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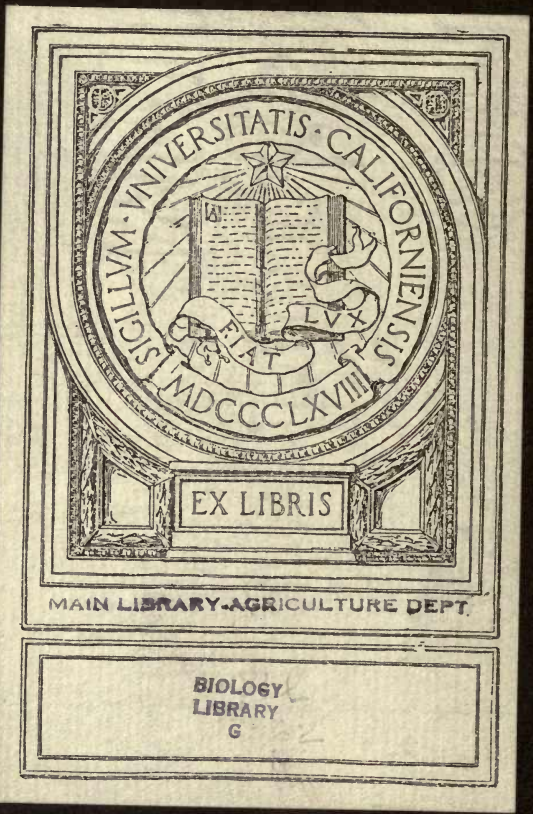

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THE PTEROPHORIDÆ

OF NORTH AMERICA.

C. H. FERNALD, A.M., PH.D.

REVISED EDITION.

July 30, 1898.

UNIV. OF ILLINOIS

SPECIAL BULLETIN.

HATCH EXPERIMENT STATION

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE.

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THE PTEROPHORIDÆ OF NORTH AMERICA.

The species of moths taken up in this work are known by the common names of plume-moths and feather-wings. They have been studied but very little, and our knowledge of the early stages and habits of a large proportion of our native American species is very imperfect, but it is hoped that our entomologists will give more attention to them hereafter.

Geographical Distribution.

The Pterophoridæ are distributed very widely over the globe, but appear to be most numerous in the temperate regions, particularly in Europe, North America and Australia; yet, when other parts of the globe have been as carefully explored, it is probable that many additional species will be discovered, and that they may be more evenly distributed than at present appears to be the case.

Geological Distribution.

I am indebted to Mr. S. H. Scudder, our highest authority on fossil insects, for the information that no Pterophoridæ have yet been recognized among the fossils, not even in amber.

Economic Importance.

A few species of the Pterophoridæ are injurious to plants of economic importance, and the larvæ of several others feed on plants raised for ornamental purposes or for flowers.

Natural Enemies.

While it is probable that the species of this family are preyed upon not only by insect enemies but also by birds, yet I have been able to find but few recorded observations with regard to them. Ashmead has described *Pimpla pterophori* and *Limneria pterophoræ* from Pterophorids in California, and the latter species has also been taken in Texas. Prof. Kellicott bred *Ichneumon humilis* Prov. from *Platyptilia carduidactyla*.

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History.

Linnæus, in the tenth edition of his "Systema Naturæ," Vol. 1, page 542, published in 1758, established the genus *Alucita* for the plume-moths with the following six species under it in order: *monodactyla*, *didactyla*, *tridactyla*, *tetradactyla*, *pentadactyla* and *hexadactyla*, — all placed under the heading Alucitæ. Some of these insects had been figured and described more or less fully by authors previous to the time of Linnæus, as Aldrovandus, 1602; Madam Merian, 1679; Petiver, 1702; Ray, 1710; Frisch, 1721; Reaumur, 1736; and Rosel, 1746; but, as Linnæus in the above work first consistently used the binomial nomenclature, it has been decided almost universally by zoölogists to adopt this edition of the "Systema Naturæ" as the starting-point in zoölogical nomenclature.

In 1761, Poda published his "Insecta Musei Graecencis," in which, on page 94, he adopted the generic name *Alucita* with *pentadactyla* L. the only species under it, and this species is therefore regarded as the type of the genus *Alucita* by Lord Walsingham and other eminent authorities. Geoffroy, in 1762, published the first edition of his "Histoire abrégée des Insectes," in two volumes. In the second volume this author, rejecting the genus *Alucita* of Linnæus, established the genus *Pterophorus*, a name which he stated was given to these insects by some naturalist in former times, and placed under it *pentadactyla* L. *didactyla* L. and *hexadactyla* L. From his description of *didactyla*, there can be no doubt that, instead of this species, he had *monodactyla* L. before him, and therefore we must consider *didactyla* Geoff. the same as *monodactyla* L. As Poda had already used *pentadactyla* as the type of *Alucita*, only the species *monodactyla* L. and *hexadactyla* L. could be considered as belonging under *Pterophorus*.

Scopoli, in his "Entomologia Carniolica," published in 1762, gives five species of plume-moths under Phalæna, which he appears to have used in a generic sense. In 1775, Fabricius, in his "Systema Entomologiæ," page 667, very improperly made use of the genus *Alucita* for *xylostella* L. and nineteen other Tineids, and followed Geoffroy in using *Pterophorus* for the plume-moths. This use of these generic names he continued through all his writings. The authors of the "Systematische Verzeichniss der Schmetterlinge der Wienergegend," 1776, page 144, adopted the genus *Alucita* in the strict Linnæan sense.

Latreille, in his "Precis des Caracteres generique des Insectes,"

published in 1796, page 148, separated *hexadactyla* from the group and established for it the genus *Orneodes*, but retained the rest of the plume-moths under Pterophorus. Latreille repeated this use of these generic names in his "Histoire naturelle des Crustaces et Insectes," Vol. XIV., page 255 (1805), and used the generic name *Alucita* in the Fabrician sense. This action of Latreille in removing *hexadactylus* from *Pterophorus* left only the species *monodactylus* L. under it which must now be regarded as the type, while *Orneodes* must be recognized with *hexadactyla* L. as the type.

In 1806, Hübner published his "Tentamen," in which these insects are placed in Phalanx 9; Alucitæ, in Tribus 1: *indubitate*. There are two divisions under this, the first of which is Pterophoræ with *Pterophora pentadactyla*, and the second is Ripidophoræ with *Ripidophora hexadactyla*. The "Tentamen" has caused a great deal of controversy as to whether it was a true publication, and whether its generic names should be recognized. No question can arise in case of the plume-moths, as Poda had long before adopted *pentadactyla* as the type of *Alucita*, and Latreille had very properly separated *hexadactyla* from the group and established for it the genus *Orneodes*. Schrank, in the second part of Vol. II. of his "Fauna Boica" (1802), page 139, adopted the Linnæan genus *Alucita* for these insects.

In 1811, Haworth published the third part of his "Lepidoptera Britannica," in which he adopted the genus *Alucita* in the Linnæan sense for the plume-moths. In 1815, Leach published his article "Entomology" in the "Edinburgh Encyclopædia," in which, under Tribe VII, Alucitides, the genus *Pterophorus* Geoff. is adopted with *pentadactylus* and *didactylus* under it, and the genus *Alucita* with *hexadactyla* under it. In 1819, Samouelle published his "Entomologist's Useful Compendium," in which he adopted the classification of Leach.

Hübner, in his "Verzeichniss bekannter Schmetterlinge," adopted the term Alucitæ for his ninth phalanx, the plume-moths. This part of the "Verzeichniss" was published between Aug. 27, 1825, and the time of Hübner's death, which occurred Sept. 13, 1826. This author divided these insects into three tribes: the first including those with unfissured wings, for which he established the genus *Agdistis;* the second with those having one fissure in the fore wings and two in the hind wings. This tribe was further divided into two families, each containing two genera. The first family, Obtusæ, contained the genera *Platyptilia* and *Amblyptilia*, and the second family, Cuspides, contained the

genera *Stenoptilia* and *Aciptilia*. The third tribe included those species in which each wing is divided into six parts, and these were all placed under the genus *Euchiradia*, which is of course synonymous with *Orneodes*.

In 1827, Curtis published Vol. IV. of his "British Entomology," in which he adopted the genus *Pterophorus* and names *pentadactyla* L. as the type. In Vol. X. of the same work (1833), he established the genus *Adactylus* with *adactyla* Hüb. for the type. In Vol. XV., published in 1838, he adopted the genus *Alucita* and named *hexadactyla* as the type. Curtis, in 1829, in his "Guide to an arrangement of the British insects," had taken the genus *Adactylus* for the species with undivided wings, *Alucita* for "*hexadactyla* and its allies" and *Pterophorus* for the remainder. In the same year Stephens published his "Catalogue of British insects," in which he adopted the genus *Agdistis* Hüb. for the species with undivided wings, and *Pterophorus* and *Alucita* in the same sense as Curtis had used them. This same classification was used by Stephens in 1834, in his "Illustrations of British Entomology."

Treitschke, in Vol. IX., Part 2, of his "Schmetterlinge von Europa," published in 1833, adopted the generic name *Alucita* for the species placed by Stephens under *Agdistis* and *Pterophorus*, while he used *Orneodes* for *hexadactylus* and its allies. In 1836, Duponchel, in his "Histoire naturelle des Lepidopteres," Vol. IX., adopted the classification of Latreille, but in his "Catalogue Methodique," published in 1844, he used the genus *Adactyla* Zell. for *hübneri* Curt., *Orneodes*, for *hexadactyla* and its allies, and *Pterophorus* for the remaining species. Westwood, in Vol. I. of his "Classification of insects," page 115, published in 1839, adopted the classification of Stephens.

Zeller, in 1841, published his monograph of the plume-moths in "Isis," Vol. X. This author adopted the name *Pterophoridæ* for the group, and divided them into the *Pterophoridæ proprii*, and *Alucitina*. Under the first division he established the genus *Adactyla*, apparently unconscious of the fact that Curtis had already used the same name. Under this same division Zeller adopted the genus *Pterophorus* Geoff., which he divided into groups or subgenera as follows: *Platyptilus* (*Platyptilia* Hüb.), *Oxyptilus* (*Amblyptilia* Hüb.), *Pterophorus* (*Stenoptilia* Hüb.), *Aciptilus* (*Aciptilia* Hüb.). The division *Alucitina* contained the genus *Alucita* with *hexadactyla* and allies under it. In 1852, Zeller published his "Revision of the Pterophoridæ" in "Linnæa Entomologia," Vol.

VI., page 319, in which he sinks his genus *Adactyla* and adopts Hübner's *Agdistis*, and establishes the genus *Deuterocopus* for the species *tengstrœmi* of Java.

In 1840, Zetterstedt, in his "Insecta Laponica," placed all his plume-moths under the genus *Alucita*, but in a note refers to *Orneodes hexadactyla* indicating his adoption of this generic name. Herrich-Schæffer, in his "Schmetterlinge von Europa," Vol. V., published in 1853–55, follows the classification of Zeller. Stainton, in his "Manual of British Butterflies and Moths" (1859), adopted the generic name *Adactyla* for *bennetii*, *Pterophorus* for *rhododactylus* and its allies and *Alucita* for *polydactyla*.

In 1859, Wallengren published his work on the Scandinavian plume-moths, which, like Zeller's works, marked an era in the classification of these insects. Wallengren followed Zeller in dividing them into the *Pterophoridæ* and *Alucitina*, under the first of which he established four new genera, and used, in addition to these, five genera established by earlier authors. Under *Alucitina* he adopted the genus *Alucita* for *hexadactyla*.

In 1864, Walker published Part 30 of his "List of the Lepidopterous Insects in the British Museum," in which he refers to all the described species of the plume-moths, and added thirty-five new species and two new genera founded on new species from Ega, South America. In this work Walker followed the classification of Zeller.

In 1869, Dr. Jordan, in the "Entomologist's Monthly Magazine," Vol. VI., pages 119 and 149, gave a review of Wallengren's work, referred to above, which contains valuable information. Mr. South has given a most interesting and valuable series of illustrated papers on the early stages, habits and food plants of the British plume-moths in the "Entomologist," Vol. XIV. and following volumes. Tutt's "Monograph of the Pterophorina of Britain" is also a valuable paper on the British plume-moths. In 1877, Dr. Wocke, in "Die Schmetterlinge Deutschlands und der Schweiz," Vol. II., Part 2, followed very closely the classification of Wallengren. In 1886, Leech, in his British Pyralides," including the Pterophoridæ published in 1886, uses the super-family Pterophori with the families *Pterophoridæ* and *Alucitidæ* under it.

Meyrick, in his paper "On the Classification of the Pyralidina of the European Fauna," published in 1890, in the "Transactions of the Entomological Society of London," placed these insects as families under the super-family Pyralidina. Mr. Meyrick had already made critical studies on these insects in his researches on

the Lepidoptera of Australia and New Zealand, and in the paper above referred to he gave most excellent characters to the families and genera. He adopted the family names *Pterophoridæ* and *Orneodidæ* with the genus *Orneodes* under the last for *hexadactyla* and its allies. In his "Handbook of British Lepidoptera" (1895), Meyrick retains substantially the same classification. The latest and one of the most valuable works that I have seen is "Die deutschen Pterophoriden" by Dr. O. Hofmann (1895). In this work we are given for the first time a very good account of the genitalia, and all stages are described in full so far as known.

The first writer on the North American plume-moths, so far as I am able to learn, was Fitch, in his first "Report on the Insects of New York," page 145 (1856), where he published eight species, placing them under the genus *Pterophorus*. In 1864, Walker published two species from this country under the same genus, in the "Catalogue of the Lepidoptera Heterocera," Part 30, page 940. In 1869, Riley, in his first "Report on the Insects of Missouri," published one new species and gave a more complete description of one of the species of Fitch. In 1873, Packard described three species from California under the genus *Pterophorus*, in the "Annals of the Lyceum of Natural History," Vol. X., page 265. In the same year Zeller, in his "Beitrage," described six new species of the North American plume-moths, and in the same paper established a new genus (*Scoptonoma*) with two new species from Texas. This genus, however, proved to be the same as *Lineodes* of Guenee, a Pyralid genus. The next year Zeller described his *Leioptilus Mathewianus* in his "Lepidoptera der Westkuste Amerika's," page 23. Chambers published *Pterophorus lacteodactylus* in the "Canadian Entomologist," Vol. V., page 265 (1873).

The most important contribution to our knowledge of the North American species of these insects was given by Lord Walsingham in his "Pterophoridæ of California and Oregon," published in 1880. This work contains full descriptions of forty-one species, many of them here published for the first time, and all of the species are illustrated in colors. Lord Walsingham was so generous as to give me co-types of nearly all of his species. In this same year Miss Murtfeldt described two new species with their early stages in the "American Entomologist," Vol. III., page 235. In 1881, Mr. Charles Fish described ten species of these moths in the "Canadian Entomologist," Vol. XIII., pages 70 and 140. This

gentleman made extensive studies of the Pterophoridæ, and secured the types of Fitch's species and all of his notes on them; but, having abandoned the work because of other engagements, I obtained his entire collection of these insects, including all of his own types as well as those of Fitch. Valuable notes by other writers have also been made, which will be referred to under the various species on following pages.

Structure.

The Pterophoridæ are small, slim insects, with long, slender legs and long, narrow fore wings, cut by a fissure extending in from the middle of the outer margin between veins 4 and 7, from a fourth to one-half of the length of the wing (plates II. and III.). The parts on each side of the fissure are called lobes, the anterior one being called the first lobe and the other the second lobe. In some of the genera these lobes are narrow and pointed, while in others they are well developed and present two well-marked angles on each, which are called the apex and anal angle (Plate II., fig. 1). The normal number of veins in the fore wings is twelve, but this number is reduced in many of the species. Vein 1 is feebly forked at the base, at least in some of the species, and the cross vein and veins 5 and 6 are very weak, often entirely visible; 5 and 6 at equal distances from each other and from 4 and 7, extending to the fissure which ends between them. Veins 8 and 9 are stalked and 10 sometimes arises from the same stalk, but is occasionally wanting.

The hind wings have two fissures, the first extending in from the outer margin between veins 4 and 7 to about the middle of the wing; the second, between the inner margin veins and vein 2, extends to about the basal fourth. These divisions are called feathers, the anterior one being called the first feather, the middle one the second feather and the posterior one the third feather (Plate II., fig. 2).

The first feather in some species is somewhat spoon-shaped, rounded at the outer end, widest near the middle and narrower near the base. The costal vein bends down near the middle of its course, approaching very near to the subcostal. The costal vein ends in the costa when this feather tapers gradually to a point and vein 7 ends in the point. When this feather is broad at the outer end and has two angles corresponding to the apex and anal angle, the costal vein usually ends in the apex and vein 7 in the anal

angle. The frenulum is single in the male and divided in the female.

The second feather in some species is widest towards the outer end, which is very oblique, but in others it is of the same form as the third feather. The median vein runs into this feather, giving off vein 2 which ends in the hind margin, vein 3 which ends in the anal angle of this feather and vein 4 which ends in the apex. In the narrow, tapering forms vein 4 is wanting and 3 runs to the end of the feather. The cross vein and also veins 5 and 6 are exceedingly fine and scarcely visible under the most favorable circumstances.

The third feather tapers gradually to the more or less blunt outer end, but in some species it has a very obtuse and rounded angle on its hind margin, which represents the anal angle of the wing (Plate II., fig. 2). This feather has a strong vein running through the middle to the end, which is undoubtedly vein 1b. In some species a weak vein may be seen above lying very near the edge of the feather, and in others a shorter vein below running to the hind margin of the feather a little beyond the anal angle. This, without doubt, is vein 1a, and therefore the three internal veins are represented in the Pterophoridæ, but all three do not occur in any one species.

The fringes are long and arranged along both sides of the feathers, giving them a strong resemblance to the feathers of a bird, thus making more complete organs of flight. In some species there are clusters of dark spatulate scales in the hind fringe of the third feather, and similar scales occur along the median vein on the under side of the wing. The basal part of the median vein on the upper side of the hind wings is not provided with a row of fine hairs, as in some families of moths.

The head is of medium size, with the front smooth and vertical in some species but more or less conical in others. The labial palpi are either porrect or curved upward and closely scaled, or more or less bushy. The maxillary palpi are entirely wanting. The proboscis is about as long as the head and thorax, and not clothed with scales at the base. The eyes are nearly hemispherical, naked and without lashes or cilia. The ocelli are absent. The scales of the head lie smooth over the surface, giving it an even appearance; but in some species they form a more or less cone-shaped tuft, extending forward from the front. The antennæ are fine filiform, and about two-thirds as long as the costa of the fore wings. The basal segment is much larger than those beyond,

and covered with scales which sometimes form a pointed tuft at the end. The remaining segments are finely ciliated, those in the males being stronger than in the females.

The thorax is of medium size, and its covering of scales smooth without any indication of tufts or other characters. The tegulæ are of medium length, without long scales, hairs or other unusual characters. The abdomen is long and slim, of nearly uniform size throughout in the male, but somewhat fusiform in the female. The genitalia of the male consist of a pair of long, comparatively thin and broad exserted claspers and a prominent uncus.

The legs are long and slim with cylindrical segments, except the femora, which are somewhat compressed. The coxæ are about as long as the thorax and stouter than the remaining segments of the legs. The fore tibiæ have a tibial epiphysis on the inside near the end, the middle tibiæ have a pair of unequal spurs at the end, while the hind tibiæ have a pair of unequal spurs at the end and a similar pair at the outer third. The tarsi consist of five segments with a pair of claws at the end. There are no spines on any of the segments of the legs, but they are covered by scales that lie smooth and close to the surface. In some species, however, the scales are raised, forming an enlarged ring around the middle and hind legs at the base of the spurs, and a similar ring occurs around the end of the fore tibiæ. In one species (*monodactylus*) there is a small tuft of scales on the hind tibiæ, opposite and within the middle spurs (Plate I., figs. 11, 12). This character is very useful in determining this exceedingly variable and common species.

The ground color of the Pterophoridæ is generally white, yellowish white or some shade of brown, occasionally without darker markings, though the fore wings most frequently have a dark triangular spot resting on the costa and extending down to a point just within the end of the fissure. One or two light lines cross the lobes obliquely, and there is a dark spot on the cell a little before the middle of the wing and another on the fold still nearer the base of the wing. The hind wings are of one uniform color, and seldom have spots or lines of other colors.

Habits.

The usual time of flight is on warm, calm evenings, when they are occasionally attracted to light and rarely to sugar. They may, however, be easily "flushed" in the day time from the shrubbery, when they fly a short distance and alight. When at rest they hold their wings nearly horizontal and at right angles with the body,

but the feathers of the hind wings are folded over each other and drawn under the fore wings.

Early Stages.

I am not aware that anything is known of the egg-stage of any of our North American plume-moths, and if any thing has been published on this stage, I have overlooked it. In the European species, so far as I have seen any descriptions, they are more or less oval in outline, smooth and of a pale-green color.

The larvæ are short and stout, pale green, with longitudinal stripes of other colors in some species, and one or more coarse or fine hairs arise from tubercles on the segments. The pupæ are formed above ground, and attached by the anal extremity. Some species are hairy, while others are naked; and they sometimes have a pair of prominent tubercles arising from the back.

It is not known positively whether any of our North American species have more than one generation in a season; but so little is known about them that we cannot speak with any certainty on this point. *Acanthodactyla* and *monodactyla* are said to have two generations in a year in Europe, and very likely this is true here, at least in some parts of the country.

Systematic Position.

Linnæus placed these insects at the end of the Lepidoptera, after the Tineina, and he was followed by later writers till a little more than twenty-five years ago, when it began to dawn upon those who were working upon these insects that they were out of place. At first the matter was talked over, but it was some time before any one seemed to be willing to express such an apparent heterodox opinion in print. Dr. Jordan, however, in 1869 (Ent. Mon. Mag., Vol. VI., p. 152), expressed the opinion that these insects form "an aberrant group of the Pyralidæ." A few years ago, entomologists, both in this country and England, in making critical studies on the early stages as well as on the imago of the Lepidoptera, quite revolutionized the order, not only with regard to the position of the families, but also with regard to the names. I am heartily in sympathy with this movement, and, if I do not always adopt the changes at once, it is because I have not had time to study them carefully and convince myself that they are right.

The genus *Chrysocorys* has been placed among the Pterophoridæ by several of the English entomologists, and Zeller established the genus *Scoptonoma* for two Texan species, placing it in this family;

but this genus is identical with *Lineodes* Guen., which both he and Lederer very properly placed among the Pyralids. If these two genera be removed, we have rather a compact group, which may be placed in the vicinity of the Pyralids, in my opinion.

Characters of the Pterophoridæ.

Long, slim insects, with long legs. Fore wings usually with one fissure and hind wings with two. The North American species, so far as known, have fissured wings. Proboscis and labial palpi well developed. Maxillary palpi and ocelli absent. Fore wings with vein 1b either simple or with a short fork at the base; 1c present, 4 and 5 remote at the base, 8 and 9 stalked or fused. Hind wings above without a row of hairs along the basal part of the median vein; 1a usually absent, 4 and 5 remote at the base, 6 and 7 remote, 7 and 8 approach very near each other near the middle of the wing.

Synopsis of the Genera.

1.	Hind wings with a cluster of black scales in the fringe of the third feather, ...	2.
	Hind wings without a cluster of black scales in the fringe of the third feather, ...	4.
2.	Anal angle present in second lobe of fore wings, . . .	3.
	Anal angle absent in second lobe of fore wings, .	*Trichoptilus.*
3	Anal angle absent in first lobe of fore wings, . .	*Oxyptilus.*
	Anal angle present in first lobe of fore wings, .	*Platyptilia.*
4.	Feathers of hind wings similar and tapering uniformly,	*Alucita.*
	Feathers of hind wings unlike in form, ...	5.
5.	Anal angle present on first lobe of fore wings, .	*Stenoptilia.*
	Anal angle absent on first lobe of fore wings, . .	*Pterophorus.*

Genus TRICHOPTILUS Wlsm., Pter. Cal. and Ore. (1880).

Front neither extended nor tufted, vertex smooth. Antennæ pubescent; palpi slightly ascending; second and third segments nearly equal in length, the former a little thickened with scales, especially towards the outer end, the latter filiform. Tibiæ thickened with scales at the origin of the spurs. Fissure of the fore wings extending in a little more than half their length, the lobes being very slender, diverging, and without the anal angle on either. Hind wings with the fissure between the first and second feathers reaching within one-fourth of their base, while the second fissure reaches nearly to the base of the wing. All the feathers

are very slender, almost filiform, and there is a cluster of black scales in the fringe near the middle of the hind margin of the third feather.

This genus was established by Lord Walsingham on a single species, *pygmæus*, of which his lordship took three specimens near Milville, in Shasta County, California, on the 11th of July, 1871, one of which with his characteristic generosity he gave me. As this single co-type is all I have, I do not feel like injuring it to study the venation or genitalia. Mr. Meyrick, in his "Handbook of British Lepidoptera," has given the venation of the fore wings probably of *T. paludum* Z. as follows: 2 out of 4 or absent, 3 absent, 7 and 9 absent, 10 from near 8 or absent, 11 from near 8.

Hofmann gives a description of the male genitalia and a figure of a paramere of *T. paludum*. He states that the genitalia of the male are distinguished by the remarkable form of the claspers, which are long and narrow, hollow within, and with a broad, bell-shaped, bristly appendage. The tenth dorsal plate is obtusely triangular, arched and bent down at the end. The ninth dorsal and ventral plates offer nothing especially worthy of remark.

Synopsis of the Species.

Expanse of wings, 10 mm. or less, . . *pygmæus*.
Expanse of wings, 17 mm., ... *ochrodactylus*.
Expanse of wings, 20 mm., ... *lobidactylus*.

Trichoptilus pygmæus.

Trichoptilus pygmæus Wlsm., Pter. Cal. and Ore., p. 64, Plate III., fig. 15 (1880).

Expanse of wings, 10 mm. Head and thorax pale fawn color; antennæ slightly pubescent, marked above with fawn brown and white alternately; palpi whitish touched with fawn color. Abdomen whitish, with a tinge of fawn color on the sides and above posteriorly. Legs white, dotted and barred above with fawn brown; spurs white, and at their origin the legs are thickened with fawn brown scales, among which project some which are white and almost erect. Fore wings very pale fawn color, dusted with fuscous brown scales along the costa, especially above the base of the fissure and near the base of the hind margin. Two indistinct white stripes cross the lobes of the fore wings, one beyond and the other before the middle, cutting the fawn-colored fringes on each side. Hind wings pale grayish brown, with

cinereous fringes interrupted with white behind and at the apex. The third feather has long cinereous fringes interrupted with white at the apex, and there is a cluster of dark scales slightly beyond the middle in the fringe of the hind margin.

Habitat. — Shasta County, California. Early stages and food plant unknown.

Trichoptilus ochrodactylus.

Trichoptilus ochrodactylus Fish, Can. Ent., Vol. XIII., p. 142 (1881).

Expanse of wings, 17 mm. Head and anterior part of the thorax pale ochreous. Antennæ with a longitudinal brown line above, bordered by a fine white line on each side, pale ochreous beneath. Posterior part of thorax and abdomen light cream color, the latter nearly pure white beneath. Legs white, striped longitudinally with pale brownish ochreous; posterior tibiæ with a band of raised ochreous scales before each pair of spurs. Fore wings pale ochreous, approaching to cream color, with a very light brownish tinge on the first lobe. A minute brown spot at the base of the first lobe reaches from the end of the fissure half way to the costa. Costal fringe of the first lobe brownish ochreous, with a longitudinal white spot at the basal third, another at the outer third and a smaller one just before the apex. Fringe of the fissure ochreous and tinged with brown just beyond the middle, and there are some white hairs near the apices. Fringe of hind margin pale ochreous, with a white patch near the middle of the second lobe, beyond which the fringe is rather dark brownish, with a streaklet of white near the apex. Hind wings pale brown, with the fringes slightly paler. The third feather has a cluster of dark-brown scales in the hind fringe, just beyond the middle, and a row of club-shaped white scales extends from this to the base of the wing.

Habitat. — Texas. Early stages and food plant unknown.

Trichoptilus lobidactylus.

Pterophorus lobidactylus Fitch, N. Y. Rep., Vol. I., p. 848 (1854).
Aciptilus californicus Wlsm., Pter. Cal. and Ore., p. 60, Pl. II., fig. 9 (1880).

Expanse of wings, 17–20 mm. Head grayish brown, with a white line over each eye; palpi whitish, touched with brown on the outside of the second segment, with a long, slim tuft at the outer end beneath, of nearly the same size and length as the slim outer

segment, which is dark brown, as is also the tuft at the end of the second segment. Antennæ grayish beneath, blackish above and dotted with white. Thorax brown, much lighter posteriorly. Abdomen dark brown, with diverging white lines on some of the segments. Legs striped with dark brown and white, with a tuft of dark scales at each pair of spurs; tarsal segments white at the base and brown at the outer end.

Fore wings with the fissure extending in one-half of the length of the wing, dark cinnamon brown. An oblique stripe of pale yellow or white crosses the basal third of the first lobe, cutting the brown fringe on each side of the lobe. Traces of this stripe are sometimes seen on the second lobe, especially in the fringe on the hind margin. There are also indications of a second stripe on the outer third of the lobes, as shown by a few light scales and the white in the fringes, which are dark elsewhere except on the apical end of the costa. Hind wings and fringes dark brown, with a cluster of black scales in the hind fringe a little beyond the middle, preceded by white, and the fringe at the apex is also white.

I have carefully compared four examples of *californicus*, given me by Lord Walsingham, with seven eastern examples of *lobidactylus* Fitch, and can see no difference except in the ground color, which is considerably lighter in the former; but, as the genitalia are absolutely alike in both, I must consider *californicus* only as a variety. Lord Walsingham doubtfully referred this species to the genus *Aciptilus*, but it seems to me to agree better with the characters of *Trichoptilus*.

Habitat. — Massachusetts, Connecticut, New York, Colorado, California. Food, *Solidago canadensis*.

I have been informed by Mr. Fish that Mr. N. Coleman of Berlin, Conn., has bred this insect from this plant.

Genus OXYPTILUS Zeller, Isis, Vol. X., p. 765 (1841).

Front smooth, without projection; labial palpi longer than the head, ascending, the second segment with appressed or projecting scales beneath, sometimes forming a short tuft at the apex, terminal segment filiform. Legs long and slim, the anterior and middle tibiæ thickened with scales at the middle and end. Fore wings fissured nearly to the middle, the first lobe narrow, curved somewhat at the end and terminating in a point without a defined anal angle. Second lobe with the apex somewhat produced, and

with a more or less prominent anal angle. Feathers of the hind wing narrow and pointed, linear and without anal angles. Vein 2 arises from the median vein, a little before the outer end of the cell, while 3 and 4 arise from a short stalk, 9 and 10 arise one after the other from 8, and 11 arises near 8 from the upper angle of the cell. In the hind wing the costal vein terminates near the outer third of the costa; the continuation of the subcostal runs through the middle of the first feather and ends in the apex. The median vein has three branches the third of which ends in the apex of the second feather. The third feather with a single strong vein through the middle, terminating in the apex. This feather has a cluster of dark scales in the hind fringe beyond the middle. The characters of the male genitalia are represented in Plate VI., figs. 1–8.

SYNOPSIS OF THE SPECIES.

General color tawny yellow, ... *periscelidactylus.*
General color light reddish brown, . . *delawaricus.*
General color dull grayish brown, . . *ningoris.*
General color dark brown, ... *tenuidactylus.*

OXYPTILUS PERISCELIDACTYLUS.

Pterophorus periscelidactylus Fitch, N. Y. Rep., Vol. I., p. 843 (1854).
Pterophorus periscelidactylus Riley, Mo. Rep., Vol. I., p. 137 (1869).
Pterophorus periscelidactylus Riley, Am. Ent., Vol. II., p. 234 (1870).
Oxyptilus periscelidactylus Zell., Ent. Zeit., Vol. XXXII., p. 178 (1871).
Pterophorus periscelidactylus Pack., Guide, p. 356 (1872).
Oxyptilus periscelidactylus Zell., Beitr., Part 2, p. 119 (1873).
Pterophorus periscelidactylus Saund., Can. Ent., Vol. V., p. 99 (1873).
Oxyptilus periscelidactylus Wlsm., Pter. Cal. and Ore., p. 25, Pl. II., fig. 5 (1880).
Oxyptilus periscelidactylus Saund., Ins. Inj. Veg., p. 268 (1889).
Oxyptilus periscelidactylus Comst., Manual, p. 238 (1895).
Oxyptilus periscelidactylus Smith, Econ. Ent., p. 318 (1896).

Expanse of wings, 14 to 29 mm. Head, thorax and fore wings tawny yellow. Palpi slim, porrect or ascending, reaching as high as the top of the head, white touched on the outside of second and third segments with tawny yellow. Antennæ dark brown beneath, white above and dotted with white along each side. Posterior part of the thorax marked in some specimens with white on the top of the tegulæ, the sides and two longitudinal stripes on the top of the metathorax. Abdomen tawny yellow, marked more or less imperfectly with a white stripe along each side and also on each

side of the dorsal stripe, except on the third segment, which is entirely dark tawny brown. Underside white, striped with tawny brown. Fore legs white, with longitudinal brown lines on the femora and tibiæ; middle and hind femora white, striped with tawny; middle tibiæ tawny on the outside, also a tuft of scales on the middle and at the end tawny; hind tarsi tawny at the middle and end, and all the tarsi are marked more or less with this color at the end of the segments.

Fore wings fissured nearly to the middle, tawny yellow, with two oblique white stripes crossing the lobes, dividing them into nearly equal parts, the space between these stripes often rusty brown, a transverse white spot just within the end of the fissure is edged on its inner side with rusty brown, the posterior end often extending outward and fusing with the first cross line. There is usually a very oblique white spot on the cell near the middle of the wing, with a dark dot at the basal end of it, and a second white spot rests on the hind margin at the basal fourth of the wing. The fringes of the two lobes are whitish, cut by blackish at the apex and anal angle, this latter on the second lobe extending along nearly half the hind border. Hind wings rusty brown, the third feather white in the middle and dark brown at the end, with large dark scales in the fringes on both sides of this part of the feather.

Thirty-five specimens examined.

Habitat. — Maine to Missouri, Ontario, Quebec, Texas. Food, leaves of the grape vine.

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 towards the metathorax, 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 pupæ 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.

So far as I can learn, nothing is known of the egg and early larval stages. Both Fitch and Riley expressed the opinion that there were two generations in a year, but it has not been observed. The moths are on the wing here in Amherst during the latter part of June.

OXYPTILUS DELAWARICUS.

Oxyptilus Delawaricus Zell., Verh. z.-b. Ges. Wien, XXIII., p. 318 (1873).
Oxyptilus delawaricus Wlsm., Pter. Cal. and Ore., p. 29, Pl. II., fig. 7 (1880).

Expanse of wings, 17 to 18 mm. Head, thorax and fore wings light reddish brown. Palpi projecting forward about the length of the head, acuminate, lighter beneath and at the tip, the second segment tufted beneath at the end. Antennæ fuscous, dotted with white above. Abdomen reddish brown at the base, yellowish white beyond and indistinctly marked with whitish scales and lines, but not so conspicuously marked as *tenuidactylus*. Legs white, barred with dark brown.

Fore wings with a few whitish scales scattered along the costa, which is slightly shaded with fuscous beyond the middle. There is a faint brown spot on the cell before the middle, and an indistinct pale spot on the basal fourth of the hind margin. Two oblique white stripes cross the first lobe, dividing it into thirds, the outer stripe appearing again on the second lobe, while only a trace of the inner stripe is occasionally seen on the second lobe, extending along to the inner end of the fissure, which is edged with white and dark brown. The ground color of the lobes is often darker than the rest of the wing. The costal fringe from the outer white stripe to the apex is white, that within the fissure is brown, while the fringe on the rest of the second lobe is white, cut with brown at the apex, and from the anal angle along the hind margin to the middle of the lobe, beyond which in one or two places black scales are seen in the white fringe. Hind wings darker brown than the fore wings, and with the usual cluster of black scales in the fringe, near the apex of the third feather. Nine specimens examined.

Habitat. — Canada, New Hampshire, Massachusetts, California. Early stages andfood plant unknown.

Oxyptilus ningoris.

Oxyptilus ningoris Wlsm., Pter. Cal. and Ore., p. 26, Pl. II., fig. 6 (1880).

Expanse of wings, 15 to 20 mm. Head and thorax dark grayish brown. Palpi clothed with close scales, second segment untufted. Antennæ brownish, dotted with white above. Abdomen grayish white at the base, brownish fuscous beyond, with three pairs of slender white streaks diverging from the front to the back of each of the anterior segments; beyond them crossed by lines of whitish scales. Legs white and banded with brownish fuscous.

Fore wings dull grayish brown, sprinkled with whitish scales along the costa, with two oblique white stripes across the lobes and a small white spot at the end of the fissure, connected with the first oblique stripe by the white of the fringes, which beyond this are brownish, except on the outer end of the costa of the first lobe and in the concave outer border of the second lobe, where they are white. There is also an inconspicuous white spot on the basal fourth of the hind margin, and a similar ill-defined spot near the middle of the wing. Hind wings brownish fuscous, the first feather barred with white beneath and the third feather widely barred with white and with blackish scales in the fringe on both sides towards the outer end. Six specimens examined.

Habitat. — California, Oregon. Early stages and food plant unknown.

Oxyptilus tenuidactylus.

Pterophorus tenuidactylus Fitch, N. Y. Rep., Vol I., p. 848 (1854).
Oxyptilus nigrociliatus Zeller, Verh. z.-b. Ges. Wien, XXIII., p. 322 (1873).
Oxyptilus nigrociliatus Wlsm., Pter. Cal. and Ore., p. 31, Plate II., fig. 8 (1880).
Oxyptilus delavaricus Forbes, 3d Ill. Rep., p. 91, Plate X., fig. 2 (1885).
Oxyptilus nigrociliatus Saund., Inj. Ins., p. 314, figs. 326–7 (1889).

Expanse of wings, 12 to 15 mm. Head and thorax dark tawny brown, with a tinge of coppery red; posterior part of the thorax white. Palpi ascending, reaching above the top of the head, slender, not tufted. Antennæ black, dotted with white above. Abdomen of the same color as the wings, with two diverging white lines on the top of the third segment, and the fifth strongly

marked with white above except in the middle line. Legs white and banded with dark brown.

Fore wings dark tawny brown, with a tinge of coppery red in certain lights. Two oblique white stripes cross the lobes, the inner one being the wider, and both more or less indistinct or wanting on the second lobe. There is a faint indication of a white spot near the middle of the wing and a similar one at the inner end of the fissure. Fringes white on the apical part of the costa and on the outer margin, cut with blackish at the apex and anal angle of each lobe, and also blackish in the fissure and on the outer part of the hind margin of the second lobe. Hind wings of the same color as the fore wings, with the first feather barred with white beneath and the third feather white in the middle, beyond which the fringe on both sides is thickened by heavy black scales. Fifty-eight specimens examined.

I have before me one specimen from the National Museum, labelled, in Zeller's handwriting, "Oxyptil. nigrociliatus Z., N. Am." It also has a printed label, "Collection C. V. Riley," and therefore it is probable that this specimen was determined by Zeller himself. I also have two specimens given me by Lord Walsingham which he took in California. Although Professor Zeller declared Lord Walsingham's Californian specimens to be identical with his *nigrociliatus*, yet, because of the lighter color of the Californian specimens, his lordship wrote: "It is open to question how far the two forms may be entitled to be considered distinct; but I must leave it to be decided by some one who has a more extended series of the undoubted *tenuidactylus* to refer to." I have the types of Fitch in my possession, and there are two specimens of *tenuidactylus*, one of which is a male, from which the figures of the genitalia on Plate VI. were drawn. I have carefully compared this with the genitalia of the Californian specimens, as well as other eastern specimens, and find that there is absolutely no difference. There is, therefore, no doubt that Lord Walsingham was correct in considering *nigrociliatus* the same as *tenuidactylus*, and that his Californian specimens are light varieties of the same species. I have a specimen from Philadelphia as light as any of my Californian specimens received from Lord Walsingham, and one taken in Whitman, Mass., which is as light in color as the lightest specimen from California. This, with many others, was taken July 19, 1881, by Mr. J. Elwyn Bates, who found them flying around blackberry bushes in large numbers.

Habitat. — Massachusetts, New York, Delaware, Maryland,

West Virginia, Illinois, Ontario, Colorado, California. Food, blackberry. This species has been bred from blackberry by Prof. William Saunders and also by Prof. S. A. Forbes.

"About the middle of June the larva reaches full growth, when it is about four-tenths of an inch long, of a pale greenish-yellow color, streaked with pale yellow, and with transverse rows of shining tubercles, from each of which arise from two to six spreading hairs of a yellowish-green color. The head is small, pale green, with a faint brown dot on each side.

"When the larva is about to change to a chrysalis, it spins a loose web of silk on a leaf or other suitable spot, to which the chrysalis is attached. This is less than three-tenths of an inch long, pointed behind, enlarging gradually towards the front, where, near the end, it slopes abruptly to the tip. Its color is pale green, with a line along the back of a deeper shade, margined on each side with a whitish ridge; it is also more or less hairy. In about a week or ten days the chrysalis changes to a darker color, shortly after which the perfect insect escapes." (Saunders.)

Genus PLATYPTILIA Hüb., Verz. bek. Schm., p. 429 (1826).

Front with a conical projection, covered by a longer or shorter tuft of scales. Labial palpi long, slim, porrect or slightly ascending, closely scaled, the third segment filiform and shorter than the second. Legs long and slim, the tibiæ with darker scales and sometimes thickened at the end and also in the middle of the hind tibiæ.

Fore wings fissured about one-third of their length, the lobes, especially the second, wider at the outer end than at the base, each with a distinct anal angle, the first falcate and the second convex on the outer margin. The cell is nearly rectangular at the outer end, and veins 5 and 6, as well as the cross vein, are very weak. Two internal veins are present. Vein 2 arises from the outer third of the median vein and ends in or near the anal angle of the second lobe, while vein 3 ends in the middle and 4 in the apex of the same lobe. Vein 7 arises a little below the anterior angle of the cell and ends in or near the anal angle of the first lobe; 8 and 9 are from a stalk which arises from the anterior angle of the cell, and 8 ends in the apex, while 9 ends in the costa; 10 and 11 are somewhat remote from each other and from the stalk of 8 and 9. The first feather of the hind wings has a blunt apex, and is wider towards the outer end than at the base. Veins 7 and 8 arise separately from the base of the wing, approach

very near to each other at the basal third and end at the widest part of the feather, one in the costa a little before the apex, and the other in the outer margin behind the apex. The second feather has an acute apex and a distinct anal angle; and vein 3, arising a little before the end of the cell, ends in the anal angle, while 4 arises from the end of the cell and ends in the apex of this feather. The third feather is narrow and tapers gradually to the apex, but there is usually a slight enlargement indicating the anal angle near the middle of the hind margin. A cluster of black scales more or less pronounced occurs in the fringe of the hind margin. One internal vein runs through the middle of this feather and a second terminates at the end of the second fissure.

The characters of the genitalia are represented in plates V., VII. and VIII.

Synopsis of the Species.

1. Palpi and frontal tuft much longer than head, *marginidactyla.*
   Palpi and frontal tuft not longer than head, ... 2.
2. With a dark triangle on the outer third of costa, . . . 3.
   Without a dark triangle on the outer third of costa, . . 13.
3. Cluster of dark scales in the middle of fringe of third feather, 4.
   Cluster of dark scales beyond the middle, ... 10.
4. Hind tibiæ white, banded with dark near middle and end, . 5.
   Hind tibiæ without these characters, ... 6.
5. More than half the space between spurs white, . *carduidactyla.*
   Less than half the space between spurs white, . *percnodactyla.*
6. Ground color of fore wings pale fawn, ... 7.
   Ground color of fore wings whitish, ... 8.
7. Expanse of wings 36 mm., ... *grandis.*
   Expanse of wings 20 mm., ... *fragilis.*
8. Expanse of wings 30 mm., ... *albidorsella.*
   Expanse of wings 20 mm., ... *shastæ.*
   Expanse of wings 25 mm., ... 9.
9. Costa black between stripes on first lobe, . . *orthocarpi.*
   Costa not black between stripes on first lobe, . . *albida.*
10. Fore wings reddish fuscous, ... 11.
    Fore wings pale gray marked with black, ... 12.
11. Markings dark brown, ... *acanthodactyla.*
    Markings light brown, ... *edwardsii.*
12. Thorax white, ... *pica.*
    Thorax gray, ... *cosmodactyla.*
13. First lobe with two light cross lines or stripes, . . . 14.
    First lobe without cross lines or stripes, ... 15.
14. Costa cinnamon brown, hind margin white, . . . *albicans.*
    Fore wings white shaded with brownish scales at base and costa, ... *petrodactyla.*
    Fore wings brownish gray, ... *tesseradactyla.*

15. { Fore wings cinereous, ... *modesta.*
    { Fore wings cinnamon brown, ... 16.

16. { Second segment of palpi enlarged with scales, . *albiciliata.*
    { Second segment of palpi not enlarged with scales, . *adusta.*

Platyptilia pica.

Amblyptilus pica Wlsm., Pter. Cal. and Ore., p. 21, Plate II., fig. 1 (1880).

I have never seen this species, and therefore repeat Lord Walsingham's description: —

"Head and palpi cinereous, dusted with white scales. Antennæ cinereous, faintly dotted with whitish above. The thorax white touched with cinereous above and at the sides, with two black spots behind.

"Fore wings white, dusted with cinereous along their costal half before the fissure; the costa fuscous, dotted with white; a blackish spot before the middle of the wing touching the costal shade; another nearer to the base below it; a blackish fuscous, triangular, costal patch before the fissure, followed by a conspicuous white space, beyond which is a fuscous shade, crossing both lobes, divided by a white line running parallel to the apical margin, on which the cilia are white, dotted with some fuscous. The dorsal half of the wing is less shaded or dusted than the costal, and contains two short, oblique, blackish dashes near the middle, the second being followed by a straight streak of brownish fuscous scales running parallel to the dorsal margin. The cilia on the dorsal margin are white, with two distinct tooth-like tufts of black scales; the cilia within the fissure are fuscous.

"Hind wings fuscous brown, with cilia of all the lobes the same color, except on the dorsal margin of the third, where they are white, irrorated with black scales along the basal half, and bearing a conspicuous projecting triangular tuft of black scales beyond the middle, and a few more below the apex of the lobe.

"The abdomen is white above and beneath, with a fuscous line along each side, which also crosses it above near the base, and again below the middle. The third pair of legs are annulated with white and fuscous brown, the bases of the white spurs being also fuscous. Expanse, 23 mm.

"It is allied to *A. acanthodactylus* and *A. cosmodactylus* of Huebner."

Habitat. — California. Early stages and food plant unknown.

PLATYPTILIA COSMODACTYLA.

Alucita Cosmodactyla Hüb., Aluc, Plate VII., figs. 35, 36 (1825).
Amblyptilus cosmodactylus Wlsm., Pter. Cal. and Ore., p. 23, Plate II., figs. 2-4 (1880).

Expanse of wings, 18–21 mm. Head, thorax and fore wings pale gray, finely striated with black; a triangular black spot on the outer third of the costa, followed by a small white costal spot, which is in turn followed by a broad black band edged on the outside with white, which crosses the lobes diagonally. On the second lobe the white cuts a dark basal portion twice at equal distances; costa of the wing dark gray with a series of white dots. Fringes blackish basally, white externally. Hind wings dark grayish brown, with a large cluster of black scales beyond the middle of the fringe of the third feather, and a small black cluster on the apex.

Habitat. — Europe, California, Oregon. Food, *Stachys*, *Aquilegia*, *Geranium*, *Orthocarpus*. "Larva, from pale green to purplish pink; dorsal line dark gray; subdorsal white, conspicuous; lateral and spiracular whitish, interrupted; head dark reddish fuscous, almost black." (Meyrick.)

PLATYPTILIA ACANTHODACTYLA.

Alucita Acanthodactyla Hüb., Aluc., Plate V., figs. 23, 24 (1825).

Expanse of wings, 18–21 mm. Head, thorax and fore wings reddish fuscous, marked very similarly to *cosmodactyla*, but may be separated by the ground color of the fore wings.

Habitat. — Europe, South Africa, New York. Food, *Stachys*, *Mentha*, *Ononis*, *Calamintha*, *Pelargonium* and *Euphrasia*.

I have a single specimen of this species, taken at West Farms, N. Y., by Mr. James Angus.

"Larva from pale green to deep purple; dorsal line dark gray; subdorsal, lateral, and sometimes spiracular whitish, interrupted; head yellow gray or yellowish brown, blackish-marked." (Meyrick.)

PLATYPTILIA EDWARDSII.

Platyptilus Edwardsii Fish, Can. Ent., Vol. XIII., p. 72 (1881).

Expanse of wings, 22–27 mm. Head and thorax ochreous brown; frontal tuft short and blunt, brown above, whitish beneath. Palpi ascending, extending beyond the frontal tuft; an-

tennæ finely ciliated, dotted above with dark scales, cinereous beneath. Abdomen ochreous, slender. Legs ochreous brown, hind tibiæ and all the tarsi paler.

Fore wings reddish brown, darker on the costa; triangular costal spot dark brown, bordered on the outside by whitish scales. A small brown spot occurs near the hind margin at the basal fourth, another near the costa at the basal third, and a transverse white line at the apical third of the lobe. The first lobe with a dark longitudinal spot half-way between the costa and hind margin; second lobe dark at the anal angle. Fringes whitish, with a patch of dark scales before and another just behind the apex of the costal triangle. Hind wings reddish brown; fringes brown, whitish at base of hind margin and bearing a small patch of dark scales just before the apex.

Habitat. — Maine, Massachusetts. Early stages and food plant unknown.

PLATYPTILIA CARDUIDACTYLA.

Pterophorus carduidactylus Riley, Mo. Rep., Vol. I., p. 180, Plate II., figs. 13, 14 (1869).
Platyptilus cardui Zell., Stett. Ent. Zeit., Vol. XXXII., p. 179 (1871).
Platyptilia cardui Zell., Beitr., p. 118 (1873).
Platyptilus cardui Wlsm., Pter. Cal. and Ore., p. 7, Plate I., fig. 6 (1880).
Platyptilus cardui Riley, Gen. Index Ent. Rep. Mo., p. 83 (1881).

Expanse of wings, 23 mm. Head, thorax and abdomen tawny yellow. Legs tawny yellow, except the tarsi, which are nearly white, spotted with dark brown; spurs brown, with darker tips.

Fore wings tawny yellow, fissure extending in about one-fourth of the length of the wing; triangular spot dark brown, its outer margin slightly concave; three dark diffuse longitudinal spots, one on the basal third of the wing near the costa, one near the hind margin, nearer the base than the latter, and one on the outer third of the hind margin. Two paler transverse lines cross the outer portion of the wing, one bordering the triangular spot behind and curving across the lower lobe towards the anal angle, the other very near and parallel to the outer margin. The space between these two lines usually darker than the ground color. Fringes dark basally, whitish outwardly except three brown patches of scales, one in the middle of hind margin, one on the anal angle

and a smaller one half-way between. Hind wings ashy brown. Fringes concolorous, with a patch of very dark scales about half-way on hind margin of third feather, and a few scattering scales about half-way between that and the base.

Habitat. — New York, Pennsylvania, Illinois, Missouri, Texas, California, Washington. Food, Thistle (*Cirsium lanceolatum*).

"*Larva.* — Average length, 0.60. Largest in the middle of the 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 lighter 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." (Riley.)

Platyptilia percnodactyla.

Platyptilus percnodactylus Wlsm., Pter. Cal. and Ore., p. 8, Plate I., fig. 7 (1880).

Expanse of wings, 22 mm. Head and thorax pale brown; antennæ spotted on the upper side with white and brown. Abdomen brownish, paler at the base. Legs whitish, slender, slightly enlarged, and tinged with brownish at the end of the segments. Spurs pale.

Fore wings pale brown with much paler blotches, one reaching from the base of the fissure to the costa, another below the dark-brown costal triangle and another at the base of the costal margin; a pale streak crosses the wing, parallel to the outer margin, which is brownish; a brown line at the base of the fringes, which are brown except within the fissure and near the anal angle; a few brown scales near the middle of the hind margin. Hind wings brown, the third feather paler than the others, and with a few

fuscous scales in the fringe of the hind margin of the third feather.

Habitat. — California. Early stages and food plant unknown.

Platyptilia shastæ.

Platyptilus shastæ Wlsm., Pter. Cal. and Ore., p. 14, Plate I., fig. 11 (1880).

As I have no example of this species, I quote Lord Walsingham's description: —

"Head white; palpi white, touched with cinereous at the sides; antennæ dotted above. Thorax dusted with cinereous.

"Fore wings narrow, whitish, dusted with cinereous atoms, especially along the costa; the triangular costal patch brown, followed by the usual pale space; a brown line along the base of the white fringes; a very slender whitish line, running parallel to the apical margin, terminates in a white dash on the costa, reaching to the extreme apex; the antemedian dots scarcely indicated. Hind wings pale cinereous, the third lobe perhaps slightly the lightest in color; fringes nearly unicolorous, pale cinereous, scarcely paler at their bases. Abdomen yellowish white. The third pair of legs cinereous, slightly whitish below each joint and on the spurs and feet. Expanse 20 mm."

Habitat. — California.

"This species may be distinguished by its slender appearance and narrow fore wings, which are so delicately dusted as to be of almost the same shade as the pale cinereous hind wings, which separate it at once from any of its allies now described."

Platyptilia fragilis.

Platyptilus fragilis Wlsm., Pter. Cal. and Ore., p. 16, Plate I., fig. 12 (1880).

Expanse of wings, 19 mm. Head and thorax white, sprinkled with yellowish scales; palpi slightly cinereous; abdomen yellowish; legs yellowish white, brownish at the joints.

Fore wings fawn color with yellowish tinge; the two antemedian spots and the triangular costal patch brown; outer margin brownish. Fringe white with a fine brown line at its base. Two brown dashes in the fringes of the hind margin before the anal angle. Hind wings very pale brownish white with paler fringes.

Habitat. — California. Early stages and food plant unknown.

PLATYPTILIA ORTHOCARPI.

Platyptilus orthocarpi Wlsm., Pter. Cal. and Ore., p. 11, Plate I., fig. 9 (1880).

Expanse of wings, 25 mm. Head and thorax whitish, slightly tinged with ochreous; frontal tuft short. Hind legs whitish, marked with fuscous on the outside, with white annulations below each segment; spurs and feet white.

Fore wings dusted with ochreous and brown scales, especially on the costa; triangular costal patch and a dash at the end of the first third of the wing very dark fuscous, and more produced toward the apex than in *albida;* space beyond the triangular patch and a streak parallel to the outer margin white, with the space between them brown. Hind wings fuscous brown; fringes fuscous with a white line at the base.

Habitat. — Oregon. Food, *Orthocarpus.*

PLATYPTILIA ALBIDA.

Platyptilus albidus Wlsm., Pter. Cal. and Ore., p. 10, Plate I, fig. 8 (1880).

Expanse of wings, 24 mm. Head and thorax white, with a bluish tinge. Antennæ white dotted with brown above. Abdomen white streaked with fuscous. Hind legs dark ashy in color; spurs and feet slightly paler on the inner side.

Fore wings bluish white, with brownish scales, especially along the costa to the brown triangular spot, beyond which is a pale stripe running parallel to the outer margin across both lobes of the wing; another pale line near the outer margin; the space between these pale lines is grayish brown except near the costa, where it is brownish; a brown stripe between this and the fringes. Two indistinct brown spots on the inner half of the wing, the lower one much nearer the base than the upper one; a brown line at the base of the fringe, which is white except at the anal angle. Hind wings brown; fringes brown, a little paler on the hind margin of the third feather.

Habitat. — Southern Oregon, California. Early stages and food plant unknown.

PLATYPTILIA ALBIDORSELLA.

Platyptilus albidorsellus Wlsm., Pter. Cal. and Ore., p. 13, Plate I., fig. 10 (1880).

Expanse of wings, 30 mm. Head and thorax white, with a few scattered fuscous scales; frontal tuft short. Legs whitish tinged with cinereous; feet and spurs paler.

Fore wings white, thickly sprinkled with brown, forming a widening streak from the base of the wing to the triangular patch, beyond which it is paler and crossed by a white costal patch and a white line near the outer margin and parallel to it. Fringes ashy, with a brown line at the base. Hind wings white, thickly dusted with brown. Fringes paler brown, much paler at the base.

Habitat. — California. Early stages and food plant unknown.

PLATYPTILIA GRANDIS.

Platyptilus grandis Wlsm., Pter. Cal. and Ore., p. 6, Plate I, fig. 5 (1880).

Expanse of wings, 36 mm. Head and thorax pale fawn color; antennæ brownish fawn color, spotted with white above; frontal tuft fawn color, shorter than in allied species. Legs very pale, the hind tibæ with their extremities darker.

Fore wings pale fawn color, with the costa and triangular blotch fuscous; two brownish, elongated dots near the middle of the wing, the larger one nearer the base. The lobes are crossed by a pale wavy streak parallel and near to the outer margin; a brown line at the base of the fringes, which are dark fuscous except near the anal angle, where they are pale. Hind wings brownish fawn color. Fringes pale except on the hind margin of the third feather, where they are brownish.

Habitat. — California. Early stages and food plant unknown.

PLATYPTILIA COOLEYI, n. s.

Expanse of wings, 21–27 mm. Head, thorax and fore wings yellowish brown; a darker brown spot on the middle of the cell, and two of the same color, one above the other, just before the end of the cleft; the upper one being absent in some specimens, while in others they are joined, forming a dark-brown dash across the end of the cell. A subterminal whitish stripe occurs on the first lobe. Fringes whitish, with a sub-basal line concolorous with the wing. Hind wings and fringes a little darker than the fore wings. Early stages and food plant unknown.

Described from seven examples taken in Marshall's Pass, Colorado, July 15, 1888, and one taken in Colorado by Bruce. None of these are in very good condition.

A variety in the National Museum, from Placer County, California, has both lobes of the fore wings completely overlaid with white scales.

Named for Mr. R. A. Cooley, a most conscientious and faithful worker in entomology, to whom I am indebted not only for the careful and accurate drawings of the genitalia and other structural characters in this paper, but also for valuable assistance in other entomological work.

PLATYPTILIA MODESTA.

Platyptilus modestus Wlsm., Pter. Cal. and Ore., p. 18, Plate I., fig. 14 (1880).

As I have no example of this species, I give a copy of Lord Walsingham's description: —

"Head and palpi cinereous; antennæ slightly dotted above.

"Fore wings very narrow, cinereous, with a slight ochreous tinge towards the dorsal margin. The costa sprinkled and shaded with fuscous, the fuscous shade widening towards the fissure, forming an elongate but indistinct triangular costal blotch. The apical portion of the wing more or less shaded with fuscous, and a fuscous line along the base of the cilia on the apical margin, which are whitish at their points. The cilia within the fissure and those along the dorsal margin before the anal angle white, the latter containing a few dark scales. Hind wings cinereous; the cilia slightly paler, especially along their bases. Posterior legs cinereous; the feet slightly paler. Expanse 22 mm."

Habitat. — California. Early stages and food plant unknown.

PLATYPTILIA PETRODACTYLA.

Pterophorus petrodactylus Walk., Cat. Lep. Het., Vol. XXX., pp. 940, 941 (1864).

Platyptilus petrodactylus Wlsm., Pter. Cal. and Ore., p. 20, Plate II., fig. 15 (1880).

Expanse of wings, 23 mm. Head, thorax and abdomen shaded cinereous. Legs cinereous, slightly thickened at the joints; the spurs apparently of equal length.

Fore wings white, shaded with cinereous or ashy brown; costa brownish beyond the middle; an oblique brownish fuscous line,

starting from the costa before the apex, extends inward more obliquely than the outer margin, but does not reach the fissure. This line is widest on the costa, tapering to a point inwardly, and is darker at its lower end. Fringes white within the fissure, with a cinereous line near their bases, shaded with fuscous at the anal angle. Hind wings pale cinereous; fringes slightly darker towards the end of the feathers.

Habitat. — Arctic America. Early stages and food plant unknown.

Platyptilia adusta.

Platyptilus adustus Wlsm., Pter. Cal. and Ore., p. 5, Plate I., fig. 4 (1880).

Expanse of wings, 23 mm. Head, frontal tuft, thorax and abdomen fawn color, with a brownish tinge. Legs pale fawn color, with the feet and anterior parts of the tibiæ slightly paler.

Fore wings fawn color, somewhat streaked with a paler tint; the costa much darker. Fringes but little paler than the wings, but with a fine brown basal line. Hind wings fawn color, the first and second feathers slightly darker than the fore wings.

Habitat. — California. Early stages and food plant unknown.

Platyptilia albiciliata.

Platyptilus albiciliatus Wlsm., Pter. Cal. and Ore., p. 17, Plate I., fig. 13 (1880).

Expanse of wings, 24 mm. Head cinnamon brown; frontal tuft short. Thorax grayish brown. Hind legs cinereous; feet and spurs paler.

Fore wings cinnamon brown, with a slight grayish tinge on the costa and outer margin. Fringes whitish except at the base, where they are of the same color as the wing. Hind wings pale brown, with the fringes paler at the base.

Habitat. — California. Early stages and food plant unknown.

Platyptilia albicans.

Platyptilia albicans Fish, Can Ent., Vol. XIII., p. 71 (1881).

Expanse of wings, 22 mm. Head and thorax cream color, frontal tuft short and blunt. Palpi extending beyond frontal tuft, slightly ascending. Antennæ cinnamon brown, dotted above with white. Abdomen ochreous, lighter at base. Legs whitish, anterior and middle femora and tibiæ cinnamon brown, sprinkled

with whitish scales; tarsi cinereous, first two segments whitish interiorly; posterior tibiæ cream color, brownish just before the spurs.

Fore wings creamy white along the hind margin, on the costa cinnamon brown; costal triangular spot cinnamon brown, bordered outwardly above the fissure by a broad white line; below the fissure its apex is continuous with the brownish color of the second lobe. Both lobes cinnamon brown, with a transverse white line not reaching the hind margin of the second lobe. Fringes cream color, sprinkled with cinnamon brown. Hind wings cinnamon brown, with fringes concolorous.

Habitat. — Nevada. Early stages and food plant unknown.

Platyptilia tesseradactyla.

Alucita tesseradactyla Linn., Fn. Suec., p. 370 (1761).

Expanse of wings, 16–20 mm. Head, palpi and frontal tuft grayish brown. Antennæ whitish, dotted above with dark brown. Thorax gray in front, white behind.

Fore wings whitish, heavily dusted with brownish gray. The somewhat indistinct brownish triangle on the outer third of the costa is followed by a whitish spot, and a subterminal white line crosses both lobes.

Habitat. — Europe, Massachusetts. Food, *Gnaphalium dioicum*, *G. arenarium*.

"The egg is pale green, smooth and somewhat elongated, and the larva in its earliest stage is clear white with isolated hairs. Head, thoracic and anal shields black. Later (in September) the dorsal and lateral rows of rust-brown points appear, and in March, after hibernating, it becomes stout without increasing very much in length. The head, thoracic and anal shields are dark brown; dorsal stripe is crimson rust color; the subdorsal and lateral lines are of the same color but finer. The ground color of the body is yellowish above and rust red beneath. The adult larva is a little smaller at each end and cylindrical in the middle. The head is small and black, the thoracic shields small, black divided by a light line. The color of the body is dark ferruginous brown. On the back stand whitish flecks with two pairs of black tubercles on each segment, of which the hinder are placed farther from each other than those in front; similar tubercles occur on the sides, from which arise long light hairs. The anal shield and legs are dark brown. These larvæ frequently vary in the tone of the color." (Gartner.)

PLATYPTILIA MARGINIDACTYLA.

Pterophorus marginidactylus Fitch, N. Y. Rep., Vol. I., p. 848 (1854).
Pterophorus nebulœdactylus Fitch, N. Y. Rep., Vol. I., p. 849 (1854).
Platyptilus Bertrami. Roessl., Wien. Mts., Vol. VIII., p. 54 (1864).
Platyptilus Bischoffii Zell., Stett. Ent. Zeit., Vol. XXVIII., p. 333 (1867).
Platyptilia Bertrami Zell., Stett. Ent. Zeit., Vol. XXXIV., p. 135 (1873).
Platyptilia Bischoffii Zell., Verh. z.-b. Ges., p. 317 (1873).
Pterophorus cervinidactylus Pack., Ann. Lyc. N. Y., Vol. X., p. 266 (1873).
Platyptilus bertrami Wlsm., Pter. Cal. and Ore., p. 3, Plate I., fig. 3 (1880).
Platyptilia bertrami Tutt, Mon., p. 31 (1891).
Platyptilia Bertrami Mey., Brit. Lep., p. 434 (1895).
Platyptilia Bertrami Hof., Deut. Pter., p. 55 (1895).

Expanse of wings, 22–28 mm. Head, palpi, frontal tuft, thorax and abdomen pale ochre yellow, the collar and outside of the palpi sometimes a little darker. Palpi and frontal tuft of nearly equal length, extending forward of the head a distance equal to the length of the head. Antennæ whitish, dotted above with dark brown. All the coxæ, femora, anterior and middle tibiæ brownish yellow on the outside, whitish within. Hind tibiæ whitish at the base, dull brown on the outer half. All the tarsi whitish, except in some examples the segments of the hind tarsi are touched with dull brown. Fore wings somewhat falcate at the end of the first lobe, pale ochre yellow, fuscous along the costal edge, broken by an oblique light shade above and a little beyond the end of the fissure, within which a darker shade extends from the costa across the cell containing two brownish dots, one on each angle of the cell. The anterior dot is seldom present and often both are absent. An elongated ochre yellow spot rests on the cell halfway between the discal dots and the base of the wing, a second elongated spot on the hind margin at the base and another near the middle of the wing. The lobes are somewhat darker at the outer end, sometimes with an indication of a pale subterminal line. Fringes whitish, with a darker shade outwardly, and with a dark-brown basal line which extends a little into the fissure. The darker ochre yellow spots are often extended so that nearly the whole surface of the wing is of this color. Hind wings dark

ochreous fuscous, with a more or less distinct cluster of dark scales near the middle of the hind fringe of the third feather.

The genitalia are represented on Plate III., figs. 4 and 5. For the sake of comparison the genitalia of *P. ochrodactyla* are represented on the same plate, figs. 14 and 15. These were made from specimens received from Professor Zeller, and labelled in his own handwriting.

The above description was drawn up from one hundred and thirteen American specimens.

Habitat. — Europe; Canada, Maine, New Hampshire, Massachusetts, New York, Pennsylvania, Colorado, California, Oregon. Food, Yarrow (*Achillea millefolium*).

In some unpublished notes received from Mr. Charles Fish, I find the following statement: "Received from Mr. J. Elwyn Bates, on June 30, 1881, some eggs of *Plat. bischoffii*, which were laid June 24, to the number of twenty-four. They were 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." There was no note made as to whether these eggs hatched, or not.

Different stages of the larva have been described by several writers in Europe, and the mature larva is briefly described as follows: "Larva green; dorsal line darker or somewhat brownish tinged; subdorsal and lateral gray whitish; subspiracular white; head whitish yellowish." (Meyrick.)

"The pupa is a little over half an inch long, with 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 color is bright pale green, dorsal line dark green, edged on the thorax with white; beak white above, rust color on the sides; there is a conspicuous streak of this rust color on the hind part of the thorax, and the same color 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." (Porritt.)

The insects before me, so far as the labels indicate, were on the wing in Maine, June 24; Massachusetts, from the 10th to the 27th

of June; New York, from June 23 to July 17; Missouri, in May; Colorado, from the 11th to the 16th of June; California, June 1 to 18.

I have seven European species of *Platyptilia* in my collection, all named by Professor Zeller. Five of these are males, and an examination of the genitalia proves that one which Zeller named *bertrami* is *ochrodactyla* and one named *ochrodactyla* is *bertrami*. They approach each other so closely in form and coloration that it is not surprising that they should have been considered conspecific for so long a time, and that there should have been so much discussion about the matter in the European journals. Mr. Tutt has given an excellent resumé of this discussion in his "Monograph of the Pterophorina of Britain." Mr. Tutt suggests that Haworth's *pallidactyla* is identical with *bertrami*, and in that case it should take precedence, but until this is adopted we must accept the name *marginidactyla* Fitch, which is ten years older than *bertrami*.

The types of Fitch now belong to my collections; and I have made a critical examination of the genitalia, and they agree perfectly with the genitalia of *bertrami*.

Genus ALUCITA Linn., Syst. Nat., Ed. X., p. 542 (1758).

Vertex smooth; front smooth or a little swollen, closely scaled; antennæ with a thickened basal segment. Palpi slim, porrect or somewhat ascending, the third segment shorter than the second, pointed and sometimes bent down a little. Anterior and middle tibiæ very slightly thickened at the end; hind tibiæ without thickening of scales. Abdomen moderately slim, the second and third segments not much longer than the others. Fore wings fissured half their length or a little more, the lobes running to a point and bent backward somewhat, especially the second lobe. Feathers of the hind wings all of the same form, linear and pointed, without a cluster of dark scales in the fringe of the third feather.

Synopsis of the Species.

Ground color of the fore wings white, ... *montana.*
Ground color of the fore wings yellowish white, . . *cinerascens.*
Ground color of the fore wings gray, ... 2.
Expanse of wings, 18 mm., ... *belfragei.*
Expanse of wings, 25 mm., ... *walsinghami.*

Alucita walsinghami, n. s.

Expanse of wings, 25–26 mm. Head, thorax and abdomen grayish white. Legs pale brown.

Fore wings grayish white, brownish along the extreme costal margin; a more or less obsolete brown spot on the middle of the cell and three darker brown spots in the whitish costal fringe of the first lobe, one nearly over the end of the fissure, one at the middle and one near the end of the lobe. Remaining fringes pale brown, white at the end of the fissure, along the middle of the costa of the second lobe, just before the apex of the hind margin, near the base of the lobe and beneath the outer fourth of the cell. Hind wings and fringes pale brown.

Nearly related to *A. volgensis* Moesch., from Sarepta, Russia.

Described from four examples from Colorado, and named in honor of Lord Walsingham, who has made most valuable contributions to our knowledge, not only of North American Pterophoridæ, but also of other microlepidoptera.

Early stages and food plant unknown.

ALUCITA BELFRAGEI.

Aciptilus Belfragei Fish, Can. Ent., Vol. XIII., p 142 (1881).

Expanse of wings, 18 mm. Head brownish gray. Palpi brown above, whitish beneath. Antennæ whitish, dotted with pale brown above. Thorax pale ochreous gray in front; hind portion and abdomen pale grayish ochreous, striped longitudinally with fine white lines and marked with dark streaks. Legs pale grayish; fore and middle femora striped longitudinally with whitish and dark brown lines; tarsi pale ochreous, with shadings on the outer side; hind tibiæ and tarsi pale ochreous; spurs tipped with brown.

Fore wings pale ochreous gray, dusted with brown scales; an oblique dark-brown patch at the base of the fissure, bordered posteriorly with white; a small brown spot midway between this and the base of the wing; two longitudinal brown spots on the outer third of the costa of first lobe and one or two brown dots on the outer margin of the same lobe near the apex. Fringes pale brown except at the apex of the second lobe, where they are white. Hind wings brownish cinereous. Fringes pale brown.

Habitat. — Texas. Early stages and food plant unknown.

ALUCITA MONTANA.

Aciptilus montanus Wlsm., Pter. Cal and Ore., p. 59, Plate III., fig. 14 (1880).

Expanse of wings, 16 mm. Head white, antennæ faintly dotted above with brownish. Thorax, abdomen and legs snow white; the fore and middle legs brownish on the inner side.

Fore wings snow white, sprinkled with ferruginous-brown scales, especially on the outer half of the costa; a spot of these scales before the base of the fissure runs obliquely to a darker spot on the costa, and this is nearly connected by a dark shade with another brown costal spot near the apex; a dark-brown fine streak on the outer half of the costa of the second lobe extends through the fringe under the apex; all of the rest of the fringe is snow white. Hind wings dusted with cinereous brown.

Habitat. — California, New York.

"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 larvæ 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." (Kellicott.)

ALUCITA CINERASCENS.

Aciptilus cinerascens Wlsm., Pter. Cal. and Ore., p. 57, Plate III., fig. 13 (1880).

Expanse of wings, 19 mm. Head slightly ochreous; palpi very short; antennæ pubescent, pale ochreous. Thorax whitish, especially in front, where two indistinct dark lines run forward to the head. Abdomen pale ochreous. Legs whitish, the fore and middle pairs tinged with brown on the inner side.

Fore wings very pale ochreous, dusted thickly with brownish, forming a large spot before the base of the fissure; a subcostal spot before the middle and two small costal spots on the outer half of the first lobe. Fringes below the apex of first lobe and on the apex of the second lobe dark brown; pale subochreous within the fissure, with a brownish spot on the hind margin. Hind wings and fringes pale cinereous; under side pale brownish.

Habitat. — California. Early stages and food plant unknown.

GENUS PTEROPHORUS Geoff., Hist. Ins., Vol. II., p. 90 (1764).

Vertex and front smooth; palpi short, not reaching beyond the head or but very slightly; porrect, or slightly ascending, the third segment short and sometimes bent down a little; antennæ with a thickened basal segment. Anterior and middle tibiæ only slightly thickened at the end; hind tibiæ without a thickening of scales.

Fore wings fissured about one-third of their length; both lobes pointed, the hind lobe in some species with a scarcely perceptible anal angle. Feathers of the hind wings unlike in form, with long fringes and without a black scale cluster. The upper angle of the cell is very acute, formed by the very oblique cross vein.

SYNOPSIS OF THE SPECIES.

1. Fore wings remarkably narrow, dirty white, . *agraphodactylus.*
   Ground color of the fore wings snow white, ... 2.
   Ground color of the fore wings bluish white, . . . *brucei.*
   Ground color of the fore wings pale sulphur yellow, *sulphureodactylus.*
   Ground color of the fore wings pale straw color, . . . 4.
   Ground color of the fore wings cream white, ... 5.
   Ground color of the fore wings pale brownish white, . *rileyi.*
   Ground color of the fore wings very pale brownish gray, . 6.
   Ground color of the fore wings ochre yellow, . . . 8.
   Ground color of the fore wings brown or dark gray. 14.

2. { Expanse of wings less than 21 mm., ... *fishii.*
   { Expanse of wings more than 21 mm., ... 3.

3 { Expanse of wings between 23 and 25 mm., . . . *elliottii.*
  { Expanse of wings more than 25 mm., . . . *homodactylus.*

4. { Costa of first lobe of fore wing indistinctly brownish, *stramineus.*
   { Costa of first lobe of fore wing not marked with brown, *angustus.*

5. { Expanse of wings 24 mm., ... *helianthi.*
   { Expanse of wings 28 mm., ... *subochraceus.*

6. { Fore wings with a brown spot at the end of the fissure, . 7.
   { Fore wings unspotted, ... *inconditus.*

7. { Fore wings sprinkled with black scales, . . *mathewianus.*
   { Fore wings not sprinkled with black scales, . . *paleaceus.*

8 { With three or four terminal brown spots on outer margin of second lobe, ... *kellicottii.*
  { Without this character, ... 9.

9. { Pale ochre yellow without any markings, . . . *grandis.*
   { With more or less markings, ... 10.

10. { An oblique reddish brown shade from costa to fissural spot, *cretidactylus.*
    { Without this character, ... 11.

11. { Second lobe of a lighter color than the rest of the wing, *baroni.*
    { Without this character, ... 12.

12. { A brown costal streak over the end of fissure, . . . 13.
    { Without this character, ... *guttatus.*

13. { Expanse of wings 28 mm., ... *cineraceus.*
    { Expanse of wings 22 mm., ... *gratiosus.*

14. { With tuft of scales near middle of hind tibiæ, . *monodactylus.*
    { Without this character, ... 15.

15. { Expanse of wings less than 20 mm., ... 16.
    { Expanse of wings more than 20 mm., ... 17.

16. { Costa of first lobe with two dark brown spots, . *inquinatus.*
    { Costa of first lobe without two dark brown spots, . . *parvus.*

17. { Costal region light yellowish brown, ... *eupatorii.*
    { Costal region dark, ... 18.

18 { Outer fourth of costa mostly white,. . . . *griseseens.*
   { Outer fourth of costa with but little white, . . . *lugubris.*

Pterophorus fishii.

Alucita fishii Fern., Can. Ent., Vol., XXV., p. 95 (1893).

Expanse of wings, 20 mm. Thorax and abdomen white. Legs white slightly tinged with brownish.

Fore wings white with a few brown scales scattered over the costal portion before the fissure, forming a faint costal triangular patch, beyond which are two equidistant brown spots on the costa. Fringes pure white. Hind wings and fringes pure white. Described from one specimen with the head wanting.

Habitat. — Nevada. Early stages and food plant unknown.

PTEROPHORUS HOMODACTYLUS.

Pterophorus homodactylus Walk., Cat. Lep. Het., Vol. XXX., p. 941 (1864).
? *Leioptilus hololeucos* Zell., Lep. Westk. Am., p. 23 (1874).
Lioptilus homodactylus Wlsm., Pter. Cal. and Ore., p. 50, Plate III., figs. 8, 9 (1880).

Expanse of wings, 22–27 mm. Head white, palpi and antennæ whitish. Thorax and abdomen white. Legs white, slightly tinged with cinereous.

Fore wings white, very slightly dusted on the costa with brownish scales; a brownish spot before and slightly below the base of the fissure; a group of indistinct brownish scales between this and the base of the wing; a faint indication of two brownish dots on the outer margin. Hind wings and fringes pure white, with a silky lustre. In some specimens the brownish spots are absent.

A variety of this species has the head brown behind and in front, the palpi brownish and antennæ dingy white. Fore wings more heavily dusted with brown scales, fringes tinged at the tips around the obsolete anal angle with pale cinereous. Hind wings and fringes very pale cinereous. Legs white, first two pairs touched with brownish on their inner sides.

A specimen of this species was sent by Lord Walsingham to Professor Zeller, who remarked: "Only larger, otherwise agreeing with *Lioptilus hololeucos* Zeller; on the right anterior wings it has also two dots."

Habitat. — South America, California, Oregon. Food, *Solidago*, *Eupatorium purpureum*.

"*Larva.* — Length, .55 of an inch; pale yellowish green; dorsal line sharply defined, white; subdorsal and stigmatal lines similar; the top of each ring from the second to the tenth bears a minute circle of white interrupting the dorsal line. The dorsal spaces of each ring from the fourth to the eleventh bear a pair of tubercles on either side of the middle line, from these proceed rather long, stiff, hoary, smooth hairs; the thoracic and terminal rings have a single papilla in place of the pairs. These tubercles stand in a light stripe. Below them a single tubercle with similar appendages; below the spiracles a larger one with a minute one back of it bearing three or four hairs, also one above the line of the feet. Legs and ventral surface hairy. The anterior half of the first ring bears many hairs, which hang over the head somewhat. Spiracles round, rim white; back of each there is a short, stiff hair. Head almost colorless, except mouth organs and ocelli;

epicranial suture deep; cranial lobes hemispherical, with scattered hairs.

"The pupa measures .45 of an inch. It is light pea green, turning white before the moth escapes. There is a clear dorsal space with an interrupted white line in the middle; also white lines on the lateral faces. The tubercles are set with hairs exactly as in the larva, so the pupa is quite conspicuously clothed; the head and thorax support shorter hairs arising singly from the surface; short, dusky hairs stand in rows on the wing covers, apparently outlining the veins; there is a similar row on the antennæ covers. The pointed cremaster ends with many hooklets, which fasten the pupa securely to the leaf, on which a tuft of silk has been spun by the larva. The thorax is quite obliquely truncated; seen from below, it is slightly bilobed, rendered so by the prominent origin of the antennæ covers; between the lobes there is a slight tufted tubercle." (Kellicott.)

PTEROPHORUS BRUCEI, n. s.

Expanse of wings, 24–26 mm. Head and thorax pale ashy gray, with the tegulæ much lighter.

Fore wings white, with a few brown scales scattered over the surface, most numerous basally and along the costa. An elongated brown spot on the cell near the basal third of the wing; a triangular brown spot on the end of the cell immediately before the fissure, indistinctly connected with an elongate brown spot on the costa above the end of the fissure; a similar spot occurs near the middle of the costa of the first lobe. Fringe of first lobe whitish on the costa and fuscous from the base of the cleft to the apex, immediately before which it is cut with white, and there is a brown spot on the wing at the base of the white. Fringe of second lobe fuscous within the cleft and whitish elsewhere. Hind wings pale fuscous, with the fringes a little darker than the surface of the feathers.

Early stages and food plant unknown.

Described from three examples collected in Colorado by Mr. David Bruce, whose work in the west has enriched many museums and private collections.

PTEROPHORUS ELLIOTTII.

Alucita elliottii Fern., Can. Ent., Vol. XXV., p. 95 (1893).

Expanse of wings, 23–25 mm. Head very pale fuscous. Thorax and abdomen whitish fuscous. Legs white.

Fore wings white, tinged more or less with ochre yellow near the base and on the apical third of the costa; a very oblique streak of brown scales on the costa near the apex and a dark-brown spot before the fissure; a streak of irregular brown scales extends from the base of the wing to the fissure. Fringes white. Hind wings pure white, with a few ochre yellow scales scattered over the surface in some specimens. Fringes white.

Habitat. — New York. Early stages and food plant unknown.

PTEROPHORUS SUBOCHRACEUS.

Lioptilus subochraceus Wlsm., Pter. Cal. and Ore., p. 53, Plate III., fig. 10 (1880).

? *Pterophorus lacteodactylus* Cham., Can. Ent., Vol. V., p. 73 (1873).

Having no example of this species from California, I copy Lord Walsingham's description: —

"Head whitish above; face and neck brownish; palpi very short, not projecting as far as the front of the head; antennæ whitish ochreous, with the basal joint brown.

"Fore wings pale subochreous, without spots or markings, except a rather oblique delicate ferruginous shade above the base of the fissure, reaching the costa before the apex; the cilia about the dorsal margin of the second lobe are slightly tinged with brownish. Hind wings very pale brownish straw color. Legs whitish.

"Expanse, 28 mm."

Habitat. — California. Early stages and food plant unknown.

I have the type of *lacteodactylus* before me, and the head and palpi agree perfectly with the above description, but the wings are somewhat worn. Without seeing an authentic specimen of *subochraceus*, I do not feel prepared to pronounce them identical. I have two specimens from Massachusetts which were supposed to be *subochraceus*, by Mr. Fish, and from which the drawings of the genitalia on Plate IV. were made. In these specimens the palpi are longer than in *lacteodactylus*, and I do not think they are the same.

PTEROPHORUS HELIANTHI.

Lioptilus helianthi Wlsm., Pter. Cal. and Ore., p. 54, Plate III., fig. 11 (1880).

Expanse of wings, 24 mm. Head and thorax whitish; palpi brownish; antennæ white, dotted with brown above. Abdomen whitish. Legs whitish, dotted with brown on the under side of the segments.

Fore wings cream white, with a few scattered brown scales; a brown spot before the base of the fissure and another between that and the costa, upon which is a brown line; the apex of each lobe sprinkled with brown, and on the apex of the first lobe are two or three small brown spots or dashes. Fringes cream white, tinged with brown on the outer margin. Hind wings very pale cinereous; fringes slightly darker about the ends of the feathers.

Habitat. — Southern Oregon. Food plant, *Helianthus*.

PTEROPHORUS STRAMINEUS.

Lioptilus stramineus Wlsm., Pter. Cal. and Ore., p. 41, Plate III., fig. 3 (1880).

Expanse of wings, 19 mm. Head yellowish brown above and in front, yellowish white between the antennæ; palpi and antennæ pale straw color above, brownish beneath. Thorax, abdomen, legs and spurs pale straw color. Fore wings straw color, with a slightly brownish streak extending from the base along the lower half of the wing, and one running obliquely on the costa, pointing inward toward a brown spot at the base of the fissure. Fringes grayish, slightly tinged with brown. Hind wings and fringes pale grayish brown.

Habitat. — Southern Oregon. Early stages and food plant unknown.

PTEROPHORUS ANGUSTUS.

Lioptilus angustus Wlsm., Pter. Cal. and Ore., p. 43, Plate III., fig. 4 (1880).

Expanse of wings, 18 mm. Head very pale straw color; palpi straw color above, tinged with brownish on the sides; antennæ whitish, with indistinct ochreous spots above. Thorax and abdomen pale straw color. Legs whitish.

Fore wings narrow, very pale straw color tinged with ochreous; a dark fuscous dot at the base of the fissure. Fringes very pale straw color except at the outer end of the fissure above and below where they are grayish. Hind wings pale cinereous; fringes paler.

Habitat. — California. Early stages and food plant unknown.

It differs from *stramineus* in having no costal streak.

PTEROPHORUS SULPHUREODACTYLUS.

Pterophorus sulphurcodactylus Pack., Ann. Lyc. Nat Hist., N. Y., Vol. X., p. 266 (1873).

Lioptilus sulphureus Wlsm., Pter. Cal. and Ore., p. 48, Plate III., fig. 7 (1880).

Expanse of wings, 25 mm. Head ochreous. Palpi whitish yellow, streaked with ochreous; antennæ long, yellowish, tinged

with fuscous. Thorax and abdomen sulphur yellow, streaked with ochreous scales. Legs whitish ochreous, streaked with brown.

Fore wings with the first lobe produced into a very acute point, the second lobe broad halberd-shaped, unspotted, clear sulphur yellow, slightly tinged with brownish on the outer fourth of the costa. A minute brown dot before the base of the fissure. Fringes pale yellowish white, cinereous on the hind margin. Hind wings whitish, thickly dusted with cinereous. Fringes concolorous.

Habitat. — California. Early stages and food plant unknown.

Pterophorus mathewianus.

Leioptilus Mathewianus Zell., Lep. Westk. Am., p. 23 (1874).

Expanse of wings, 24 mm. Head brownish gray behind; palpi whitish gray; antennæ dust gray, faintly annulated on the basal third with whitish. Thorax and abdomen whitish gray. Legs light gray, all the femora and tibiæ brownish ochre, lightest on hind legs.

Fore wings pale reddish gray, sprinkled with black scales, especially on the margin. A diffuse brown dot on the cell, nearer to the base of the wing than to the fissure. Before this is a more distinct dot, variable in form and size, and sometimes a pale dot at the base of the second lobe. A white longitudinal spot under the first-named dot, and before the same an almost pure white stripe runs to the fold, where it widens and sends out a slender line through the middle of the second lobe to its outer margin. A dark-brown line bordered with white on each side runs to the dot on the fissure, and a brown indistinct dot rests on the middle of the first lobe; two brown spots on the apex of the second lobe and a short brown cross line at the base of the fringes of the outer margin. Hind wings clear brownish gray, with a silky luster.

Habitat. — Vancouver Island. Early stages and food plant unknown.

Pterophorus paleaceus.

Leioptilus paleaceus Zell., Beitr., p. 126 (1873).
Lioptilus paleaceus Wlsm., Pter. Cal. and Ore., p. 41, Plate III., fig. 2 (1880).
Leioptilus sericidactylus Murtf., Am. Ent., Vol. III., p. 235 (1880).

Expanse of wings, 21–25 mm. Head yellowish brown, pale between the antennæ; antennæ whitish. Thorax dull yellowish white. Abdomen dull yellowish, with fine longitudinal brownish

lines. Legs yellowish white, with fuscous shadings on the under side.

Fore wings very pale brownish gray, with a brownish spot before the fissue. Fringes concolorous with the lobes. Hind wings of the same color as the fore wings. Fringes paler, except at the apices.

Habitat. — Ohio, Illinois, Missouri, Texas, California, Oregon. Food, Iron Weed (*Vernonia noveboracensis*).

An examination of the genitalia of the types of *paleaceus* and also of *sericidactylus* proves them to be identical.

"*Larva.* — Length, 0.55 inch; diameter, 0.10 inch; form, subcylindrical. 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 medio-dorsal 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 lateral yellow stripes. In the fall brood the dorsum is pale yellow or flesh color, with two fine, indistinct, medio-dorsal lines of lilac color; subdorsal ridge pale, inclining to lilac on outer side. In subdorsal 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, the stigmata. On the thorax the dark stripes are represented by two slightly diverging dashes on each side. Situated in the subdorsal 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." (Murtfeldt.)

PTEROPHORUS AGRAPHODACTYLUS.

Pterophorus agraphodactylus Walk., Cat. Lep. Het., Vol. XXX., p. 94 (1864).
Lioptilus agraphodactylus Wlsm., Pter. Cal. and Ore., p. 46, Plate III., fig. 6 (1880).

I have not seen this species, and therefore quote Lord Walsingham's description: —

"Head whitish in front, touched with brownish ochreous towards the thorax and in front; antennæ whitish, browner beneath; palpi very short. Thorax yellowish white.

"Fore wings remarkably narrow, dirty white, with a faint yellowish tinge, streaked longitudinally with faint slender lines of brownish gray, apparently following the neuration; the widest and most conspicuous of these runs parallel to the costa from the base of the wing to the middle of the anterior lobe, where it is diffused in a faint shade towards the costa, sending two slender and scarcely discernible lines to the apex and inner margin. There are two slender brownish-gray lines on the dorsal half of the wing, the upper one, coming from the base, passing below the cleft, where it throws off a branch beneath and running along the upper edge of the second lobe to its apex; the lower coming also from the base, and attaining the dorsal margin below the base of the cleft. The costa pale; the cilia tinged with gray. Hind wings and fringes pale cinereous. Abdomen and legs slightly yellowish white. Under side uniformly pale cinereous, except the costa and the fringes of the anterior lobe within the fissure which are whitish.

"Expanse, 25 mm."

Habitat. — St. Domingo, Southern Oregon. Early stages and food plant unknown.

PTEROPHORUS INCONDITUS.

Lioptilus inconditus Wlsm., Pter. Cal. and Ore., p. 44, Plate III., fig. 5 (1880).

Expanse of wings, 19 mm. Head pale brownish gray, paler between the antennæ; palpi brownish gray; antennæ pubescent,

whitish, the basal segment enlarged and with a few erect scales on its inner side; thorax and abdomen slightly tinged with yellowish. Legs yellowish white.

Fore wings very pale brownish gray or bone color, without any markings except faint traces of darker lines upon some of the veins. Fringes slightly paler than the wings. Hind wings and fringes very slightly darker, with a more decided cinereous tinge. Under side of all the wings brownish gray, with the costal margin of the fore wings slightly paler.

Habitat. — California, Washington, D. C. Early stages and food plant unknown.

PTEROPHORUS PARVUS.

Lioptilus ? parvus Wlsm., Pter. Cal. and Ore., p. 55, Plate III., fig. 12 (1880).

As I have no example of this species, I quote Lord Walsingham's description: —

"Head grayish white, a scarcely paler frontal tuft projecting slightly above the long, well-clothed but sharply pointed palpi, which are about twice the length of the head; antennæ pubescent, grayish.

"Fore wings cleft to scarcely one-third of their length, with no posterior angle to the upper lobe, which is rather narrow, acuminate and appressed at the apex, dusty grayish, sprinkled with fuscous scales, which form an elongate shade, extending from an ill-defined antemedian fuscous dot to the base of the anterior and to the apex of the posterior lobe; a small fuscous dot lies immediately before and slightly below the base of the fissure; there is a slight fuscous shade along the posterior margin of the upper lobe, of which the costal portion is rather pale ochreous; the costa itself whitish. The cilia along the apical margin of both lobes are grayish, spotted along their base with four or five groups of fuscous scales, of which one is at the extreme apex of the upper lobe. The anal angle appears to be slightly more defined in the second lobe of the fore wings, and the fissure rather wider at the base than is usual in this genus. Hind wings cinereous. Abdomen grayish white; the legs whitish, first two pairs touched at the sides with grayish fuscous. The first pair of spurs on the hinder tibiæ are unequal in length; the second pair equal to the longest of the other two.

"Expanse, 15 mm."

Habitat. — California. Early stages and food plant unknown.

PTEROPHORUS KELLICOTTII.

Lioptilus Kellicottii Fish, Can. Ent., Vol. XIII., p. 141 (1881).

Expanse of wings, 28–30 mm. Head ochreous brown, whitish between antennæ. Palpi rather long and slender, second segment with a small tuft of raised scales on the upper side at the extremity. Antennæ pale ochreous, brownish beneath; thorax and abdomen pale brownish ochreous, the latter striped longitudinally with pale brown lines. Fore and middle legs brownish ochreous; hind legs whitish ochreous, tarsi paler.

Fore wings pale ochreous, dusted more or less with brownish scales, which in some examples form longitudinal streaks on the costa and basal half of the median space; a dark-brown dot on the base of fissure; two brown dashes on the costa near the apex, one on the hind margin of first lobe near the apex, usually four at the end of the second lobe on veins 2, 3, 4 and 5. Fringes concolorous. Hind wings, also under side of all the wings, cinereous brown, with a silky lustre. Fringes darker.

Habitat. — New York. Food, *Solidago*.

"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, bearing 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 brown 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 larvæ obtained in May differ but slighty 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 pupæ of certain stem-boring beetles. The wing and limb covers are free for a considerable distance from their tips." (Kellicott.)

Pterophorus grandis.

Lioptilus grandis Fish, Can. Ent., Vol. XIII., p. 141 (1881).

Expanse of wings, 34 mm. Head, palpi, antennæ, thorax and abdomen of nearly a uniform pale brownish-ochreous color. Legs brownish ochreous, with tarsi somewhat lighter.

Fore wings pale brownish ochreous, in some species with a few scattered faint brownish dots on the second lobe. Fringes slightly darker. Hind wings very slightly browner than fore wings, with the fringes still darker.

Habitat. — California. Early stages and food plant unknown.

Pterophorus rileyi, n. s.

Expanse of wings, 29–31 mm. Head, thorax and fore wings pale brownish white or bone color. Back of head and collar dull cinnamon brown.

Fore wings more or less sprinkled with brown scales, especially along the costa and on the outer half of the cell; an oblique brown line at the end of the cell extends upward in the direction of a brown costal streak, between which and the apex are generally two equidistant brown dots, and there is a similar one on the cleft within the apex. Three brown dots occur on the outer margin of the second lobe, one on the apex, one on the middle and one on the anal angle. Hind wings pale fuscous, darker than the fore wings.

Early stages and food plant unknown.

Described from seven examples taken in September, in Placer County, California, and presented to the National Museum by the late Dr. C. V. Riley, to whose memory I dedicate this species.

PTEROPHORUS MONODACTYLUS.

Alucita monodactyla Linn., Syst. Nat., Ed. X., Vol. I., p. 542 (1758).
Pterophorus cineridactylus Fitch, N. Y. Rep., Vol. I., p. 848 (1854).
Pterophorus nævosidactylus Fitch, N. Y. Rep., Vol. I., p. 849 (1854).
Pterophorus pergracilidactylus Pack., Ann. Lyc. N. Y., Vol. X., p. 265 (1873).
Pterophorus monodactylus Wlsm., Pter. Cal. and Ore., p. 39, Plate II., fig. 16; Plate III., fig. 1 (1880).

Expanse of wings, 22–26 mm. Head and thorax pale gray, sprinkled with brown scales. Palpi short, tipped with brown; antennæ grayish white, spotted with fuscous above. Abdomen grayish ochreous, striped with fuscous and brown scales on the sides; a dorsal row of brown dots, one at the base of each segment. Legs grayish, with the joints enlarged and covered with brownish hairs; a tuft of scales near the middle of the hind tarsi on the side opposite the spurs.

Fore wings varying from pale grayish to pale reddish brown, often mixed with white and sometimes with a few black scales; stripes or streaks of dark brown or blackish scales on the costa and hind margin; before the fissure a brown spot, sometimes tapering to a point toward the base; an elongated spot of brown scales on the costa, half-way between the latter and the apex, with two smaller ones between it and the apex; one or more small blackish dots on one or both lobes near the apex. Fringes grayish, tinged with fuscous on the outer third of fissure. Hind wings gray or fuscous, with a silky lustre; fringes slightly darker.

This species is exceedingly variable both in color and markings, some examples being very light with but few spots, while others are reddish brown.

Habitat. — Europe; Maine to California. Food, *Convolvulus sepium*, *Convolvulus arvensis*, *Chenopodium album*, *Atriplex patula*.

"*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 color bright yellowish green, more decid-

edly 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 color along the spiracular region, and the space between it and the spiracles is prickled with streaks and spots of the same color. Spiracles black, hairs grayish. Ventral surface, legs and prolegs uniformly pale green. The pupa, although attached by the tail, was laid flat along the top of the cage." (Porritt.)

PTEROPHORUS CRETIDACTYLUS.

Pterophorus cretidactylus Fitch, N. Y. Rep., Vol. I., p. 849 (1854).
Œdematophorus occidentalis Wlsm., Pter. Cal. and Ore., p. 37, Plate II., figs. 13, 14 (1880).
Pterophorus cretidactylus Fern., Can. Ent., Vol. XXV., p. 96 (1893).

Expanse of wings, 26 mm. Head whitish ochreous, slightly tinged with fawn color on the front; palpi fawn color; antennæ whitish, faintly spotted with fawn color; thorax whitish ochreous. Abdomen fawn color. Fore and middle legs white, with dark, brush-like tufts on the joints; hind legs tinged with fawn color, whitish on the inner sides; segments slightly thickened, not annulated.

Fore wings whitish ochreous, the costa, apex and hind margin tinged with fawn color; a dark fawn-colored spot before the base of the fissure, more or less connected obliquely with an elongated spot of the same color on the costa; a light space on each side of the costal spot. Fringes whitish ochreous, tinged with pale fawn color. Hind wings and fringes lustrous, pale fawn color.

Habitat. — New York, California. Early stages and food plant unknown.

PTEROPHORUS EUPATORII.

Œdematophorus cretidactylus Zell., Lep. Westk. Am., p. 22 (1874).
Œdematophorus cretidactylus Wlsm., Pter. Cal. and Ore., p. 35 (1880).
Œdematophorus cretidactylus Kell., Bull. Buf. Soc., Vol. IV., p. 2 (1882).
Alucita eupatorii Fern., Can. Ent., Vol. XXV., p. 96 (1893).

Expanse of wings, 22–24 mm. Head dull reddish brown; thorax pale brown; legs brown, darker at the middle and ends of the tibiæ; segments of the tarsi white at the base and brown at the tips; spurs white in the middle and brown at the tips.

Fore wings pale ochre yellow, whitest on the costal portion, and sprinkled with dark-brown scales to such an extent as to give them a wood-brown color. These dark-brown scales form an antefissural spot, which in some specimens is concave on the outside and extended obliquely up and out, nearly reaching a dark-brown costal streak over the end of the fissure, beyond which are two costal dark-brown spots, the first of which is the smaller. The brown on the second lobe sometimes gives this part of the wing a streaked appearance. Fringes smoke brown, cut with whitish once on the first lobe and twice on the outer margin of the hind lobe. Hind wings and fringes brownish cinereous.

Habitat. — New York, California, Vancouver Island. Food, *Eupatorium purpureum.*

"*Larva.* — Length, 0.55 of an inch; color of skin greenish, striped with wine color and white; hairs dusky, lighter laterally. Dorsal line white, interrupted with circles and bordered laterally with wine color. That part of the dorsal space in which the tubercles stand, much lighter in hue; subdorsal and stigmatal lines white, bounded by the same shade as the dorsal. Head light green, spiracles ringed with brown.

"*Pupa.* — Color, green, ornamented with wine-colored and white lines. It has the same size and habits as *homodactylus;* the tubercles are similar. It is a little thicker, the anterior end more obtusely truncated and less bilobed. The hairy clothing similar to *homodactylus*, but the hairs not so smooth as in that pupa." (Kellicott.)

Pterophorus guttatus.

Œdematophorus guttatus Wlsm., Pter. Cal. and Ore., p. 36, Plate II., fig. 12 (1880).

Expanse of wings, 25 mm. Head and palpi whitish, sprinkled with cinereous, the palpi fuscous at the sides; thorax and abdomen whitish cinereous. Hind legs white, with two slightly fuscous annulations.

Fore wings whitish cinereous, paler at the base, dusted with fuscous scales toward the costa and hind margin; a white spot, generally bordered on the inner edge by two fuscous scales, lies at the base of the fissure; another similar spot is sometimes indicated before the middle of the hind margin. Fringes of the outer margin and fissure cinereous fuscous, slightly interrupted with whitish. Hind wings pale cinereous. Fringes paler.

Habitat. — California. Early stages and food plant unknown.

PTEROPHORUS CINERACEUS.

Œdematophorus cineraceus Fish, Can. Ent., Vol. XIII., p. 73 (1881).

Expanse of wings, 28 mm. Front of head dark grayish brown, vertex pale cinereous. Palpi grayish brown, ascending, third segment short. Antennæ cinereous, dotted above with dark brown. Abdomen cinereous, marked with reddish-brown scales. Legs brownish cinereous, sprinkled with dark-brown scales; a band on the middle and on the end of the middle tibiæ dark grayish brown, spurs tipped with dark brown; tarsi whitish cinereous, slightly brownish at extreme end of segments.

Fore wings cinereous, tinged with brownish, and very thinly sprinkled with dark-brown scales. These scales form a median spot before the base of the fissure, bordered on the outside with white. A longitudinal brown spot occurs on the costa opposite the base of the fissure, and two smaller ones toward the apex. Fringes brownish cinereous. Hind wings and fringes brownish cinereous.

Habitat. — Washington. Early stages and food plant unknown.

PTEROPHORUS BARONI.

Œdematophorus Baroni Fish, Can. Ent., Vol. XIII., p. 73 (1881).

Expanse of wings, 30 mm. Front of head brownish cinereous, vertex lighter. Palpi rather stout, third segment very short and blunt. Antennæ pale cinereous, dotted above with dark brown. Thorax and abdomen pale brownish cinereous, the latter marked dorsally by a row of fine black dots on each segment beyond the third. Anterior and middle femora brownish cinereous, tibiæ grayish, tarsi whitish cinereous. Hind femora and tibiæ pale brownish cinereous, spurs short, tipped with black.

Fore wings brownish cinereous, ochreous on the inner margin and second lobe, the whole surface sprinkled with fine black scales. Fringes concolorous with the wings. Hind wings and fringes dark cinereous.

Habitat. — California. Early stages and food plant unknown.

PTEROPHORUS GRATIOSUS.

Œdematophorus gratiosus Fish, Can. Ent., Vol. XIII., p. 73 (1881).

Expanse of wings, 22 mm. Head and palpi dark brown; antennæ pale brownish, dotted above with white and dark-brown scales. Thorax grayish brown, anterior portion lighter. Abdo-

men fawn brown. Legs grayish brown, tarsi pale cinereous, slightly darker on the extremities of segments.

Fore wings pale cinereous, dusted with dark brown; an oblique brown spot occurs before the base of the fissure and a longitudinal brown costal line nearly opposite the base of fissure. Fringes concolorous with wings. Hind wings and fringes brownish cinereous, third feather whitish.

Habitat. — California. Early stages and food plant unknown.

PTEROPHORUS LUGUBRIS.

Œdematophorus lugubris Fish, Can. Ent., Vol. XIII., p. 140 (1881).

Expanse of wings, 27–29 mm. Head and palpi dark smoky brown. Antennæ dotted above with white and blackish scales. Thorax light smoky brown. Abdomen slender, dark smoky brown, thickly sprinkled with very dark scales. Legs grayish brown, the middle tibiæ whitish just before the middle and end; all the tarsi whitish at base of joints; spurs whitish at base.

Fore wings dark smoky gray, dusted with dark brown scales; a longitudinal black dash on the costa, opposite the base of fissure; an obscure blackish spot before the base of fissure, bordered outwardly by gray scales. Faint indications of two smaller blackish spots on the costal margin of anterior lobe. Fringes smoky gray, with a few whitish hairs on the hind margin of anterior lobe near the apex. Hind wings and fringes, as well as under side of wings, cinereous.

Habitat. — California. Early stages and food plant unknown.

PTEROPHORUS GRISESCENS.

Œdematophorus grisescens Wlsm., Pter. Cal. and Ore., p. 34, Plate II., fig. 11 (1880).

Expanse of wings, 29 mm. Head and palpi gray, with a fuscous tinge on the apex of the palpi. Antennæ spotted with gray and fuscous. Thorax and abdomen grayish, sprinkled with fuscous. Legs grayish white, tinged on the segments and on the tips of the spurs with fuscous.

Fore wings gray, slightly spotted with white and dusted with fuscous scales, the hind portion touched with ferruginous. A white space on the costa before the base of the fissure, and another beyond and obliquely connected by whitish scales with the base of fissure; a whitish spot before the middle of the hind margin and an indistinct fuscous spot above it. Fringes mottled with white

and grayish fuscous. Hind wings cinereous; fringes whitish mixed with gray.

Habitat. — Southern Oregon. Food, *Artemisia.*

PTEROPHORUS INQUINATUS.

Œdematophorus inquinatus Zell., Beitr., p. 125 (1873).
Œdematophorus ambrosiæ Murtf., Am. Ent., Vol. III., p. 236 (1880).

Expanse of wings, 19 mm. Head and thorax gray, spotted with white; palpi small, porrect, acute, whitish, touched with brown outwardly. Antennæ whitish, spotted with brownish, white at the base on the under side. Abdomen gray.

Fore wings dust gray, thickly dusted with white and brown scales forming scattered flecks or blotches, one of which is generally present on the middle of the space between the base of the wing and the fissure; a larger one before the fissure and separated from it by a whitish space, against which its oblique outer margin is excavated; below this is a longitudinal streak of scales, bordered basally by a white spot and separated from the spot before the fissure by a whitish space. Two blackish streaks or spots occur on the costa, the larger one above the base of fissure, the other half-way between it and the apex of the wing. Fringes grayish, cut with white under the apices of the lobes and on the anal angles, where there is a white wisp. A similar wisp before the apex and on the anal angle of the second lobe. A brown dot sometimes rests on the base of each of the three wisps. Hind wings brownish gray, a diffuse brown dot on the apex of each feather or at least on the first. Fringes brighter.

Habitat. — Alabama, Texas, Missouri, Colorado, Arizona. Food, Rag-weed (*Ambrosia artemisiæfolia*).

"*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, corneous, 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 curving bristle. The projecting edges 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 semicircle 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 the same color on the abdomen. On either side of the thorax is a small, velvety dark-brown dot." (Murtfeldt.)

Genus STENOPTILIA Hüb., Verz., p. 430 (1826).

Vertex smooth; front cone-shaped, smoothly scaled; palpi extending beyond the frontal projection, the second segment somewhat triangular, with projecting scales above at the end, the third segment very small and cylindrical. Fore wings fissured about one-third of their length, the lobes narrow and with very oblique outer margins, but with more or less distinctly visible anal angles. The feathers of the hind wings are dissimilar in form: the first is the widest; the second is smaller, and has a long, produced apex; the third is linear, without dark scales in the hind fringe. The venation is complete, as shown on Plate III., figs. 1 and 2.

Synopsis of the Species.

1. Expanse of wings less than 15 mm., ... *pumilio*.
   Expanse of wings more than 15 mm., ... 2.
2. With a dark-brown streak on the middle of first lobe, . . 3.
   Without a dark streak on the middle of first lobe, . . . 4.
3. First lobe of fore wings without an oblique white stripe, *pterodactyla*.
   First lobe of fore wings with a subterminal oblique white stripe, ... *coloradensis*.

4. { Second lobe with a more or less complete brown streak, *semicostata.*
   { Second lobe without any trace of a brown streak, . . . 5.

5. { Two fuscous spots before the end of the fissure, . *exclamationis.*
   { One fuscous spot before the end of the fissure, . . . *mengeli.*

STENOPTILIA PUMILIO.

Mimeseoptilus pumilio Zell., Beitr., p. 124 (1873).

Expanse of wings, 12 mm. Head reddish gray, front whitish; palpi very thin, filiform, horizontal, whitish. Antennæ pale gray, white towards the base on the outside. Thorax reddish gray. Abdomen yellowish white at the base and end. Legs slender, white, the first pair of spurs on hind tibiæ unusually long.

Fore wings unusually short and broad, very bright fawn color, darkest on the costal margin of the anterior lobe; costal vein white for two thirds of its length; a long blackish streak on the fold at the basal fourth of the wing; a long, conspicuous point in the middle between this and the fissure, and before these one or two long, confused flecks. Fringe of anterior lobe white or gray, with scattered black scales, with two black, somewhat commingled dots on the outer margin near the anal angle. Fringe of the second lobe gray, thickly sprinkled with deep black scales, which are united with three black spots on the hind margin; at the apex it is whitish, and marked with a row of unequal, somewhat commingled dots, which do not reach to the base of the fringe. Hind wings brownish gray, with much lighter fringes. On the apex of the first and second feathers a small black dot may be seen in certain lights, most distinct on the under side, where the apex of the third feather is dark brown.

Habitat. — Texas. Early stages and food plant unknown.

STENOPTILIA PTERODACTYLA.

Alucita pterodactyla Linn., Faun. Suec., p 371 (1761).

Expanse of wings, 21–24 mm. Head ashy brown; palpi long, acuminate, whitish at the tips; antennæ brownish above, whitish beneath. Thorax ashy brown, with a few darker scales. Abdomen fuscous, striped with pale ochreous lines and with a few dark-brown dots at the ends of the segments. Legs ochreous brown on the outside, whitish on the inner sides, tarsi very pale ochreous.

Fore wings reddish brown, the entire costa and the apex of the second lobe heavily sprinkled with dark-brown scales; a dark-brown reniform spot at the base of the fissure. Fringes ashy

brown, with a very pale line at their bases. Hind wings fuscous with ashy brown fringes.

Habitat. — Europe, New York. Food, Speedwell (*Veronica chamœdrys*).

"*Larva.* — 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 at 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 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 specimens, dark-brown alimentary canal forms the dorsal stripe; subdorsal lines rather indistinct, grayish white; below there is a still more indistinct waved line of the same color; there is, again, a similarly colored faint line along the spiracular region, and the segmental divisions are also of this pale color. In some specimens the hairs are gray; in others, brown. Ventral surface uniformly of the same color as the ground of the dorsal area; the legs reticulated and the prolegs tipped with black.

"*Pupa.* — 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." (Porritt.)

Stenoptilia exclamationis.

Mimæoptilus exclamationis Wlsm., Pter. Cal. and Ore., p. 32, Plate III., fig. 10 (1880).

Expanse of wings, 22 mm. Head and palpi above, gray, with brown scales on the sides and beneath the palpi; thorax gray, with a brown spot on the top. Antennæ brownish gray. Abdomen ochreous brown. Legs brownish above, whitish beneath; feet white.

Fore wings gray, sprinkled with fuscous; costa fuscous; a row of fuscous spots runs from the base along under the cell for one-third the length of the wing; a small fuscous dash under the costa

before the middle. Two fuscous spots before the end of the fissure, and beyond them, on the first lobe, a fuscous dash, pointing toward the upper spot, both together forming an exclamation point; above, the costa is spotted with fuscous. Fringes around the fissure white; along the outer margin cinereous, with a fuscous line at their base, but interrupted with white on the middle of the anterior and at the upper angle of the posterior lobe. Hind wings fuscous, with brownish scales. Fringes brownish.

Habitat. — California, Oregon. Early stages and food plant unknown.

STENOPTILIA MENGELI, n. s.

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. In the "Entomological News," Vol. V., p. 129, I gave an account of McCormack's Bay, where these insects were taken.

STENOPTILIA SEMICOSTATA.

Mimescoptilus semicostatus Zell., Beitr., p. 123 (1873).

Expanse of wings, 18 mm. Head grayish, with a fine white line above the eyes. Antennæ grayish, white toward the base. Thorax dusted with brown in front, whitish behind. Abdomen slender, pale yellowish, with two black dots on the end of each of the three segments before the last. Legs whitish.

Fore wings brownish gray, shading into pale reddish ochre along the hind margin and upon both lobes. In the middle of the space, between the base and the fissure, is a black dot. At the fissure, at the beginning of the second lobe, is a similar dot, and above it, in one example, is a larger but very distinct wisp-like mark. One example has in the middle of each lobe a fine, brown longitudinal streak; upon the first lobe it is short and in the middle, upon the second it is long and reaches quite to the hind margin. Fringes of hind margin of first lobe whitish at the base, gray outwardly; fringe of outer margin pure white with two black dots, one behind

the other. Fringes of second lobe gray, dark outwardly except at the apex, where they are white with two black dots. Hind wings brownish gray; fringes dark gray, with a clear fine line at their base and around the apex of the first two feathers.

Habitat. — Texas. Early stages and food plant unknown.

STENOPTILIA COLORADENSIS, n. s.

Expanse of wings, 17–24 mm. Head and front half of thorax dark ashy gray; hind part of thorax much lighter towards the abdomen, which is ashy gray above and lighter beneath. A fine whitish longitudinal line occurs on each side of the head, over the eyes.

Fore wings with a dark-brown stripe along the costa, which widens outwardly to include the whole of the first lobe, which is more or less sprinkled with white scales, especially on the middle of the wing and at the base and near the end of the first lobe, the two latter forming two more or less defined oblique white stripes, the outer one of which is much more oblique and narrower than the one above the end of the fissure. Hind half of the wing much lighter, with a somewhat indistinct brown spot on the middle of the cell and another just within the end of the cleft. Fringes brownish, with a sub-basal darker line. Hind wings and fringes grayish brown.

Early stages and food plant unknown.

Described from four examples from Colorado.

ORNEODIDÆ.

This family is not so closely related to the Pterophoridæ as was supposed by the early entomologists, and is introduced here merely because there is only a single species known in this country; and, as it is placed near the Pterophoridæ in collections, generally, it may be convenient to treat of it here.

Mr. Meyrick has given the following characters: —

Ocelli distinct. Tongue developed. Maxillary palpi obsolete. Fore wings six-cleft, cell very short, vein 5 absent, 7 separate, 8 and 9 coincident. Hind wings six-cleft, cell very short, 5 absent, 7 out of 6 near origin, 8 free.

GENUS ORNEODES Latr., Prec. d. Car., p. 148 (1796).

Labial palpi long, obliquely ascending, second segment tufted, third segment long and slim. Veins 5, 6, 9 and 10 wanting in the fore wings.

The following well-known European species occurs in the western part of this country: —

ORNEODES HEXADACTYLA.

Alucita hexadactyla Linn., Syst. Nat., Ed. X., Vol. II., p. 542 (1758).
Alucita montana Ckll., MS., Ent. Mon. Mag., Vol. XXV, p. 213 (1889).

Expanse of wings, 13–16 mm. Head and thorax dark gray.

Fore wings ochreous gray, with two dark-gray bands edged with whitish crossing them; the first on the middle of the wing and wider on the costa, where it is interrupted in the middle by a white edged gray spot; the second is subterminal, and wider on the middle of the wing. A dark spot on the costa between the bands, and two others before the first band. A dark-brown or black dot on the apex of each of the feathers of both wings; feathers of the hind wings whitish and dotted with dark gray.

Habitat. — Europe, Missouri, California, Oregon, Canada, Manitoba. Food, *Lonicera.*

The eggs are laid in the early spring, on the flower-buds of the honey-suckle, and the larvæ, when hatched, feed inside of the buds and flowers.

Explanation of Plate I.

EXTERNAL ANATOMY OF PTEROPHORUS MONODACTYLUS.

[All the drawings enlarged.]

Fig. 1. Side view of denuded body of male.

Fig. 2. Top view of denuded body of male.

Fig. 3. Top view of head.

Fig. 4. Front view of head.

Fig. 5. Labial palpus.

Fig. 6. Base of tongue and labrum.

Fig. 7. Antenna of male.

Fig. 8. Fore leg.

Fig. 9. Tibial epiphysis.

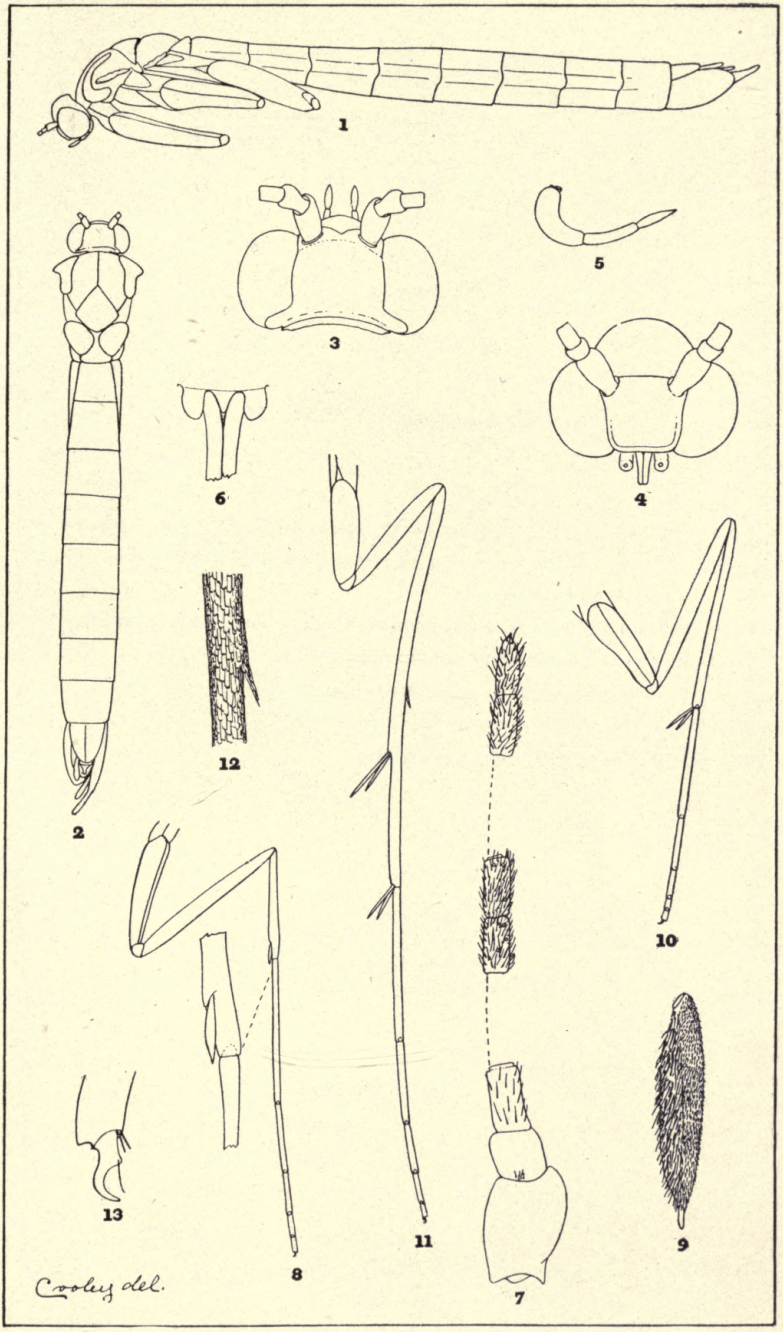
Fig. 10. Middle leg.

Fig. 11. Hind leg.

Fig. 12. Portion of hind tibia, showing tuft of scales.

Fig. 13. Claw from the hind leg.

Plate I.



Explanation of Plate II.

Fig. 1. Fore wing of **Platyptilia carduidactyla**, showing veins numbered. *A*, apex of first lobe; *B*, anal angle of first lobe; *C*, apex of second lobe; *D*, anal angle of second lobe.

Fig. 2. Hind wing of **Platyptilia carduidactyla**, showing veins numbered.

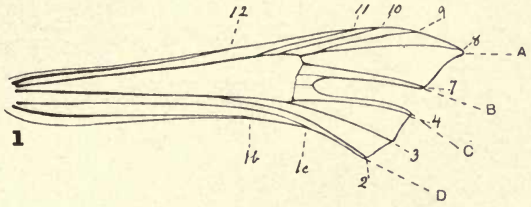
Fig. 3. Fore wing of **Oxyptilus periscelidactylus.**

Fig. 4. Hind wing of **Oxyptilus periscelidactylus.**

Fig. 5. Fore wing of **Alucita cinerascens.**

Fig. 6. Hind wing of **Alucita cinerascens.**

Plate II.



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Explanation of Plate III.

Fig. 1. Fore wing of **Stenoptilia exclamationis.**

Fig. 2. Hind wing of **Stenoptilia exclamationis.**

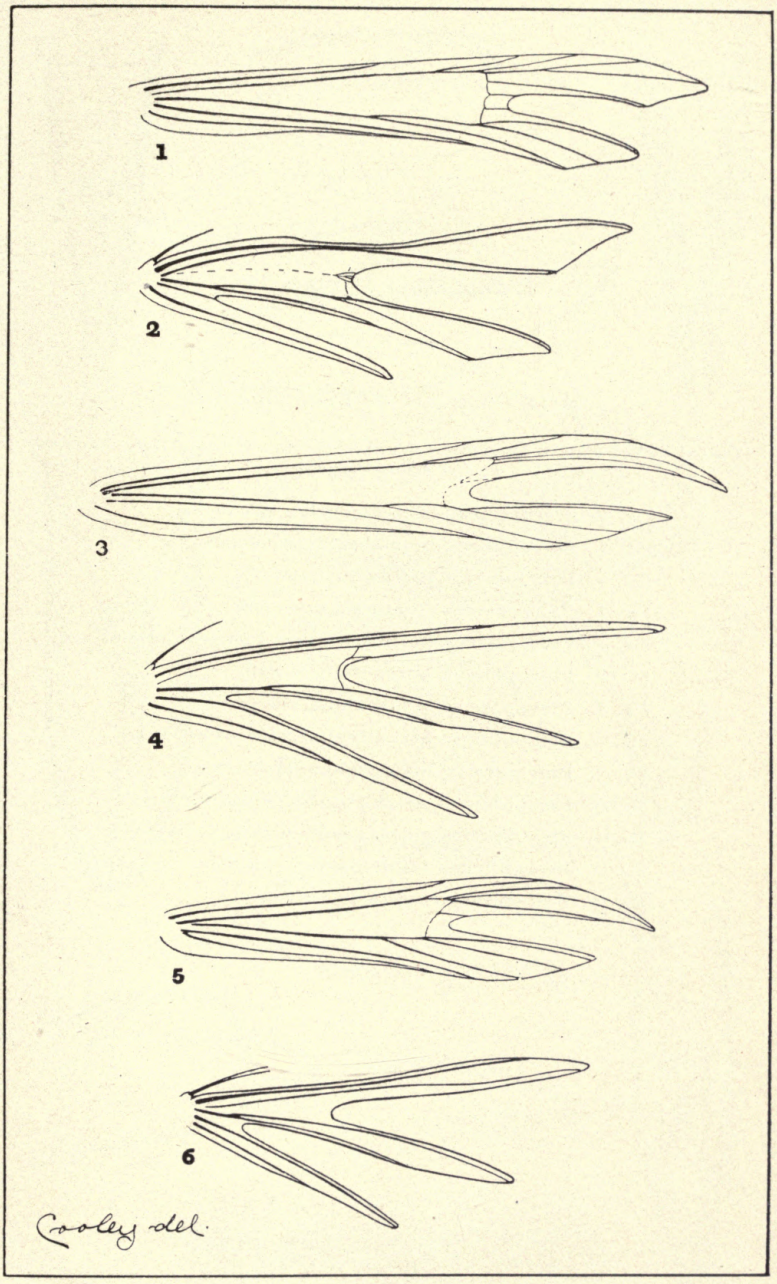
Fig. 3. Fore wing of **Pterophorus monodactylus.**

Fig. 4. Hind wing of **Pterophorus monodactylus.**

Fig. 5. Fore wing of **Pterophorus inquinatus.**

Fig. 6. Hind wing of **Pterophorus inquinatus.**

Plate III.



Explanation of Plate IV.

MALE GENITALIA OF PTEROPHORIDÆ.

[Parts of the genitalia: *A*, dorsal plate; *B*, uncus; *C*, clasp; *D*, ventral plate; *E*, elongated internal chitinous appendage.]

Fig. 1. **Pterophorus homodactylus**, side view.

Fig. 2. **Pterophorus homodactylus**, top view.

Fig. 3. **Pterophorus inquinatus**, side view.

Fig. 4. **Pterophorus inquinatus**, top view.

Fig. 5. **Pterophorus kellicottii**, view of inside of left clasper.

Fig. 6. **Pterophorus kellicottii**, top view.

Fig. 7. **Pterophorus stramineus**, side view.

Fig. 8. **Pterophorus stramineus**, outside of left clasper.

Fig. 9. **Pterophorus subochraceus**, side view.

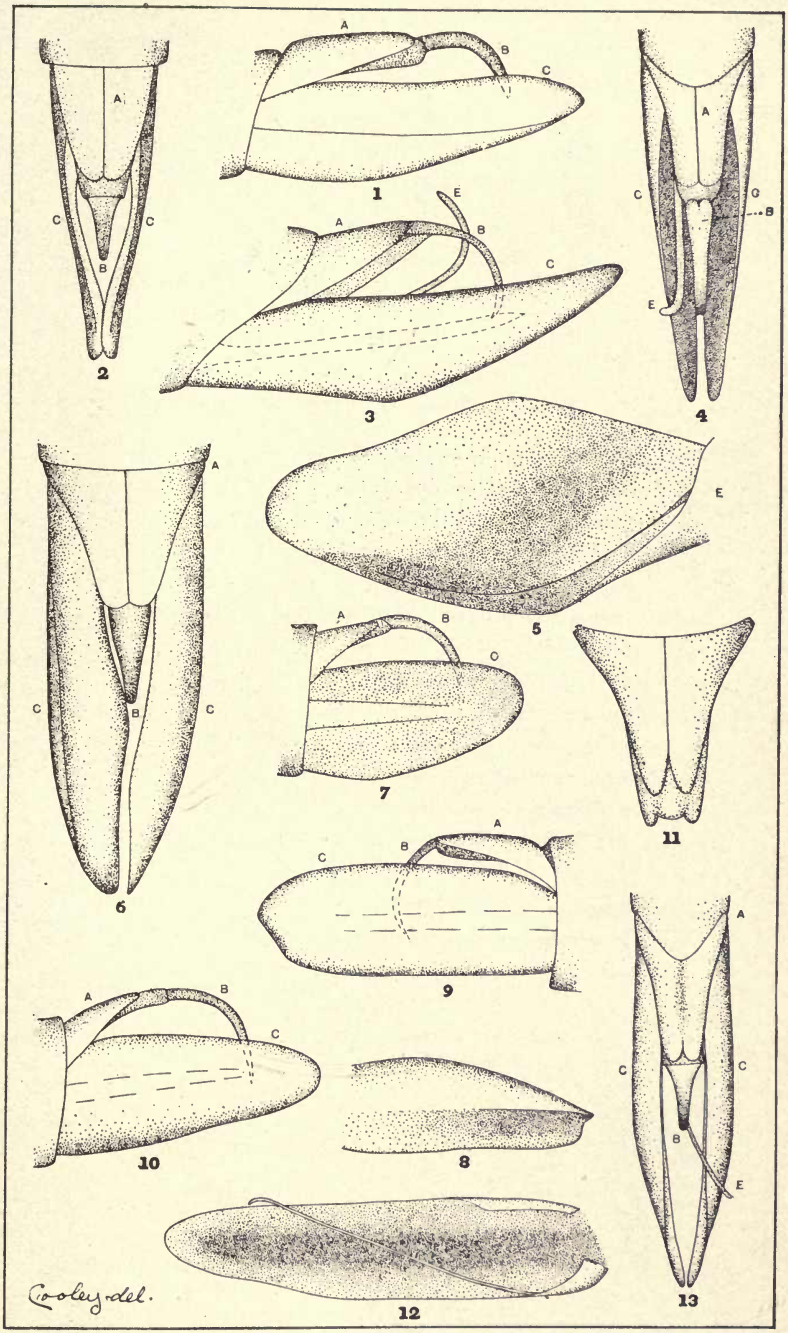
Fig. 10. **Pterophorus sulphureodactylus**, side view.

Fig. 11. **Pterophorus sulphureodactylus**, dorsal plate.

Fig. 12. **Pterophorus lugubris**, view of inside of left clasper.

Fig. 13. **Pterophorus lugubris**, top view.

Plate IV.



Explanation of Plate V.

MALE GENITALIA OF PTEROPHORIDÆ.

Fig. 1. **Oxyptilus periscelidactylus**, side view.

Fig. 2. **Oxyptilus periscelidactylus**, view from beneath.

Fig. 3. **Pterophorus sulphureodactylus**, side view.

Fig. 4. **Pterophorus sulphureodactylus**, top view of dorsal plate.

Fig. 5. **Pterophorus cineraceus**, side view.

Fig. 6. **Pterophorus cineraceus**, top view of dorsal plate.

Fig. 7. **Platyptilia adusta**, side view.

Fig. 8. **Platyptilia adusta**, top view.

Fig. 9. **Pterophorus grandis**, side view.

Fig. 10. **Pterophorus grandis**, top view.

Fig. 11. **Alucita montana**, side view.

Fig. 12. **Alucita montana**, top view.

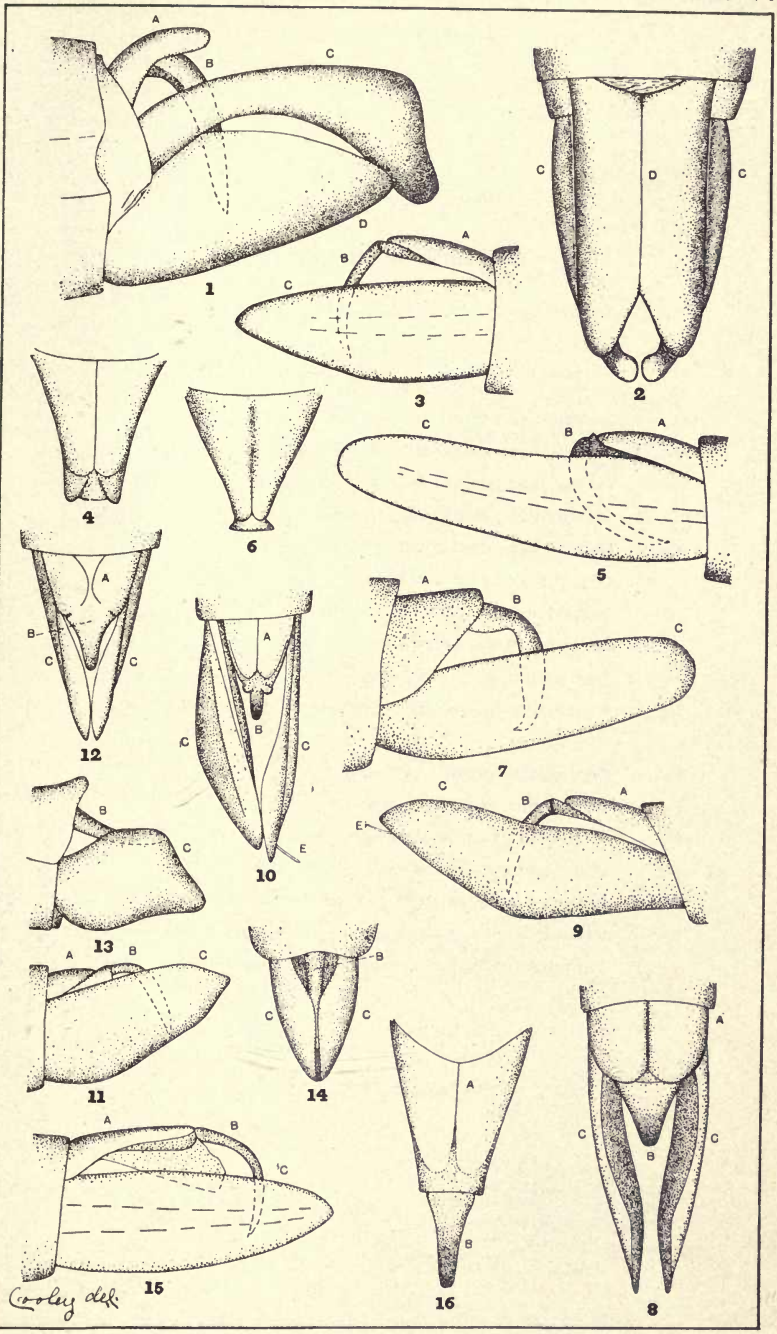
Fig. 13. **Trichoptilus ochrodactylus**, side view.

Fig. 14. **Trichoptilus ochrodactylus**, top view.

Fig. 15. **Pterophorus eupatorii**, side view.

Fig. 16. **Pterophorus eupatorii**, top view of dorsal plate and uncus.

Plate V.



Explanation of Plate VI.

MALE GENITALIA OF PTEROPHORIDÆ.

Fig. 1. **Oxyptilus ningoris**, side view.

Fig. 2. **Oxyptilus ningoris**, top view.

Fig. 3. **Oxyptilus ningoris**, view from beneath.

Fig. 4. **Oxyptilus tenuidactylus**, side view.

Fig. 5. **Oxyptilus tenuidactylus**, top view.

Fig. 6. **Oxyptilus tenuidactylus**, view from beneath.

Fig. 7. **Oxyptilus delawaricus**, side view.

Fig. 8. **Oxyptilus delawaricus**, top view.

Fig. 9. **Pterophorus cretidactylus**, side view.

Fig. 10. **Pterophorus cretidactylus**, top view of dorsal plate and uncus.

Fig. 11. **Orneodes hexadactyla**, side view.

Fig. 12. **Orneodes hexadactyla**, top view.

Fig. 13. **Orneodes hexadactyla**, view from beneath.

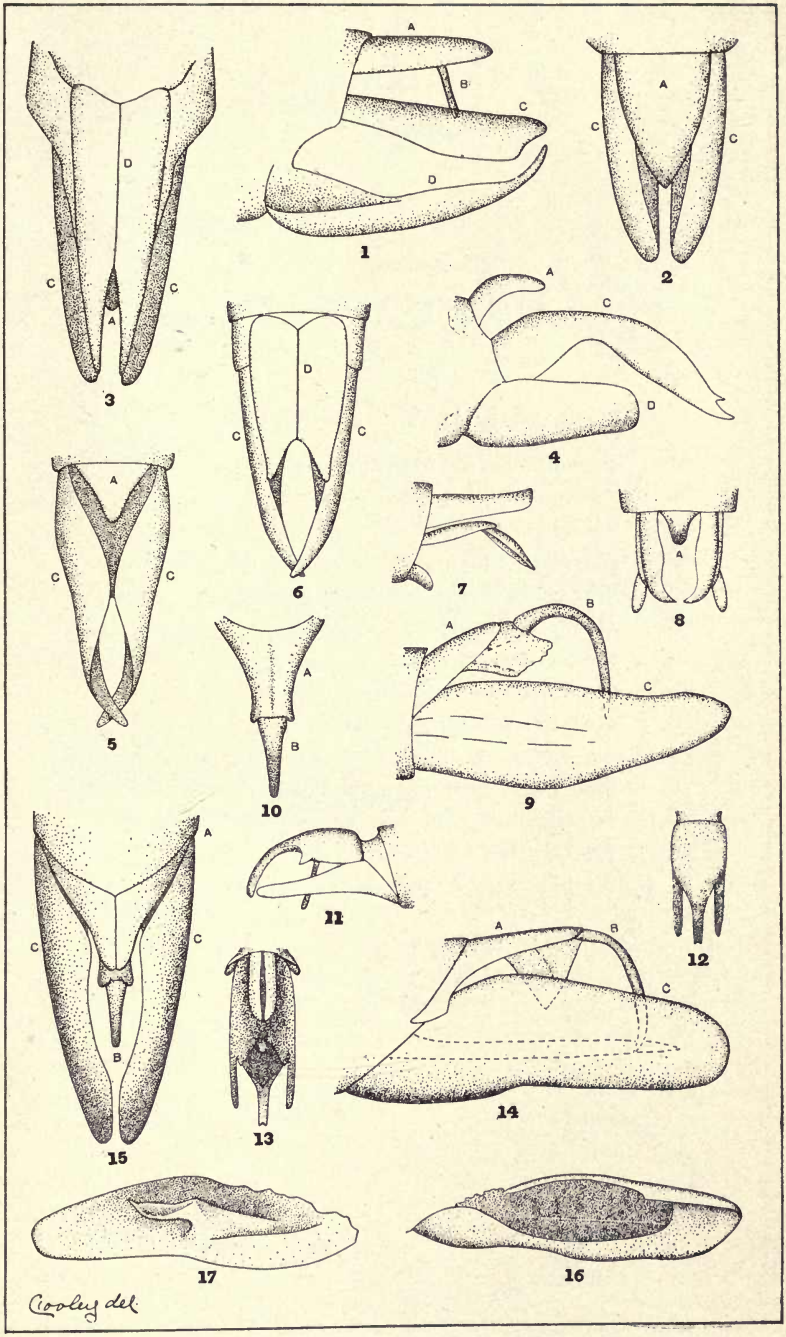
Fig. 14. **Pterophorus ambrosiæ**, side view.

Fig. 15. **Pterophorus ambrosiæ**, top view.

Fig. 16. **Pterophorus ambrosiæ**, view of inside of right clasper.

Fig. 17. **Pterophorus ambrosiæ**, view of inside of left clasper.

Plate VI.



Explanation of Plate VII.

GENITALIA OF PTEROPHORIDÆ.

Fig. 1. **Pterophorus monodactylus**, side view.

Fig. 2. **Pterophorus monodactylus**, top view.

Fig. 3. **Pterophorus monodactylus**, inside view of right clasper.

Fig. 4. **Pterophorus monodactylus**, inside view of left clasper.

Fig. 5. **Pterophorus monodactylus**, female.

Fig. 6. **Platyptilia edwardsii**, side view.

Fig. 7. **Platyptilia edwardsii**, top view.

Fig. 8. **Platyptilia carduidactyla**, side view.

Fig. 9. **Platyptilia carduidactyla**, top view.

Fig. 10. **Platyptilia carduidactyla**, view of inside of left clasper.

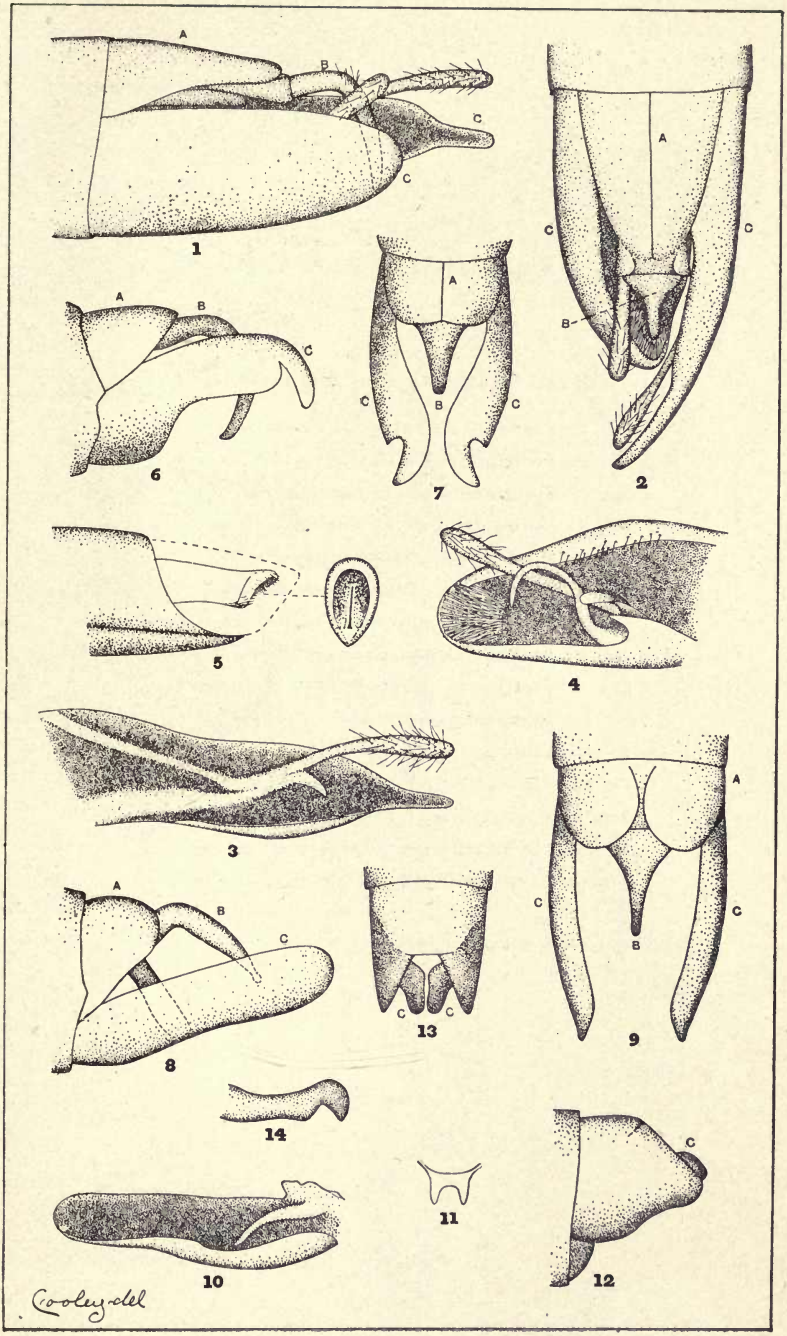
Fig. 11. **Platyptilia carduidactyla**, ventral plate.

Fig. 12. **Trichoptilus lobidactylus**, side view.

Fig. 13. **Trichoptilus lobidactylus**, top view.

Fig. 14. **Trichoptilus lobidactylus** outside view of left clasper.

Plate VII.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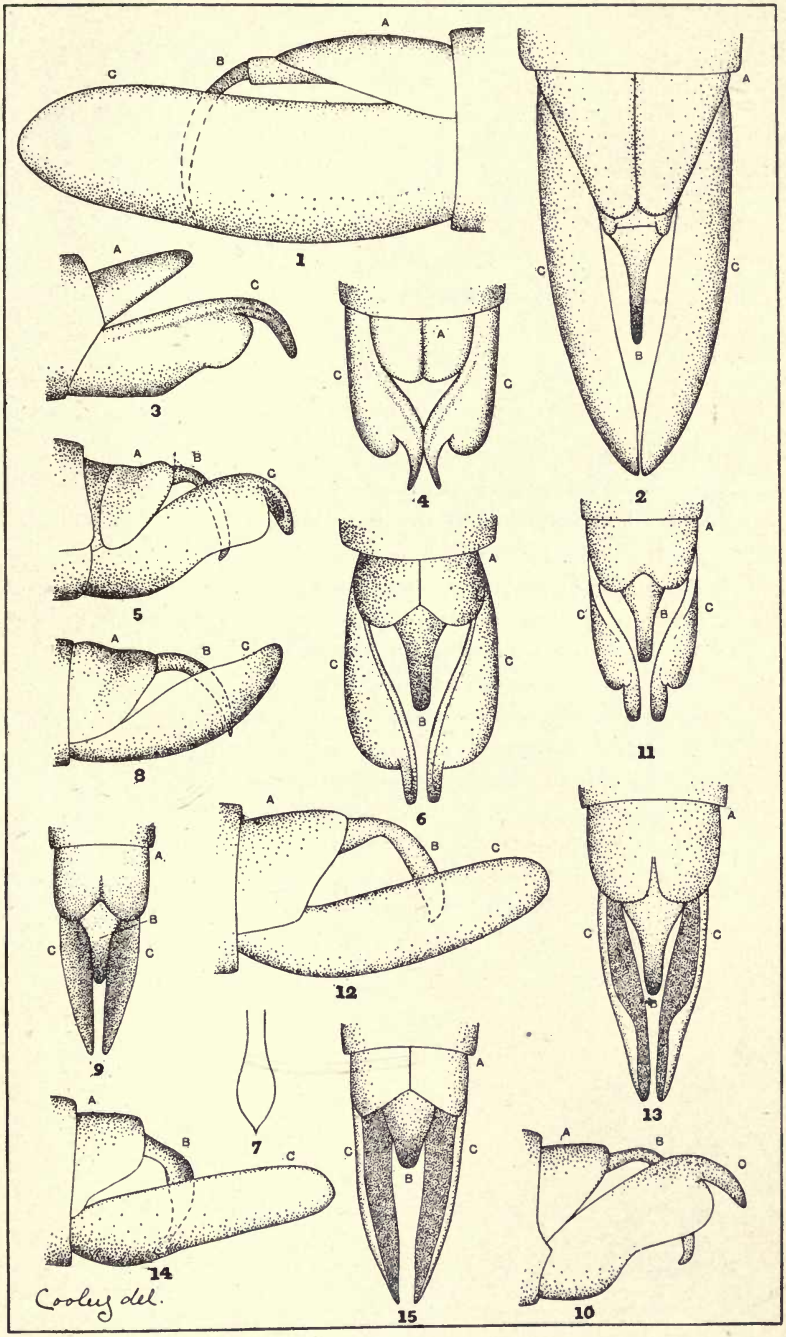
Explanation of Plate VIII.

MALE GENITALIA OF PTEROPHORIDÆ.

Fig. 1. **Pterophorus elliottii**, side view.
Fig. 2. **Pterophorus elliottii**, top view.
Fig. 3. **Stenoptilia exclamationis**, side view.*
Fig. 4. **Stenoptilia exclamationis**, top view.*
Fig. 5. **Platyptilia albidorsella**, side view.
Fig. 6. **Platyptilia albidorsella**, top view.
Fig. 7. **Platyptilia albidorsella**, end view of uncus.
Fig. 8. **Platyptilia tesseradactyla**, side view.
Fig. 9. **Platyptilia tesseradactyla**, top view.
Fig. 10. **Platyptilia albida**, side view.
Fig. 11. **Platyptilia albida**, top view.
Fig. 12. **Platyptilia albicans**, side view.
Fig. 13. **Platyptilia albicans**, top view.
Fig. 14. **Platyptilia percnodactyla**, side view.
Fig. 15. **Platyptilia percnodactyla**, top view.

* The uncus is wanting in the specimens from which these drawings were made.

Plate VIII.



Explanation of Plate IX.

MALE GENITALIA OF PTEROPHORIDÆ.

Fig. 1. **Platyptilia cosmodactyla**, side view.

Fig. 2. **Platyptilia cosmodactyla**, top view.

Fig. 3. **Platyptilia cosmodactyla**, end of uncus.

Fig. 4. **Platyptilia marginidactyla**, side view.

Fig. 5. **Platyptilia marginidactyla**, top view.

Fig. 6. **Platyptilia albiciliata**, side view.

Fig. 7. **Platyptilia albiciliata**, top view.

Fig. 8. **Platyptilia albiciliata**, end of uncus.

Fig. 9. **Alucita cinerascens**, side view.

Fig. 10. **Alucita cinerascens**, top view.

Fig. 11. **Alucita cinerascens**, view of an internal chitinous piece.

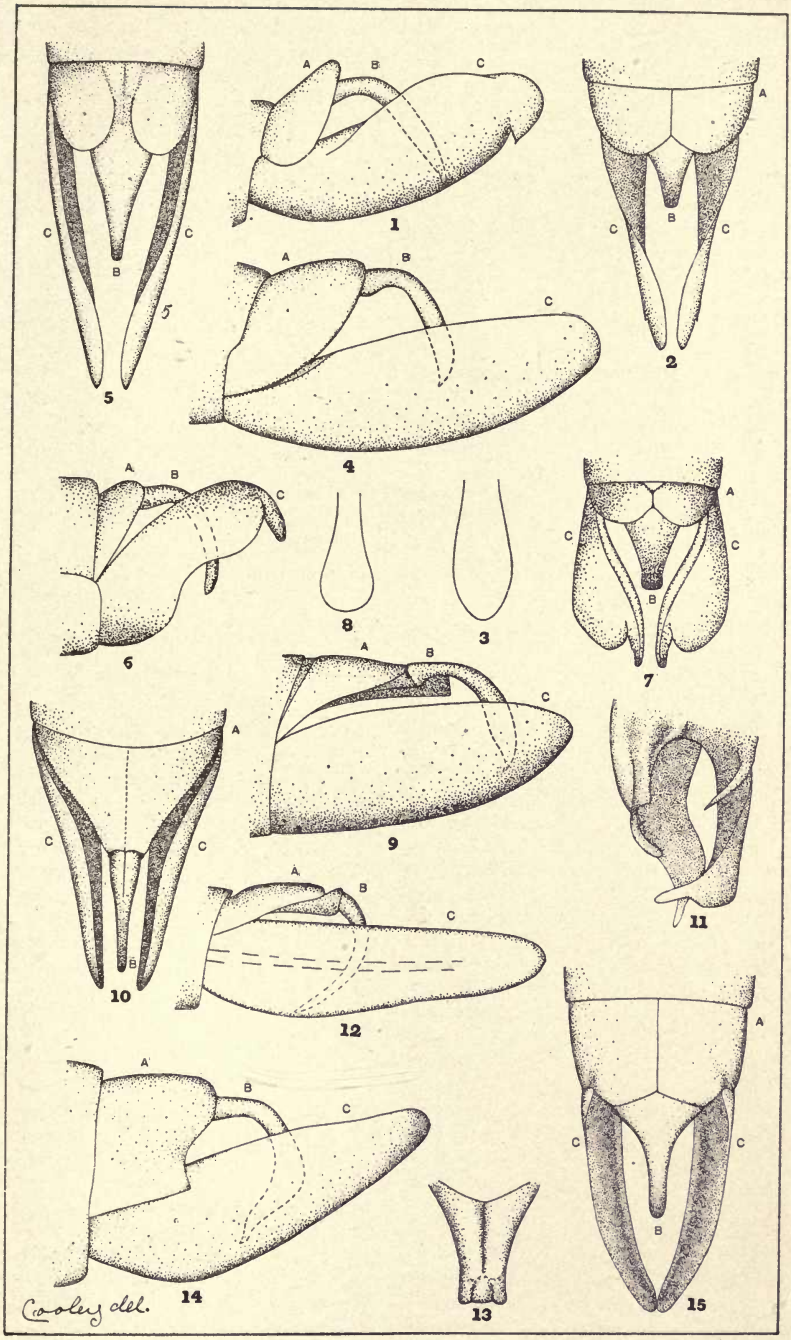
Fig. 12. **Pterophorus guttatus**, side view.

Fig. 13. **Pterophorus guttatus**, top view of dorsal plate.

Fig. 14. **Platyptilia ochrodactyla**, side view.

Fig. 15. **Platyptilia ochrodactyla**, top view.

Plate IX.



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