

REVISION OF THE AMERICAN MOTHS OF THE GENUS ARGYRESTHIA.

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The genus *Argyresthia* was erected by Hübner^a for four species, of which three are truly congeneric, and of which the first mentioned and best known (*Argyresthia goodartella* Linnaeus) may be regarded as the type of the genus.

The genus includes a group of small moths of about half an inch or less in alar expansion, which are found principally in Europe and America. The different species exhibit great variety in the pattern of their wing ornamentation, but the ground color is nearly always white and the markings are either metallic golden or bronze or are brown and fuscous.

They may be recognized by the following generic characters: Face smooth, head rough. Labial palpi porrected, moderately long, slightly curved and pointed; terminal joint long, both joints more or

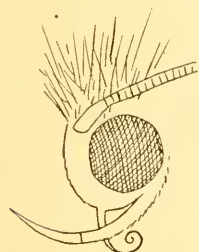


FIG. 1.—HEAD OF ARGYRESTHIA.

less roughened beneath. Maxillary palpi obsolete; tongue moderate. Antennae three-fourths of wing-length, with rather long pectinated basal joint; in the males finely serrate and pubescent.

Forewings elongate, pointed, smooth scaled with 12 veins (or with only 11 veins, one median vein being obsolete); 7 and 8 stalked or separate; 7 to termen; 1 b slightly furcate at base or simple; 2 from or near corner of cell, which is proportionally broad and which has an internal vein from between 11 and 10 to below 8 and another from base to between 4 and 5; membrane thickened along the costal edge above vein 11.

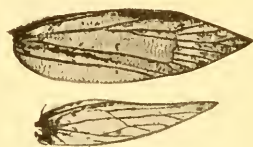


FIG. 2.—VENATION OF ARGYRESTHIA FREYELLA.

^a Verz. bekant. Schmett, 1816, p. 422.

Hindwings narrower than the forewings, lanceolate with cilia 2-3; 8 veins (or sometimes only 7 veins, vein 4 absent, see page 10); 3 and 4 separate, connate or stalked; 5 and 6 stalked; 7 parallel to 6; 8 free; internal vein to stalk of 5 and 6; transverse vein sometimes more or less obsolete. Posterior tibiae smoothly scaled.

The genus is nearest and correlated with *Zelleria* Stainton, which differs mainly in the absence of vein 4 in the hindwings.

From *Cedestis* Zeller it differs mainly in having veins 5 and 6 in the hindwings stalked instead of parallel.

The larvæ feed within leaves, shoots, buds, fruit, or bark, and pupate either in the mine or in a dense white cocoon outside the mine.

The moths assume at rest a characteristic position, apparently standing on their head, with the body and wings raised obliquely or sometimes nearly perpendicularly from the surface; before settling down to rest some of the American species at least execute a curious seesawing motion by balancing the body up and down with the second pair of legs as a pivot.

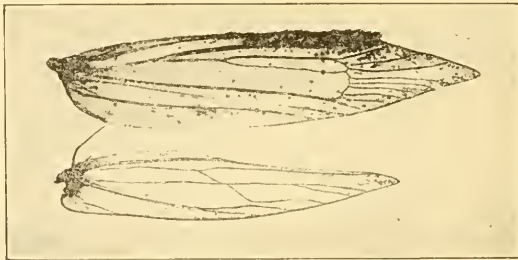


FIG. 3.—VENATION OF ARGYRESTIA GEODARTELLA.

Some of the species are occasionally numerous enough to be of some economic importance.

The genus *Argyresthia* is in the American Catalogue classed at present under the family Tineidae, following Meyrick's system in his Handbook of British Lepidoptera, but, as before mentioned,^a the writer is inclined to follow continental writers on this point, and regard the Argyrestidae as a subfamily under the Yponomeutidae, to which group they seem to be more allied than to the Tineidae, notwithstanding the rough head, which on the whole appears to be of less fundamental importance, than has hitherto been given to that character.^b

Some forty species of *Argyresthia* are known in Europe.

In the United States the genus was first recognized by Clemens, who in 1860 described one species. This species, *oreusella*, was at once wrongly determined by Stainton as the European *andereggiella* Duponchel, and has since remained obscured as a synonym of that species.

^aProc. U. S. Nat. Mus., XXVII, 1904, p. 754.

^bVide genus *Tamartha* Walker, Busck, Proc. U. S. Nat. Mus., XXX, 1906, p. 729.

Of the true *andereggella* I have not met with any American specimens, and the species should probably be excluded from our American List. It is included in the present paper on suspicion and in order to point out the differences of our *oreasella* Clemens.

Packard in 1871 described *Bucculatrix thuicella*, which now proves to be an *Argyresthia*.

Zeller in 1873 described three American species as follows: *quadristrigella*, *delectella*, and *austerella*, and identified wrongly a fourth species^a as his European *abdominalis*, which name should be dropped from the American List.

Chambers described, during 1874-1877, seven species of *Argyresthia*—*undulatella*, *apicimaculella*, *belangerella*, *montella*, *quercicolella*, *altissimella*, and *pedmontella*—besides recording the European *goedartella* Linnaeus. Of these Chambers himself made *undulatella* a synonym of Zeller's *austerella*, but, as the description and the types show, it is a good species and should be preserved.

Lord Walsingham described, in 1882 and 1890, four species in the present genus, namely, *subreticulata*, *cupressella*, *freyella*, and *plicipunctella*, of which *freyella* is the species wrongly identified by Zeller as the European *abdominalis*. He further recorded the European *mendica* Haworth from this country, but this record appears quite erroneous, as shown in detail under *Argyresthia vilciella*, new species (see p. 20), the type of which is the unique specimen on which the record of *mendica* was made, and *mendica* should thus be excluded from the American list.

Finally Riley recorded, in 1891, the European *pygmaella* Hübner from this country, and in 1896 Fletcher recorded the European *conjugella* Zeller, making 19 species rightly recorded from America, to which 5 new species are added in the present paper. Thus altogether 24 species of *Argyresthia* are known at the present time in this country, which number, however, will undoubtedly be considerably augmented, when the fauna is better known. These species may be distinguished by the help of the following analytical key, which, however, should be used with some caution, for the following reasons: (1) Because some of the species are quite close; (2) because the distinction between metallic golden and brown may be interpreted differently by other persons, especially as nearly all the species have a brilliant luster which might be described as metallic by some. Reference to the description and figure ought to make the determination reasonably certain.

I wish to acknowledge my obligations to Mr. T. W. Smillie, of the U. S. National Museum, for the excellent photographs from which the two accompanying plates are made. The photographs were taken from slides made by the writer, and thus represent the actual speci-

^aThe species later described as *freyella* Walsingham.

mens, in some cases the types, on which this paper is based. They will prove a valuable aid in the identification of the species under consideration.

Meyrick has grouped^a the European species of *Argyresthia* according to whether they have veins 7 and 8 in the forewings stalked or separate. I am unable to class the American species by this character in any natural sequence, and believe the character quite unimportant as indicating natural groups; the stalked veins are generally found in the small species and the separate veins in the broader winged species irrespective of other affinities. Thus I can not recognize the propriety of the generic name *Blastotere* Ratzeburg, 1840, recently reintroduced and advocated by Lord Walsingham^b for the species with veins 7 and 8 stalked, Meyrick's section A. The character, however, is constant within the species and may thus with advantage be an aid in determining the species. I have therefore noted the condition under the description of each species.

It is hoped that no American reference of any consequence has been omitted, but of European references only the original description and Standinger and Revel's Catalogue of European Lepidoptera are included.

ANALYTICAL KEY TO ARGYRESTHIA.

Forewings with metallic golden or bronzy markings	1
Forewings with nonmetallic brown or fuscous markings	13
1. With four straight transverse fasciæ	<i>quadristriella</i> p. 9
Without such fasciæ	2
2. Thorax golden	3
Thorax white	6
3. With golden fasciæ	4
Without fasciæ	5
4. With forked central fasciæ	<i>gadartella</i> p. 12
Without such fasciæ	<i>thoracella</i> p. 9
5. Forewings with dark transverse striation	<i>deletella</i> p. 16
Forewings without such	<i>cupressella</i> p. 10
6. Head pure white	7
Head golden ochereous white	<i>pygmaella</i> p. 13
7. Markings dark brownish, at least at the edges	8
Markings light yellowish	9
8. With complete central fasciæ	<i>inscriptella</i> p. 15
Without such	<i>oreasella</i> p. 14
9. With black apical spot	10
Without such spot	12
10. Golden color diffused and prevailing	<i>freyella</i> p. 11
White color prevailing markings sharp	11
11. With forked central fasciæ	<i>annetella</i> p. 12
Without such	<i>apicimaculata</i> p. 15
12. Entire dorsal edge white	<i>subreticulata</i> p. 16
Golden markings extending to dorsal edge	<i>querciolella</i> p. 11

^a Handbook of British Lepidoptera.

^b Ent. Mo. Mag., XVII, p. 169, August, 1906.

13. Alar expanse half an inch or more.....	14
Alar expanse less than half an inch.....	17
14. Forewings with white dorsal path.....	15
Forewings uniformly lead colored.....	<i>alissimella</i> p. 17
15. With distinct dark dorsal spot.....	16
Without such spot.....	<i>montella</i> p. 19
16. Dark dorsal spot crossing white area.....	<i>conjugella</i> p. 17
Dark dorsal spot not crossing white area.....	<i>belangerella</i> p. 18
17. Ground color of costal part of forewings darker than dorsal part.....	18
Ground color of entire wing white.....	19
18. With dark brown dorsal streak.....	<i>rileiella</i> p. 20
Without such streak.....	<i>plicipunctella</i> p. 19
19. With complete transverse oblique fascia.....	20
Without such fascia.....	22
20. With large dark costal streak preceding the fascia.....	<i>austrella</i> p. 22
Without such costal streak.....	21
21. Basal part of costal edge suffused with brown.....	<i>undulatella</i> p. 22
Costal edge white.....	<i>bolliella</i> p. 21
22. Alar expanse 11-12 mm., veins 7-8 in forewings separate.....	<i>pedmontella</i> p. 21
Alar expanse 8-9 mm., veins 7 and 8 stalked.....	<i>thiella</i> p. 23

ARGYRESTHIA QUADRISTRIGELLA Zeller.

Plate IV, fig. 1.

Argyresthia quadristrigella ZELLER, Verh. zool. bot. gesell. Wien, XXIII, 1873, p. 304.—FREY and BOLL, Stett. Entom. Zeitung, XXVIII, 1877, p. 209.—CHAMBERS, Bull. U. S. Geol. Surv., IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6468.

Labial palpi whitish. Antennæ white annulated with black. Face and head light golden yellow. Thorax golden. Forewings golden white with the base, tip, and four nearly straightedged transverse fasciæ dark golden yellow. Cilia golden. Hindwings light gray. Forewings with veins 7 and 8 stalked.

Alar expanse.—10 mm.

A very characteristic species, which can not easily be confounded with any other and at once recognized by the golden thorax and the four sharply defined golden fasciæ. The type is in Museum of Comparative Zoology in Cambridge.

Habitat.—Texas (Boll).

Boll obtained his specimens of this species, among which the type, by beating *Juniperus virginiana* in March, and it is probable that this is the food plant of the species.

ARGYRESTHIA THORACELLA, new species.

Plate IV, fig. 2.

Labial palpi, face and head pure white; antennæ white with black annulations. Thorax light golden yellow. Forewings silvery pearly white with light golden markings as follows: A basal patch, a broad transverse fasciæ a basal third, somewhat wavy in outline and bulging

out in the middle toward apex; another much more undulating fascia on the middle of the wing with similar but exaggerated outline, and a third nearly straight fascia at apical third, sending out a zigzag line from its dorsal end into the apical part. No black apical dot. Hind wings whitish gray. Abdomen light ochreous. Legs silvery with tips of tarsal joints slightly blackened. Veins 7 and 8 in forewings stalked.

Alar expanse.—9 mm.

Habitat.—Williams, Arizona [H. S. Barber].

Type.—Cat. No. 9945, U.S.N.M.

Nearest to *A. cupressella* Walsingham, with clear white ground color and with lighter and more well-defined markings, which are nearly perpendicular on the edge, not strongly oblique as in *cupressella*.

ARGYRESTHIA CUPRESSELLA Walsingham.

Plate IV, fig. 3.

Argyresthia cupressella WALSINGHAM, Insect Life, III, 1890, p. 118—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6461.

Face and labial palpi yellowish white. Head white. Antennae annulated with black. Thorax dark golden. Forewings with the white ground color suffused with light golden, and obscured by the diffused dark golden markings, which cover the base and the tip of the wing, and consist of an irregular, more or less broken, broad zigzag line touching both edges of the wing, and leaving only two or three dorsal and three or four costal spots of the whitish ground color exposed, giving the wing a checkered appearance. At the extreme apex is a minute black dot.

Forewings with only 11 veins—vein 3 absent—and veins 7 and 8 stalked. Hindwing with vein 4 absent.

Alar expanse.—8-9 mm.

Foodplant.—*Cupressus*.

Habitat.—California (D. W. Coquillett).

I have examined the type of this species in Lord Walsingham's collection at Merton Hall, England. The series from which the type was taken was bred by Mr. Coquillett at Los Angeles, California, from twigs of several species of *Cupressus*. This series is in U. S. National Museum.

The forewings of this species have only four dorsal veins from the cell below the forked veins 7 and 8 and in the hindwing vein 4 is absent. It would, according to Meyrick's table, fall in the allied genus *Cedestis* Zeller, but this genus seems to me rather characterized by the parallel veins 5 and 6 in the hindwings than by the absence of veins in the forewings, and the present species is so closely allied to the nearest following species of *Argyresthia*, that I include it in this genus with its natural allies.

ARGYRESTHIA FREYELLA Walsingham.

Plate IV, fig. 4.

Argyresthia freyella WALSHINGHAM, Insect Life, HI, 1890, p. 119.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6462.

Argyresthia abdominalis ZELLER [not of Europe], Verh. Zool. bot. Gesell. Wien, XXIII, 1873, p. 306.—CHAMBERS, Bull. U. S. Geol. Surv., IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6453.

Labial palpi, face and head white; antennæ with brown annulations. Thorax white; patagina golden yellow. Forewings golden yellow, mottled with silvery white, as follows: A narrow basal central streak reaching to basal third; a small basal dorsal spot, two costal and two dorsal rather ill-defined outwardly oblique streaks meeting or nearly meeting at the center of the wing; a series of small costal and dorsal apical dots round the tip of the wing. Extreme apex black. Cilia golden yellow, with silvery base. Hind wings pale ochreous fuscous. Forewings with veins 7 and 8 stalked.

Alar expanse.—8-9 mm.

Foodplant.—*Juniperus*.

Habitat.—Texas (Boll), Missouri (U. S. Dept. Agr.).

I have examined the type of *freyella* at Merton Hall, England, and also Zeller's specimens of the supposed *abdominalis*, which are in the Museum of Comparative Zoology. There is, as suggested by Lord Walsingham, no doubt that they are identical but different from the true *abdominalis* of Europe, which thus should be excluded from our American list.

In the U. S. National Museum is a large series, compared with the type, bred in the insectary of U. S. Department of Agriculture from *Juniperus*, received from Cadet, Missouri.

This series was wrongly placed and labeled as *Bucculatrix thuiella* Packard. (See p. 23.)

ARGYRESTHIA QUERCICOLELLA Chambers.

Plate IV, fig. 5.

Argyresthia quercicolella CHAMBERS, Bull. U. S. Geol. Surv., III, 1877, p. 130; IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6469.

Head, face and palpi white; antennæ annulated with black. Thorax white. Forewings silvery white, largely suppressed by the extensive golden-yellow markings which caused Chambers to regard that color as the groundcolor. The basal costal part of the wing is light golden and reaches on the costa out to a darker golden, inwardly oblique, broad fascia on the middle of the wing; this fascia is edged and partly overlaid with dark brownish scales on its dorsal half. The white groundcolor occupies the dorsal base of the wing and projects as a spur up along the central fascia nearly to the costal edge; it also

appears as a narrow basal central streak dividing the light golden color into two parts. The entire apical third, except two small dorsal and one small costal white spots, is golden-yellow sprinkled and edged with dark brown scales; the basal edge of this apical golden space is oblique and parallel with the central fascia, separated from it by a narrow, pure white, oblique fascia. Cilia golden with brown tips. Hindwings light fuscous. Forewings with veins 7 and 8 stalked.

Alar expanse.—10 mm.

Habitat.—Colorado (Chambers).

This species, the type of which is in the Museum of Comparative Zoology, is nearest *annetella* Busek (see p. 12), but larger and easily distinguished by the ornamentation.

Chambers collected this species among scrub oak in June, but the foodplant is only surmised to be oak.

ARGYRESTHIA ANNETTELLA, new species.

Plate IV, fig. 6.

Labial palpi, face, and head pure white; antennæ annulated with golden brown. Forewings silvery white with a pale golden crooked fascia from base of costa to basal third of dorsal edge; on the middle of the wing is a broad golden fascia, slightly furcate at the costal edge and at apical third is an irregular inwardly curved golden fascia with a golden costal streak preceding it and with two lobes into the apical part, one going to the costal and one to the dorsal edge. Extreme apex black; cilia golden. Hindwings light golden fuscous. Forewings with 7 and 8 stalked, one dorsal vein absent.

Alar expanse.—9 mm.

Habitat.—Cincinnati, Ohio (Miss Annette Braun).

Type.—Cat. No. 9946, U.S.N.M.

This species is nearest to *goedartella* Linnaeus in wing markings, but much smaller than that species and differing in details of the pattern.

Named in honor of the collector, Miss Annette F. Braun, who has sent me this and many other interesting microlepidoptera, all in the most attractive condition and setting.

ARGYRESTHIA GOEDARTELLA (Linnaeus.)

Plate IV, fig. 7 and text fig. 2.

Tinea goedartella LINNÆUS, Syst. Nat., 1758, p. 541

Argyresthia goedartella AUCTORES, Staudinger and Rebel Cat. Lep. Eur., II, 1901, No. 2402.—CHAMBERS, Can. Ent., VII, 1875, p. 144; VIII, 1876, p. 19.

Argyresthia goedastella CHAMBERS, Cinn. Quart. Journ. Science, II, 1875, p. 294; Bull. U. S. Geol. Survey, III, 1877, pp. 131, 141, 147; IV, 1878, p. 130.—SAUNDERS, Can. Ent., VII, 1878, p. 220.

Argyresthia goedartella DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6458.

Labial palpi, face, and head golden white; antennæ white with black annulations. Thorax pale golden. Forewings shining white with golden reflections, sometimes suffused with pale golden; an outwardly oblique, somewhat curved coppery-golden fascia from base of costa; another similarly colored on the middle of the wing is strongly furcate at costa, and a third inwardly oblique fascia at apical third, parallel with the outer fork of the second fascia, emits a lobe into the apical part of the wing, sometimes connecting with the coppery-golden apex. Hindwings dark gray. Forewings with veins 7 and 8 separate.

Alar expanse.—11–13 mm.

Foodplant.—Catkins and shoots of birch and alder (Meyrick).

The American specimens, which, without hesitation, I refer to this species, as Lord Walsingham and others have done before, average slightly larger than the European specimens and the color of the head and thorax is somewhat lighter than in the European series at my command.

Chambers recorded the species from Colorado. In the U. S. National Museum are, in addition to a good European series (Hoffmann collection), specimens from California, determined by Lord Walsingham, and a large series collected by Doctor Dyar on alder in British Columbia; also specimens from Center Harbor, New Hampshire (Dyar), and from Pecos, New Mexico (Cockerell).

ARGYRESTHIA PYGMÆELLA Hübner.

Plate IV, fig. 8.

Argyresthia pygmaella HÜBNER, Schm. Eur., 1827, p. 353.—STAUDINGER and REBEL, Cat. Lep. Eur., II, 1901, p. 2419.—RILEY, Smith's List Lep. Bor. Am., 1891, No. 5175.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6467.

Labial palpi, face, and head golden white; antennæ annulated with brown. Thorax golden-white; patagina golden. Forewings white suffused with pale golden; a darker golden streak on the fold from base to a golden dorsal spot at basal third; an outwardly oblique golden streak from the middle of the dorsal edge reaches beyond the middle of the wing and at tornus is a golden spot. Hindwings fuscous. Forewings with veins 7 and 8 separate.

Alar expanse.—12–14 m. m.

This striking species was first recorded from America by the late Prof. C. V. Riley. In the U. S. National Museum are specimens from British Columbia (Dyar) and from Seattle, Washington (Kincaid), which I can not differentiate from the European series of this species.

ARGYRESTHIA OREASELLA Clemens.

Plate IV, fig. 9.

Argyresthia oreasella CLEMENS, Proc. Acad. Nat. Science, Phila., 1860, p. 7; Stainton's ed. Tin. N. Am., 1872, pp. 39, 93.—CHAMBERS, Can. Ent., VI, 1874, p. 10.—BUSCK, Proc. Wash. Ent. Soc., V, 1903, p. 193.

Argyresthia andereggella ZELLER (not Duponchel) Ver. Zool. bot. Gesell. Wien, XXIII, 1873, p. 304.—CHAMBERS, Can. Ent., VII, 1875, p. 145; Bull. U. S. Geol. Survey, IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6455.

Argyresthia anduegiella CHAMBERS, Bull. U. S. Geol. Surv., III, 1877, pp. 131, 141.

Labial palpi silvery white; face faintly tinged with golden; head white; antennae white, with dark-brown annulations. Thorax white. Forewings silvery white, with a pale golden streak from base of costa diverging slightly from costal edge; from the middle of the dorsal edge runs a broad golden fascia, somewhat outwardly oblique, across the wing, tapering strongly toward costa, which it hardly reaches, but where it is substituted by two minute golden-brown dots. From costa, just beyond these dots, and nearly touching the tip of the first fascia, runs a narrower, outwardly oblique golden fascia to tornus; this fascia emits from its middle a broad branch toward apex, which divides into three smaller branches, two of which reach the costal and one the dorsal edge; all the golden markings except the basal streak are edged with dark-brown scales; around apical edge is a narrow brown line before the cilia, which is dark-golden fuscous. Hindwings dark gray. Forewings with veins 7 and 8 separate.

Alar expanse.—13 mm.

It is with some reluctance that I must disagree with all former writers on this species, among whom are such careful workers as Stainton and Zeller, who have made this species a synonym of the European *andereggella* Duponchel. I was led to accept this synonymy in a former paper^a by trusting to the determination of several American specimens in U. S. National Museum, which were collected and named by Lord Walsingham; but critical study of a large series of European specimens shows definite and constant differences in the ornamentation between the European and the American forms, and Clemens's name therefore should be retained for the latter.

In the U. S. National Museum are specimens of this species, collected and determined by Lord Walsingham, from Mount Shasta, California; also specimens from Cornwall, Idaho (Piper); New York, Beutenmüller; Missouri (Miss Murtfeldt), Ontario (Hanham), and Beulah, New Mexico (Cockerell).

Chambers recorded the species from Colorado, where he took it among oaks, and as Miss Murtfeldt's specimens also were captured

^a Proc. Wash. Entom. Soc., V, 1903, p. 196.

on oak, this may eventually prove the food plant of the species. Of *Argyresthia andereggella* Duponchel, I know no American specimens, and it should properly be excluded from our American faunal list, as its record seems to be made only on misidentified specimens. There is, however, a possibility that the species may have been or will be introduced, and I give the figure of the wing from authentic European specimens (Plate IV, fig. 10) for comparison with *areasella*.

ARGYRESTHIA INSCRIPTELLA, new species.

Plate IV, fig. 11.

Palpi and face light golden; head pure white; antennæ white, with brown annulations. Thorax white. Forewings silvery white, with dark golden or bronze-brown markings, as follows: Costal edge from base to the middle of the wing suffused with light brown; from the middle of the costa a broad, inwardly oblique, dark golden-brown fascia, with two or three small white notches on the costal edge; entire apical third strongly overlaid with dark golden-brown scales, except for three costal white dashes, two dorsal and several minute apical white dots. The apical dark part of the wing is separated from the central fascia by a large triangular pure white spot, which rests with one side on the dorsal edge and from the opposite upper corner emits a narrow line upward to a white costal dash. Hindwings rather dark fuscous. Legs silvery white, with tips of all joints brown. Forewings with veins 7 and 8 stalked.

Alar expanse.—8 mm.

Habitat.—Williams, Arizona, July (Barber).

Type.—Cat. No. 9947, U.S.N.M.

A very strikingly marked little species, easily recognized from the figure of the wing.

ARGYRESTHIA APICIMACULELLA Chambers.

Argyresthia apicimaculella CHAMBERS, Can. Ent., VI, 1874, p. 11.—Bull. U. S. Geol. Surv., IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6456.

Argyresthia risaliella CHAMBERS, Can. Ent., VII, 1875, p. 145.

Shining silvery-white, each joint of the antennæ (except the basal one) dotted above with dark brown. Primaries with a blackish or dark-brown, shining, almost triangular spot at the apex, with three pale and indistinct brownish costal streaks before it; the first of these streaks is the shortest and most indistinct and is placed at the beginning of the cilia. The second is a little more distinct and sometimes extends entirely across the wing and the third one always does so after dividing into two branches just before the apical spot. These streaks are usually more or less interrupted and sometimes spread over the apex, so that it might perhaps be more correctly described as dusted

than streaked. There is a bright though pale golden basal streak just within the costal margin.

Alar expanse.— $\frac{2}{3}$ inch (about 10 mm.). Kentucky, in oak woods, in June and July.

The above is Chambers's original description. The species is unknown to me except from a single specimen in poor condition in Museum of Comparative Zoology, received from Chambers. This specimen is glued on a card point and is labeled *A. visaliella*; it undoubtedly represents the present species, which should be easily recognized from the description, when met with.

ARGYRESTHIA SUBRETICULATA Walsingham.

Plate IV, fig. 12.

Argyresthia subreticulata WALSINGHAM, Trans. Am. Ent. Soc. Phila., X, 1882, p. 173.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6470.

Labial palpi golden-white. Face and head silvery-white. Antennæ annulated with light golden-brown. Thorax white. The dorsal two-thirds of the forewings pure immaculate white from base to shortly before apex. The costal third from base to apex light golden-brown, in the apical part somewhat darker and reticulated with white. The dark part of the wing broadens slightly and gradually toward apex and reaches to the apical third of the dorsal cilia. Around the apical edge is a narrow dark bronze line. Apical cilia golden, dorsal cilia white. Hindwings light gray. Forewings with veins 7 and 8 stalked.

Alar expanse.—9 mm.

Habitat.—Pennsylvania.

The type of this very distinct species is in the collection of the Philadelphia Academy of Natural Sciences. It is easily distinguished from all described American species of the genus by the large immaculate dorsal part of the forewings.

ARGYRESTHIA DELETELLA Zeller.

Plate V, fig. 1.

Argyresthia deletella ZELLER, Verh. Zool. bot. Gesell. Wien, XXIII, 1873, p. 305.—CHAMBERS, Bull. U. S. Geol. Surv., IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6463.

Labial palpi and face golden-white. Head white. Antennæ with black annulations. Thorax light golden yellow. Forewings whitish yellow, darker on the costal and apical parts than below the fold and irregularly sprinkled with small indistinct brownish transverse streaks. On the middle of the dorsal edge is a poorly defined brown transverse marking, crossing the light dorsal part and reaching beyond the fold. Apical cilia brownish with white base; dorsal cilia light ochreous.

Hindwings light ochereous gray. Veins 7 and 8 in the forewings stalked.

Alar expanse.—10 mm.

Habitat.—Texas.

The species is nearest *A. palmontella* Chambers, but differs from it by its ochereous coloration and is easily recognized by the brown transverse striation.

The types are in the Museum of Comparative Zoology and in Lord Walsingham's collection. In U. S. National Museum is an identical specimen, which I have compared in both these places and which I believe belongs to the original type series.

ARGYRESTHIA ALTISSIMELLA Chambers.

Argyresthia altissimella CHAMBERS, Bull. U. S. Geol. Surv., III, 1877, pp. 130, 147; IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6454.

I quote Chambers' description:

Of a leaden hue, except that the vertex is whitish, the antennæ annulated with white; the palpi are a little darker than the general hue, except the under surface of the second joint, which is whitish. Cilia paler than the wings. Expanse of wings scant 6 lines (about 12 mm.). In some lights the forewings appear silvery or pale golden. Taken in July among dwarf willows on the side of Mount Elbert, Colorado. Altitude 11,000 feet.

This species is unknown to me except from the unique type in the Museum of Comparative Zoology, on which I made the following note in October, 1902:

Type No. 1412, unique, labeled Colorado; in rubbed condition. Probably a true *Argyresthia*, but different from any known to me; forewings, which are much rubbed, appear to have been uniformly golden fuscous, with strong metallic reflexions.

Closer study of this type is required, but if, as I believe, it belongs to the present genus, the species should be easily recognized when met with.

ARGYRESTHIA CONJUGELLA Zeller.

Plate V, fig. 2.

Argyresthia conjugella ZELLER, Isis, 1839, p. 204.—FLETCHER, Rept. Entom. Can. Agricult. Dept., 1896, p. 258; 1897, p. 201; 1898, p. 198.—STAUDINGER and REBEL, Cat. Lep. Eur., 1901, No. 2393.—LAMPA, Entom. Tidsek., XXVII, 1906, p. 1.

Palpi, face, and head yellowish-white; antennæ annulated with dark brown. Thorax yellowish-white; patagina dark brown. Forewings dark purplish-brown with dorsal part to tornus white; on the middle of the dorsal edge is an outwardly oblique blackish-brown streak, which loses itself in the dark costal part. Costal edge is strigulated with yellowish white, and shortly before apex is a larger white costal dash. Apical cilia blackish-brown; dorsal cilia ochereous fuscous.

Hindwings dark fuscous with ochereous-gray cilia. Forewings with veins 7 and 8 separate.

Alar expanse.—12–13 mm.

Food plants.—Berries of *Sorbus aucuparia* (authorex), fruit of apple (Fletcher, Lampa).

This European insect, whose normal food plant is mountain ash, has of late years been observed in Canada and Scandinavia to attack cultivated apples whenever the normal food supply for any reason has failed, and it has thereby proved itself a very destructive enemy of the apple crop of considerable economic importance.

Dr. J. Fletcher first recorded the species and its change of food plant from British Columbia. One of his specimens determined by Lord Walsingham and Mr. Durrant, in 1897, is in U. S. National Museum; it is labeled: Apple-fruit miner, British Columbia, Jan. 2, 1897.

Another specimen from Fieldbrook, California (H. S. Barber), can not be distinguished from typical European specimens in the Museum collection.

Prof. S. Lampa has recently (see reference above) given a very excellent review of this insect with an account of his own careful observations on its habits on *Sorbus* and on apple; it is illustrated by a fine colored plate.

ARGYRESTHIA BELANGERELLA Chambers.

Plate V, fig. 3.

Argyresthia belangerella CHAMBERS, Can. Ent., VII, 1875, p. 145; Bull. U. S. Geol. Surv., IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6460.

Palpi white; head and face white; antennae with dark brown annulations. Thorax white; patagina dark brown. Costal part of forewing above the fold dark brown, with a series of still darker costal spots from the middle to apex, the outer ones intersected with white dashes. Dorsal part of the wing below and somewhat beyond the folds ochereous white, with a semicircular, not very well defined, dark brown spot on the middle of the dorsal edge and a smaller one at apical third. Cilia light brown. Hindwings dark fuscous. Legs white, shaded with brown. Forewings with veins 7 and 8 separate.

Alar expanse.—13 mm.

Habitat.—Canada.

The type of this species, from Professor Belanger's collection, was obtained by the writer with the other of Chambers's types in that collection through the courtesy of Rev. Dr. C. E. Dionne of the Laval University, Quebec, Canada, and it is now in U. S. National Museum as type No. 5777.

An identical cotype, received from Chambers, is in the Museum of Comparative Zoology.

The species is very near *conjugella* Zeller, but differs by the dorsal dark spot not reaching the costal dark part of the wing.

ARGYRESTHIA MONTELLA Chambers.

Argyresthia montella CHAMBERS, Bull. U. S. Geol. Surv., III, 1877, p. 130; IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6464.

Face and palpi yellowish; tuft and thorax white; antennæ fuscous, annulated with white; forewings fuscous, the apical portion indistinctly dusted with white, and with indistinct short white streaks before the apex, each dark margined before; the dorsal margin is white as far as the fold, and very faintly dusted; no dorsal fuscous streak; there is a row of fuscous scales around the base of the cilia, which at the apex have, to the naked eye, the appearance of a minute spot. Hindwings, cilia, and upper surface of the abdomen pale grayish; undersurface of the wings grayish fuscous and tuft whitish; legs whitish, the tarsi stained with yellowish.

Expanse of wings.—7 lines [about 15 mm.]. Among scrub-oaks at Edgerton [Colorado] in July.

The above is Chambers description; the species is known to me only from the unique type [No. 1411] in Museum of Comparative Zoology on which I made the following note in 1902:

Near *belangerella*, but larger, and without the dark dorsal spot in the white part of the wing; with an extreme apical black line as in *pedmontella*, from which it also differs by the absence of the dorsal streak.

ARGYRESTHIA PLICIPUNCTELLA Walsingham.

Plate V, fig. 4.

Argyresthia plicipunctella WALSINGHAM, Insect Life, III, 1890, p. 119; IV, 1891, p. 386.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6465.

Labial palpi, face, and head white, antennæ annulated with brown. Thorax white, patagina light fuscous. Forewings white, suffused, and sprinkled with grayish brown, especially in costal and apical parts, while the dorsal part below the fold is nearly pure white. Around the apical edge is a not very prominent darker line and on the fold is a rather indistinct, somewhat darker brownish spot, not touching the dorsal edge. Hindwing light ochreous fuscous. Legs white, tarsal joints slightly tipped with brown. Forewing with veins 7 and 8 stalked.

Alar expanse.—10 mm.

Habitat.—California and Oregon.

I examined the types of this species at Merton Hall, England, and obtained through the liberality of my hosts one of the cotypes from Mendocino County, California, from which the present description and figure is made. It is an obscure, poorly marked species, which, however, can not well be mistaken for any of the other described forms.

ARGYRESTHIA RILEIELLA, new species.

Plate V, fig. 6.

Argyresthia mendica WALSINGHAM [not Haworth], Insect Life, III, 1891, p. 118.—
DURRANT, Rept. of Entomologists, Can. Dept. Agricult., 1897, p. 202.—DYAR,
Bull. 52, U. S. Nat. Mus., 1903, No. 6459.

Head, face, and palpi white; antennæ annulated with golden brown. Thorax white, patagina dark golden brown. Forewings white, above the fold strongly suffused with golden brown especially toward apex, which is quite dark; along the outer half of the costal edge is an irregular series of ill-defined small darker brown spots intervened with whitish. The dorsal edge below the fold is nearly immaculate white until the middle of the wing, where it is cut off by a large ill-defined dark brown patch, which crosses the fold and gradually widens out and is lost in the dark portion of the wing. Hindwings light ochereous fuscous. Legs white, tarsal joints tipped with brown. Forewings with veins 7 and 8 separate and one dorsal vein absent.

Alar expanse.—9 m m.

Habitat.—Washington, District of Columbia (Riley), May, 1885.

Type.—Cat. No. 9948, U.S.N.M.

Lord Walsingham erroneously recorded the European *Argyresthia mendica* Haworth on the unique specimen in National Museum, which I have now made the type of *rileiella*. The specimen is only in fair condition, and I should not have described the species until more material was on hand except for the correction of this record; it is certainly distinct from *mendica*, a figure of which (Plate V, fig. 5) I give for comparison, it being smaller, more slender winged, and without the white costal markings characteristic of the European species; this latter of course must be dropped from our faunal list.

It is also quite distinct from *conjugella*, which species it was suggested it might be by Mr. H. Durrant, who, with Lord Walsingham, had realized, that the determination *mendica* was probably erroneous.^a

Rileiella is nearest to *pedmontella*, but is a smaller, more shining species in which the costal part is darker and the dorsal part more immaculate white than in *pedmontella*. It differs from all three species by the absence of one dorsal vein in the forewing.

Named in honor of the collector, the late Prof. C. V. Riley, to whose special interest in Microlepidoptera we owe much valuable work done by himself and others in this group.

^aDurrant, Rept. Entom. Can. Dept. Agricult., 1897, p. 202.

ARGYRESTHIA PEDMONTELLA Chambers.

Plate V, fig. 7.

Argyresthia pedmontella CHAMBERS, Bull. U. S. Geol. Surv., III, 1877, p. 131; IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6466.

Labial palpi, face and head white; antennæ annulated with brown. Thorax white, patagina brown. Forewings white, strongly suffused with dark brown on the costal and apical parts; dorsal part below the fold only slightly sprinkled with dark scales; on the costal edge from basal third to apex is an irregular series of darker brown spots intervened by pure white dashes; around apex and along base of dorsal cilia is a thin blackish-brown line, and on the middle of the dorsal edge is a large, oblique, dark brown spot shaped like a parallelogram reaching across the light dorsal area to the more densely dusted costal part. Cilia light fuscous. Hindwings light fuscous. Legs shaded with dark brown. Forewings with veins 7 and 8 separate.

Alar expanse.—13 mm.

Habitat.—Colorado (Chambers).

This is nearest to *belangerella* and *rileiella*, differing from both in the lighter costal part of the forewing and in the form of the dorsal spot.

ARGYRESTHIA BOLLIELLA, new species.

Plate V, fig. 8.

Labial palpi and face golden white; head white; antennæ with dark-brown annulations. Thorax and patagina white. Forewings white, with dark-brown markings as follows: A broad, inwardly oblique, dark-brown fascia from beyond the middle of the costal edge, sometimes narrower, and diffused on the middle of the wing, but reaching and widening out on the dorsal edge; a large, ill-defined dorso-apical spot, covering apical fourth except along costal edge, which is white; a series of small, irregular brown streaks along the costal edge and a sparse sprinkling of brown scales on the entire wing; sometimes a larger dot on dorsal edge before the fascia. Hindwings dark fuscous. Legs golden white; tarsal joints shaded with brown. Forewings with veins 7 and 8 separate.

Alar expanse.—10–11 mm.

Habitat.—Texas (Boll).

Type.—Cat. No. 9949, U.S.N.M.

Named in honor of the collector, the late Jacob Boll, whose beautifully preserved specimens, collected more than a quarter of a century ago, are still among the most valuable material in the few important collections of American Microlepidoptera.

The species is nearest to *undulatella* Chambers, but somewhat larger, without the basal costal dark streak and with the fascia reaching across the wing to the dorsal edge.

ARGYRESTHIA UNDULATELLA Chambers.

Plate V, fig. 9.

Argyresthia undulatella CHAMBERS, Can. Ent., VI, 1874, p. 10; VII, 1875, p. 145.*Chalciope undulatella* CHAMBERS, Can. Ent., VI, 1874, p. 10.*Polyco undulatella* CHAMBERS, Can. Ent., VI, 1874, p. 10.*Albanca undulatella* CHAMBERS, Can. Ent., VI, 1874, p. 10.*Argyresthia austerella* CHAMBERS (not Zeller), Can. Ent., IX, 1877, p. 72; Bull. U. S. Geol. Surv., IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6457 (part).

Labial palpi white, shaded externally with brown. Face white below, brownish above. Head white. Antennæ annulated with black. Thorax and patagium white. Forewings white, with base of costal edge brownish and with costal and apical parts rather freely dusted with brown scales; from beyond the middle of costa runs a dark brown fascia inwardly oblique, which does not quite reach the dorsal edge; at apical third is a similar, but not so well defined, oblique dark brown streak, which is connected with and diffused into the nearly brown apical part of the wing in which are two or three white costal dashes and a thin black line along the apical edge. Hindwings light fuscous. Legs white, tarsi annulated with brown. Forewings with veins 7 and 8 stalked.

Alar expanse.—9 mm.*Habitat*.—Kentucky (Chambers).

This species was made a synonym of Zeller's *austerella* by Chambers himself, though he noted the differences of his species from Zeller's very striking figure of *austerella*, and it has since been regarded as such; but Chambers's description and a comparison of his and Zeller's type in the Museum of Comparative Zoology and in the U. S. National Museum clearly proves that the two species are distinct, and Chambers's old name must be revived.

The most striking difference from *austerella* is the total absence of the first costal dark streak at basal third, found in Zeller's species.

ARGYRESTHIA AUSTERELLA Zeller.

Plate V, fig. 10.

Argyresthia austerella ZELLER, Verh. zool. bot. Gesell. Wien, XXIII, 1873, p. 305.—CHAMBERS, Bull. U. S. Geol. Surv., IV, 1878, p. 130.—DYAR, Bull. 52, U. S. Nat. Mus., 1903, No. 6457.

Labial palpi white, shaded with fuscous. Face lead colored. Head white. Antennæ white, with black annulations. Thorax white. Forewings white, with striking dark-brown marking; entire costal edge and apical part of the wing mottled with dark brown, in which the ground color appears as small dots and dashes, especially in the apical part.

Before the middle of costa is a dark brown, nearly black, inwardly oblique streak reaching to the fold; from just beyond the middle of costa runs a broader blackish brown fascia parallel with the first costal streak, but reaching to the costal edge, though somewhat attenuated. At apical third is a third dark streak parallel to the other two, but generally more or less diffused into the dark apical part of the wing. Legs golden white, annulated with black. Forewings with veins 7 and 8 stalked.

Alar expanse.—8-9 mm.

This boldly marked species is nearest to the two foregoing, but, as indicated under them, quite distinct, as Zeller's figure alone proves.

Zeller's types are in the Museum of Comparative Zoology; they came from Texas (Boll). In the National Museum are identical specimens from Cincinnati, Ohio, by Miss A. F. Braun, and near St. Louis, Missouri, and on Plummers Island, Maryland, by the writer.

ARGYRESTHIA THUIELLA Packard.

Plate V, fig. 11.

Bucculatrix thuiella PACKARD, Amer. Nat., V, 1871, p. 152; Rept. U. S. Entom.

Com., V, 1890, p. 917.—RILEY, Rep. Ins. Mo., IV, 1872, p. 51.—DYAR,

Bull. 52, U. S. Nat. Mus., 1903, No. 6250.

Argyresthia sp., FLETCHER, Rept. of Entom. Can. Dept. Agr., 1905, p. 189.

Palpi, head, and face white, antennæ with brown annulations. Thorax white. Forewings pearly white with brown markings; base of costal edge light golden brown; at basal third is a small brown dorsal streak; on the middle of the wing is a larger brown dorsal streak, sometimes reaching nearly to an opposite small brown costal spot, but generally diffused and interrupted before then; at apical third is a nearly complete narrow brown fascia and around the apical edge is a series of small dark-brown dots. These markings are quite variable and often much diffused; in some specimens the entire basal half is nearly immaculate white and the markings confined to the gradually darker apical spots; in other specimens the entire wing is slightly sprinkled with irregular ill-defined brown spots. Hindwings, light fuscous. Legs yellowish white. Veins 7 and 8 in the forewings stalked.

Alar expanse.—8-9 mm.

Habitat.—Maine (Packard), Canada (Fletcher), Pennsylvania (Dietz).

Foodplant.—*Thuja occidentalis*.

This neat little species can not easily be confused with any other described American *Argyresthia*, in spite of the variation in markings. A very large series was lately bred by the writer from *Thuja* branches sent from Dr. J. Fletcher, Ottawa, Canada. The larvæ mines the terminal shoots, leaving them dead and discolored, and Doctor Fletcher stated that the species did considerable damage in his neighborhood to ornamental *Thuja*, as was also very evident from the material sent.

The larva pupates within the mine without much of a cocoon, and the adults go through the characteristic undulating motion before settling down to the typical position of rest.

I have very little hesitation in identifying this species as the one described by Packard as a *Bucculatrix* for the following reasons: No species of *Bucculatrix* is known to feed on evergreens; the description fits the present species very well, as does the figure, which, although poor, looks like an *Argyresthia*, but could hardly have been drawn from a *Bucculatrix*. Packard had rather vague ideas of the genera of Microlepidoptera, as is abundantly proven by his description of *Nepticula pomivorella* as a *Micropteryx*, and of *Tinea fuscipunctella* Haworth as *Oecophora frigidella*; a large number of the small, very peculiar parasite *Pentacnemus bucculatrixis* Howard, which was described from Packard's specimens, were also bred from my material; the cocoons which Packard described and associated with his species did, according to his description, not look like those of a *Bucculatrix* and probably belonged to the *Recurvaria thuyella*, common on the same plant and also bred from Doctor Fletcher's material.

However, there is, of course, a possibility of a *Bucculatrix* feeding on *Thuja*, and if such is ever found Packard's name must revert to that species; but I consider this very improbable.

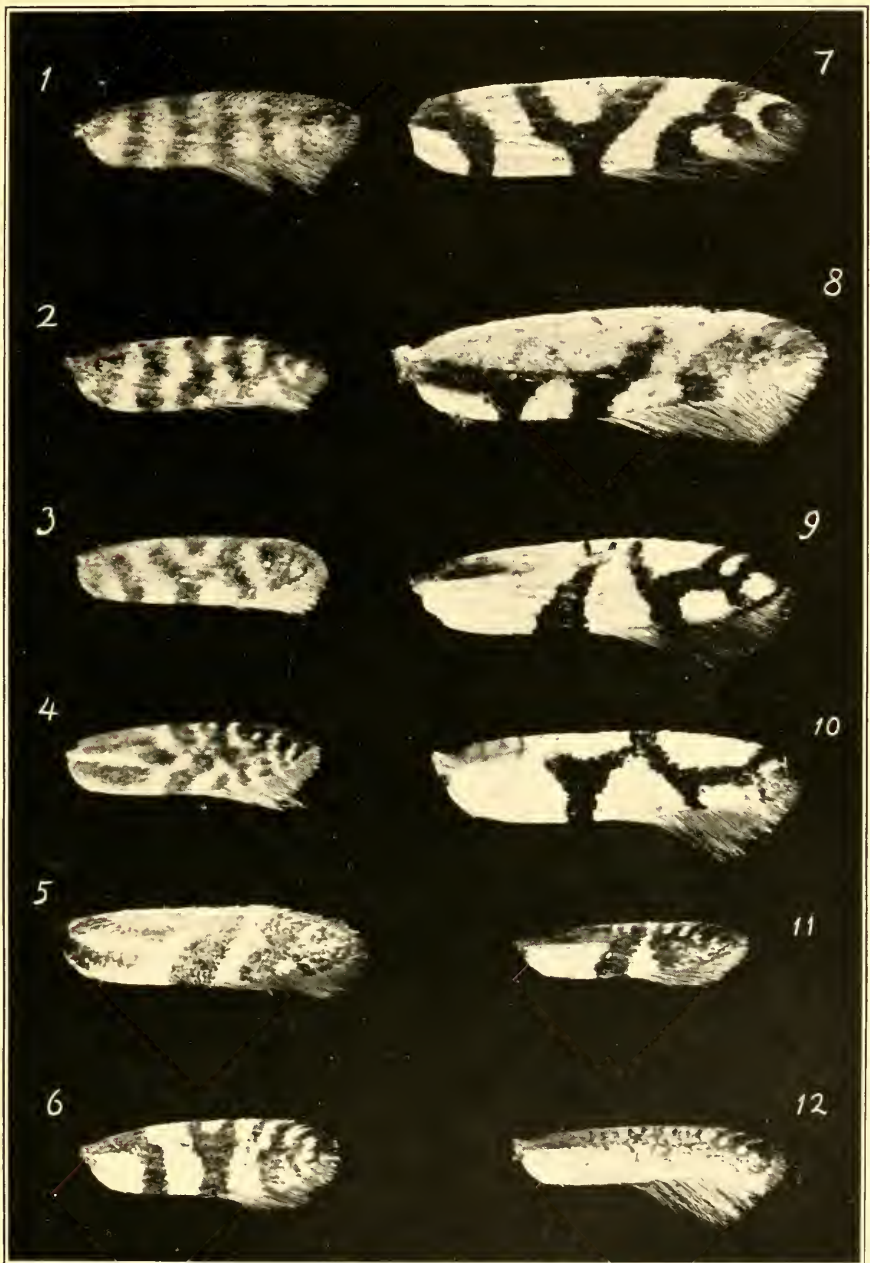
EXPLANATION OF PLATES.

PLATE IV.

- FIG. 1. *Argyresthia quadririgella* Zeller.
 2. *Argyresthia thoracella* Busck.
 3. *Argyresthia cupressella* Walsingham.
 4. *Argyresthia freyella* Walsingham.
 5. *Argyresthia quercicolella* Chambers.
 6. *Argyresthia annettella* Busck.
 7. *Argyresthia goedartella* (Linnaeus).
 8. *Argyresthia pygmaeella* Hübner.
 9. *Argyresthia oreasella* Clemens.
 10. *Argyresthia andereggiella* Duponchel.
 11. *Argyresthia inscriptella* Busck.
 12. *Argyresthia subreticulata* Walsingham.

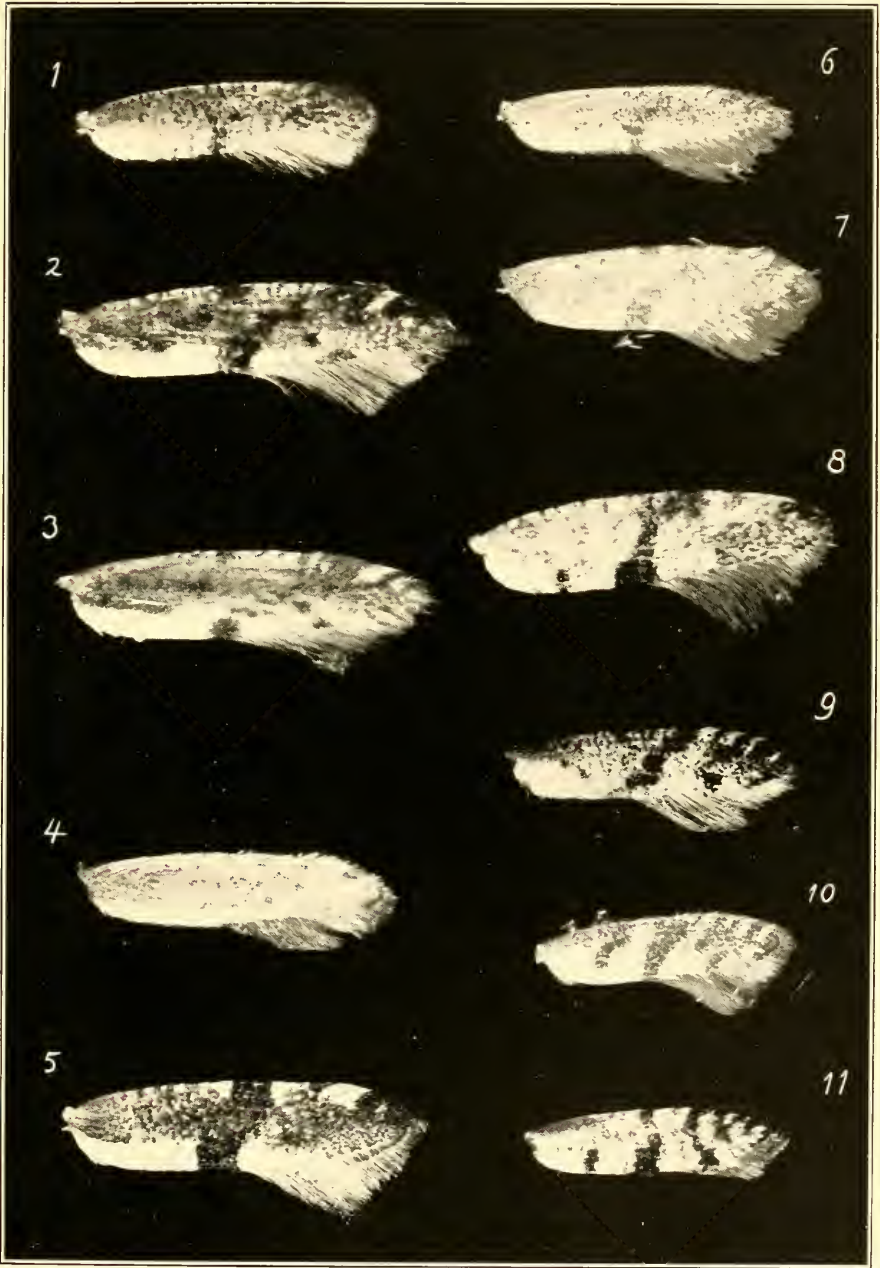
PLATE V.

- FIG. 1. *Argyresthia deletella* Zeller.
 2. *Argyresthia conjugella* Zeller.
 3. *Argyresthia belangerella* Chambers.
 4. *Argyresthia plicipunctella* Walsingham.
 5. *Argyresthia mendica* Haworth.
 6. *Argyresthia rileyella* Busck.
 7. *Argyresthia pedmontella* Chambers.
 8. *Argyresthia bolliella* Busck.
 9. *Argyresthia undulatella* Chambers.
 10. *Argyresthia austerella* Zeller.
 11. *Argyresthia thuyella* Packard.



WINGS OF THE GENUS ARGYRESTHIA.

FOR EXPLANATION OF PLATE SEE PAGE 24.



WINGS OF THE GENUS ARGYRESTHIA.

FOR EXPLANATION OF PLATE SEE PAGE 24.

