the rear edge of the segment is a tubercle which bears one medium hair and one small hair pointing backwards (? III b). The prothoracic plate is not well defined; two large patches of white hair project over the head; behind these are two long single hairs and on the posterior portion three tubercles, the central one bearing two hairs and each lateral one three. Two large lateral tubercles with numerous hairs are present, the raised spiracle being situated posterior to the upper one near the rear margin of the segment. Length 14 mm.

*"Pupa* (Fig. 2).—Pale green, with long, white, subequal hairs; wing-cases smooth with fringe of short hair only on margin of primaries. The ends of the leg sheaths project free but unequally above the fifth and sixth abdominal segments; the inner sheaths (prothoracic legs) reach to the rear edge of the fifth segment, the outer ones (mesothoracic) to the middle of the sixth segment; beneath these a third pair (metathoracic) projects still further, reaching nearly to the rear edge of the segment. The antennal sheaths are slightly shorter than the prothoracic legs. Apex of pupa sloping gently forward to base of antennae where a distinct crescentic flange or ridge is formed; a distinct sub-dorsal ridge is present, becoming obsolete caudad to the second abdominal segment. There is a narrow, cream-coloured dorsal stripe, a broad sub-dorsal one along the ridge, encircling tubercles I and II, two pale broken lateral stripes, slightly downwardly oblique from front to rear, the lower one broader and crossing tubercle III, and a creamy stripe along the lateral flange.

"The tubercular setae are reduced in number as compared with those of the larval stage; two white hairs arise from both tubercles I and II, tubercle III shows a single hair; tubercles IV and V appear to have become separated, both being situated on the lateral flange, the former with two, the latter with two or three smaller hairs. The number of dorsal hairs is increased on the two posterior abdominal segments and on the thoracic ones tubercle III shows the usual two setae. There is on the prothorax a posterior row of eight setae crossing the segment, a single lateral hair and a fringe of hairs across the apex."

36. OIDAEMATOPHORUS ELLIOTTII Fernald. Pl. XLV, fig. 5.

†*Lioptilus homodactylus* Hy. Edwards, Bull. 35 U. S. N. M. 137, 1889 (in part).

*Alucita elliottii* Fernald, Can. Ent. XXV. 95, 1893.

*Pterophorus elliottii* Fernald, Pter. N. A. 42, pl. VIII, f. 1, 2, 1898.

Dyar, Psyche VIII, 250, 1898, (biol.).

Fernald, Bull. 52 U. S. N. M. 445, 1902.

Forbes, Psyche XVI, 136, 1909.

Meyrick, Gen. Ins. C, 16, 1910.

Winn, List Ins. Que. 86, 1912.

Meyrick, Wagner's Lep. Cat. pars 17, 24, 1913.

McDunnough, Can. Ent. LII, 90, pl. II, f. 3, 1920 (biol.).

Britton, Ins. Conn. 103, 1920.

‡*Pterophorus elliotti* Barnes & McDunnough, Check List 151, 1917.

Head brown, white between antennae. Antennae white. Palpi small, slender, appressed, touched with brown on outer side. Legs white, fore and mid femora and tibiae brown inside; first joint of mid and hind tarsi and hind tibiae at bases of spurs usually touched with brown. Spurs with a brown line on one side, rather long. Mid tibiae with moderately developed median and terminal tufts. Thorax white. Abdomen white with dorsal, ventral and broken ventro-lateral stripes, the dorsal line never heavy and sometimes lacking.

Primaries snowy white with scattered grayish brown scales, most numerous in costal region and below cell. Costa with a dash just beyond base of cleft, usually powdery and sometimes scarcely traceable or absent. This mark is continued obliquely inward, becoming faint but usually connected with a rounded spot some distance before base of cleft. Cell with a dot near middle in some specimens. Costa of first lobe with two blackish dots in the more heavily marked specimens, and apex, inner margin before apex, and tips of veins of second lobe with similar dots. Our most heavily powdered specimen has a brown subcostal line in the first lobe which extends slightly basad along costal margin of cell. Fringes pale gray brown with white bases, white in cleft. Secondaries white, sometimes tinged with gray; fringes gray tipped. Expanse 21-26 mm.

Distribution: Que. to Man., south into N. J. and Ill. Late June and July.

The numerous superficial features in which *elliottii* differs from *homodactylus* are so variable that they do not suffice to separate some

pale specimens, but the tufted tibiae are always dependable if we except the cripples which are so numerous in collections of this family. The genitalia show no difference (see pl. LIII, fig. 5, *homodactylus*).

There are four male and three female "types" in the Fernald collection, all from New York.

*Larva* (full-grown).—Head pale ochreous. Body light green with long, white, shiny, non-spiculate hairs from the tubercles, the longest being about 4 mm. in length. Except on the prothorax there is a distinct creamy dorsal line broken in the centre of each segment by a small, round dot of the ground color; traces of a pale subdorsal line are visible crossing tubercles I and II, especially shortly before pupation; a somewhat broken pale lateral line midway between tubercles I and III and a similar spiracular line, broken on the posterior portion of each segment. Prothoracic plate indistinctly defined, the arrangement of setae on this segment being similar to that found in *homodactylus*. On the other thoracic segments tubercle I + II bears two long, central hairs and three shorter ones, two anterior and one posterior. A single minute hair is situated directly posterior to this group. Tubercle III shows two long central setae, two minute posterior ones and three longer anterior ones; tubercle IV has four long central hairs and six or seven shorter ones arranged in a crescent around the edge; three short hairs are present on a level with the abdominal spiracle. On the abdominal segments tubercle I bears one long, shiny, smooth, central seta, three anterior shorter ones and one posterior one, very minute; tubercle II is represented by a central, long hair, two shorter posterior ones, pointing backward, and one very short anterior hair; tubercle III bears the same number of setae as tubercle I; tubercle IV + V shows four long central hairs and about seven shorter ones, arranged in a semicircle around the ventral portion of the tubercle; posterior to this group two short hairs, pointing backward, probably represent tubercle III b; tubercle VI is a large one with about twelve hairs of which several are long; several hairs at the base of the prolegs represent tubercle VII. Length 14 mm.

*Pupa* (Fig. 3).—Very similar to that of *homodactylus*, green with the same pale ochreous markings: the white hairs from the tubercles are, however, shorter and more numerous, the abdominal segments contain a short white centrodorsal hair, midway between tubercles I, and the wing cases, besides the lateral fringe of fine hair, bear several additional rows of still shorter hair; the sheaths of the two posterior pairs of legs are also of equal length. On the first three abdominal segments tubercle I is preceded by a patch of small, white secondary hair, and on these same segments it bears one long central white hair, one anterior shorter hair and a single very short posterior one; on the remaining abdominal segments both the secondary hairs and the anterior tubercular hair are absent. Tubercle II is distinctly laterad to I, is large and bears a long, central, white hair, and five shorter hairs arranged around the circumference; dorsad to tubercle II is a single short hair and laterad to same tubercle, situated in the downward angle of the first pale lateral line, are two small white hairs, one directed forward, the other backward; below these again

are two further short hairs on a line with tubercle III; this tubercle is situated on the second lateral line and bears one long hair pointing forward and one short hair directed backward; anterior to III on the first three abdominal segments are two short hairs. Below the spiracle and slightly posterior to same is a small tubercle with three short white hairs (? III b) and below this on the flange IV + V appears as a large crescentic tubercle with about eight long white hairs. Three short hairs, well below the flange, apparently represent tubercle VI. The thoracic segments show the usual modifications as well as considerable secondary hair on the posterior dorsal portion of each segment."

37. OIDAEMATOPHORUS STRAMINEUS Walsingham. Pl. XLV, fig. 18.  
Pl. LIII, fig. 6.

*Lioptilus stramineus* Walsingham, Pter. Cal. Ore. 41, pl. III, f. 3, 1880.

*Lioptilus angustus* Walsingham, op. cit. 43, pl. III, f. 4, 1880.

‡*Alucita angusta* Fernald, Smith's List Lep. N. A. 87, 1891.

‡*Alucita straminea* id., loc. cit.

*Pterophorus stramineus* Fernald, Pter. N. A. 44, pl. IV, ff. 7, 8, 1898.

Id., Bull. 52 U. S. N. M. 445, 1902.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 23, 1913.

Barnes & McDunnough, Check List 151, 1917.

*Pterophorus angustus* Fernald, Pter. N. A. 44, 1898.

Id., Bull. 52 U. S. N. M. 445, 1902.

Anderson, Cat. B. C. Lep. 50, 1904.

Dyar, Proc. U. S. N. M. XXVII, 923, 1904 (biol.).

B. C. Ent. Soc. Check List 42, 1906.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 24, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head yellow or ochreous, brown in front and usually above. In some cases the upper part of the head is so nearly evenly colored that the pale patch between the antennae is not defined. Antennae sometimes dotted with brown above. Palpi slender, moderate, oblique; tips of second and third joints touched with fuscous outside. Legs yellowish, first two pairs striped and shaded with gray-brown on one side. Thorax yellow. Abdomen yellow with brown dorsal and ventral lines.

Primaries usually definitely yellow or yellowish, occasionally somewhat ochreous. There is at least a trace of a brown spot contiguous to the base of the cleft, and in a majority of specimens this spot is well marked. The tips of the veins in both lobes are sometimes lightly touched with brown, and there is often a heavy brown shade running from the base next to the inner margin into the first lobe. When this shade is absent there is frequently a trace of its outer end in the first lobe. Fringes and secondaries more grayish. Expanse 15-21 mm.

Distribution: Ariz. and N. M. to Vancouver Is., B. C., east to Colo. and E. Canada, thence south into N. J. July to Sept. In a long series we have one specimen labelled June.

*Stramineus* was described from specimens taken in the Siskiyou Mts. of S. Ore. in June, and *angustus* from a series taken on Mt. Shasta, Cal., in Aug. The types of both are now in the British Museum, and paratypes in the Fernald collection. We have specimens compared with the types by Mr. Meyrick and others which we compared in person with Fernald's paratypes, and are unable to find differences which we can regard as specific. The species is rather variable in appearance, due to the inconstancy of the brown shade, but may be easily recognized by the more or less yellow primaries with the brown dot at base of cleft, and the secondaries not conspicuously darker. We know of no other small species which combines these characters.

Dyar gives the following account of this species as it occurred at Ainsworth, B. C.:

" \* \* \* The moths were easily started up from low grass and weeds, but especially from the plant *Anaphalis margaritacea*, which I suppose is their food plant. Larvae were found commonly in the flower heads of this plant, but unfortunately were not bred. The following is a description of them:

"*Larva*.—Head shining brown-black, bilobed, the clypeus reaching vertex, rounded at top; mouth pointed. Body robust, flattened, tapered behind, feet normal, small. Densely covered with brown-black, flat granules, forming a double patch dorsally, bisected by a pale dorsal line; ground color whitish, forming a subdorsal band; segmental incisures shagreened. Tubercles i and ii separate, i dorsally placed, with secondary hairs; iv and v separate. Later the larva is whitish, with the flat black granules; dorsal, subdorsal, and stigmatal purplish bands, the dorsal band geminately segmentarily bimaculate in blackish."

38. OIDAEMATOPHORUS PALEACEUS Zeller. Pl. XLV, fig. 6. Pl. I.I. fig. 12.

*Leioptilus paleaceus* Zeller, Verh. z.-b. Ges. Wien. XXIII, 326, 1873.  
Murtfeldt, Am. Ent. III, 235, 1880.

*Leioptilus paleaceus* Walsingham, Pter. Cal. Ore. 41, pl. III, f. 2, 1880

*Leioptilus sericidactylus* Murtfeldt, Am. Ent. III, 235, 1880 (biol.).

Dimmock, Psyche III, 389, 1882.

*Leioptilus sericidactylus* Dimmock, Psyche III, 404, 1882.

Fly. Edwards, Bull. 35 U. S. N. M. 137, 1889.

‡*Alucita paleacea* Fernald, Smith's List Lep. N. A. 87, 1891.

‡*Alucita sericidactyla* id., loc. cit.



- Pterophorus palcaccus* Fernald, Pter. N. A. 45, 1898.  
 Id., Bull. 52 U. S. N. M. 445, 1902.  
 B. C. Ent. Soc. Check List 43, 1906.  
 Meyrick, Gen. Ins. C, 16, 1910.  
 Id., Wagner's Lep. Cat. pars 17, 24, 1913.  
 Barnes & McDunnough, Check List 151, 1917.  
 Britton, Ins. Conn. 103, 1920.

Head dark brown, with a brownish white patch between antennae. Antennae with a brown line above. Palpi moderate, slender, oblique, with a brown line outside. Legs brownish white or whitish, fore and middle femora and tibiae striped and tarsi shaded with dark brown. Hind legs similar in color with sometimes a trace of brown at bases of spurs. Spurs rather long. Thorax brownish white to tawny brown, paler in front. Abdomen concolorous with paler part of thorax, with slender parallel brown stripes on all sides.

Primaries tawny whitish to brownish white, with a broad light to smoky brown shade running from middle of base to costa above cleft and thence out into the first lobe, which it sometimes obscures completely but usually leaves pale along cleft. The cleft is preceded by a variably heavy dark brown dot which is sometimes contiguous to and sometimes slightly before it. There are no marginal dots. In some specimens the brown shade is much heavier and more extensive, and occasionally it suffuses the entire wing. In some of these dark specimens the veins are contrastingly pale in the lobes. Fringes and secondaries a little darker and more grayish. Expanse 19-26 mm.

Distribution: Type series from Dallas, Tex. It is reported also from Cal. and B. C. but we have seen no specimens from these localities. Our series indicates a range from the Atlantic coast west to Nebraska and New Mexico. We should expect it in southeastern Canada. March to Sept.

There are one male and two female types in the Cambridge Museum, and part of the type series in the British Museum. The types of *sericidactylus* which we have been able to locate include a female and a male in the Murtfeldt collection at Cornell University, which we have labelled lectotype and allotype respectively, a ♂ and a ♀ in coll. Fernald, and one ♀ now in our possession through the kindness of Dr. J. Chester Bradley of Cornell University. The ♀ in coll. Fernald is a specimen of *kellicottii*. An examination of the various types shows that the previous treatment of both species and synonym has been correct.

Miss Murtfeldt's types were reared from *Vernonia noveboracensis*, a species of Ironweed, and her account of the early stages is the only one known to us. We therefore quote her descriptions.

"*Larva*: Length, 0.55 inch; diameter, 0.10 inch; form sub-cylindrical. Color, when young, dingy-white, with a tinge of green, becoming at maturity pale glaucous, often varying, especially in the late Fall brood, to dull salmon. Dorsal hairs proceeding from prominent tubercles, and of two sizes in each tuft, each of the shorter ones tipped with a minute pellucid bead of viscid fluid, to which pollen and bits of leaves often adhere. Lateral ridge well defined. Prolegs long and narrow. When mature, the larva weaves a dense mat of silk, upon which it extends itself, remaining quiescent for two or three days, the dorsal surface acquiring, meanwhile, a translucent lilaceous hue, with three greenish-white longitudinal stripes, of which the mediadorsal is most distinct and continuous.

"*Pupa*, with ventral surface closely appressed to the mat of silk, to which the anal hooks are firmly attached. An upright or inverted horizontal position seems to be preferred, although there is no thoracic band or other support for the anterior part of the body.

"Average length 0.45; diameter same as larva, tapering rather abruptly from seventh abdominal segment backward. Wing sheaths narrow, free at the blunt-tips. Dorsum with prominent subdorsal ridges. Color and markings quite variable. In the spring brood commonly dull green, with indistinct yellow lateral stripes. In the Fall brood the dorsum is pale yellow, or flesh color, with two fine indistinct mediadorsal lines of lilac color; sub-dorsal ridge pale, inclining to lilac on outer side. In sub-dorsal space are two nearly continuous, quite heavy, black or fuscous lines, separated by a broad, pale stripe, from two narrow, interrupted, dark lines, one beneath, the other, above stigmata. On the thorax the dark stripes are represented by two slightly diverging dashes on each side. Situated in the sub-dorsal ridge, at the posterior edge of each segment, are a pair of small, geminate piliferous warts, each bearing a sparse tuft of light sprangling hairs. The last larval skin, rolled into a little hairy ball, is often supported over the back of the chrysalis, raised above it on the hairs of the sub-dorsal ridges. The pupa is quite active and irritable, striking about in all directions when meddled with."

39. OIDAEMATOPHORUS VENAPUNCTUS Barnes & Lindsey. Pl. XLV, fig. 19. Pl. LIV, fig. 6.

*Oedematophorus venapunctus* Barnes & Lindsey, in Heinrich, Jn. Agr. Research XX, 827, 1921.

§*Oedematophorus venapunctus* Heinrich, Jn. Agr. Research XX, 827, 1921 (biol.)

The original description is as follows:

"Head whitish ochreous between the antennae, elsewhere light brown. Antennae and palpi pale brownish ochreous, almost white, the latter short, oblique or porrect. Thorax and legs of the same shade of pale brownish ochreous, the fore and middle legs tinged with brown inside. Abdomen similar both above and below, with a fine, brown, middorsal line.

"Primaries concolorous with thorax, darker toward costa, especially in first lobe, though this shade is scarcely evident in some specimens. Just before

and below the base of the cleft is a small blackish brown spot, isolated except in our darkest specimen, in which it is continued obliquely toward the costa by a faint dark shade. In the outer margin of the second lobe there are four short, dark dashes on the tips of the anal, cubital and third median veins. These are very faint in some specimens. A similar but heavier spot occurs on the inner margin of the first lobe a short distance before its apex at the tip of the fifth radial. Two vague dots sometimes appear on the costal margin of this lobe, one just before the apex and the other almost opposite the one on the inner margin. Fringes concolorous, slightly darker toward the apex of the wing and with their bases slightly paler. Secondaries somewhat paler than primaries and with a more grayish tinge. Fringes concolorous with slightly paler bases.

"Expanse 15 to 18 mm.

"Described from the following series: Holotype male, Brownsville, Tex., March; paratype male, same locality; allotype and six paratype females, San Benito, Tex., March and April. (Collection Barnes.)

"Paratype male, Brownsville, Tex., March, and paratype female, from San Benito, Tex., April, in United States National Museum, type Cat. No. 23495.

"This species appears to be allied to *Oedematophorus paleaccus*, *O. stramineus*, *O. kellicotti* and related species. It differs from the first two in the presence of the terminal dots and from the last two in that the dot in the disc of the primaries is not contiguous to the base of the cleft. The form of the male genitalia also differs from that of any related species known to us. We have been unable to place it as a described Mexican or Central American species."

Simultaneously with this description there appeared the following notes by Mr. Heinrich on larvae and pupae reared from the leaves of a composite:

"The pterophorid larvae have only two setae on the prespiracular shield of the prothorax and setae IV and V approximate on the proleg-bearing abdominal segments, as in the Pyralidae with which they are affiliated. They have, however, in distinction from the Pyralidae proper, long stem-like prolegs and a greater or less development of secondary setae. The crochets are also peculiar, being unordinal, few in number (6 to 8 in the genus *Oedematophorus*), and arranged in a quarter circle opening outwardly. In *O. venapunctus* the secondary hairs are confined to a row of 5 to 8 in the area normally occupied by seta VI. The body tubercles are somewhat produced, especially on the prothorax and tenth abdominal segment, and the hairs themselves are swollen and bulbous. In addition to the setae there are on all except the first thoracic and the last abdominal segments several finger-like projections from the skin. On the abdomen these arise back of setae I, II, III, IV and V from the base of their tubercles and in the area back of the spiracle and seta group IV-V. The prothorax is somewhat produced dorsally, and the head is capable of retraction under the cover of this rooflike projection.

"In the pupa the venter of the eighth, ninth, and tenth segments is deeply concave with the lateral edges fringed by rather short flexible setae. The ventral edge of the tenth segment and the anterior margins of the concavity

are also armed with clusters of slender, hooked hairs. The caudal end is sharply pointed, but there is no distinct cremaster.

"The larva is an external feeder, and the pupal period is very short. Larvae collected by Diven from April 7 to 14, 1919, produced moths as early as the 19th of the same month."

40. *OIDAEMATOPHORUS LUTEOLUS* n. sp. Pl. XLV, fig. 20. Pl. LIV, fig. 9.

Head brown, sometimes pale; whitish between antennae. Antennae whitish above, darker below, sometimes with a blackish line above near base. Palpi moderate, slender, oblique, whitish. Legs white; fore and middle legs, including first joint of tarsi, with brownish black stripes, remainder of tarsi brown shaded on inside. Thorax and abdomen yellowish, pale brownish white or tawny, the last sometimes with a few small blackish dorsal spots.

Primaries a little paler than thorax and abdomen, tawny white. Inner margin of first lobe with a fine blackish brown dot before apex. Cleft preceded at some distance by a similar but larger dot. In the allotype there are a few dark scales on the discal area, a fine dot in the apex of the second lobe and one at the tip of  $Cu_1$ , which is very faint. The dot before the cleft is also slightly extended across the wing. Fringes concolorous. Secondaries and their fringes a little darker and more grayish. Expanse 20-21 mm.

Described from three specimens taken at Paradise, Cochise Co., Ariz.

Holotype ♂, May 8-15 and allotype, Aug., in coll. Barnes.

Paratype ♂, May, U. S. N. M. No. 23480.

We have also a worn male from Jemez Springs, N. M., which differs in the form of the left harpe (pl. LIV, fig. 9a). We are unable to say whether this indicates variability in this structure or the specific distinctness of the specimen, but we believe the former possibility more likely.

The early stages are unknown.

41. *OIDAEMATOPHORUS LACTEODACTYLUS* Chambers. Pl. XLVII, fig. 6. Pl. LIV, fig. 2.

*Pterophorus lacteodactylus* Chambers, Can. Ent. V, 72, 1873.

Fernald, Bull. 52 U. S. N. M. 445, 1902.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 24, 1913.

Barnes & McDunnough, Check List 151, 1917.

‡*Alucita subochracea* Fernald, Smith's List Lep. N. A. 87, 1891 (in part).

*Pterophorus subochraceus* Fernald, Pter. N. A. 43 (in part), pl. IV, f. 9, 1898.

Head brown, whitish between antennae. Antennae whitish, palpi similar becoming brown toward tip; slender, moderate, oblique. Legs whitish, the first two pairs tinged with brown on one side. Spurs of hind tibiae with slender

brown lines. Thorax and abdomen whitish, sometimes tinged with yellow. Abdomen with a faint dorsal line, sometimes marked by brown dots in posterior margins of segments.

Primaries brownish white, the veins in both lobes more or less definitely tipped with brownish black. There is sometimes a faint brown spot contiguous to base of cleft and a dark basal dash below the cell. The wing is slightly darker toward the costa, and there is usually an evident shade on the costa of the first lobe, especially above base of cleft. Fringes concolorous at base, grayish at tips. Secondaries approximately concolorous, fringes the same. Expanse 25-28 mm.

Distribution: Described from Kentucky. North Carolina to Nova Scotia, west to Colo. May to July.

The type of *lacteodactylus* is now in the Cambridge Museum. It is a large specimen and well worn, but is sufficiently well preserved to establish its identity satisfactorily. The species is rather closely related to *kellcottii* but differs in the absence of a well marked spot at the base of the cleft on the primaries and in other slight features, as well as in the form of the genitalia. There is no reason for confusing it with *subochraceus* for that species has no marginal or discal spots.

The life history is unknown.

#### 42. OIDAEMATOPHORUS KELLICOTTII Fish. Pl. XLVII, fig. 5.

*Lioptilus kellcottii* Fish, Can. Ent. XIII, 141, 1881.

Kellicott, Bull. Buff. Soc. Nat. Hist. IV, 51, 1881. (Biol.) (*vide* Hy. Edwards).

Dimmock, Psyche III, 404, 1882.

Hy. Edwards, Bull. 35 U. S. N. M. 137, 1889.

*Alucita kellcottii* Fernald, Smith's List Rep. N. A. 87, 1891.

*Pterophorus kellcottii* Fernald, Pter. N. A. 49, pl. IV, ff. 5, 6, 1898.

Dyar, Ent. Rec. XI, 140, pl. I, f. 3, 1899.

Fernald, Bull. 52 U. S. N. M. 446, 1902.

Winn. List Ins. Que. 86, 1912.

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 135, 1917.

‡*Pterophorus kellcottii* Meyrick, Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 25, 1913.

Barnes & McDunnough, Check List 151, 1917.

*Pterophorus chlorias* Meyrick, Trans. Ent. Soc. Lond. 497, 1908.

Id., Wagner's Lep. Cat. pars 17, 24, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head brown, whitish between antennae. Antennae whitish. Palpi moderate, slender, whitish; third joint touched with fuscous outside. Legs whitish. The two anterior pairs shaded with brown on one side, including tarsi; spurs moderately long. Thorax and abdomen concolorous with primaries, the latter with a faint dorsal and several more conspicuous ventral and lateral brown lines.

Primaries white to pale brownish tawny, usually white tinged with tawny or brownish. Cleft preceded by a brownish black spot which usually slightly embraces it. The first lobe usually has a blackish dot at apex, one before apex on inner margin and two on costa, and the second similar dots or rather elongate dashes on tips of veins. All of these may be rather faint, and some are frequently lacking. There is a light brown to smoky brownish gray shade from base of wing into first lobe, sometimes faint. In part of a series of small specimens in coll. Barnes this shade is evident only in the lobe and appear to curve outward from the costal extremity of the discal spot. In some specimens there are a basal dash, spot near middle of cell, and a subcostal dash near base. The dashes somewhat broken. Fringes and secondaries almost concolorous to distinctly darker and more grayish. Expanse 14 to 29 mm.

Distribution: Florida north into Canada and west to Utah. May to Aug.

One male and one female type in the Fernald collection are larger and darker than our series of *kellicottii*, but both appear to be the same species. The female looks much like a small specimen of *balanotes*, so we have labelled the male lectotype. It appears to be much more nearly average. The genitalia also resemble those of *balanotes* (see pl. LIV, fig. 5) but are much smaller. The specimen which Meyrick compared with the type of *chlorias* for us is one of a series from Utah which is rather duller and more grayish-brown than normal *kellicottii*. Meyrick's types are from Colo. and our equivalent specimens from Utah.

The limitation of *kellicottii* has proven one of our greatest puzzles in this genus. The very small Florida specimens with a pronounced shade in the first lobe at first seemed to be distinct, but they grade into nearly normal individuals in the same locality. Another strange form was found in a series from Cohasset, Mass., in the National Museum. These specimens were also very small and rather evenly grayish. The genitalia of all the forms, however, do not differ more than is to be expected in any species of *Oidaematophorus*, and we are utterly at loss to find tenable specific characters for their separation in markings and superficial structure. For the present, therefore, we feel justified in regarding this limitation and synonymy as correct for the species.

We have no copy of Kellicott's paper on the life history, but his account is quoted by Fernald, from whose monograph we reproduce it. The food plant is given as *Solidago*. A specimen in the National Museum is labelled "larva boring in *Artemisia baccharis*." This plant is not listed in Gray's Manual.

"The larva, when first examined, August 22, was .3 of an inch long; color light yellow, head and shield darker, the oblique anal plate almost black, bearings hairs and hooks; dorsal and subdorsal lines pinkish. By the middle of September it abandons the branches, being then .45 of an inch in length, and bores into the stalk a few inches above the ground; it makes its way down the pith into the roots, well under the ground, where it passes the winter. I fetched several examples from the fields in January for examination; they were then .58 to .6 of an inch in length, lighter in color, with the longitudinal lines of pink brighter than in autumn, the eighth segment conspicuously marked on the back by pink. There are few hairs over their smooth bodies; on the last ring, however, there is a brown or black chitinous disc, with a circle of long black hairs about its circumference; in the centre of this disc there is a small papilla, with two stout, straight black teeth, pointing rearwards; these teeth are hooked upward in the autumn stage. The hairs render the plate sensitive to touch, and help to brush fragments from their long, narrow galleries, while the teeth assist in backward motion in them. The mature larvae obtained in May differ but slightly from these, except that they are then .7 of an inch long, and the pink stripes and marks are brownish. The fourth, fifth and sixth segments are smaller than those preceding or following them. They are quite active, moving up and down their burrows rapidly.

"By the middle of May the caterpillar has worked its way back to the place of entrance in autumn, enlarging its way to accommodate its increased size, and, after loosely stopping the upper part with a few chips, retires and changes to the pupa. It is then .6 of an inch in length, slender, cylindrical. Color white, except the oblique disc or plate terminating the head, which is made dark by many teeth-like elevations on its surface. The abdominal segments are clothed with hairs, and the last four segments have each a transverse row of teeth on the dorsal part, reminding one of a Tortrix or Cossus pupa. The conical tip of the abdomen has many teeth; these teeth together with the roughness on the head, enable the pupa to worm its way up and down the burrow with readiness. When removed from the stem to the table, it travels about, rolling and worming its way very much as do the pupae of certain stem-boring beetles. The wing and limb covers are free for a considerable distance from their tips."

43. OIDAEMATOPHORUS BALANOTES Meyrick. Pl. XLIV, fig. 12. Pl. LIV, fig. 5.

*Pterophorus balanotes* Meyrick, Trans. Ent. Soc. Lond. 1907, 503, 1908.

Id., Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 26, 1913.

Barnes & McDunnough, Check List 151, 1917.

*Pterophorus aquila* Meyrick, Trans. Ent. Soc. Lond. 1907, 503, 1908.

Id., Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 25, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head brown, whitish between antennae. Antennae whitish. Palpi whitish, brown toward tips, longer than in the several related species preceding, oblique, but long enough to reach bases of antennae if upturned; slender. Legs pale brown or brownish white, the first two pairs brown inside. Thorax and abdomen brownish white, the latter with dorsal, ventral and ventro-lateral brown stripes, sometimes faint.

Primaries brownish white more or less suffused with brown, sometimes heavily. The complete markings include dark brown spots at tips of veins in both lobes, a brown spot contiguous to base of cleft preceded by a smaller spot a little nearer inner margin, which is the isolated outer end of powdery line reaching about half way from it to the base, a basal powdery line below the cell and a subcostal basal line. We have specimens in which all of these are lacking, and they are rarely all present. In one peculiar variation the spot at base of cleft is faint, while the one preceding it is conspicuous. Fringes and secondaries approximately concolorous, the latter sometimes browner. Expanse 30-41 mm.

Distribution: Florida to Arizona. We have specimens taken in all months but April, May and Nov. The American Museum collection contains a ♂ from N. J.

The species is so extremely variable in markings that we cannot place one specimen from Arizona, which expands only 26 mm., with certainty. It has the long palpi of *balanotes*, however, and may be an abnormally dwarfed specimen. As a rule the brownish wings distinguish the species, but some immaculate specimens are sufficiently ochreous to be confused with *grandis*. In that species the palpi are distinctly shorter.

In sending specimens to Mr. Meyrick for comparison with his types we erroneously identified *balanotes*. Later on, to verify our corrected opinion of the species, he very kindly compared the types of *balanotes* and *aquila*, both in his collection, and pronounced them sexes of the same species. *Balanotes* was described from a single Florida specimen and *aquila* from a single Texas example. The description of the former immediately precedes that of the latter.

The life history is unknown.

44. OIDAEMATOPHORUS GRANDIS Fish. Pl. XLVII, fig. 7, Pl. LIII, fig. 12.

*Lioptilus grandis* Fish, Can. Ent. XIII, 141, 1881.

*Alucita grandis* Fernald, Smith's List Lep. N. A. 87, 1891.

*Pterophorus grandis* Fernald, Pter. N. A. 50, pl. V, ff. 9, 10, 1898

Id., Bull. 52 U. S. N. M. 446, 1902.



Meyrick, Gen. Ins. C, 17, 1910.

Id., Wagner's Lep. Cat. pars 17, 25, 1913.

Walsingham, Biol. Cent. Am., Lep. Het. IV, 441, 1915.

Barnes & McDunough, Check List 151, 1917.

*Pterophorus baccharides* Grinnell, Can. Ent. XL, 317, 1908.

Williams, Ent. News XX, 60, 1909 (biol.).

Meyrick, Wagner's Lep. Cat. pars 17, 24, 1913.

Barnes & McDunough, Check List 151, 1917.

Head brown, brownish white between antennae. Antennae brownish white, palpi similar, becoming brown toward apex, slender and oblique, moderately long. Legs brownish white, first two pairs shaded with brown on inner surface. Thorax and abdomen pale tawny, the latter with a faint brown dorsal stripe.

Primaries ochreous, more or less heavily tinged with brown, in some specimens almost evenly brown but usually paler toward inner margin and along base of costa. Veins slightly darker than ground color on inner half of wing and sometimes tipped with dark brown in both lobes. Fringes concolorous. Secondaries and their fringes slightly more grayish. Expanse 34-66 mm.

Distribution: California. We have the species from northern, central and southern localities, June and July. In U. S. N. M. from Mexico.

There are two types of *grandis*, a male and a broken specimen, in the Fernald collection, and one type male in the Cambridge Museum, all from California. Grinnell's two types are this species without doubt; they were reared from *Baccharis pilularis* at San Francisco by F. X. Williams, and give us our only knowledge of the life history.

Williams' account of these specimens is as quoted below:

"Description of a nearly mature larva (fig. 12).—Head pale brown, darker about the mouth and along the sides, clypeus not reaching half way to vertex. Body of uniform thickness, somewhat depressed, shining white, with slight creamy yellow tinge ventrad; cervical shield strong, pale brownish, with two transverse patches of small dark brownish tubercles, interspersed rather sparsely with hairs, the first patch the narrower. On the second and penultimate segments is a less developed patch. On each side of the dorsal line an irregular, rather broad and broken purple line; subdorsal a heavier, wider purple band; and below the brownish spiracles an indistinct geminate line of the same color, with an extended blotch just cephalad of each spiracle. Indications of another line below lateral fold. Body with sparse brownish hairs, except on last segment where the heavily chitinized, dark brown anal plate is widely bordered with numerous dark hairs arising from small tubercles. This plate (fig. —) which occupies obliquely half the segment contains a raised disc somewhat below its middle, bearing a pair of slightly upcurved chitinized processes. On this plate between and below the prongs are rough granulations. Feet dull

white, with pale brown blotches: prolegs dull white, crochets semicircular. Length of mature larva 16 mm., width (at seg. 6) 2.75 mm.

"Described from fresh specimens, measurements from alcoholic material.

"*Pupa*.—Slender, cylindrical, slightly narrowest above middle, color pale yellowish brown, darker at base of abdominal segments, and very dark brown at the obliquely truncate cephalic end, which is heavily armed with numerous little spines. Of these, there is a strong ridge of large ones at the base of each antenna above, and a smaller group on each shoulder. Brown hairs especially along dorsal edge of this area and on thorax and abdomen. On lower dorsal border of segments 4, 5 and 6 of abdomen is a row of spines pointing obliquely cephalad, and on the remaining segments is a row pointing obliquely caudad. Somewhat below the lateral line of each of the spiny segments are other spines arranged in a row, on segments 4, 5, and 6 few, on the remaining segments becoming more numerous. Fused leg and wing tips free from body. Length 15-18 mm., width at thorax 2.80 mm.

"Described from alcoholic specimens.

"The larva bores a smooth cylindrical passage in the stem of *Baccharis pilularis*, and the oblique opening can be readily detected by the quantity of pale-colored frass on the ground below. The galleries may be in the smaller stems or in the main trunk and at least partly above ground. On tall shrubs the caterpillar may be found working high up in the stems. Several parallel passages often occur in one stem, and are usually quite straight and almost invariably open on the under side of the branch.

"The pupa, which is very active, lies some distance from the bottom of the gallery, but may move considerably therein. The pupal chamber is not silk-lined. A short search in winter revealed no pupae of this insect, but half-grown and nearly mature larvae were plentiful. The larval period, while not determined, must be of at least a year's duration. Adults were common in June and in September. The cocoons of a hymenopterous parasite were found in two galleries, but no adults have as yet been secured."

We have listed in our notes on the National Museum material a specimen of *grandis* labelled Plummer's Id., Md., May, but we feel that there must be some error either in our record or in the label. The family is so imperfectly known, however, that the species may occur in the southern states and along the east coast.

45. OIDAEMATOPHORUS SUBOCHRACEUS Walsingham. Pl. XLVII, fig. 8, 9. Pl. LIII, fig. 8.

*Liophilus subochraceus* Walsingham, Pter. Cal. Ore. 53, pl. III, f. 10, 1880.

‡*Alicia subochracea* Fernald, Smith's List Lep. N. A. 87, 1891.

*Pterophorus subochraceus* Fernald, Pter. N. A. 43, 1898 (in part).

Id., Bull. 52 U. S. N. M. 445.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 24, 1913 (in part).

Barnes & McDunnough, Check List 151, 1917.

Head light brown, whitish between antennae. Antennae whitish. Palpi very short, oblique, whitish. Thorax and abdomen creamy white, the latter with a brown dorsal line. Legs whitish, first two pairs infuscated within, the tarsi very slightly.

Primaries creamy white with bright, but often faint, brown shade from middle of costa of first lobe to near middle of anterior margin of cell. Base sometimes with a few brown scales. Veins slightly brownish in paler parts of wing. Fringes concolorous at their bases, darker at tips. Secondaries and their fringes almost concolorous. Under surface of primaries slightly tinged with dull brown, especially near base. Expanse 27-33 mm.

Distribution: California. Types from Lake Co., June. We have a small series from the San Bernardino Mts., July.

The types are in the British Museum and our identification is based on a specimen compared by Mr. Meyrick. Walsingham's description and figure are excellent, and the species need not be confused with *lacteodactylus*, as has been done, nor with *australis*, which was described as a variety. From the former it is separated by the absence of marks from the primaries with the exception of the soft brown shade, and from the latter by the relatively pale under surface of these wings. The short palpi separate it at once from all related species when comparison can be made.

We know nothing of the early stages.

46. OIDAEMATOPHORUS SULPHUREODACTYLUS Packard. Pl. XLIV, fig. 10. Pl. LIII, fig. 9.

*Pterophorus sulphureodactylus* Packard, Ann. Lyc. Nat. Hist. N. Y. X, 266, 1873.

Fernald, Pter. N. A. 44, pl. V, ff. 3, 4, 1898.

Id., Bull. 52 U. S. N. M. 445, 1902.

Dyar, Proc. U. S. N. M. XXV, 398, 1902. (Biol.).

Barnes & McDunnough, Check List 151, 1917.

‡*Lioptilus sulphureus* Walsingham, Pter. Cal. Ore. 48, pl. III, f. 7, 1880

‡*Alucita sulphureodactyla* Fernald, Smith's List Lep. N. A. 87, 1891.

‡*Pterophorus sulphureodactylus* Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars. 17, 24, 1913.

Head pale yellow. Antennae whitish with a few brown dots above near base. Palpi white with a brown outer line from tip to near base of second joint; long, slender, second joint thicker at tip than base of third, third almost as long as second, oblique. Legs white, femora yellow; first two pairs striped with brown excepting tarsi. Spurs long. Thorax and abdomen sulphur yellow, the latter with a faint brown dorsal line.

Primaries sulphur yellow with a small brown spot contiguous to base of cleft. Extreme costa whitish darkened with brown scales from base almost

to cleft and with a small brown dash above base of cleft. These costal marks are not at all conspicuous. First lobe with brown dots well before apex on both margins. Second sometimes with a few brown scales on veins. Fringes tawny gray. Secondaries and their fringes brownish gray, much darker in appearance than primaries. Expanse 24-28 mm.

Distribution: Type locality Goose Lake, Siskiyou Co., Cal., July. We have a long series from Loma Linda, San Bernardino Co., Cal., and a single specimen from Golden, Colo., all July, and the species is in the National Museum from Mont. and N. M.

There are six types in the Cambridge Museum, one ♂ and five without abdomens.

The long palpi, large size and distinctly yellow primaries of this species render it very distinct, but the fact that the costal marks are inconspicuous may be rather misleading in placing it in the proper category of the key, so we have included it in both of the possible groups. We have not, however, actually observed specimens which lack these marks.

The species has been reared by Dyar, who gives the following account of the larva:

"*Larva*.—Thick, flattened, tapering at the ends; feet normal, slender. Head rounded, bilobed, the apex under joint 2, mouth projecting; width about 12 mm.; black, the sutures broadly brown. Body without secondary hairs, the warts low and diffuse; i with three or four, ii with one hair, these warts somewhat approximate; iii with several hairs; a group of six hairs on the subventral fold without wart and a hair posteriorly in line, absent on some segments; several hairs for tubercle vi. Olivaceous green, a broken, broad, sordid white subdorsal line along warts i and ii with four black dots on each segment between in a square, becoming black blotches on the posterior segments. Wart iii pale; spiracles black; skin finely dark granular; cervical shield blackish, hairy; thoracic feet black, the abdominal ones pale. Hair white, minutely glandular tipped; segments obscurely 2-annulate; a black impressed lateral dot in the middle of the segment.

"The larvae were found webbing up the young heads of a wild sunflower, *Helianthus pumilus*, and feeding within the spun mass. They occurred on the foot hills near Boulder Creek Canyon (Colo.). Spun among dead leaves; emerged June 10."

47. OIDAEMATOPHORUS SERENUS Meyrick. Pl. XLIV, fig. 11. Pl. LII, fig. 13.

*Pterophorus serenus* Meyrick, Exot. Microlep. I, 113, 1913.

Id., Wagner's Lep. Cat. pars. 17, 26, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head broadly cream-white between antennae, elsewhere more or less brownish. Antennae white. Palpi whitish, long, slender, third joint almost as long as second but with its base hidden by the prominent terminal scales of the second; outer end of second and entire length of third with a brownish gray stripe outside. The palpi are much like those of *sulphureodactylus*. Legs ochreous whitish, first two pairs suffused with gray-brown on one side. Spurs moderate. Thorax and abdomen pale yellowish, the latter with two subdorsal pure white stripes, visible only in clean specimens, and a slender brown dorsal stripe.

Primaries whitish to creamy or yellowish on inner margin, blending into a deeper dull yellowish suffused with a light gray-brown shade in the costal region; immaculate. Fringes concolorous. Secondaries and fringes gray brown, usually contrastingly dark but occasionally rather light in color. Expanse, 23-35 mm., usually not less than 27 mm.

Distribution: Type locality Gallinas Canyon, N. M. Ariz. and N. M. north into Utah and S. Cal., June to Sept.

The general appearance of the primaries of *screnus* is usually brownish ochreous, more whitish toward inner margin, but fresh specimens in our series show that the basic ground color is clear yellow, though of a duller shade than that found in *sulphureodactylus*. The white stripes of the abdomen are visible only in specimens which are free from grease. We have but one specimen which expands as little as 23 mm., but have no doubt of its identity. Our identification of the species is based on Mr. Meyrick's comparison with his type.

The life history is unknown.

48. *OIDAEMATOPHORUS AUSTRALIS* Grinnell. Pl. XLVI, fig. 20, 21.  
Pl. LIII, fig. 13.

*Pterophorus subochraceus* subsp. *australis* Grinnell, Can. Ent. XL, 318, 1908.

Barnes & McDunnough, Check List 151, 1917.

*Pterophorus subochraceus* Meyrick, Wagner's Lep. Cat. pars 17, 24, 1913  
(in part).

Head white, faintly darkened above and in front. Antennae and palpi whitish, the latter not longer than diameter of eye, slender and oblique. Legs whitish, front and middle tibiae with dark gray-brown stripes. Spurs moderate. Thorax and abdomen yellowish white.

Primaries creamy-whitish along inner margin, usually darkened in the costal region with a shade of pale ochreous; immaculate; evenly suffused on under surface with brownish gray. Fringes concolorous. Secondaries and their fringes whitish, faintly tinged with gray. Expanse 24-30 mm.

Distribution: S. Cal., Utah, Mar., July and Aug. Type locality Santa Ana R., San Bernardino Mts., Cal.

Although described as a subspecies of *subochraceus*, *australis* is very distinct from that insect, and is readily distinguished by the evenly gray under surface of the primaries. The absence of gray from the upper surface of these wings separates it from its nearest ally, *costatus*.

Nothing is known of the early stages.

49. OIDAEMATOPHORUS COSTATUS n. sp. Pl. XLVII, fig. 14. Pl. LIII, fig. 10, 11.

Head pale grayish-yellow, paler between antennae. Antennae and palpi more whitish, the latter moderate, slender, oblique, with a dark streak on outside of third joint and tip of second. Thorax and abdomen pale grayish yellow, the latter with a faint brown dorsal line. Legs similar, the first two pairs, including tarsi, shaded with gray inside.

Primaries yellowish-white, shaded over all with gray, becoming darker and more brownish in costal region. Extreme costa pale grayish yellow. Fringes approximately concolorous. Secondaries and their fringes brownish gray, neither conspicuously darker nor paler than primaries. Expanse 30-33 mm.

Described from seven specimens from the Monachee Meadows, Tulare Co., Cal., 8000 ft., July 8-14.

Holotype ♂, allotype and 3 paratypes, 1 ♂ & 2 ♀, coll. Barnes.

Paratype ♀ U. S. N. M. No. 23481.

Paratype ♀ coll. Meyrick.

We have also a specimen from Vineyard, Utah, taken in August.

*Costatus* is very closely related to *australis*, and we are unable to find superficial characters to separate it with the exception of the grayish primaries, generally darker color, and the stripe on the palpi. Our series is not sufficient to indicate whether or not pale specimens occur which might be confused with Grinnell's species. The genitalia offer an ultimate character in the form of the right valve.

50. OIDAEMATOPHORUS FALSUS n. sp. Pl. XLVI, fig. 17. Pl. LIV, fig. 7.

Entirely chalky white. Palpi rather long, slender, oblique. Primaries with a faint brownish shade in the costal region and sometimes with the entire surface underlain with brownish gray, rarely dark. Secondaries tinged with brownish gray, rather dark in the darker examples. All fringes concolorous. Expanse 22-25.5 mm.

Described from three specimens from Ariz.

Holotype ♂, Tucson, and allotype, Christmas, Gila Co., coll. Barnes.

Paratype ♂, Christmas, Gila Co., U. S. N. M. No. 23482.

We have also two specimens in rather poor condition from Yuma Co., one dated March, the two others from Christmas. The Yuma

Co. specimens are much the darkest, but the holotype shows the grayish underlying shade on the primaries with sufficient distinctness to connect the three, and in its genitalia agrees with the paratype from Christmas. The species is unlike any other known to us. Its life history has not been worked out.

51. *OIDAEMATOPHORUS VARIUS* n. sp. Pl. XLVI, fig. 16. Pl. LII, fig. 11.

Head whitish, faintly touched with brown above. Antennae white usually vaguely brown dotted above. Palpi white with a few dark scales on outside of second joint, moderate, slender, oblique. Legs white, the first two pairs striped with dark brown and the hind pair shaded lightly on one side with grayish. Thorax and abdomen white.

Primaries soft, pale, brownish gray with a variably heavy white overscaling which is slightly thinner on the costa and often appears to be confined to the spaces between the veins on the lobes so that the veins appear to be dark-lined. Fresh specimens show a rather definite band of the white scales entirely around the cleft. Extreme costa darker in basal half. Fringes and secondaries concolorous but without white scales. Expanse 19-23 mm.

Type series seven specimens from San Diego, Cal., Apr. to Aug. and one paratype ♂ from Palm Springs, Riverside Co., Cal., Mar.

Holotype ♂, allotype and 4 paratypes, 3 ♂, 1 ♀, coll. Barnes.

Paratype ♂ U. S. N. M. No. 23485.

Paratype ♂ coll. Meyrick.

We also have specimens from Mohave Co., Ariz., Sept., and Redington, Ariz.

*Varius* does not impress us as a species which is likely to be mixed readily with *falsus*, but it is difficult to select definite and conspicuous characters to distinguish the two. In general *falsus* is much stouter in appearance, and we have seen no specimens in which the costa of the primaries was darkened toward the base nor the antennae dotted above. The latter is not always true of *varius*, but the former appears to be; both characters are very obscure.

We have no notes on the early stages.

52. *OIDAEMATOPHORUS CORVUS* n. sp. Pl. XLII, fig. 17, 18. Pl. LIV, fig. 8.

Head brown, narrowly pale yellow between antennae. Antennae whitish, dotted with brown above. Palpi moderate, slender, oblique, yellowish white with a brown outer line. Legs yellowish white, the first two pairs gray-brown on one side and the hind pair variably shaded in the darker specimens. Thorax and abdomen pale yellow to very pale grayish yellow, the latter with a fine

light brown dorsal line and unusually short, scarcely longer than third feather of secondaries. Thorax yellowish in front in darker specimens and slightly brownish above in the lighter ones.

Primaries clear pale yellow in the lightest specimens, with some brown scales near base, sometimes a small brown dot a short distance before base of cleft, and sometimes a brown subcostal shade which meets the costa in the first lobe. In the type series these wings have a pale yellowish or grayish yellow costal band from base to a point opposite base of cleft, in which the extreme costal margin bears some brown scales. Behind this the entire wing is clothed with brownish gray mixed with very pale yellowish scales, becoming more whitish toward inner margin. The spot before the cleft is faintly marked, continued slightly toward costa to form a transverse shade. Costal fringes on first lobe yellowish, others dark grayish. Secondaries and their fringes brownish gray, in the pale specimens appearing dark in contrast to the yellow primaries. Expanse 17-20 mm.

Holotype, allotype and 11 paratypes, 6 ♂ 5 ♀, from Tuolumne Meadows, Tuolumne Co., Cal., July and Aug. and 7 paratypes, ♂, Deer Park Springs, Lake Tahoe, Cal., June and July. Of the first lot there are a paratype ♂ in the Fernald collection and 2 paratypes, ♂ and ♀, U. S. N. M., No. 23483. Of the second one paratype is in the Cambridge Museum and one in coll. Meyrick. The remaining types are in coll. Barnes.

We have also specimens from Colo., Sept., Wash., July, and B. C., July and August.

The life history is unknown.

53. *OIDAEMATOPHORUS PERDITUS* n. sp. Pl. XLVI, fig. 19. Pl. LII, fig. 10.

Head dark brown, yellowish white between antennae. Antennae dark with a slender line of whitish above. Palpi very slender, moderately long, oblique, whitish. Legs whitish, the first two pairs brownish gray within except toward end of tarsi. Thorax pale yellowish white, the patagia touched with light brown. Abdomen similar to thorax, with some gray scales, and apparently a faint brown dorsal stripe.

Costa of primaries very narrowly yellowish, sometimes obscured toward base. Just inside of this line the wing is brownish gray, becoming gradually paler toward inner margin with an increasing admixture of whitish scales. Veins sometimes darker in second lobe. Fringes brownish gray with paler bases, on costa yellowish. Secondaries and their fringes brownish gray. Expanse 19-25 mm.

Types from Chimney Gulch, Golden, Colo., Aug. (Oslar).

Holotype ♂, allotype and one paratype ♀ coll. Barnes.

Paratype ♀ U. S. N. M. No. 23484.

We have also a single specimen each from Loma Linda, San Bernardino Co., Mar., and San Diego, Cal., Apr., and a small series



from Claremont, Cal. The last is part of a good series found in the National Museum material, for which we are indebted to the Museum authorities.

*Perditus* in a general way resembles *corvus*, but the pale costal line is not interrupted above the base of the cleft, there is no spot before the cleft, and the abdomen is of normal length. It is also similar to *costatus* but so much smaller that it is very easily distinguished. The genitalia are distinctive.

The life history is unknown to us.

54. OIDAEMATOPHORUS INCONDITUS Walsingham. Pl. XLVI, fig. 24.  
Pl. LII, fig. 6.

*Lioptilus inconditus* Walsingham, Pter. Cal. Ore. 44, pl. III, f. 5, 1880.

‡*Alucita incondita* Fernald, Smith's List Lep. N. A. 87, 1891.

*Pterophorus inconditus* Fernald, Pter. N. A. 47, 1898.

Id., Bull. 52 U. S. N. M. 446, 1902.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 24, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head pale brownish above and in front, broadly whitish between antennae. Palpi moderately long, oblique, very slender, whitish. Antennae whitish. Legs whitish, the first two pairs shaded with gray-brown inside.

Primaries yellowish white to very pale brownish gray, always with a darker shade of a more or less brownish color in the costal region. This shade is usually, however, inconspicuous. The veins in the second lobe are often slightly darker than the ground color. Fringes and secondaries very pale brownish gray. Expanse 14-22 mm.

Distribution: S. Tex. and Ariz. north into Utah and Cal., Mar., May, July, Aug., Oct. Type locality Mendocino Co., Cal., May.

We are rather doubtful of this species as we limit it here, but are unable to divide it satisfactorily either by superficial characters or genitalia. We sent Meyrick a rather yellowish specimen, and he returned it with the note: "probably not correct, but there is little to go by, your example being worn; it is rather larger than the two types (which are in very good order), segments of forewings apparently narrower and more pointed, tone of forewings yellower and less grayish; true *inconditus* is very uniform and dull-coloured, wings shorter-looking." Later we were able to compare the paratype ♀ in the Fernald collection with our entire series. Judging by Meyrick's note, this paratype does not differ from the types in the British Museum, and we are able to check the points which he mentions, but

still quite unable to divide our series in a satisfactory way. We must therefore leave the species as a small, variable, pale coloured *Oidaematophorus*, without strict definition. The larger specimens are from Utah, and approach *caudelli* Dyar, but lack the prominently dark-lined veins in the lobes of the primaries.

The life history is unknown.

55. OIDAEMATOPHORUS UNICOLOR Barnes & McDunnough. Pl. XLII, fig. 19.

*Pterophorus unicolor* Barnes & McDunnough, Cont. Nat. Hist. Lep. N. A. II, 185, pl. I, f. 8, 1913.

Id., Check List 151, 1917.

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII 136, 1917.

The species is still known only from the unique type ♀, so we reproduce the original description and notes.

"Primaries pale straw-color, immaculate, slightly tinged with smoky along terminal margins of lobes; first lobe pointed, second lobe rather broad with well defined upper angle. Secondaries pale smoky with lighter silky fringes. Beneath, smoky. Legs pale ochreous, first two pairs blackish inwardly. Expanse 14 mm.

"Habitat. Marco, Fla. (Apr. 24-30). 1 ♀. Type, Coll. Barnes.

"From several larvae, found boring in the stems of the *Eupatorium* species above referred to, we succeeded in breeding this single specimen."

We would call attention to the fact that the type has a brown head with a whitish patch between the antennae, and that vein  $R_5$  and all of those in the second lobe of the primaries are distinctly marked with smoky brown, most heavily in the outer margin. The thorax and abdomen are pale yellowish white, the latter with a dorsal and several ventral and lateral brown stripes. We associate with the type a single other ♀ from St. Petersburg, Fla., Oct., whose expanse is 19 mm., but we are not at all certain of the identity of this specimen.

56. OIDAEMATOPHORUS CAUDELLI Dyar. Pl. XLVI, fig. 23. Pl. LIII, fig. 3.

*Pterophorus caudelli* Dyar, Proc. Ent. Soc. Wash. V, 228, 1903.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 24, 1913.

Barnes & McDunnough, Check List 151, 1917.

Head light brown, yellowish white between the antennae. Palpi moderate, oblique, whitish, slender. Antennae whitish. Legs whitish, the first two pairs shaded with fuscous inside; tibiae of hind legs slightly shaded outside. Thorax and abdomen yellowish white. Abdomen apparently with a few faint brown stripes. We have few specimens in which these can be observed.

Primaries yellowish white with a light brown or gray brown subcostal shade. Veins in paler areas marked with a similar color. Fringes concolorous. Under surface mostly gray-brown, but with the lobes as above, with dark veins. Secondaries and their fringes pale brownish gray. Expanse 20-27 mm.

Distribution: Type locality Williams, Ariz. Miss. to Ariz., north into S. Cal. and Utah. Mar. to May, July, Sept.

Like the related species, *caudelli* seems to be poorly defined. We have only a small series, but it includes a very considerable range of variation in depth of color and prominence of markings. A specimen from Jemez Springs, N. M., is very close to the type, which we have examined, but two others from the same lot diverge, and our Utah specimens approach *australis* Grinn. The genitalia differ from that species, and also from those of *catalinae* Grinnell (*agrophodactylus* Auct. ? Walk.) with which *caudelli* seems also to intergrade in appearance. *Unicolor* B. & McD. may be based on a dwarfed specimen of *caudelli*, but the type and one other ♀ which we refer tentatively to that species have the abdomen more distinctly striped than the series which we are calling *caudelli*.

The life history is unknown.

57. OIDAEMATOPHORUS CATALINAE Grinnell. Pl. XLVI, fig. 22. Pl. LIII, fig. 2.

†*Lioptilus agraphodactylus* Walsingham (? Walker), Pter. Cal. Ore. 46, pl. 111, f. 6, 1880.

‡*Alucita agraphodactyla* Fernald, Smith's List Lep. N. A. 87, 1891

†*Pterophorus agraphodactylus* Fernald, Pter. N. A. 47, 1898.

Id., Bull. 52 U. S. N. M. 445, 1902.

Meyrick, Gen. Ins. C, 16, 1910 (in part).

Id., Wagner's Lep. Cat. pars 17, 24, 1913 (in part).

Barnes & McDunnough, Check List 151, 1917.

*Pterophorus catalinae* Grinnell, Can. Ent. XL, 319, 1908.

Meyrick, Wagner's Lep. Cat. pars 17, 26, 1913.

Barnes & McDunnough, Check List 151, 1917.

This species is so nearly the counterpart of *caudelli* that a description would be mere repetition. We have only six specimens. These average a little larger than *caudelli* and are slightly more yellow, with the brown subcostal shade running back to about the middle of the base of the wing. Just within the costal margin of this shade is a slender line of ground color along the margin of the cell. We should hesitate to regard the two species as distinct but for the fact that the male genitalia differ conspicuously. Our series expands 25-27 mm., the type 28 mm.

Distribution: Type locality Avalon, Santa Catalina Id., Sept. In coll. Barnes S. Cal., June Aug. Walsingham recorded it from S. Oregon, May.

Our data may be regarded as insufficient for dropping *agraphodactylus* from our fauna, and this very probably should not be done. We believe, however, that this name is likely to apply to *caudelli*, rather than to the Californian form, and since we cannot settle the question we prefer to use names of which we can be certain. We submitted a specimen of *catalinac* to Meyrick as *agraphodactylus*, and received the following note in reply: "May be correct, but the type is in poor condition and wanting in definite characters; I think it may be accepted as reasonably likely." The examination of genitalia of West Indian males should settle the question satisfactorily; consideration of superficial characters certainly will not do so, since the type is poor and we are acquainted with two almost indistinguishable species of this immediate group. Grinnell's type is in excellent condition, and is a very well marked example of our west coast species.

58. OIDAEMATOPHORUS ARION n. sp. Pl. XLVI, fig. 18. Pl. I.IV, fig. 3.

Head, thorax and abdomen evenly dotted with brownish gray and white scales. Abdomen with single blackish dorsal dots in hind margins of segments. Antennae with gray-brown and white scales, finely banded. Palpi slender, moderate, drooping in the type but probably oblique in nature; white with gray-brown scales outside. Legs whitish, shaded on one side with fuscous, the hind pair lightly. Tarsi very slenderly dark-annulate at tips of joints.

Costal margin of primaries dark brownish gray, lighter outward with a heavy spot beyond base of cleft. Remainder of wing lighter brownish gray with a superficial vestiture of white scales. There is a small dark dot in the cell and a larger, but still inconspicuous one before the cleft, not touching base of cleft. A few scattered dark scales near inner margin. Fringes rather darker than wing, darkest in cleft, cut by a few white hairs and tufts especially on outer margin of second lobe. Secondaries light brownish gray, fringes concolorous. Expanse 22.5 mm.

Holotype ♂, Palmerlee, Cochise Co., Ariz., coll. Barnes.

We associate with this specimen, with some doubt, a single female from Silverton, Colo., July. This ♀ agrees with the type in most features but the primaries are whiter, with rather plentiful dark irroration streaking them. We should hesitate to name the one specimen but for the peculiar and distinct genitalia. The more salient superficial features are the rather narrow primaries, even color, and

absence of a pale patch between the antennae. The species may be long nearer to the head of the genus with *griescenscens*, but it seems to us to show some relationship with *monodactylus*; rather remote, it is true.

59. OIDAEMATOPHORUS MONODACTYLUS Linnaeus. Pl. XLVI, fig. 13, 14, 15. Pl. LIV, fig. 13.

*Alucita monodactyla* Linnaeus, Syst. Nat. Ed. X, 542, 1758.

Fernald, Smith's List Lep. N. A. 87, 1891.

Meyrick, Handbook 439, 1895.

†*Alucita pterodactyla* Huebner (not Linn.), Samml. Eur. Schmett. pl. 1, i. 4, 1823.

*Pterophorus cineridactylus* Fitch, Trans. N. Y. Agr. Soc. XIV, 848, 1854.

Id., 1st Rept. Ent. N. Y. 144, 1854.

Morris, Cat. Lep. N. A. 54, 1860.

Walker, List Lep. Ins. B. M. XXX, 940, 1864.

*Pterophorus naevosidactylus* Fitch, Trans. N. Y. Agr. Soc. XIV, 849, 1854

Id., 1st Rept. Ent. N. Y. 145, 1854.

Morris, Cat. Lep. N. A. 54, 1860.

Walker, List Lep. Ins. B. M. XXX, 940, 1864.

*Pterophorus pergracilidactylus* Packard, Ann. Lyc. Nat. Hist. N. Y. X, 265, 1873

‡*Pterophorus monodactylus* Zeller, Verh. z.-b. Ges. Wien. XXIII, 326, 1873.

Id., op. cit. XXV, 355, 1875.

Walsingham, Pter. Cal. Ore. 39, pl. II, f. 16, pl. III, f. 1, 1880.

Dimmock, Psyche III, 390, 403, 1882.

Hy. Edwards, Bull. 35 U. S. N. M. 137, 1889.

Hofmann, Deutsch. Pter. 157, 1895 (hiol.).

Fernald, Pter. N. A. 51, pl. 1, pl. II, ff. 3, 4; pl. VII, ff. 1-5, 1898.

Id., Bull. 52 U. S. N. M. 446, 1902.

Dyar, Proc. Ent. Soc. Wash. V, 228, 1903.

B. C. Ent. Soc. Check List 43, 1906.

Meyrick, Gen. Ins. C, 17, 1910.

Winn, List Ins. Que. 86, 1912.

Meyrick, Wagner's Lep. Cat. pars 17, 26, 1913.

Walsingham, Biol. Cent. Am., Lep. Hct. IV, 442, 1915.

Barnes & McDunnough, Check List 151, 1917.

Grossbeck, Bull. Am. Mus. Nat. Hist. XXXVII, 135, 1917.

*Pterophorus monodactyla* Tutt, Pter. Brit. 111, 1896.

*Pterophorus barberi* Dyar, Proc. Ent. Soc. Wash. V, 228, 1903.

Meyrick, Gen. Ins. C, 16, 1910.

Id., Wagner's Lep. Cat. pars 17, 24, 1913.

Barnes & McDunnough, Check List 151, 1917.

*Emmeline monodactyla* Tutt, Ent. Rec. XVII, 37, 1905.

*Pterophorus pictipennis* Grinnell, Can. Ent. XL, 320, 1908.

Meyrick, Wagner's Lep. Cat. pars 17, 25, 1913.

Barnes & McDunnough, Check List 151, 1917

Head very dark brown above, slightly paler in front, much paler between antennae, whose bases are sometimes connected in front of this pale area with a white line. Antennae whitish with brown dots above, sometimes almost completely dark. Palpi small, oblique, whitish, darkened at tips. Thorax white, yellow, tawny, gray, cinnamon or dark brown. Abdomen more or less brownish or grayish, with some dark streaks and dashes, and a narrow dorsal stripe, concolorous with thorax, which widens anteriorly and is sometimes margined with white toward its junction with the thorax. The only features of the legs which need be noted are the slender tufts of the front and middle tibiae and the crest of scales which is usually present on the upper surface of the hind tarsi.

The primaries are narrow, as noted in the key, but have unusually long fringes at the anal angle of the second lobe. The longest of these exceed the width of the lobe. The color of these wings is extremely variable. We have specimens which are yellowish tawny, and others gray or whitish with a few brown scales, cinnamon, and various mixtures of these colors. The costa may have a blackish spot well out toward middle of first lobe, and in the less grayish examples is sprinkled from base to opposite cleft with black and white. There is a black spot before base of cleft sometimes extended to it, a dot in cell, some at tips of veins in both lobes, and some black scales streaking the wing, at least near inner margin. Secondaries and fringes of both wings brownish gray. Expanse 21-27 mm

Distribution: Europe, N. Africa and Asia. N. America from Atlantic to Pacific and from Mexico into southern Canada. March to November, even in the northern part of its range.

The brief European synonymy is taken from Meyrick's writings. The types of *cineridactylus* and *naevosidactylus* are in the Fernald collection, of *pergracilidactylus* in the Cambridge Museum, of *barberi* in the National Museum and of *pictipennis* in the Southwest Museum. We have examined all of these types, and find the first three to be the gray form and the last two rather brownish tawny. The type of *barberi* has no crests on the hind tibiae, but in our series of over a hundred specimens we find this crest in all stages of development.

The species has been reared by numerous entomologists on this continent, but we are forced to reproduce Tutt's descriptions of the larva and pupa, which he quotes from Porcitt and South, as indicated. The recorded food plants known to us are *Convolvulus sepium*, *arvensis*, *major*, *tricolor*, *Chenopodium album*, *Atriplex patula*, *Calluna vulgaris*, *Ipomoea purpurea* and *Eupatorium purpureum*.

Larva: "Length, when at rest, about five-eighths of an inch, and stout in proportion. Head, polished and rather small, narrower than the second segment. Body uniform and cylindrical, tapering a little posteriorly. Segmental divisions, well defined and deeply cut ventrally; each tubercle emits a tuft of short but rather strong hairs. Ground colour, bright yellowish-green, more decidedly green on the back; head, pale yellow; the mandibles light brown. A fine but clear yellowish-white line forms the dorsal stripe; there is a much broader stripe of the same colour along the spiracular region, and the space between it and the spiracles is speckled with streaks and spots of the same colour. Spiracles black, hairs greyish. Ventral surface, legs and pro-legs uniformly pale green." (Porritt, *Entomologist* XV, 90, 91.)

Pupa: "Green at first, afterwards pale dingy-brown, more or less suffused with reddish-brown along the dorsal area. Dorsal and lateral lines interrupted, blackish-brown; warts and hairs as in the larva except that some of the dorsal series are blackish. Head flattened, marked with brown, and thickly covered with short hairs. Wing-cases yellowish-green, faintly streaked with brown. Attached by anal segment to stem of food plant or other object near." (South, *Entomologist* XVIII, 277.)

60. OIDAEMATOPHORUS LONGIFRONS Walsingham. Pl. XLVII, fig. 15.  
Pl. LIV, fig. II.

*Pterophorus longifrons* Walsingham, *Biol. Cent. Am., Lep. Het.* IV, 448, 1915.

Head clothed with white tipped gray scales. Frontal tuft long, conical. There is no frontal prominence within the tuft. Antennae whitish. Palpi long, porrect, about as long as entire head, including tuft, and exceeding front by about length of head; grayish, second joint with rather thick vestiture above. Fore and middle legs white, shaded with brownish gray inside and at tips of tarsal joints. Third pair whitish, lightly shaded with brownish gray. Thorax anteriorly clothed with white tipped, very pale grayish scales, posteriorly with a heavy Y-shaped mark outlined in white, the intermediate space gray-brown. Abdomen brownish gray with the white margins of the Y continued as a broad whitish dorsal stripe containing three gray brown lines, the central one with blackish dots in the posterior margins of the segments. Both legs and abdomen are very long and slender.

Primaries grayish on costa, becoming brownish on inner margin, with scattered black and a few white scales. Continuing from the pale front part of the thorax there is a whitish basal streak. Above base of cleft a whitish costal mark faintly relieves a dark spot following it. There is a black dot near middle of cell, a faint dark spot or a few pale scales at base of cleft in some specimens, and occasionally a few obscure black dots at tips of veins in first lobe. Secondaries and all fringes gray-brown. Expanse 25-28 mm.

Distribution: Mexico. Texas, Mar.; Ariz., June; S. Cal. Sept.

We have fourteen specimens of this species from the states mentioned. Among them we find two forms of genitalia, but we are utterly unable to divide the series by superficial characters, and since

we have no way of determining the genitalic structure of true *longifrons* we prefer to assume, for the present, that this difference is possibly only a variation within the species. We should hardly expect this, but the difference lies in the length of the right harpe only, so the assumption is reasonable. We have made five slides without finding an intermediate, and therefore figure both forms.

The unique type of *longifrons* was taken at Omilteme, Guerrero, Mexico, in July. It is a male, but the abdomen is broken so the form of the genitalia of the species must be decided from topotypical material. Mr. Meyrick compared one of our specimens with the type and pronounced it correctly identified.

The early stages are unknown.

### Genus *Agdistis* Huebner

Haplotype *Alucila adactyla* Hbn.

*Agdistis* Huebner, Verz. Lk. Schmett. 429, 1826.

Zeller, Linn. Ent. VI, 321, 1852.

Meyrick, Trans. Ent. Soc. Lond. 486, 1890.

Tutt, Pter. Brit. 14, 1891.

Meyrick, Handbook 441, 1895.

Hofmann, Deutsch. Pter. 47, 50, 1895.

Tutt, Ent. Rec. XVII, 35, 1905.

Meyrick, Gen. Ins. C, 20, 1910.

Id., Wagner's Lep. Cat. pars 17, 31, 1913.

Barnes & McDunnough, Check List 151, 1917.

*Adactylus* Curtis, Brit. Ent., Lep. II, 471, 1833. Orthotype *adactyla*.

Tutt, Ent. Rec. XVII, 35, 1905. Pseudotype *bennettii* Curt.

§*Agdistes* Westwood, Gen. Syn. 115, 1840. Orthotype *bennettii*.

‡*Adactyla* Zeller, Isis X, 771, 1841.

*Ernestia* Tutt, Brit. Lep. V, 128, 1906. Orthotype *lerinensis* Mill

*Herbertia* Tutt, op. cit. 129. Orthotype *tamaricis* Zell.

Front prominent, smoothly rounded. Ocelli present. Palpi moderate, upturned; second joint with loose vestiture of long scales; third small, ovoid. Primaries entire;  $Cu_2$  from near angle of cell,  $M_3$  and  $Cu_1$  stalked,  $M_2$  to  $R_5$  free, discocellulars obsolete ( $R_1$  to  $R_4$  approximate or connate in other faunae according to Meyrick). Secondaries entire, outer margin sinuate; under surface with pecten of black scales over the usual row of black scales on cubital stem;  $Cu_2$  from middle of cell,  $Cu_1$  well before end of cell, discocellulars and one median faintly indicated,  $M_2$  strong, one radial and S C near costa, R to apex and S C to costa just before apex. Two anals present, obsolescent. (See pl. XLVIII, fig. 10.)



The entire wings segregate our single species of *Agdistis* so conspicuously that no other characters are needed for its identification. The neuration differs in several particulars from that of the genotype.

1. *AGDISTIS AMERICANA* n. sp. Pl. XLII, fig. 20. Pl. LII, fig. 16.  
†*Agdistis adactyla* Dyar (Not Hbn.), Proc. Ent. Soc. Wash. X, 60, 1908.

Barnes & McDunnough, Check List 151, 1917.

Vestiture of head and body of whitish and brownish gray scales, under parts overlaid with white. Abdomen with paired dorsal dots on posterior margins of segments. Legs concolorous, more or less whitish on one side; spurs short.

Primaries with a gray brown, thinly scaled, subtriangular area beginning at basal third of cell and extending to outer margin with limits of cell continued in a sharp line equidistant from inner and costal margins respectively as its boundaries. Remainder of wing with mixed whitish and fuscous scales. There is usually a fuscous spot at apex of thinly scaled triangle, two dots on its hind margin, and several spots in the apical portion of the costa. Fringes grayish white with a dark median line. Secondaries and their fringes similar to triangle, sometimes with a slight "pepper-and-salt" area on outer margin. Fringes with a faint dark line. Expanse 24 mm.

The male genitalia are abundantly distinct from those of the European *adactyla* Hbn.

Described from a long series from San Diego, Cal., taken by Messrs. W. S. Wright and Geo. H. Field, in every month from March to August. The types are as follows:

Holotype ♂, allotype, and 8 paratypes ♂ in coll. Barnes.

Paratype ♂ and paratype ♀ U. S. N. M. No. 23486.

5 paratypes ♂, coll. W. S. Wright.

The greater part of our series is from the collection of W. D. Kearfott, who recognized the distinctness of the species and labelled a type series with the name which we now adopt. We have but one specimen of *adactyla*, a male, which differs from the American species in its more brownish color, more conspicuously white costal fringes on the primaries and white hind tarsi (four distal joints only). The genitalia, as noted, are much different.

The species has apparently not been reared.

## FAMILY ALUCITIDAE

- Phalacnac alucitae* Linnaeus, Syst. Nat. ed. X, I, 542, 1758 (in part).  
*Ripidophorae* Huebner, Tentamen, 1806.  
*Pterophorites* Latreille, Consid. Gen. 370, 1810 (in part).  
*Alucitidae* Samouelle, Ent. Comp. 255, 1819 (in part).  
*Alucitae* Huebner, Verz. bek. Schmett. 428, 1825 (in part. *Multifidac*).  
*Alucitidae* Stephens, Cat. Brit. Ins. II, 229, 1829 (in part).  
 Westwood, Mod. Class. Ins. II, 413, 1840 (in part).  
*Alucitina* Zeller, Isis X, 865, 1841.  
 Wallengren, Skand. Fjäd. 1859.  
 Tutt, Pter. Brit. 155, 1896.  
*Orneodites* Duponchel, Cat. Meth. 384, 1845.  
*Orneodidae* Meyrick, Trans. Ent. Soc. Lond. 483, 1890.  
 Fernald, Smith's List Lep. N. A. 88, 1891.  
 Meyrick, Handbook 441, 1895.  
 Fernald, Pter. N. A. 61, 1898.  
 Id., Bull. 52 U. S. N. M. 448, 1902.  
 Meyrick, Gen. Ins. CVIII, 1910.  
 Id., Wagner's Lep. Cat. pars 17, 40, 1913.  
 Fracker, Class. Lep. Larvae 94, 1915.  
 Barnes & McDunnough, Check List 152, 1917.

Ocelli present. Proboscis well developed. Maxillary palpi not developed in our species. Labial palpi strong. Both primaries and secondaries deeply cleft into six "feathers" each. One vein runs to the tip of each lobe. In the primaries we regard these as  $R_2$ ,  $R_3$ ,  $M_3$ ,  $Cu_1$ ,  $Cu_2$  and A. S C and  $R_1$  are also present, but short. In the secondaries the veins are probably  $R_1$ ,  $R_2$ ,  $M_2$ ,  $Cu_1$ ,  $Cu_2$  and A. S C is present but short. The under surface of the secondaries lacks the black scales which occur in the *Pterophoridae*, and the legs are of normal length; spurs as in *Pterophoridae*.

The family includes four genera, of which only one is represented in our fauna.

Genus *Alucita* Linnaeus

Logotype *Alucita hexadactyla* Linn.

- Alucita* Linnaeus, Syst. Nat. Ed. X, I, 542, 1758.  
 Curtis, Brit. Ent., Lep. II, 695, 1838. Fixes type.  
 Wallengren, Skand. Fjäd. 23, 1859.  
 Tutt, Pter. Brit. 157, 1896.  
*Ornecodes* Latreille, Précis Car. Ins. 148, 1790. Logotype *hexadactyla*.  
 Id., Consid. Gen. 442, 1810. Fixes type.  
 Meyrick, Trans. Ent. Soc. London, 490, 1890.  
 Fernald, Smith's List Lep. N. A. 88, 1891.

Meyrick, Handbook 442, 1895  
 Fernald, Pter. N. A. 61, 1898.  
 Id., Bull. 52 U. S. N. M. 448, 1902.  
 Meyrick, Gen. Ins. CVIII, 2, 1910  
 Id., Wagner's Lep. Cat. pars 17, 40, 1913.  
 Barnes & McDunnough, Check List 152, 1917.

*Euchiradia* Hübner, Verz. bek. Schmett. 431, 1825. Logotype *hexadactyla*.  
 Tutt, Ent. Rec. XVII, 35, 1905.  
 Meyrick, Gen. Ins. CVIII, 2, 1910. Fixes type (under *Ornecodes*).

Characters of the family.

The European writers on whose work the former usage of this genus was based, accepted the restriction to *pentadactylus* by Poda. This is not in accordance with the International Rules. The earliest actual designation of a type which is validated by these rules, is that of Curtis. We accept this fixation.

Only one species has been taken in North America.

1. *ALUCITA MONTANA* Cockerell. Pl. XLII, fig. 2I. Pl. LIV, fig. 10.  
*Alucita hexadactyla* Walsingham (not Linn.), Pter. Cal. Ore. 66, pl. III, f. 16, 1880.

Cockerell, Ent. Mo. Mag. XXV, 213, 1889.

*Alucita montana* Cockerell, Ent. Mo. Mag. XXV, 213, 1889.

*Ornecodes hexadactyla* Fernald (not Linn.), List Lep. N. A. 88, 1891.

Constock, Manual 238, 1895

Fernald, Pter. N. A. 62, 1898 (in part).

Dyar, Ent. Rec. XI, 140, pl. 1, f. 6, 1899.

Fernald, Bull. 52 U. S. N. M. 448, 1902 (in part).

Houghton, Ent. News, XIII, 89, 1902.

Dyar, Proc. U. S. N. M. XXVII, 924, 1904 (biol.).

Meyrick, Gen. Ins. CVIII, 3, 1910 (in part).

Id., Wagner's Lep. Cat. pars 17, 42, 1913 (in part).

Barnes & McDunnough, Check List 152, 1917.

Palpi with second joint heavily scaled, rather triangular, truncate, white above and below, brown on sides. Third upturned, long, slender, brown with white tip and base. Abdomen brown, each segment with white posterior margin. Head, antennae and thorax brown.

The primaries of this species are crossed by a wide median band, margined narrowly with white, which forks on the first two lobes. There is another band nearer the base on the first lobe which is not distinctly marked elsewhere, and an additional subterminal band which is narrower on the first two lobes. Between this and the median band there is a heavy costal spot which does not reach the inner margin of the first lobe. All of these marks are margined with white. The ground color is grayish tawny and the marks very dark brown, as also are the tips of the lobes. Secondaries checkered with dark brown,

tawny and white. Fringes of both wings concolorous with the contiguous parts. Expanse 11-16 mm.

Distribution: Type locality Custer Co., Colo. Ariz. to Vancouver Is., east to Ont. and N. Y., Mar., Apr., June, July.

We have a single specimen of *hexadactyla* kindly supplied by Mr. Busck from the Hofmann collection in the National Museum. This specimen is much lighter and more ochreous in general appearance than our large series of the North American species, and entirely lacks pure white scales. It is otherwise closely related. The genitalia show enough differences, we believe, to warrant the retention of *montana* as a good species, though they are of the same general form. The gnathos is more spatulate in *hexadactyla*, the uncus in our one slide appears to be notched, but without the two small processes which are found in *montana*, and the basal processes on the claspers are much more blunt.

Under the name *hexadactyla* Dr. Dyar published a few notes (Proc. U. S. N. M. XXVII, 924) which indicate that the larva probably mines the leaves of snowberry (*Symphoricarpos* spp.). The European *hexadactyla* lives in the flowers of honeysuckle (*Lonicera*).

The following terms and signs, taken from Van Duzee's "Catalogue of the Hemiptera," are used in this work:

Types of genera are designated as:

Orthotype: type by original designation.

Haplo-type: type by single reference (only included species).

Logotype: type by subsequent designation.

Pseudotype: erroneous type designation.

|| signifies preoccupied names.

† signifies names cited in error.

‡ signifies emendations.

§ signifies clerical errors.

The figures on plates XLI to XLVII inclusive are three times natural size.

In drawing the figures of neuration on plate XLVIII various scales were used to give figures of the same size.

All figures of genitalia, plates XLIX to LIV inclusive, are approximately seventeen times natural size.

## PLATE XLI

1. *Trichoptilus defectalis* Wlk. Chokoloskee, Fla.
2. *Trichoptilus lobidactylus* Fitch. Meach Lake, Ottawa Co., Que.
3. *Trichoptilus californicus* Wlsm. Lakeland, Fla.
4. *Pterophorus periscclidactylus* Fitch. Decatur, Ill.
5. *Pterophorus tenuidactylus* Fitch. New Brighton, Pa.
6. *Pterophorus raptor* Meyr. Chimney Gulch, Golden, Colo.
7. *Pterophorus ningoris* Wlsm. Deer Park Springs, Lake Tahoe, Cal.
8. *Pterophorus delawareicus* Zell. Hot Springs, Green River, Wash.
9. *Platyptilia marmarodactyla* Dyar. San Diego, Cal.
10. *Platyptilia punctidactyla* Haw. Aweme, Man.
11. *Platyptilia punctidactyla* Haw. Crater Lake, Ore.
12. *Platyptilia pica* Wlsm. Wellington, B. C.
13. *Platyptilia acanthodactyla* Hbn. Carmel, Cal.
14. *Platyptilia williamsii* Grin. Alameda Co., Cal.
15. *Platyptilia crenulata* B. & McD. St. Petersburg, Fla.
16. *Platyptilia carolina* Kit "Cotype". Black Mts., N. C.
17. *Platyptilia tessradactyla* Linn. New Brighton, Pa.
18. *Aciptilia walsinghami* Fern. Stockton, Utah.
19. *Psephenophorus belfragci* Fish. Fort Myers, Fla.
20. *Adaina bipunctatus* Moesch. Florida.
21. *Adaina zephyria* n. sp. Paratype ♂. San Diego, Cal.

PLATE XLII



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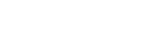
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PLATE XLII

1. *Adaina montana* Wlsm. (N. Y. ? Kellicott).
2. *Adaina montana* form *declivis* Meyr. Colo.
3. *Adaina cinerascens* Wlsm. Verdi, Nevada.
4. *Adaina buscki* n. sp. Allotype ♂. Coconut Grove, Fla.
5. *Adaina ambrosiae* Murt. Pale form. San Diego, Cal.
6. *Adaina ambrosiae* Murt. Dark form. Decatur, Ill.
7. *Marasmarcha pumilio* Zell. Essex Co. Pk., N. J.
8. *Exclastis cervinicolor* B. & McD. Type ♀. Everglade, Fla.
9. *Stenoptilia rhynchosiæ* Dyar. Stemper, Fla.
10. *Stenoptilia mengeli* Fern. Greenland. (Type lot).
11. *Stenoptilia exclamationis* Wlsm. Dark form. Silverton, Colo.
12. *Stenoptilia parva* Wlsm. San Diego, Cal.
13. *Stenoptilia pterodactyla* Linn. European.
14. *Stenoptilia exclamationis* Wlsm. Light form.
15. *Stenoptilia pallistriga* B. & McD. St. Petersburg, Fla.
16. *Stenoptilia zophodactyla* Dup. San Diego, Cal.
17. *Oidacmatophorus corvus* n. sp. Pale form. Victoria, B. C.
18. *Oidacmatophorus corvus* n. sp. Gray form. Paratype ♀. Tuolumne Meadows, Tuolumne Co., Cal.
19. *Oidacmatophorus unicolor* B. & McD. Type ♀. Marco, Fla.
20. *Agdistis americana* n. sp. Paratype ♂. San Diego, Cal.
21. *Alucita montana* Ckll. "St. Cruz Mts., Cal."

PLATE VIII



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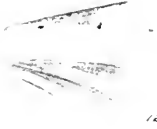
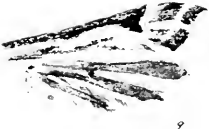
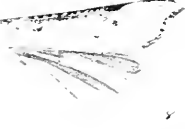
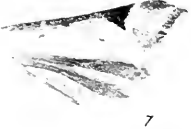




## PLATE XLIII

1. *Platyptilia carduidactyla* Riley. Decatur, Ill.
2. *Platyptilia percnodactyla* Wlsm. Castle Lake, Siskiyou Co., Cal.
3. *Platyptilia rhododactyla* D. & S. European.
4. *Platyptilia orthocarpi* Wlsm. B. C.
5. *Platyptilia fragilis* Wlsm. Deer Park Springs, Lake Tahoe, Cal.
6. *Platyptilia albida* Wlsm. Monache Meadows, Tulare Co., Cal.
7. *Platyptilia shastae* Wlsm. Shasta Retreat, Siskiyou Co., Cal.
8. *Platyptilia maca* n. sp. Paratype ♂. Tuolumne Meadows, Tuolumne Co., Cal.
9. *Platyptilia albidorsella* Wlsm. San Diego, Cal.
10. *Platyptilia albiciliata* Wlsm. Wellington, B. C.
11. *Platyptilia albicans* Fish. Verdi, Nevada.
12. *Platyptilia modesta* Wlsm. Huachuca Mts., Ariz.

PLATE XIII





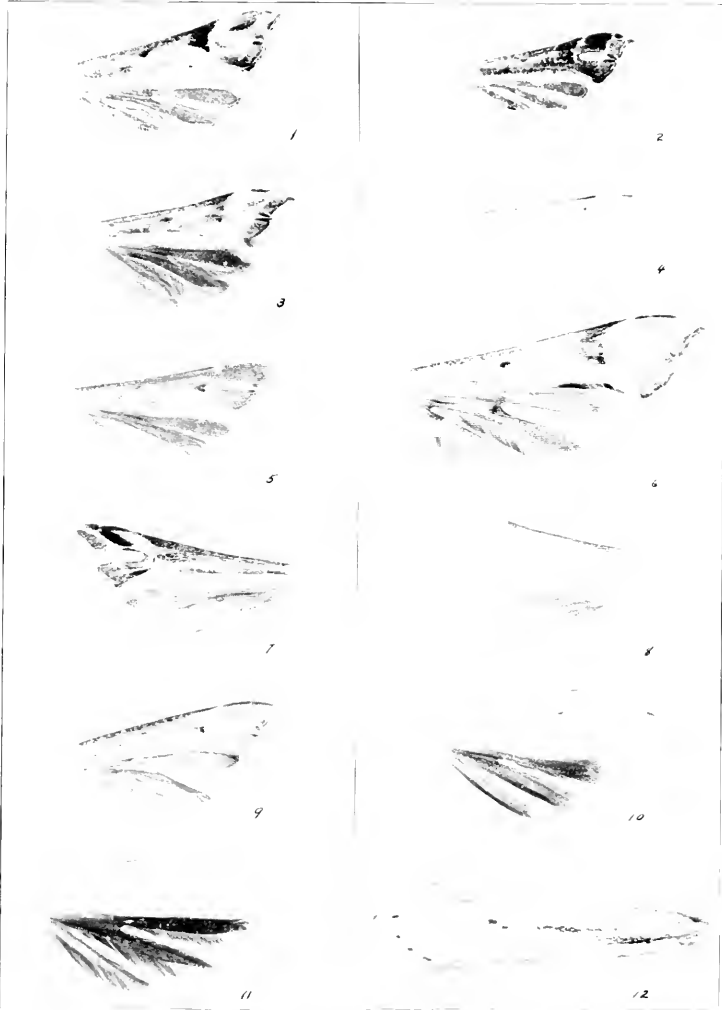




## PLATE XLIV

1. *Platyptilia edwardsii* Fish. Durham, N. H.
2. *Platyptilia auriga* n. sp. Paratype ♀. Essex Co. Park, N. J.
3. *Platyptilia pallidactyla* Haw. Normal. Decatur, Ill.
4. *Platyptilia pallidactyla* Haw. Pale form. Silverton, Colo.
5. *Platyptilia xylopsamma* Meyr. Stockton, Utah.
6. *Platyptilia grandis* Wlsm. Shasta Retreat, Siskiyou Co., Cal.
7. *Platyptilia petrodactyla* Wlk. Dawson, Alaska.
8. *Platyptilia albertae* n. sp. Holotype ♀. Laggan, Alta.
9. *Platyptilia coolcyi* Fern. Silverton, Colo.
10. *Oidaematophorus sulphureodactylus* Pack. Loma Linda, Cal.
11. *Oidaematophorus serenus* Meyr. Paradise, Cochise Co., Ariz.
12. *Oidaematophorus balanotes* Meyr. St. Petersburg, Fla.

PLATE XLIV



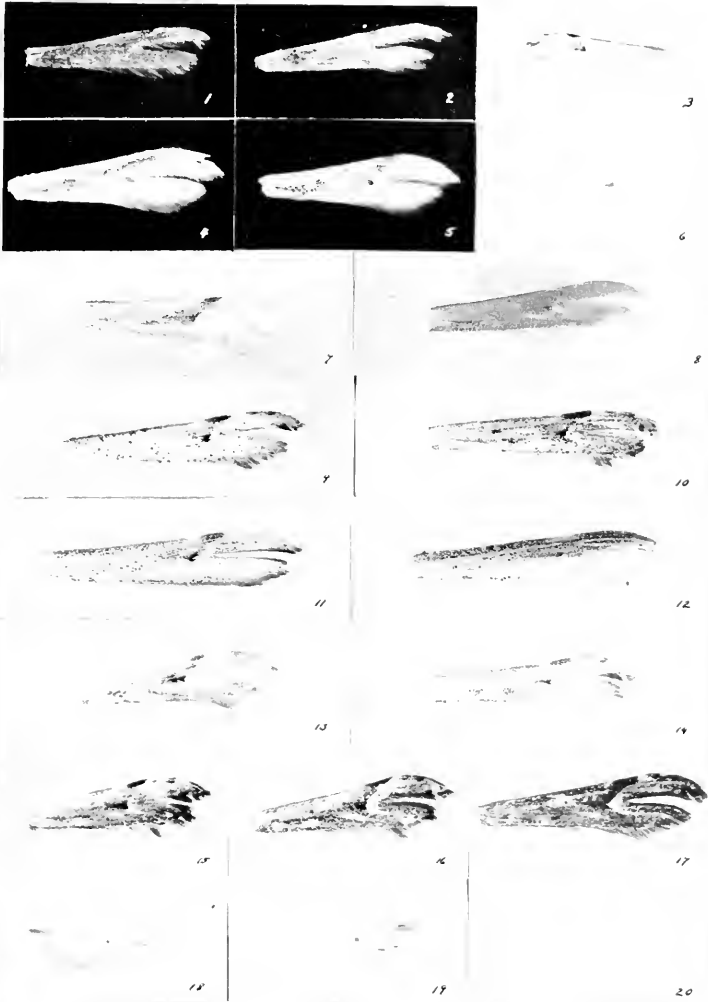




## PLATE XLV

- 1 *Oidacmatophorus fishii* Fern. ♂ Chiricahua Mts., Cochise Co., Ariz.
- 2 *Oidacmatophorus fishii* Fern. ♀ San Bernardino Mts., Cal.
- 3 *Oidacmatophorus tinctus* Wlsm. Paradise, Cochise Co., Ariz.
- 4 *Oidacmatophorus homodactylus* Wlk. Chelsea, Quebec.
- 5 *Oidacmatophorus allottii* Fern. Chelsea, Quebec.
- 6 *Oidacmatophorus paluccus* Zell. Decatur, Ill.
- 7 *Oidacmatophorus occidentalis* Wlsm. Normal form. Hereford, Ariz.
- 8 *Oidacmatophorus occidentalis* Wlsm. Dark form. Monache Meadows,  
Tulare Co., Cal.
- 9 *Oidacmatophorus cineraceus* Fish. Light form. Wellington, B. C.
- 10 *Oidacmatophorus cineraceus* Fish. Dark form. Malahat, B. C.
- 11 *Oidacmatophorus rileyi* Fern. Deer Park Springs, Lake Tahoe, Cal.
- 12 *Oidacmatophorus baroni* Fish. Mills College, Alameda Co., Cal.
- 13 *Oidacmatophorus creditadylus* Fitch. Essex Co. Park, N. J.
- 14 *Oidacmatophorus mathewianus* Zell. Camp Baldy, San Bernardino Mts.,  
Cal.
- 15 *Oidacmatophorus cupaterii* Fern. Decatur, Ill.
- 16 *Oidacmatophorus guttatus* Wlsm. Stockton, Utah.
- 17 *Oidacmatophorus alaskensis* n. sp. Paratype ♂. Ruby, Alaska.
- 18 *Oidacmatophorus stramineus* Wlsm. Awome, Man.
- 19 *Oidacmatophorus crenipunctus* B. & L. San Benito, Tex.
- 20 *Oidacmatophorus luteolus* n. sp. Holotype ♂. Paradise, Cochise Co., Ariz.

PLATE XLV





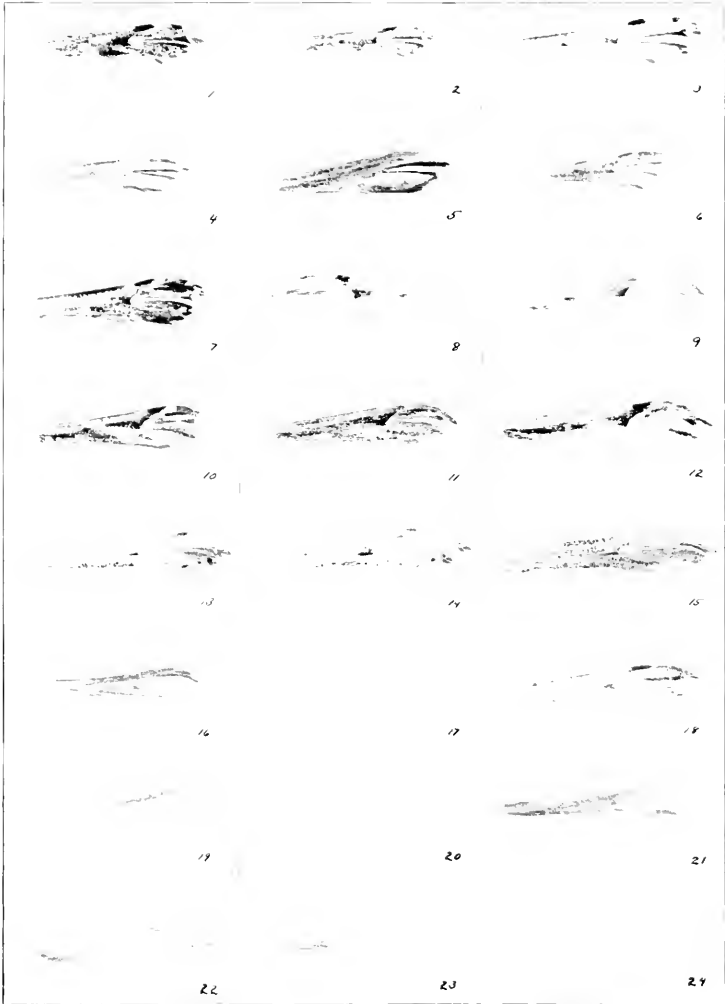




## PLATE XLVI

1. *Oidaematophorus inquinatus* Zell. Denver, Colo.
2. *Oidaematophorus cros* n. sp. Paratype ♂. Mohave Co., Ariz.
3. *Oidaematophorus pan* n. sp. Paratype ♀. Palm Springs, Riverside Co., Cal.
4. *Oidaematophorus triton* n. sp. Holotype ♂. Palmerlee, Ariz.
5. *Oidaematophorus phoebus* n. sp. Paratype. Carmel, Cal.
6. *Oidaematophorus integratus* Meyr. Palmerlee, Ariz.
7. *Oidaematophorus auster* n. sp. Holotype ♂. Mohave Co., Ariz.
8. *Oidaematophorus brucei* Fern. Aweme, Man.
9. *Oidaematophorus citrites* Meyr. Boulder, Colo.
10. *Oidaematophorus meyericki* n. sp. Paratype ♂. San Diego, Cal.
11. *Oidaematophorus graciosus* Fish. Carmel, Cal.
12. *Oidaematophorus fieldi* Wright. "Cotype" ♀. San Diego, Cal.
13. *Oidaematophorus monodactylus* Linn. Grey form. Loma Linda, Cal.
14. *Oidaematophorus monodactylus* Linn. Irrorate form. Winnipeg, Man.
15. *Oidaematophorus monodactylus* Linn. Brown form. Palo Alto, Cal.
16. *Oidaematophorus varius* n. sp. Paratype ♂. San Diego, Cal.
17. *Oidaematophorus falsus* n. sp. Holotype ♂. Tucson, Ariz.
18. *Oidaematophorus arion* n. sp. Holotype ♂. Palmerlee, Ariz.
19. *Oidaematophorus perditus* n. sp. Allotype ♀. Chimney Gulch, Golden, Colo.
20. *Oidaematophorus australis* Grin. Upper surface. Santa Ana R., San Bernardino Mts., Cal.
21. *Oidaematophorus australis* Grin. Lower surface.
22. *Oidaematophorus catalinae* Grin. San Diego, Cal.
23. *Oidaematophorus candelli* Dyar. Jemez Springs, N. M.
24. *Oidaematophorus inconditus* Wlsm. San Diego, Cal.

PLATE XLVI







## PLATE XLVII

1. *Oidaematophorus medius* n. sp. Allotype ♀. Brownsville, Tex.
2. *Oidaematophorus linus* n. sp. Holotype ♂. New Brighton, Pa.
3. *Oidaematophorus cadmus* n. sp. Holotype ♂. Palmerlee, Ariz.
4. *Oidaematophorus helianthi* Wlsm. Tuolumne Meadows, Cal.
5. *Oidaematophorus kellicottii* Fish. Anglesea, N. J.
6. *Oidaematophorus lacteodactylus* Cham. Greenwood Lake, N. J.
7. *Oidaematophorus grandis* Fish. Carmel, Cal.
8. *Oidaematophorus subochraceus* Wlsm. Upper surface. Camp Baldy, San Bernardino Mts., Cal.
9. *Oidaematophorus subochraceus* Wlsm. Lower surface.
10. *Oidaematophorus castor*, n. sp. Holotype ♂. Redington, Ariz.
11. *Oidaematophorus pollux* n. sp. Holotype ♂. Paradise, Cochise Co., Ariz.
12. *Oidaematophorus mizar* n. sp. Allotype ♀. Palmerlee, Ariz.
13. *Oidaematophorus griseus* Wlsm. Loma Linda, San Bernardino Co., Cal.
14. *Oidaematophorus costatus* n. sp. Paratype ♂. Monache Meadows, Tulare Co., Cal.
15. *Oidaematophorus longifrons* Wlsm. Palmerlee, Cochise Co., Ariz.
16. *Oidaematophorus iobates* n. sp. Allotype ♀. En route Dewey to Salome, Ariz.
17. *Oidaematophorus cochise* n. sp. Holotype ♂. Palmerlee, Cochise Co., Ariz.
18. *Oidaematophorus arcs* n. sp. Holotype ♀. Stockton, Utah.

PLATE XLVII



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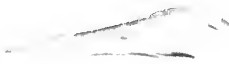
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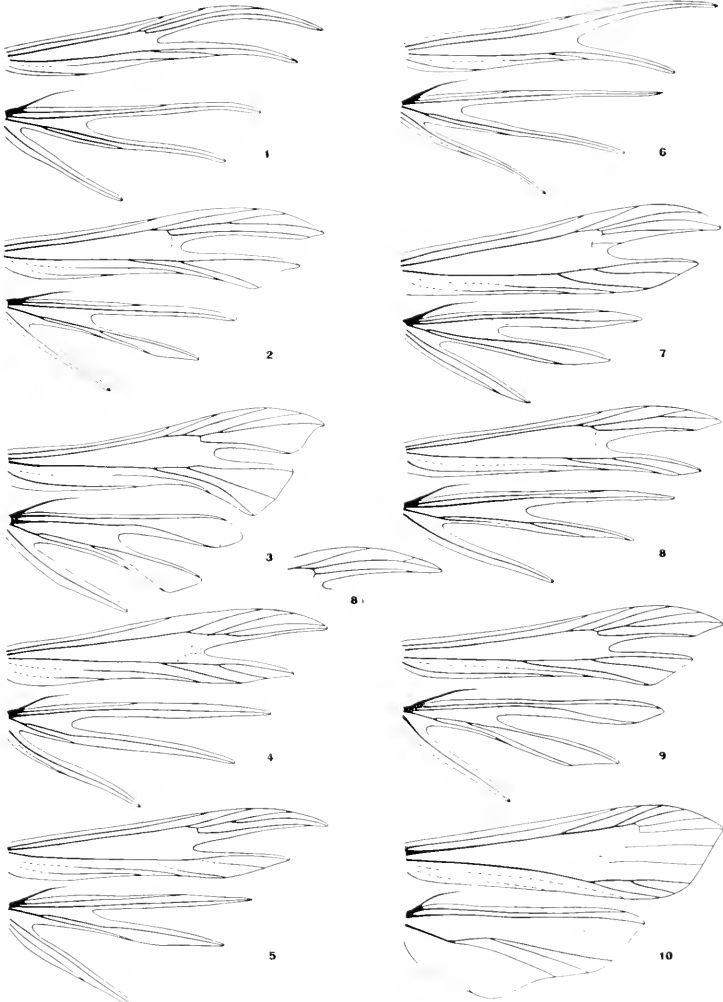


## PLATE XLVIII

## Neuration

1. *Trichoptilus lobidactylus* Fitch.
2. *Pterophorus periscelidactylus* Fitch.
3. *Platyptilia carduidactyla* Riley.
4. *Pschnophorus belfragci* Fish.
5. *Adaina zephyria* B. & L.
6. *Aciptilia walsinghami* Fern.
7. *Oidacmatophorus lithodactylus* Tr. (genotype).
8. *Marasmarcha pumilio* Zell.  
8a. *Exclastis cervinicolor* B. & McD., first lobe of primary.
9. *Stenoptilia pterodactyla* Linn. (genotype).
10. *Agdistis americana* B. & L.

PLATE XLIII



A. W. Landsey, del.



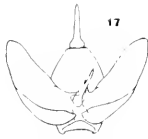
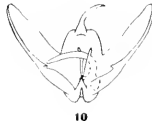
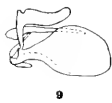
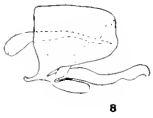
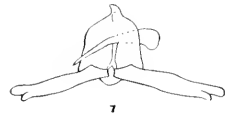
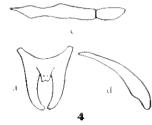
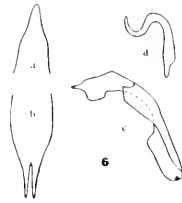
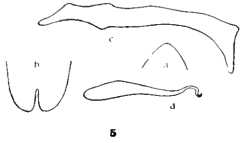
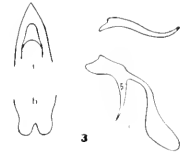
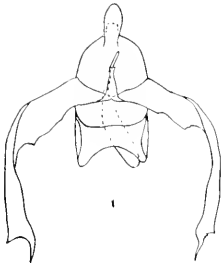


## PLATE XLIX

a. uncus. b. ventral plate. c. right valve. d. oedeagus.

1. *Pterophorus tenuidactylus* Fitch.
2. *P. cygnus* B. & L., holotype.
3. *P. raptor* Meyr.
4. *P. delawarensis* Zell.
5. *P. periscelidactylus* Fitch.
6. *P. ningoris* Wlsm.
7. *Trichoptilus lobidactylus* Fitch.
8. *T. californicus* Wlsm., lateral aspect.
9. *T. defectalis* Wlk., lateral aspect.
10. *Stenoptilia parva* Wlsm.
11. *S. exclamationis* Wlsm., right valve.
12. *Exclastis cerzincolor* B. & McD., right valve.
13. *Marasmarcha pumilio* Zell.
14. *Stenoptilia rhynchosiae* Dyar.
15. *S. zophodactyla* Dup.
16. *S. mengeli* Fern., right valve.
17. *Aciptilia walsinghamsi* Fern.
18. *Adaina bipunctata* Moesch.
19. *Psechnophorus bolfragei* Fish.
20. *Adaina zephyria* B. & L.

PLATE XLIX







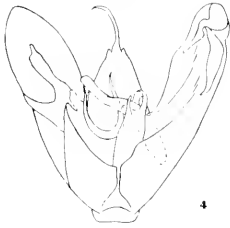


## PLATE L

## Male genitalia

1. *Adaina buscki* B. & L., holotype.
2. *A. montana declivis* Meyr.
3. *A. cinerascens* Wlsm
4. *A. ambrosiae* Murt.
5. *Platyptilia crenulata* B. & McD.
6. *P. albertae* B. & L., uncus and right valve of allotype.
7. *P. modesta* Wlsm.
8. *P. tesseraedactyla* Linn.
9. *Stenoptilia pterodactyla* Linn.
10. *Platyptilia marmarodactyla* Dyar.
11. *P. pallidactyla* Haw.
12. *P. albicans* Fish, left valve and uncus.
13. *P. punctidactyla* Haw. a. lateral aspect of uncus. u. uncus of *acanthodactyla* Hbn.
14. *P. perenodactyla* Wlsm.
15. *P. carolina* Kearf., cotype. u. uncus of *albiciliata* Wlsm.
16. *Stenoptilia pallistriga* B. & McD., right valve of holotype.

PLATE I.





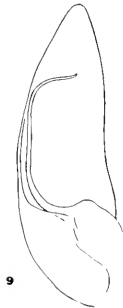
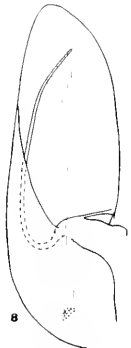
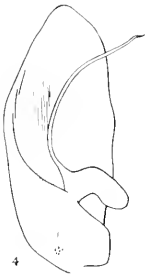
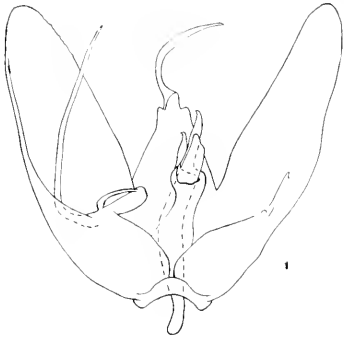


## PLATE LI

## Male genitalia

1. *Oidacmatophorus occidentalis* Wlsm.
2. *O. crettdactylus* Fitch, left valve.
3. *O. mathezianus* Zell., left valve.
4. *O. eupatorii* Fern., left valve.
5. *O. guttatus* Wlsm., left valve.
6. *O. alaskensis* B. & L., paratype, left valve.
7. *O. rilcyi* Fern., left valve.
8. *O. castor* B. & L., holotype, left valve.
9. *O. inquinatus* Zell., left valve.
10. *O. pan* B. & L., left valve.
11. *O. eros* B. & L., paratype, left valve.
12. *O. fulcaceus* Zell., left valve.

PLATE LI



A. W. Lindsey, del.







## PLATE LII

## Male genitalia

1. *Oidaematophorus poilux* B. & L., paratype, left valve.
2. *O. nizar* B. & L., holotype.
3. *O. tinctus* Wlsm., left valve.
4. *O. medius* B. & L., holotype, left valve.
5. *O. cadmus* B. & L., paratype, left valve.
6. *O. inconditus* Wlsm., left valve.
7. *O. integratus* Meyr., left valve.
8. *O. auster* B. & L., holotype, left valve.
9. *O. linus* B. & L., paratype, left valve.
10. *O. perditus* B. & L., holotype, left valve.
11. *O. varius* B. & L., holotype, left valve.
12. *O. helianthi* Wlsm., left valve.
13. *O. serenus* Meyr., left valve.
14. *O. brucci* Fern., left valve.
15. *O. phoebus* B. & L., holotype, left valve.
16. *Agdistis americana* B. & L., left valve.

PLATE LII



A. W. Lindsey, del.





## PLATE LIII

## Male genitalia

- 1 *Didacnophorus aris* B. & L., left valve of allotype.
- 2 *O. catalinae* Gim., from specimen compared with type.
- 3 *O. caudelli* Dyar.
- 4 *O. cochise* B. & L., holotype.
- 5 *O. homodactylus* Wlsm., left valve.
- 6 *O. stramineus* Wlsm., left valve.
- 7 *O. fishi* Fern., left valve.
- 8 *O. subochraceus* Wlsm., left valve.
- 9 *O. sulphureodactylus* Pack., left valve.
- 10 *O. costatus* B. & L., left valve of holotype.
- 11 *O. costatus* B. & L., right valve of holotype.
- 12 *O. grandis* Fish., left valve.
- 13 *O. australis* Gim.

PLATE LIII



A. W. Lindsey, del.







## PLATE LIV

## Male genitalia

- 1 *Oidacmatophorus meyricki* B. & L.
- 2 *O. lacteodactylus* Cham, left valve.
- 3 *O. arion* B. & L., holotype, left valve.
- 4 *O. griseescens* Wlsm., left valve.
- 5 *O. balanotus* Meyr., left valve.
- 6 *O. venapunctus* B. & L., paratype, left valve.
- 7 *O. falsus* B. & L., holotype, left valve.
- 8 *O. corvus* B. & L., paratype, left valve.
- 9 *O. hirculus* B. & L., paratype, left valve.
  - a. harpe of New Mexican specimen.
- 10 *Alucita montana* Ckll.
- 11 *Oidacmatophorus longifrons* Wlsm.
  - a. harpe of genitalie form.
- 12 *O. iobates* B. & L., paratype, left valve.
- 13 *O. monodactylus* Linn.

PLATE LIX



A. W. Lambsey, del.







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Families, genera, species, synonyms of genera and species, species cited in error and emendations which involve a considerable change of spelling are included in this index. Typographical or clerical errors and emendations involving only gender are omitted.

Those specific names which are treated as valid in this revision are listed under the genera to which they are referred, as well as in the general alphabetic index.

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