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REVISION OF THE NORTH AMERICAN MOTHS OF THE
FAMILY OECOPHORIDAE, WITH DESCRIPTIONS OF
NEW GENERA AND SPECIES

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INTRODUCTION

THIS study of the North American Oecophoridae was begun several years ago at the suggestion of August Busck, of the United States Bureau of Entomology and Plant Quarantine. In the beginning I had intended to do only a specific revision of the genera *Agonopterix* and *Depressaria*. It soon became apparent, however, that it would be necessary to study carefully all the species known from North America together with many from other parts of the world. Hence this paper has become a revision of the entire family.

In North America the family Oecophoridae comprises a large group of small to medium-sized moths most of which are inconspicuously colored. A few, however, are brilliantly marked. The moths are chiefly nocturnal, but some may be seen flying about in the bright sunlight. Because of their retiring habits they are seldom seen and are best secured by rearing the larvae.

The majority of the Oecophoridae are leaf and flower feeders in the larval stage. Those that feed in the inflorescence usually attack plants of the family Umbelliferae, while the leaf feeders attack a large variety of plants in many families. Some are forest insects.

Besides the leaf and flower feeders there are others that feed on stored products, such as dried foods, bulbs, and tubers. Some are scavengers and feed in the refuse occurring in the nests of mice and birds. Some live in the cracks of bark, others beneath the bark where

they feed either on refuse or bits of dried vegetable matter. One (*Martyrhilda sphaeralceae*, new species) is a leaf miner.

Among the flower feeders the most important is *Depressaria heracliana* (Linnaeus) (the parsnip webworm), which does considerable damage to commercially grown parsnips by destroying the flower-heads and immature seeds. A closely related species, *D. cinereocostella* Clemens, has been recorded from caraway but is most frequently found on closely related indigenous plants such as *Sium lineare* Michx.

Among the forest insects we find *Agonopterix argillacea* (Walsingham), which has been reared in quantity from willow (*Salix* spp.). The species of the genus *Psilocorsis* attack beech (*Fagus grandifolia* Ehrh.), oak (*Quercus* spp.), and pecan (*Carya pecan* Aschers. & Graebn.) and hickory (*Carya ovata* (Mill.) Koch). *P. caryae*, new species, is of considerable importance in the South, where it is destructive to pecan. In the immediate vicinity of Washington, D. C., the larvae of *P. faginella* (Chambers) do a great deal of damage to beech.

In addition we have the European *Carcina quercana* Fabricius, which is an oak feeder and has been introduced on Vancouver Island, British Columbia, and *Machimia tentoriferella* Clemens, which feeds on *Castanea*, *Juglans*, *Quercus*, and *Prunus*.

The scavenger bulb moth, *Hofmannophila pseudospretella* (Stainton), is recorded from stored bulbs and tubers of tulip, dahlia, and gladiolus and from dried fruits and other stored products (see hosts under species) and is a common pest in houses. It is found throughout Europe and America and in New Zealand.

Endrosis lactella (Schiffmüller) does considerable damage on the Pacific coast and in Europe, feeding on stored cereals, fruits, and other products.

The pupae are formed in debris, in leaves, or in hollow stalks and do not protrude at the time of emergence of the moth. Many species hibernate as adults.

Several species are of considerable economic importance. Notable among these are *Endrosis lactella* (Schiffmüller), *Hofmannophila pseudospretella* (Stainton), and *Depressaria heracliana* (Linnaeus).

The distribution of the North American Oecophoridae appears to center about the Southwestern States, particularly Arizona, Colorado, and California. The genus *Agonopterix*, the largest in the family, is particularly well represented in western North America.

Since Busck¹ published his paper on the North American moths of this family no attempt has been made to revise the group. He

¹Busck, A., A generic revision of American moths of the family Oecophoridae, with descriptions of new species. Proc. U. S. Nat. Mus., vol. 35, pp. 187-207, 1908.

recognized 19 genera and 121 species of North American Oecophoridae. In the Barnes and McDunnough list² the authors followed Busck in recognizing 19 genera but enumerated only 98 species, the remainder being transferred to other families. Meyrick³ recognized 17 North American genera and 104 species.

EXCLUSION OF UNRELATED FORMS

Within the family I recognize 22 genera and 117 North American species. Six genera, 19 species, and 1 race are described as new in this paper.

The genus *Endrosis* is retained in the family with doubt. Busck⁴ transferred *Triclonella* to the Cosmopterygidae in 1932. I have removed *Eumeyrickia* and *Gerdana* from the family and have placed them in the families Ethmiidae and Blastobasidae, respectively. For part of the species formerly placed in *Borkhausenia* I have erected the genus *Anoncia* and have referred it to the Cosmopterygidae. For *Semioscopis accertella* Busck I have erected the genus *Antequera* and have placed it in the family Cosmopterygidae.

CHARACTERS OF THE FAMILY

Head usually smooth, with loosely appressed scales; often with raised side tufts. Antenna simple to strongly ciliated, usually with pecten on basal segment but frequently with pecten absent or slightly developed. Labial palpus well developed, usually long, upwardly curved, variously scaled; terminal segment acutely pointed. Maxillary palpus short, filiform, appressed. Prothoracic and mesothoracic legs normally slender, moderately long; posterior tibia with long rough hairs above.

Fore wing with 12 veins (or 11 by coincidence of veins 7 and 8); 1b furcate at base; 1c always preserved, at least at margin; 7 and 8 stalked or coincident, 7 to costa, apex or termen.

Hind wing with eight veins or rarely seven by coincidence of veins 5 and 4 (*Endrosis*); veins 6 and 7 remote, subparallel; veins 3 and 4 normally stalked or connate (rarely separate); 8 free; 5 nearer to 4 than to 6 (except *Oecophora* and *Mathildana*).

Male genitalia symmetrical; harpe with or without clasper, base of harpe broadly attached; sacculus well defined; cucullus rounded or pointed except in *Carcina*, where it is greatly reduced and weakly sclerotized. Anellus a simple plate or with moderately or well developed lateral processes. Aedeagus with very small "blind sac" or

² Barnes, W., and McDunnough, J., Check list of the Lepidoptera of Boreal America, pp. 160-162, 1917.

³ Meyrick, E., in Wytzman, Genera Insectorum, fasc. 180, 1922.

⁴ Busck, A., Proc. Ent. Soc. Washington, vol. 34, p. 19, 1932.

none. The entrance of the penis is dorsal, near the proximal end. Vinculum bandlike or moderately produced. Gnathos present.⁵ Socii and uncus present or absent. First and eighth segments simple or with hair pencils.

Female genitalia: Ostium opening in median part of genital plate, the latter simple or modified (*Fabiola*, *Inga*); signum present or absent; abdomen weakly or strongly sclerotized; sometimes spinose.

The foregoing characters will serve to distinguish this family from all other Lepidoptera except a few Blastobasidae and Ethmiidae. The Blastobasidae may be separated from the Oecophoridae by the widely separate veins 11 and 10 of the fore wing, the proximity of veins 2 to 10, and the thickening of the membrane below the costa (the "stigma" of Zeller). Certain of the oecophorid genera have some of the characters of the Blastobasidae while lacking others. *Endrosis* possesses a spinose abdomen, a character frequently encountered in the Blastobasidae,⁶ but lacks the characters listed in the foregoing paragraph as being typical of that family. The larva of *Endrosis* further suggests Blastobasidae. The Ethmiidae may be distinguished from the Oecophoridae (except *Oecophora* and *Mathildana*) by the proximity of vein 5 to 6 of the hind wing; and the characteristic male genitalia, which exhibit a primitive segmented type of harpe.

I have removed the genera *Oecophora* and *Borkhausenia* from our American lists, as the only species formerly included are referable to other genera.

For *haydenella* and *pseudospretella* I have resurrected the names *Chambersia* Riley and *Hofmannophila* Spuler, respectively. For *ascriptella* Busck I have erected the genus *Carolana*. I propose the genus *Mathildana* for *newmanella* and have restricted *Oecophora* to *bractella* and its congeners. I retain all these in the family Oecophoridae.

Larva.⁷—With primary setae only (except in *Apachea*, which has a few secondary hairs in group VII on most of the abdominal segments and two or three on the prothoracic shield); three setae on prespiracular shield of prothorax; setae IV and V approximately and directly below or (frequently) ventrocephalad of the spiracle on proleg-bearing segments; on eighth abdominal segment seta III usually dorsocephalad of the spiracle, rarely directly above, never dorsocaudad or with a

⁵ The genera of the family fall into two groups on characters of the gnathos. *Agonopterix*, *Bibarrambia*, *Apachea*, *Depressaria*, *Semioscopis*, *Martyrhilda*, *Machimia*, *Himmacia*, and *Psilocorsis* fall into a group with a spiny gnathos. The remaining genera are without spines on the gnathos. This suggests a division that may be of subfamily significance.

⁶ The spinose abdomen is found in at least seven other oecophorid genera. They are *Martyringa*, *Borkhausenia*, *Hofmannophila*, *Carolana*, *Pleurota*, *Inga*, and *Semioscopis*.

⁷ The setal characters of group VII should be used with caution as occasional abnormal specimens occur in nearly all species. A hair may be missing from the group on either the first or eighth abdominal segment, but only on one side of the insect. The opposite side is nearly always normal.

pigmented sclerotized ring surrounding the base of the tubercle; on ninth abdominal segment seta I ventrocephalad of II, rarely approximate to II (*Endrosis*, *Hofmannophila*), usually about equidistant from II and III, III much nearer to IV-V than to I, IV and V closely approximate, VI rarely (*Psilocorsis*) on the same pinaculum with IV-V, sometimes approximate to VII, VII unisetose. Legs and prolegs normal. Crochets in a complete circle, biordinal and, occasionally, irregularly triordinal, never in a penellipse (or a ring broken outwardly).

Head with adfrontals extending to incision of dorsal hind margin of epicranium; frons not extending to incision of hind margin; a longitudinal ridge always present; epicranial seta L¹ usually closer to A³ than A³ is to A². Ocelli normally six (reduced to 4 or 2 in *Hofmannophila* and *Endrosis*), arranged approximately in a parallelogram; 3 and 4 mostly in a straight line with 2 and 5; 3 and 4 closely approximate.

Pupa.—Smooth or pubescent. Body usually depressed. Epicranial suture present; frontoclypeal suture not distinct for its entire length or reaching the meson; maxillary palpi present, large, usually reaching proximolateral angles of maxillae; caudal portions of antennae lying adjacent on the meson, separating at their distal ends to expose metathoracic legs; maxillae from one-half to two-thirds the length of wings; labial palpi rarely exposed (*Endrosis*). Prothoracic femora sometimes exposed, often not. Abdomen with segments 4 to 6 movable and with deep incisions between these segments on dorsal and ventral surfaces; genital and anal openings slitlike in both sexes; no hooked setae on ventral surface of ninth segment; cremaster absent or shortly developed.

CLASSIFICATION

In the classification of this family venation, palpi, general habitus, and genitalia have been employed in this revision. The genitalia are especially helpful and have been used to separate species as well as genera. I have found the anellus of the male genitalia to be particularly useful, and in most cases it is possible to separate species as well as genera by this structure.

The palpi are normally useful in the separation of genera but in a few cases cannot be relied upon. The eyes and vestiture of the head may be useful taxonomically, and Meyrick laid great weight on the length of the ciliation of the antennae, but the modifications of these characters appear to be too gradual for safe generic differentiation and have not been employed in this paper.

Venation is usually reliable within a genus, but occasionally unusual venation is encountered. A large number of genera have nearly identical venation, but such cases are easily separable on genitalia or ex-

ternal characters. In a few the venation is unstable. This is particularly true of veins 2 and 3 of the fore wing of *Semioscopsis* and veins 3 and 4 of the hind wings of *Agonopterix* and *Depressaria*. The genitalia of these three genera distinguish them, however, from all others. The species fall, with one or two exceptions, into natural groups on habitus as well as on structure, so that the definition of genera is comparatively simple.

In a few genera it is not entirely clear what we are dealing with. For example, in *Depressaria* there are five distinct species groups, which may actually represent separate genera. The *leptotaeniae-multifidae* group is especially interesting and represents a series of "species" that may represent only simple Mendelian variants of one species. As will be noted, in the proper place, all these except *yakimae* are of practically the same color and have closely similar habits and hosts, yet all have distinct genitalia.

In the genus *Psilocorsis* it is particularly difficult to separate many of the species (*reflexella-faginella* group), and here we are confronted again with the problem of what actually constitutes a species.

These problems can be settled only by careful breeding, and in the meantime we shall have to content ourselves with the supposition that genitalic differences represent specific entities or genera depending on their nature. Nevertheless, I strongly suspect that Mendelian variation may be transmitted to the genitalia as well as other structures and that eventually we shall be able in most instances to use genitalic characters for group separation only.

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The drawings for this paper were made by the author. Whenever possible the genitalia were figured from the type, either male or female, and where the type was not available, from paratypes or authentically determined specimens. I have been able to examine the genitalia, both male and female, of all the genotypes and of either male or female, or both, of all the species of *Agonopterix* and *Depressaria* except *A. endryopa* (Meyrick), *A. murmurans* (Meyrick), *D. nymphidia* Meyrick, *D. corystopa* Meyrick, *Borkhausenia aciculata* Meyrick, and *Paratheta astigmatica* Meyrick. I am unable to recognize these species.

For most of the Canadian records no reference is made to the sex of the specimens. These records were sent to me by Dr. McDunnough.

The following keys to the genera include all genera discussed by Busck (1908), with the addition of two old and six new genera described in this paper.

ARTIFICIAL KEY TO THE GENERA

- 1. Basal segment of antenna with pecten (figs. 3, 4, 6, 9, etc.)----- 2
- Basal segment of antenna without pecten (figs. 7, 10, 14, 18, etc.)----- 13
- 2. Second segment of labial palpus long, straight, porrect (fig. 6)
 - 12. *Pleurota* (p. 230)
- Second segment of labial palpus otherwise (figs. 3, 4, 9)----- 3
- 3. Antenna longer than fore wing----- 13. *Carcina* (p. 233)
- Antenna shorter than fore wing----- 4
- 4. Veins 7 and 8 of fore wing coincident (fig. 55)----- 16. *Decantha* (p. 241)
- Veins 7 and 8 of fore wing not coincident----- 5
- 5. Veins 2 and 3 of fore wing stalked (figs. 29, 44, 45)----- 6
- Veins 2 and 3 of fore wing separate----- 8
- 6. Costa of fore wing arched; costa of hind wing arched, veins 4 and 5 well separated (figs. 29, 45)----- 7
- Costa of fore wing straight or slightly concave; costa of hind wing concave, veins 4 and 5 closely approximate at bases (fig. 44)----- 2. *Martyrhilda* (p. 125)

⁸ Now at the Department of Botany, University of California, Berkeley, Calif.

⁹ Now at the Department of Botany, University of Hawaii, Honolulu.

7. Abdomen flattened; labial palpus with well-developed brush on second segment; hind wing lobed at anal angle... 1. *Agonopterix* (p. 43)
 Abdomen not flattened; labial palpus without well-developed brush on second segment; hind wing without lobe at anal angle.
 3. *Bibarrambra* (p. 146)
8. Costa of hind wing excavated (fig. 51)..... 22. *Endrosis* (p. 262)
 Costa of hind wing not excavated..... 9
9. Second segment of labial palpus with brush (figs. 11, 16)..... 10
 Second segment of labial palpus without brush (figs. 3, 4, 12)..... 11
10. Brush of labial palpus broadly triangular (fig. 16)..... 6. *Apachea* (p. 197)
 Brush of labial palpus not broadly triangular (fig. 11)
 5. *Depressaria* (p. 163)
11. Fore wing lanceolate, apex pointed; veins 3 and 4 of hind wing stalked (fig. 49)..... 15. *Carolana* (p. 239)
 Fore wing not lanceolate, apex not pointed; veins 3 and 4 of hind wing connate or closely approximate (figs. 43, 46)..... 12
12. Veins 2 and 3 of fore wing remote (fig. 46)..... 19. *Chambersia* (p. 252)
 Veins 2 and 3 of fore wing approximate (fig. 43)
 21. *Hofmannophila* (p. 258)
13. Fore wing: Veins 8 and 9 out of 7 (fig. 39)..... 11. *Martyringa* (p. 228)
 Fore wing: Vein 9 separate..... 14
14. Labial palpus with longitudinal stripes..... 9. *Psilocorsis* (p. 204)
 Labial palpus without longitudinal stripes..... 15
15. Fore wing with veins 7 and 8 coincident (fig. 41)..... 17. *Fabiola* (p. 244)
 Fore wing with veins 7 and 8 otherwise..... 16
16. Hind wing with vein 5 nearer to 6 than to 4 (fig. 50) 14. *Mathildana* (p. 236)
 Hind wing with vein 5 nearer to 4 than to 6..... 17
17. Discocellulars of hind wing strongly outwardly oblique between veins 4 and 6 (fig. 31)..... 8. *Himmacia* (p. 202)
 Discocellulars not outwardly oblique between veins 4 and 6..... 18
18. Fore wing with vein 2 distant from 3 (figs. 33, 47, 56)..... 19
 Fore wing with vein 2 approximate (sometimes connate or stalked with 3 in *Semioscopis*) to 3 (figs. 35, 37)..... 21
19. Costa of hind wing excavated (fig. 47)..... 20. *Epicallima* (p. 254)
 Costa of hind wing not excavated (figs. 33, 56)..... 20
20. Fore wing broad; termen straight (fig. 33)..... 7. *Machimia* (p. 198)
 Fore wing narrow, pointed; termen confluent with inner margin (fig. 56)..... 18. *Schiffermülleria* (p. 246)
21. Fore wing with costa and inner margin parallel; vein 11 from middle of cell (fig. 37)..... 10. *Inga* (p. 217)
 Fore wing with costa and inner margin strongly divergent; vein 11 from well before middle of cell (fig. 35)..... 4. *Semioscopis* (p. 149)

KEY TO THE GENERA BASED ON MALE GENITALIA

1. Gnathos strongly spined (figs. 59, 62, 64, etc.)..... 2
 Gnathos not spined (figs. 60, 76, 78, etc.)..... 10
2. Transtilla and anellus fused (fig. 86)..... 6. *Apachea* (p. 197)
 Transtilla and anellus not fused (figs. 62, 64, etc.)..... 3
3. Anellus with long, free lateral processes (fig. 70)..... 7. *Machimia* (p. 198)
 Anellus without long, free lateral processes (figs. 59, 64, etc.)..... 4
4. Uncus well developed (figs. 59, 64)..... 5
 Uncus absent, or if present, poorly developed (figs. 62, 65, 67, etc.)..... 6
5. Clasper present (fig. 64)..... 8. *Himmacia* (p. 202)
 Clasper absent (fig. 59)..... 9. *Psilocorsis* (p. 204)

6. Sacculus extended as a furcate process or as a broad truncated expansion with a small toothlike clasper; or vesica armed with a forked or strongly curved single cornutus. 4. <i>Semioscopis</i> (p. 149) Sacculus and cornuti not as above.....	7
7. Clasper absent or present; if present then the aedeagus twisted; or sacculus with process from base; or aedeagus with basal process.....	5. <i>Depressaria</i> (p. 163)
Clasper always present but without the above combinations (figs. 62, 65, 67).....	8
8. Clasper divided (fig. 67).....	2. <i>Martyrhilda</i> (p. 125)
Clasper simple (figs. 62, 65).....	9
9. Uncus and socii fused forming hood (fig. 65).....	3. <i>Bibarrambila</i> (p. 146)
Uncus (if present) and socii not fused (fig. 62)....	1. <i>Agonopterix</i> (p. 43)
10. Anellus with lateral processes (figs. 60, 61, 62, etc.).....	14
Anellus without lateral processes (figs. 69, 72, 78, 80).....	11
11. Clasper present (figs. 78, 80).....	12
Clasper absent (figs. 69, 72).....	13
12. Clasper concave distally; aedeagus coiled, bandlike basally (figs. 78, 78a).....	21. <i>Hofmannophila</i> (p. 258)
Clasper never concave distally; aedeagus never coiled or bandlike basally (figs. 80, 80a).....	10. <i>Inga</i> (p. 217)
13. Gnathos flat, broad, shovel-shaped; vinculum narrowly rounded (fig. 69).....	15. <i>Carolana</i> (p. 239)
Gnathos narrowed distally; vinculum strongly produced anteriorly (fig. 72).....	11. <i>Martyringa</i> (p. 228)
14. Extension of sacculus with tuft of strong, curved setae (fig. 71).....	13. <i>Carcina</i> (p. 233)
Sacculus without such tuft.....	15
15. Sacculus with pointed, curved or nearly straight, free extension (figs. 60, 61, 66, 81).....	16
Sacculus without such free extension (figs. 74, 76, 79, 82).....	19
16. Vinculum spatulate (fig. 60).....	22. <i>Endrosis</i> (p. 262)
Vinculum rounded (figs. 61, 66, 81).....	17
17. Vesica unarmed (fig. 61a).....	17. <i>Fabiola</i> (p. 244)
Vesica strongly armed (figs. 66a, 81a).....	18
18. Lateral processes of anellus flattened and expanded distally (fig. 66).....	16. <i>Decantha</i> (p. 241)
Lateral processes of anellus not appreciably flattened; pointed distally (fig. 81).....	20. <i>Epicallima</i> (p. 254)
19. Vesica strongly armed (fig. 74a).....	14. <i>Mathildana</i> (p. 236)
Vesica unarmed (figs. 76a, 79a, 82a).....	20
20. Lateral processes of anellus sharply pointed; aedeagus small, weak (figs. 79, 79a, 82, 82a).....	21
Lateral processes of anellus dilated distally; aedeagus stout (figs. 76, 76a).....	12. <i>Pleurota</i> (p. 230)
21. Lateral processes of anellus very broad basally; gnathos pointed (fig. 79).....	19. <i>Chambersia</i> (p. 252)
Lateral processes of anellus of about equal width throughout; gnathos not pointed (fig. 82).....	18. <i>Schiffermülleria</i> (p. 246)

KEY TO THE GENERA BASED ON FEMALE GENITALIA

1. Anterior apophyses branched (figs. 101, 116).....	2
Anterior apophyses not branched (figs. 95, 97, etc.).....	3

2. Ovipositor always extended after death; ductus bursae not convoluted (fig. 116).....	22. <i>Endrosis</i> (p. 262)
Ovipositor not extended after death; ductus bursae convoluted (fig. 101).....	21. <i>Hofmannophila</i> (p. 258)
3. Bursa copulatrix single (figs. 97, 99, etc.).....	4
Bursa copulatrix double (fig. 105).....	9. <i>Psilocorsis</i> (p. 204)
4. Ductus bursae with saclike evagination from ventral surface (fig. 118).....	14. <i>Mathildana</i> (p. 236)
Ductus bursae without such evagination.....	5
5. Inception of ductus seminalis at, or anterior to, middle of ductus bursae (figs. 87, 91, 95, 98, 115).....	6
Inception of ductus seminalis posterior to middle of ductus bursae (figs. 109, 110, etc.).....	10
6. Signa several (fig. 87).....	12. <i>Pleurota</i> (p. 230)
Signum, if present, single.....	7
7. Signum a weakly developed toothed plate (figs. 91, 115).....	8
Signum absent or, if present, not as above.....	9
8. Ductus bursae membranous (fig. 115).....	19. <i>Chambersia</i> (p. 252)
Ductus bursae at least partly sclerotized (fig. 91).....	16. <i>Decantha</i> (p. 241)
9. Genital plate strongly convex, protruding (fig. 95).....	17. <i>Fabiola</i> (p. 244)
Genital plate convex but not protruding (figs. 98, 213-215)	18. <i>Schiffermülleria</i> (p. 246)
10. Ductus bursae strongly sclerotized, broadened and somewhat flattened posterior to inception of ductus seminalis (figs. 90, 92, 99).....	11
Ductus bursae otherwise.....	13
11. Signum present; sclerotized portion of ductus bursae armed on inner surface (fig. 99).....	20. <i>Epicallima</i> (p. 254)
Signum absent; ductus bursae unarmed (figs. 90, 92).....	12
12. Ostium protruding; ventroanterior edge strongly sclerotized (fig. 90).....	11. <i>Martyringa</i> (p. 228)
Ostium not protruding; ventroanterior edge membranous (fig. 92).....	7. <i>Machimia</i> (p. 198)
13. Signum very large, broadly oval or elongate (fig. 100)	2. <i>Martyrhilda</i> (p. 125)
Signum, if present, otherwise.....	14
14. Signum absent (figs. 89, 229, 240, 272).....	15
Signum present (figs. 96, 102, 109, etc.).....	16
15. Area surrounding ostial opening always membranous (figs. 89, 206-210).....	10. <i>Inga</i> (p. 217)
Area surrounding ostial opening always sclerotized (figs. 229, 240, etc.).....	1. <i>Agonopterix</i> (part) (p. 43)
16. Genital plate dilated ventrolaterally; ostium transverse, slit-like (fig. 88).....	13. <i>Carcina</i> (p. 233)
Genital plate otherwise.....	17
17. Signum a toothed plate (figs. 102, 103, 109, etc.).....	18
Signum a small plate with median keel (fig. 110).....	8. <i>Himmacia</i> (p. 202)
18. Ductus bursae armed with small teeth for much of its length (fig. 96).....	15. <i>Carolana</i> (p. 239)
Ductus bursae otherwise.....	19
19. Signum a distinct cross; ostium very large (fig. 94).....	6. <i>Apachea</i> (p. 197)
Signum and ostium otherwise.....	20

20. *Signum* a moderately large plate with two or three large strong teeth (fig. 109)----- 3. *Bibarrambra* (p. 146)
Signum otherwise----- 1. *Agonopterix* (part) (p. 43);
 5. *Depressaria* (p. 163); 4. *Semioscopis* (p. 149)

1. Genus AGONOPTERIX Hübner

PLATE 2, FIGURE 13; PLATE 6, FIGURE 45; PLATE 8, FIGURES 62, 62a; PLATE 17, FIGURE 103

- Agonopterix* HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 410, 1826.—PIERCE and METCALFE, The genitalia of the British Tineina, pp. 35-38, 1935. (Genotype: *Pyralis ocellana* Fabricius, Systema entomologiae, p. 652, 1775.)
Agonopteryx BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, pp. 135-136, 1912.—BARNES and BUSCK, Contr. Lepid. North America, vol. 4, pp. 231-233, 1920.—SASSCER, Journ. Econ. Ent., vol. 13, p. 183, 1920.—BRAUN, Proc. Acad. Nat. Sci. Philadelphia, vol. 73, pt. 1, p. 10, 1921.—BUSCK, Can. Ent., vol. 53, pp. 277-278, 1921.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, pp. 236-241, 1923.—CLARKE, Can. Ent., vol. 65, pp. 84-85, 1933.—MCDUNNOUGH, Can. Ent., vol. 67, pp. 74-75, 1935.
Agonopterys ELY, Proc. Ent. Soc. Washington, vol. 12, p. 68, 1910.
Agonopteryx BARNES and MCDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 160, 1917.
Epeleustia HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 410, 1826.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 136, 1912.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 169, 1922. (Genotype: *Tinea hypericella* Hübner, Sammlung europäischer Schmetterlinge, vol. 8, fig. 441, 1796.)
Pinaris HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 411, 1826.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 135, 1912.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 169, 1922. (Genotype: *Tinea gilvella* Hübner, Sammlung europäischer Schmetterlinge, vol. 8, fig. 96, 1796; synonym of *Agonopterix arenella* Schiffermüller.)
Tichonia HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 412, 1826.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 136, 1912.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 169, 1922. (Genotype: *Phalaenae Tineae atomella* Schiffermüller, Systematisches Verzeichniss der Schmetterlinge der Wiener Gegend, p. 137, 1776.)
Haemylis TREITSCHKE, Die Schmetterlinge von Europa, vol. 9, p. 235, 1832.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 136, 1912.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 169, 1922. (Genotype: *Haemylis assimilella* Treitschke, Die Schmetterlinge von Europa, vol. 9, p. 259, 1832.)

Head with appressed scales; tongue developed; antenna ciliated or simple; basal segment elongate, with pecten; labial palpus long, recurved; second segment with well-developed furrowed brush; terminal segment shorter than (or rarely as long as) second segment, sometimes roughly scaled, acute. Thorax smoothly scaled to strongly crested.

Fore wing elongate (narrow to moderately broad); 12 veins; 2 and 3 stalked; 7 and 8 stalked; 7 to costa or apex.

Hind wing as wide as or wider than fore wing, with costa nearly straight, termen evenly rounded; 8 veins; 3 and 4 connate or short-stalked; 5 curved, approximate to 4; 6 and 7 subparallel. Abdomen flattened.

Male genitalia.—Harpe ample; clasper present, simple. Anellus without well developed fingerlike processes. Vesica with or without cornuti. Socii fleshy. Uncus reduced or lacking.

Female genitalia.—Bursa copulatrix with or without signum; ductus bursae membranous throughout (except *fulva*).

Larva.—Ninth abdominal segment with setae I and II well separated (I as near or nearer to III than to II): seta VI not on a single pinaculum with IV and V but not approximate to VII. Setal group VII bisetose on first and seventh abdominal segments, unisetose on eighth and ninth abdominal segments, normal (trisetose) on proleg-bearing abdominal segments. Ocelli normal. Submentum without sclerotized pit.

Pupa.—Pubescent. Prothoracic femora and labial palpi not exposed. Cremaster absent.

Remarks.—*Agonopterix* is a valid genus readily separable from *Depressaria*, with which Meyrick and others continue to synonymize it, and from *Apachea*. The stalking of veins 2 and 3 of the fore wing in *Agonopterix* is constant and is associated with the absence of the long lateral processes of the anellus so frequently encountered in *Depressaria* and other oecophorid genera. The pattern of the fore wings of *Agonopterix* always differs from that of *Depressaria* by entirely lacking conspicuous longitudinal streaks such as are found in the latter genus.

The moths of this genus, with the exception of one small group, form an extremely compact assemblage of species, often difficult to separate. The male genitalia are strikingly similar, species being best separated on characters of the anellus, clasper, and aedeagus. The anellus seems to be the most stable of the three and may suffice for separation of species where the other two fail. The length of the harpes (*psoralisella* and others) and the shape of the cucullus are apt to vary considerably. (In preparing mounts of the genital organs great care must be exercised to eliminate distortion and shrinkage.)

The remaining species of the genus all have fingerlike claspers, small, numerous, few, or no cornuti on the vesica, and all the females have a closely similar type of genitalia with or without a signum. The wing form varies from moderately narrow to broad, and the palpus has a well-developed brush on the second segment. There are, however, in this last large group, sections that show divergence

from the usual type. One section of the group, consisting of *atrodorsella*, *scabella*, *pulvipennella*, *pteleae*, and *eupatoriella*, forms a very closely knit complex. Another section, consisting of *gelidella*, *hyperella*, *lythrella*, *nubiferella*, and *arcuella*, forms another complex of species so closely related that separation on male genitalia is difficult. The female genitalia, however, usually give good characters, but where they fail larvae or host plants suffice to distinguish the species.

In addition there are two species, *fulva* and *arnicella*, which have become modified and represent offshoots from the type stock.

The remaining species form a group of very closely related forms.

Busck¹⁰ lists 39 species as belonging to this genus, one (*plummerella*) being described as new. The latter falls as a synonym of *eupatoriella*. In 1920 Meyrick¹¹ described *dryadoxena* (synonym of *costosa*) and *sciadopoda* (and proposed the new name *testifica* for the supposedly preoccupied *hyperella* Ely). That same year Barnes and Busck¹² described *pteleae*, *latipalpella*, *blacella*, *callosella*, and *terinella*, of which *pteleae* and *latipalpella* are valid species; *blacella* falls as a synonym of *argillacea*, *terinella* falls to *pallidella*, and *callosella* to *sabulella*. In 1921 Busck¹³ described *blackmori* (synonym of *costosa*) and Braun¹⁴ described *nivalis*, the latter being valid. In 1926 Braun¹⁵ added *cogitata* (synonym of *canella*), and in 1933¹⁶ I added *serrae* (synonym of *pallidella*). Keifer¹⁷ added *clarkei* in 1936. In the present paper I have transferred eight species to the new genus *Martyrhilda* and have described eight species and one race as new, bringing the total number of described species for our fauna to 44. There are additional species on hand at the present time, but these are represented by poor or unreared material, and I deem it inadvisable to add more names for these. When long or reared series can be obtained, then, and then only, can we safely add new names. The larvae of comparatively few of the species of this genus are known, but those known are found attacking a large variety of plants. Many larvae roll the leaves of the host plants and feed within the tube thus formed; some are leaf tiers and others feed in webs in the inflorescence or leaves. Pupation occurs in debris on the ground or, occasionally, in the leaf roll made by the larva.

¹⁰ Busck, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.

¹¹ Meyrick, Exotic Microlepidoptera, vol. 2, p. 315, 1920.

¹² Barnes and Busck, Contr. Lepid. North America, vol. 4, p. 231-233, 1920.

¹³ Busck, Can. Ent., vol. 53, p. 277, 1921.

¹⁴ Braun, Proc. Acad. Nat. Sci. Philadelphia, vol. 73, pt. 1, p. 10, 1921.

¹⁵ Braun, Can. Ent., vol. 58, p. 47, 1926.

¹⁶ Clarke, Can. Ent., vol. 65, p. 84, 1933.

¹⁷ Keifer, Bull. Southern California Acad. Sci., vol. 35, p. 10, 1936.

KEY TO THE SPECIES OF AGONOPTERIX BASED ON COLORATION

1. Fore wing roughened with numerous raised scales..... 2
 Fore wing smooth or with few raised scales..... 5
2. Fore wing light ochreous-brown with black markings..... 3
 Fore wing ochreous-fuscous thickly mottled with black and
 white scales..... 4
3. A large blackish-fuscous spot at end of cell reaching costa
 pteleae Barnes and Busck (p. 72)
 No such large spot..... *latipalpella* Barnes and Busck (p. 118)
4. Terminal segment of labial palpus long, recurved
 eupatoriella (Chambers) (p. 74)
 Terminal segment of labial palpus short, hardly recurved
 scabella (Zeller) (p. 72)
5. Fore wing with crescentic discal dash before middle..... 6
 Fore wing otherwise..... 10
6. Fore wing predominantly grayish ochreous
 curvilineella (Beutenmüller) (p. 62)
 Fore wing otherwise..... 7
7. Discal spot at end of cell yellow or cream colored..... 8
 Discal spot at end of cell white..... 9
8. Fore wing grayish lavender..... *hyperella* Ely (p. 56)
 Fore wing brownish purple..... *lythrella* (Walsingham) (p. 59)
9. Fore wing predominantly reddish purple..... *arcuella*, new species (p. 58)
 Fore wing purplish fuscous..... *gelidella* (Busck) (p. 55)
10. Fore wing some shade of ochreous or yellow..... 11
 Fore wing otherwise..... 5
11. Base of fore wing blackish fuscous..... *atrodorsella* (Clemens) (p. 70)
 Base of fore wing otherwise..... 12
12. Inner margin of fore wing immaculate, or with minute, incon-
 spicuous dark irrorations..... 14
 Inner margin of fore wing with conspicuous dark markings..... 13
13. Inner margin with fuscous subternal blotch_ *posticella* (Walsingham) (p. 119)
 Inner margin strongly suffused basally with blackish to reddish-
 fuscous_..... *flavicomella* (Engel) (p. 105)
14. Third segment of labial palpus with at least two dark annuli..... 18
 Third segment of labial palpus with one or no dark annulus..... 15
15. Outer discal spot fuscous..... 16
 Outer discal spot cream colored or yellow..... 17
16. Abdomen suffused with fuscous beneath; terminal segment of
 labial palpus with brownish-red subapical annulus
 nubiferella (Walsingham) (p. 60)
 Adbomen with black lateral line on each side beneath; terminal
 segment with subapical annulus and apex blackish fuscous
 sabulella (Walsingham) (p. 111)
17. Outer discal spot yellow; terminal segment of labial palpus fus-
 cous with creamy-white median fascia; abdomen with black
 lateral line on each side..... *dimorphella*, new species (p. 97)
 Outer discal spot cream colored; terminal segment of labial
 palpus with apex and subapical annulus black; abdomen with
 row of black spots on each side beneath..... *costosa* (Haworth) (p. 113)
18. Outer discal spot absent or indistinct; subbasal annulus of third
 segment of labial palpus brick red..... *robiniella* (Packard) (p. 92)

34. Brush of second segment of labial palpus trumpet-shaped; fore wing lavender-gray----- *nebulosa* (Zeller) (p. 110)
Brush of second segment of labial palpus not trumpet-shaped; fore wing not lavender-gray----- 35
35. Fore wing without row of dark subterminal spots; ground color gray, carmine tinted; third segment of labial palpus light grayish ochreous with black apex and black spot near base anteriorly----- *sanguinella* (Busck) (p. 123)
Fore wing and labial palpus otherwise----- 36
36. Third segment of labial palpus with two conspicuous dark annuli----- 37
Third segment of labial palpus without conspicuous bands; suffused with ochreous-gray outwardly---- *muricolorella* (Busck) (p. 64)
37. Fore wing pale yellowish gray with rosy tint on apical third of wing and on basal half of inner margin----- *canadensis* (Busck) (p. 104)
Fore wing ochreous-gray without rosy tint--- *senicionella* (Busck) (p. 107)
38. Fore wing grayish fuscous----- 39
Fore wing otherwise----- 40
39. Fore wing without dark subterminal spots; third segment of labial palpus with subbasal and suprasedial annuli and tip black----- *cajonensis*, new species (p. 82)
Fore wing with dark subterminal spots; third segment with subbasal and suprasedial annuli black; apex sordid whitish
novi-mundi (Walsingham) (p. 87)
40. Fore wing some shade of brown or fuscous----- 41
Fore wing luteous, infuscated; cilia fuscous, tipped with luteous
clarkei Keifer (p. 66)
41. Alar expanse, 16-17 mm----- 42
Alar expanse, 20-25 mm----- 43
42. Fore wing violaceous-brown; apical third of terminal segment of labial palpus black----- *amyrisella* (Busck) (p. 124)
Fore wing ochreous-brown; terminal segment of labial palpus with subbasal and suprasedial annuli black; apical third ochreous-white
amissella (Busck) (p. 117)
43. Fore wing light brown, without row of dark subterminal spots
pergandeella (Busck) (p. 116)
Fore wing brownish or ochreous-fuscous and with row of dark subterminal spots----- 44
44. Third segment of labial palpus with basal three-fourths and apex black
nigrinotella (Busck) (p. 101)
Third segment of labial palpus with subbasal and suprasedial annuli and apex blackish fuscous----- *costimacula*, new species (p. 102)

KEY TO THE SPECIES OF AGONOPTERIX BASED ON MALE GENTALIA

1. Clasper short, flattened, longitudinal; tegumen and socii strongly sclerotized (fig. 152)----- *fulva* (Walsingham) (p. 53)
Clasper not flattened and socii never appreciably sclerotized (figs. 153, 157, etc.)----- 2
2. Socii small and widely separated; tegumen truncated (fig. 153)----- 3
Socii and tegumen otherwise (fig. 62)----- 7
3. Hairs of the transtillar lobes coarse and strong (fig. 156)----- 4
Hairs of the transtillar lobes fine and weak (fig. 153)----- 6

4. Coarse, strong hairs of the transtillar lobes three or less (fig. 156)-----	5
Coarse, strong hairs of transtillar lobes at least six	
lythrella (Walsingham) (p. 59)	
5. Clasper of harpe stout, curved (fig. 156)-----	hyperella Ely (p. 56)
Clasper of harpe stout, straight (fig. 154)-----	arcuella, new species (p. 58)
6. Anellus broader than long (fig. 161)-----	nubiferella (Walsingham) (p. 60)
Anellus longer than broad (fig. 153)-----	gelidella (Busck) (p. 55)
7. Costa and sacculus of harpe parallel; cucullus broad and rounded (fig. 186)-----	arnicella (Walsingham) (p. 90)
Costa and sacculus of harpe not parallel and cucullus not broad and rounded (figs. 157, 158, etc.)-----	8
8. Clasper attaining or reaching beyond costa of harpe (figs. 174, 177, 190)-----	9
Clasper not attaining costa of harpe (figs. 169, 170, etc.)-----	11
9. Clasper reaching beyond costa of harpe (figs. 177, 190)-----	10
Clasper not reaching beyond costa of harpe (fig. 174)	
costimacula, new species (p. 102)	
10. Harpe long, slender; posterior edge of anellus strongly concave (fig. 190)-----	posticella (Walsingham) (p. 119)
Harpe broad; posterior edge of anellus nearly straight, with shallow median cleft (fig. 177)-----	psoraliella (Walsingham) (p. 121)
11. Anellus broader than long (figs. 173, 183, 184, 185)-----	12
Anellus longer than broad (figs. 181, 182, etc.)-----	16
12. Aedeagus short, stout (figs. 183a, 185a)-----	13
Aedeagus otherwise-----	14
13. Posterior margin of anellus strongly convex, smooth (fig. 183)	
pergandeella (Busck) (p. 116)	
Posterior margin of anellus not strongly convex or smooth (fig. 185)-----	nebulosa (Zeller) (p. 110)
14. Clasper very stout, nearly reaching costa of harpe (fig. 184).	
costosa (Haworth) (p. 113)	
Clasper slender, not reaching far beyond center of harpe (figs. 159, 173)-----	15
15. Clasper straight, with small basal protuberance; distal end serrate (fig. 173)-----	flavicomella (Engel) (p. 105)
Clasper hooked, without basal protuberance; distal end not serrate (fig. 157)-----	curvilineella (Beutenmüller) (p. 62)
16. Clasper abruptly broadened at distal end (fig. 181)	
sabulella (Walsingham) (p. 111)	
Clasper otherwise-----	17
17. Lobes of anellus large, prominent (figs. 158, 159)-----	18
Lobes of anellus small, inconspicuous (figs. 169, 170, 176, 179)-----	30
18. Posterior margin of anellus distinctly concave (figs. 158, 159, 160, 163, 164, 165, 180, 188)-----	19
Posterior margin of anellus not distinctly concave (figs. 162, 166, 172, 178, 182)-----	26
19. Clasper reaching well beyond middle of harpe (figs. 159, 160, 163, 164, 180, 188)-----	20
Clasper not reaching much beyond middle of harpe (figs. 158, 165)-----	25
20. Aedeagus slender, sharply pointed (figs. 159a, 163a, 164a, 180a)-----	21
Aedeagus stout (figs. 160a, 188a)-----	24

21. Anellus narrowed posteriorly; clasper very slender (fig. 159)
clemensella (Chambers) (p. 68)
 Anellus not appreciably narrowed posteriorly; clasper strong
 (figs. 163, 164)----- 22
22. Anellus with a narrow, biramous, strongly sclerotized median
 area-----*pulvipennella* (Clemens) (p. 76)
 Anellus without such sclerotized area (figs. 163, 180)----- 23
23. Lateral lobes of anellus nearly attaining posterior edge of cen-
 tral plate (fig. 180)-----*cajonensis*, new species (p. 82)
 Lateral lobes of anellus not nearly attaining posterior edge of
 central plate (fig. 163)-----*eupatoriella* (Chambers) (p. 74)
24. Anellus strongly constricted anteriorly; harpe abruptly narrowed
 beyond clasper (fig. 160)-----*atrodorsella* (Clemens) (p. 70)
 Anellus not strongly constricted anteriorly and harpe not
 abruptly narrowed beyond clasper (fig. 188)
latipalpella Barnes and Busck (p. 118)
25. Distal half of aedeagus much more slender than proximal half
 (fig. 165a)-----*walsinghamella* (Busck) (p. 78)
 Aedeagus of about equal thickness throughout its length (fig.
 158a)-----*muricolorella* (Busck) (p. 64)
26. Clasper nearly attaining costa of harpe (figs. 162, 178)----- 27
 Clasper not reaching much beyond middle of harpe (figs. 166,
 172, 182)----- 28
27. Posterior edge of anellus convex (fig. 178)-----*clarkei* Keifer (p. 66)
 Posterior edge of anellus not convex (fig. 162)
pteleae Barnes and Busck (p. 72)
28. Aedeagus long, slender (fig. 166a)-----*rosaciliella* (Busck) (p. 83)
 Aedeagus stout (figs. 172a, 182a)----- 29
29. Anellus with a narrow, longitudinal, weakly sclerotized median
 area; cucullus rather pointed (fig. 182)-----*pallidella* (Busck) (p. 88)
 Anellus without such median area; cucullus rounded (fig. 172)
senicionella (Busck) (p. 107)
30. Clasper twisted (fig. 168)-----*novi-mundi* (Walsingham) (p. 87)
 Clasper not twisted (fig. 167, etc.)----- 31
31. Clasper reaching at least three-fourths of the way to costa of
 harpe (figs. 170, 187)----- 32
 Clasper reaching to or slightly beyond middle of harpe (fig. 167, etc.)-- 34
32. Clasper straight (figs. 170, 187)----- 33
 Clasper definitely curved distally (fig. 176)--*oregonensis*, new species (p. 65)
33. Clasper stout (fig. 187)-----*amissella* (Busck) (p. 117)
 Clasper slender (fig. 170)-----*nigrinotella* (Busck) (p. 101)
34. Posterior edge of anellus concave (figs. 171, 179)----- 35
 Posterior edge of anellus not concave (figs. 167, 169, 175, 189)-----36
35. Clasper slender, reaching slightly beyond middle of harpe (fig.
 171)-----*argillacea* (Walsingham) (p. 98)
 Clasper stout, not reaching beyond middle of harpe (fig. 178)
dimorphella, new species (p. 97)
36. Anellus nearly round (figs. 169, 189)----- 37
 Anellus roughly rectangular (figs. 167, 175)----- 39
37. Posterior margin of anellus with shallow cleft; cucullus sharply
 pointed (fig. 189)-----*sanguinella* (Busck) (p. 123)
 Posterior margin of anellus without any trace of a median cleft;
 cucullus dull-pointed (fig. 169)----- 38

38. Cornuti fine, spiculate (fig. 169a)----- *robiniella* (Packard) (p. 92)
 Cornuti coarse, small----- *thelmae*, new species (p. 96)
39. Posterior margin of anellus distinctly convex (fig. 167)
fusciterminella, new species (p. 80)
 Posterior margin of anellus not distinctly convex (fig. 175)
antennariella, new species (p. 108)

KEY TO THE SPECIES OF AGONOPTERIX BASED ON FEMALE
 GENITALIA

1. Bursa copulatrix with signum (figs. 241, 255, 270, etc.)----- 5
 Bursa copulatrix without signum (figs. 229, 240, 272)----- 2
2. Ductus bursae short, not much longer than bursa copulatrix
 (fig. 272)----- *amyrisella* (Busek) (p. 124)
 Ductus bursae much longer than bursa copulatrix----- 3
3. Anterior edge of genital plate convex, entire; ostium large,
 round (fig. 240)----- *hyperella* Ely (p. 56)
 Anterior edge of genital plate produced (figs. 229, 259A)----- 4
4. Produced margin of genital plate before ostium truncate; ostium
 round (fig. 229)----- *dimorphella*, new species (p. 97)
 Produced margin of genital plate before ostium strongly convex;
 ostium broadly oval (fig. 259a)----- *thelmae*, new species (p. 96)
5. Signum minute, round; area posterior to ostium with two small
 sclerotized patches (fig. 259)----- *robiniella* (Packard) (p. 92)
 Signum a small to large toothed or scobinate plate (figs. 242, 245,
 250, 255, etc.)----- 6
6. Ductus bursae with a large sclerotized patch adjacent to bursa
 copulatrix (fig. 248)----- *fulva* (Walsingham) (p. 53)
 Ductus bursae without such sclerotized area----- 7
7. Anterior margin of genital plate cleft (figs. 230a, 249-253)----- 8
 Anterior margin of genital plate not cleft----- 13
8. Lobe of ovipositor clothed with spines (fig. 230)----- *clarkei* Keifer (p. 66)
 Lobe of ovipositor not clothed with spines (figs. 249-253)----- 9
9. Cleft narrow (figs. 251, 253)----- 10
 Cleft semicircular (figs. 249, 250, 252)----- 11
10. Inception of ductus seminalis at the ostium (fig. 251)
pteleae Barnes and Busck (p. 72)
 Inception of ductus seminalis a short distance before the ostium
 (fig. 253)----- *pulvipennella* (Clemens) (p. 76)
11. Anterior points of genital plate nearly touching (fig. 252).
atrodorsella (Clemens) (p. 70)
 Anterior points of genital plate widely separated (figs. 249, 250)----- 12
12. Ostium occupying over half length of genital plate (fig. 249).
eupatoriella (Chambers) (p. 74)
 Ostium occupying less than half length of genital plate (fig. 250).
scabella (Zeller) (p. 72)
13. Genital plate with pronounced anteromedian ventral evagina-
 tion (fig. 274)----- *posticella* (Walsingham) (p. 119)
 Genital plate without such evagination----- 14
14. Anterior margin of genital plate produced (figs. 255, 261, 265,
 266, 269, 270, 273)----- 15
 Anterior margin of genital plate not produced----- 26
15. Production of margin as wide or nearly as wide as genital plate is
 long (figs. 255, 265)----- 16
 Production of margin of genital plate narrower----- 17

16. Ostium large, round (fig. 265).....*nigrinotella* (Busck) (p. 101)
 Ostium spindle-shaped (transverse) (fig. 255) *argillacea* (Walsingham) (p. 98)
17. Ostial opening definitely in anterior half of genital plate (fig. 261).
 costimacula, new species (p. 102)
 Ostial opening not definitely in anterior half of genital plate
 (figs. 262, 263, 264, 266, 267, 268, 269, 270, 273)..... 18
18. Ostial opening about middle of genital plate (figs. 266, 269)..... 19
 Ostial opening definitely in posterior half of genital plate (figs.
 262, 264, 267, 268, 270, 273)..... 20
19. Anterior to ostium a strongly sclerotized crescent-shaped bar;
 posterior to ostium a small sclerotized rectangular area
 (fig. 269)..... *amissella* (Busck) (p. 117)
 Anterior to ostium an elongate, slightly curved, sclerotized mar-
 gin; no sclerotized area posterior to ostium (fig. 266)
 nebulosa (Zeller) (p. 110)
20. Signum distinctly 4-pointed (figs. 262, 264, 270, 273)..... 22
 Signum not 4-pointed (figs. 267, 268)..... 21
21. Genital plate broad, with a gently concave, narrow, sclerotized
 anterior margin; ostial opening on extreme posterior edge
 (fig. 268)..... *latipalpella* Barnes and Busck (p. 118)
 Genital plate narrow with a broad, convex anterior margin; ostial
 opening not reaching extreme posterior edge of genital plate
 (fig. 267)..... *flavicomella* (Engel) (p. 105)
22. Ostial opening occupying more than half length of genital
 plate (figs. 262, 263, 270)..... 24
 Ostial opening occupying half or less than half length of genital
 plate (figs. 264, 273)..... 23
23. Signum large, with small, scattered teeth; lateral points much
 larger than anterior and posterior points (fig. 273)
 costosa (Haworth) (p. 113)
 Signum small, with strong teeth; lateral, anterior, and posterior
 points about equal in length (fig. 264) *antennariella*, new species (p. 108)
24. Posterior and anterior points of signum of about equal length
 (fig. 263)..... *senicionella* (Busck) (p. 107)
 Posterior and anterior points of unequal length (figs. 262, 270)..... 25
25. Anterior point of signum longer than posterior point (fig. 262)
 canadensis (Busck) (p. 104)
 Anterior point of signum shorter than posterior point (fig.
 270)..... *sabulella* (Walsingham) (p. 111)
26. Signum situated in extreme anterior end of bursa copulatrix
 (figs. 242, 243, 245, 247a, 271)..... 27
 Signum not situated in extreme anterior end of bursa copula-
 trix (figs. 241, 246, 254, 256, 257, 258)..... 31
27. Ostial opening at extreme anterior margin of genital plate (fig.
 271)..... *psoraliella* (Walsingham) (p. 121)
 Ostial opening not at anterior edge of genital plate (figs. 242,
 243, 245, 247)..... 28
28. Ostial opening at extreme posterior edge of genital plate (fig.
 242)..... *clemensella* (Chambers) (p. 68)
 Ostial opening not at posterior edge of genital plate (figs. 243,
 245, 247)..... 29

29. At posterior end of ostium two small, sclerotized lateral areas (fig. 243)----- *muricolorella* (Busck) (p. 64)
 No such sclerotized areas at posterior end of ostium (figs. 245, 247)----- 30
30. Signum a distinctly 4-pointed plate (fig. 247a)---- *gelidella* (Busck) (p. 55)
 Signum irregular, not 4-pointed (fig. 245)-----
curvilineella (Beutenmüller) (p. 62)
31. Ostial opening at extreme posterior edge of genital plate (fig. 254)----- *walsinghamella* (Busck) (p. 78)
 Ostial opening otherwise (figs. 244, 246, 256, 257, 258)----- 32
32. Bursa copulatrix symmetrical (figs. 244a, 256, 257, 258)----- 34
 Bursa copulatrix distinctly asymmetrical (figs. 241, 246)----- 33
33. Signum oval; ostium oval (fig. 246)----- *arcuella*, new species (p. 58)
 Signum diamond-shaped, ostium elliptical (fig. 241)
oregonensis, new species (p. 65)
34. Signum large (figs. 244a, 258)----- 35
 Signum small (figs. 256, 257)----- 36
35. Signum a 4-pointed plate (fig. 244a)----- *cajonensis*, new species (p. 82)
 Signum roughly diamond-shaped (fig. 258)
fusciterminella, new species (p. 80)
36. Signum bilobed (fig. 257)----- *rosaciliella* (Busck) (p. 83)
 Signum oval (fig. 256)----- *pallidella* (Busck) (p. 88)

AGONOPTERIX FULVA (Walsingham)

PLATE 25, FIGURES 152, 152a; PLATE 42, FIGURE 248

Depressaria fulva WALSINGHAM, Trans. Amer. Ent. Soc., vol. 10, p. 175, 1882.—
 RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5251, 1891.—
 BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 741, 1902; in Dyar, U. S. Nat. Mus.
 Bull. 52, No. 5871, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal
 America, No. 6414, 1903.—MEYBECK, in Wytzman, Genera Insectorum, fasc.
 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 324,
 1939.

Agonopteryx fulva (Walsingham) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198,
 1908.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 240, 1923.

Agonopteryx fulva (Walsingham) BARNES and McDUNNOUGH, Check list of the
 Lepidoptera of Boreal America, No. 6453, 1917.

Agonopterix fulva (Walsingham) McDUNNOUGH, Check list of the Lepidoptera
 of Canada and the United States of America (Part 2, Microlepidoptera), No.
 8446, 1939.

Labial palpus with second segment tawny-red outwardly irrorated with whitish and fuscous scales, whitish inwardly; third segment sordid whitish with a poorly defined narrow, light tawny-red subapical band. Antenna pubescent, fuscous, narrowly and faintly annulated with ochreous. Head, thorax, and ground color of fore wing tawny-red; thorax suffused with fuscous and irrorated with white posteriorly; fore wing irrorated with fuscous and with a large fuscous shade at end of cell; in the center of this shade is a white discal spot (absent in some specimens); at extreme base of wing on inner angle a small transverse whitish patch not reaching costa; veins, beyond cell, marked with fuscous scales; cilia grayish fuscous edged lightly with rosy red. Hind

wing and cilia grayish fuscous, the latter lightly edged with rosy red. Legs whitish inwardly, overlaid outwardly with tawny-red and with a rosy-red suffusion; tarsi fuscous narrowly annulated with whitish. Abdomen grayish-fuscous above, whitish beneath, strongly overlaid with fuscous.

Male genitalia.—Strikingly different from those of any other described North American species: Harpe only moderately clothed with hairs at the cucullus and along the costal edge; sacculus deeply folded and very strongly sclerotized; clasper short, flattened, longitudinal, constricted at middle, broadly rounded at its extremity. Anellus broadly oval, moderately sclerotized, with a deep excavation on the posterior edge. Vinculum broadly rounded. Aedeagus sharply bent near the middle, slender, dilated at the distal end; armed with many short, stout, cornuti. Tegumen strongly sclerotized, more so along the ventral edges. Socii strongly sclerotized flaps, very sparsely clothed with hairs. Gnathos a small, round, spined knob.

Female genitalia.—Genital plate broad, strongly sclerotized except for a narrow, median, longitudinal membranous portion posterior to ostium. Ostium large with deeply concave anterior edge, and opening near anterior edge of genital plate. Ductus bursae membranous except for a large sclerotized patch adjacent to bursa copulatrix and a short portion before ostium; anterior to the latter the ductus bursae is constricted at the inception of the ductus seminalis. Signum a small, irregular sclerotized plate.

Alar expanse, 22–24 mm.

Type.—In the United States National Museum.

Type locality.—Not designated.

Food plant.—Unknown.

Distribution.—Rocky Mountains region of the United States and Canada, and eastern Canada.

United States records

Arizona: White Mountains, Apache County, near McNary P. O., ♀ (1-15-IX-25, O. C. Poling).

Canadian records

Alberta: "Head of Pine Creek," Calgary, ♂ (VIII-5-05, F. H. Wolley-Dod).

British Columbia: Jesmond, ♂ (2-VIII-1937, J. K. Jacob).

New Brunswick: Fredericktown, ♂ ("August 20").

Ontario: Stittsville, ♂, ♀ (21-VIII-1939, E. G. Lester).

I have seen other specimens without locality labels.

Remarks.—An easily recognizable species not to be confused with any other described from North America.

The type, which is before me, shows only a single white scale in the single discal spot at the end of the cell as described by Walsingham, but a "homotype" from Alberta, which is clearly this species, shows a

well-defined spot at the end of the cell. A third specimen, from Beutenmüller's collection, has only a few blackish scales suggesting this same spot.

The female from Arizona, which I have identified as this species, undoubtedly belongs here.

AGONOPTERIX GELIDELLA (Busck)

PLATE 25, FIGURES 153, 153a; PLATE 42, FIGURES 247, 247a

Depressaria gelidella BUSCK, Proc. Ent. Soc. Washington, vol. 9, p. 90, 1908.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 177, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 325, 1939.

Agonopteryx gelidella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.

Agonopteryx gelidella (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6450, 1917.

Agonopterix gelidella (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8451, 1939.

Labial palpus yellowish white; second segment purplish black outwardly tinged with carmine; third segment strongly suffused with purplish black anteriorly, tip white. Antenna purplish black on basal segment, remainder fuscous. Head grayish fuscous. Thorax purplish gray; tegula purplish black tipped with whitish. Ground color of fore wing dark purplish fuscous, sparsely irrorated with black; near base, from inner margin, a transverse yellowish-white streak, not reaching costa; on the disk, at basal third, a crescent-shaped black dash with a few carmine scales mixed and followed by a white patch; at the end of cell a white spot edged with black; costa faintly spotted with whitish; from costa a poorly defined, narrow, outwardly curved whitish line to inner margin before tornus; around termen a series of blackish-fuscous spots forming an almost continuous fine line before cilia; inner margin and apical portion of wing carmine tinted; cilia grayish fuscous. Hind wing yellowish fuscous; cilia light fuscous with considerable white mixed. Legs yellowish white inwardly, purplish black outwardly. Abdomen grayish fuscous above, yellowish white beneath, suffused and irrorated with fuscous and with a longitudinal row of black spots on each side.

Male genitalia.—Harpe only weakly sclerotized and moderately clothed with hairs; cucullus rounded; clasper very stout, somewhat dilated distally; outer edge rough; reaching two-thirds distance toward costa. Anellus narrow, longer than broad, roughly rectangular, emarginate on the posterior edge; lateral lobes weak. Vinculum broad, rounded. Aedeagus moderately stout, gently curved and terminating in a sharp upturned point; just before middle a forked sclerotized arm by which it is attached to the anellus. Transtilla a weakly sclerotized band with large, hairy lateral lobes, the hairs fine

and weak. Gnathos an oval, spined knob. Socii very small, widely separated, sparsely clothed with fine hairs. Tegumen truncated.

Female genitalia.—Genital plate broad with a row of strong hairs on posterior margin. Ostium large, round, nearer to anterior than to posterior edge; anterior edge well sclerotized. Ductus bursae long, rather stout, constricted just before ostium at inception of ductus seminalis. Bursa copulatrix large with a well developed 4-pointed signum in the anterior end.

Alar expanse, 19–20 mm.

Type.—In the United States National Museum.

Type locality.—Winnipeg, Manitoba, Canada (A. W. Hanham)

Distribution.—Alberta, eastward to Ontario.

Canadian records

Alberta: Nordegg, ♂ (1–VIII–1921, J. McDunnough).

Manitoba: Winnipeg, 2 ♂ ♂ (no date, A. W. Hanham).

Ontario: Ottawa, ♂, ♀ (9–VII–1905, 25–VII–1906, C. H. Young); Trenton, ♂ (27–VI–1911, Evans).

Saskatchewan: Earl Grey, ♂ (24–VII–1925, J. D. Ritchie); Indian Head, ♀ (3–VIII–1925, J. J. de Gryse).

Remarks.—This and the following species are similar in pattern to the European *conterminella* (Zeller).

The abdomen of the type is missing, but I do not hesitate to place the series before me under this name.

Through the courtesy of Dr. McDunnough I have been able to dissect one of the only two females I have seen and have figured the genitalia.

This species has been recorded from British Columbia, but all specimens so determined are referable to *oregonensis* (new species).

AGONOPTERYX HYPERELLA Ely

PLATE 25, FIGURES 156, 156a; PLATE 42, FIGURE 240

Agonopterys hyperella ELY, Proc. Ent. Soc. Washington, vol. 12, p. 68, 1910.

Agonopteryx hyperella (Ely) FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 240, 1923.

Agonopteryx hyperella (Ely) MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8438, 1939.

Agonopteryx hyperella (Ely) BARNES and MCDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6457, 1917.

Depressaria testifica MEYRICK, Exotic Microlepidoptera, vol. 2, p. 316, 1920; in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922. (New synonymy.)

(Not *Agonopteryx hyperella* McDunnough, Can. Ent., vol. 67, p. 74, 1935.)

Labial palpus creamy white, exteriorly heavily overlaid with fuscous; third segment with a broad black subapical annulation. Antenna dark purplish fuscous annulated with gray. Head creamy

white in front, grayish above. Thorax lavender-gray overlaid with cinereous to white scales. Fore wing dark grayish lavender shaded with yellowish brown, especially toward inner margin; at base of wing, from inner angle almost to costa, a transverse yellowish line preceded by two black spots, one near costa, the other at inner angle; in center of cell a black crescent-shaped dash margined with yellowish brown and followed by a grayish shade; between the upper point of this dash and the costa a small black spot similarly edged with yellowish brown; at the end of cell a conspicuous, though small, cream-colored or yellowish spot edged with brown and preceded and followed with a few scattered black scales; costa somewhat strigulated with fuscous and grayish; around termen, at base of cilia, a thin fuscous to black line; cilia light purplish fuscous mixed with gray. Hind wing smoky fuscous; cilia somewhat more brownish with a fuscous basal band. Legs creamy white to yellowish shaded with fuscous exteriorly except at joints. Abdomen grayish fuscous above; beneath, yellowish overlaid with fuscous and with indistinct black lateral lines.

Male genitalia.—Harpe slender, moderately clothed with fine hairs; clasper very stout, gently curved inwardly, its outer edge rugose; cucullus bluntly pointed; sacculus short, broadly folded. Anellus deeply incised on posterior margin, concave laterally; lateral lobes scarcely developed. Aedeagus curved, pointed, with a short ventral arm which articulates with the anellus; vesica armed with fine cornuti. Vinculum rounded. Transtilla a narrow sclerotized band with well-developed lateral lobes; each lateral lobe bears three long, stout hairs. Gnathos a spined oval knob. Socii small, widely separated. Tegumen truncated.

Female genitalia.—Genital plate broad, moderately sclerotized; anterior edge convex, entire. Ostium large, round; at center of genital plate. Ductus bursae membranous; inception of ductus seminalis shortly before ostium. Bursa copulatrix without signum.

Alar expanse, 15–18 mm.

Type.—In the United States National Museum.

Type localities.—Great Falls, Md., and Great Falls, Va.

Food plant.—*Hypericum prolificum* L.

Distribution.—Middle Atlantic States.

United States records

Maryland: Great Falls, 2 ♂♂, ♀ (V-26-09, Chas. R. Ely); Plummers Island, ♂ (V-30-09, Chas. R. Ely).

Virginia: Great Falls, ♀ (V-31-10, Chas. R. Ely).

Remarks.—Meyrick proposed *testifica* in place of *hyperella* thinking that the latter name was intended for *hypericella* of Hübner and further states that *hyperella* is preoccupied by *hypericella*. Ely's

species is distinct from the European *hypericella*, and *hyperella* is not invalidated by Hübner's name. I, therefore, reinstate Ely's species and sink Meyrick's name.

The stout, gently recurved clasper of *hyperella* distinguishes it from both *lythrella* and *arcuella*. The clasper of *lythrella* is slender and straight, and that of *arcuella* is stout and straight. The separation of *lythrella* from *gelidella* is discussed under *lythrella*. The females, however, give the best characters for separating *hyperella* from *arcuella*. The signum is present in *arcuella*, absent in *hyperella*.

AGONOPTERIX ARCUELLA, new species

PLATE 25, FIGURE 154; PLATE 42, FIGURE 246

Agonopteryx hyperella McDUNNOUGH [not Ely], Can. Ent., vol. 67, p. 74, 1935.

A small reddish-purple species closely related to the foregoing two and to the following species.

Head yellowish ochreous, mixed with golden-brown; labial palpus whitish ochreous; brush of the second segment narrow, heavily overlaid with reddish purple and black outwardly and beneath; terminal segment thickened, reddish purple and black exteriorly, with incomplete reddish-purple basal and subapical annuli; antenna with basal segment blackish fuscous, with narrow ochreous apical annulus; remainder of antenna fuscous, ochreous annulated, and the whole with a purplish sheen.

Thorax strongly crested, yellowish ochreous mixed with golden-brown; tegula and crest yellowish purple, the former strongly shaded with fuscous. Ground color of fore wing reddish purple strongly suffused with fuscous along costa and at base; the fuscous basal shading terminated by a sharply contrasting, narrow, whitish ochreous line and including a sharply contrasted black spot near dorsal edge; another similar black spot at base of radius; costa strigulated with whitish and carmine; at basal third an outwardly curved black crescent preceded by carmine and followed by whitish scales; discal spot at end of cell white; from middle of costa to center of wing a strong whitish shading from costa; at apical third an indistinct fascia outwardly curved to between veins 6 and 7, then turned back, parallel to termen, nearly to dorsum; cilia purplish fuscous, carmine tipped, with black basal line from veins 3 to 7. Hind wing brownish fuscous; cilia a shade lighter with dark subbasal and light basal line; underside with strong black line at base of cilia. Legs blackish fuscous, with whitish outwardly on femora and reddish purple on tibiae and tarsi; tarsi annulated yellowish ochreous. Abdomen fuscous with much yellowish ochreous beneath.

Male genitalia.—Harpe moderately sclerotized and sparsely clothed with hairs; cucullus rounded; clasper stout, straight, rugose on outer

edge; anellus roughly oval, emarginate on posterior edge; lateral lobes undeveloped; aedeagus stout, pointed, slightly curved, with large spinulate patch. Vinculum rounded. Transtilla a sclerotized band with large lateral lobes, the latter with few strong, coarse hairs. Gnathos an oval spined knob. Socii small, widely separated, with few hairs. Tegumen truncated.

Female genitalia.—Ostium large, oval at about center of genital plate; genital plate membranous or sclerotized posterior to ostium; ductus bursae long, membranous, slightly dilated at point of inception of ductus seminalis; bursa copulatrix large, asymmetrical, bulging on left side; oval, with oval, spined signum.

Alar expanse, 16–18 mm.

Type.—In the Canadian National Collection.

Paratypes.—U. S. N. M. No. 52078. Also in Canadian National Collection and collection of Dr. A. F. Braun.

Type locality.—White Point Beach, Queens County, Nova Scotia.

Food plant.—*Hypericum virginicum* L.

Remarks.—Described from the ♂ type, 16 ♂♂ and 10 ♀♀ paratypes all from White Point Beach, Queens County, Nova Scotia (VIII-7 to 13-34, J. McDunnough); 2 ♂♂, ♀, Sparrow Lake, Ontario (VII-1-26, A. F. Braun); ♀, Black Mountains, North Carolina ("VII-20").

McDunnough misidentified this species and reported it under the name *A. hyperella* Ely. In addition to the above I now have two specimens from Chamcook, New Brunswick, Canada (4-5-VIII-1938, T. N. Freeman; Rf. *Hypericum* sp.) submitted by Dr. J. McDunnough, and three specimens from Orrington, Maine (24-VII-1922, A. C. Ward; Rf. *Hypericum* sp.), submitted by J. V. Schaffner.

AGONOPTERIX LYTHRELLA (Walsingham)

PLATE 25, FIGURE 155

- Depressaria lythrella* WALSINGHAM, *Ins. Life*, vol 1, p. 257, 1889.—BUSCK, *Proc. U. S. Nat. Mus.*, vol. 24, p. 744, 1902; *in* Dyar, *U. S. Nat. Mus. Bull.* 52, No. 5879, 1903.—KEARFOTT, *in* Smith, *List of the Lepidoptera of Boreal America*, No. 6422, 1903.—MEYRICK, *in* Wytzman, *Genera insectorum*, fasc. 180, p. 176, 1922.—GAEBE, *in* Bryk, *Lepidopterorum catalogus*, pt. 92, p. 332, 1939.
- Agonopteryx lythrella* (Walsingham) BUSCK, *Proc. U. S. Nat. Mus.*, vol. 35, p. 199, 1908.—FORBES, *Cornell Univ. Agr. Exp. Stat.*, *Memoir* 68, p. 240, 1923.
- Agonopteriæ lythrella* (Walsingham) MCDUNNOUGH, *Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera)*, No. 8437, 1939.
- Agonopteryx lythrella* (Walsingham) BARNES and MCDUNNOUGH, *Check list of the Lepidoptera of Boreal America*, No. 6468, 1917.—BRIMLEY, *The Insects of North Carolina*, p. 304, 1938.

Labial palpus yellowish mottled exteriorly with purplish fuscous; third segment with indistinct basal and subapical fuscous annuli. Antenna fuscous broadly annulated with tawny. Head and thorax cinereous, the former with a fuscous median shade, the latter irrorated with purplish fuscous; tegula purplish fuscous. Fore wing brownish purple dusted with fuscous and with much cinereous scaling along costa; at base, from inner angle almost to costa a narrow, cream-colored, transverse line preceded at inner angle by a distinct black spot; on disk, before middle, a short outwardly curved, black crescent-shaped dash edged with reddish and followed by cinereous; at end of cell a small cream-colored spot edged with fuscous; from costa to termen at apical third a more or less distinct cinereous fascia; inner margin narrowly shaded with reddish; around termen, at base of cilia, a narrow blackish-fuscous line; cilia purplish gray. Hind wing and cilia brownish gray, the latter edged with cinereous. Legs cream-colored strongly overlaid and irrorated exteriorly with purplish fuscous except at joints. Abdomen purplish gray above; beneath, cream-colored strongly suffused and overlaid with purplish fuscous.

Alar expanse, 13–18 mm.

Type.—In the British Museum.

Type locality.—"Illinois."

Food plant.—*Lythrum alatum* Pursh.

Distribution.—Eastern United States.

United States records

Illinois.

North Carolina: Black Mountains (July 20, from larvae).

Remarks.—The male genitalia of this species are nearly identical with those of *hyperella*, *arcuella*, *nubiferella*, and *gelidella*. The clasper of the harpe (fig. 155), however, is much more slender than that of any of the other four. Each of the hairy lobes of the transtilla bears about half a dozen strong hairs. In *hyperella* and *arcuella* there are only two or three hairs and in *gelidella* the hairs are numerous but weak. I have not seen the female genitalia of this species. All females examined are without abdomens.

AGONOPTERIX NUBIFERELLA (Walsingham)

PLATE 26, FIGURES 161, 161a

Depressaria nubiferella WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 316, pl. 36, fig. 6.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 745, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5881, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No 6424, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 764, 1904.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 335, 1939. *Agonopteryx nubiferella* (Walsingham) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.

Agonopterix nubiferella (Walsingham) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8450, 1939.

Agonopterix nubiferella (Walsingham) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6470, 1917.

Labial palpus light ochreous, second segment overlaid with brownish red exteriorly; third segment with subapical annulus of the same color. Antenna fuscous with slight reddish luster. Head, thorax, and ground color of fore wing ochreous; tegula and anterior part of thorax overlaid with brownish red. Extreme base, except costa, of fore wing unmarked, remainder of wing suffused with brownish red and irrorated with scattered fuscous scales; from costa, across end of cell, almost to inner margin, a dark brownish-red shade with a fuscous central discal dot; this shade is preceded by two more or less distinct brownish-red discal dots, obliquely one above the other; along costa a series of reddish-fuscous spots; around termen, at base of cilia, a line of the same color; cilia ochreous, shaded with brownish red. Hind wing grayish fuscous; cilia yellowish basally, grayish fuscous apically. Legs light ochreous; anterior and median pair strongly overlaid with reddish fuscous except at joints; posterior legs irrorated and suffused with light fuscous except at joints. Abdomen ochreous overlaid with fuscous beneath.

Male genitalia.—Harpe clothed with rather coarse hairs; cucullus rounded; clasper short, reaching just beyond middle, but very stout, bluntly pointed. Anellus a lightly sclerotized plate, broader than long, indented at the posterior edge; lateral lobes undeveloped. Vinculum rounded. Aedeagus stout, dorsoventrally depressed, with a slightly upturned point; near the base is a bifid plate by which the aedeagus articulates with the anellus. Transtilla a narrow band with large, hairy lateral lobes, the hairs fine and weak. Gnathos an oval spined knob. Socii very small, widely separated, and sparsely clothed with fine hairs. Tegumen truncated.

Alar expanse, 18–20 mm.

Type.—In the British Museum.

Type locality.—Rogue River, Oreg.

Food plant.—*Hypericum perforatum* L. (The *Hypericum* referred to by Walsingham is probably this species also.)

Distribution.—Western United States and Canada.

United States records

California: Mendocino and Shasta Counties (June and July 1871, Walsingham).

Idaho: Lapwai (V-28 to 1-VI-35, J. F. G. Clarke [reared]).

Oregon: Rogue River.

Washington: Logan Hill, Chehalis (IX-8-29, T. M. Clarke); Pullman (VII-24-98 and VIII-10-98, C. V. Piper).

Canadian records

British Columbia: Shawnigan Lake, Vancouver Island (VII-14-23, E. H. Blackmore).

Remarks.—This and the four foregoing species all have very similar genitalia, but *nubiferella* has distinctly narrower harpes than the others and is widely different in pattern and coloration.

All the specimens I have seen are males. The California and Oregon specimens (including cotypes) are all considerably lighter in coloration than specimens from Washington, Idaho, and British Columbia. The northern specimens may represent a species distinct from that represented by the California and Oregon specimens, presenting a parallel case with that of *arcuella* and *hyperella* in which the females give the only reliable character for separation. The type locality (from which I have two specimens) is not far from the locality where the Idaho material was collected, and it does not seem likely, therefore, that the two color forms represent different species. Until females from both northern and southern localities are obtained I believe it advisable to leave both color forms under one name.

AGONOPTERYX CURVILINEELLA (Beutenmüller)

PLATE 26, FIGURES 157, 157a; PLATE 42, FIGURE 245

Depressaria curvilineella BEUTENMÜLLER, Ent. Amer., vol. 5, p. 10, 1889.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5874, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6417, 1903.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 321, 1939.

Depressaria curvilineella RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5260, 1891.—DIETZ, in Smith, Catalogue of the insects of New Jersey, p. 474, 1900.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 742, 1902.

Agonopteryx curvilineella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.

Agonopteryx curvilineella (Beutenmüller) FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 240, 1923.

Agonopteryx curvilineella (Beutenmüller) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8439, 1939.

Agonopteryx curvilineella KEARFOTT, in Smith, Catalogue of the Insects of New Jersey, p. 561, 1910.

Agonopteryx curvilineella (Beutenmüller) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6445, 1917.

Labial palpus white; second segment irrorated with blackish fuscous exteriorly; third segment with basal and subapical bands and apex blackish fuscous. Head, thorax, and ground color of fore wing light grayish ochreous; face white; base of tegula and fore part of thorax suffused with brown; fore wing, except extreme base and basal half of costa, strongly suffused with brown and irrorated with scattered

blackish-fuscous scales; in pale basal patch two small blackish-fuscous spots; along costa and around termen a series of blackish-fuscous spots, those around termen small and indistinct; at end of cell a white discal spot edged with blackish fuscous and preceded by a long, curved, blackish-fuscous discal dash; cilia light grayish ochreous, suffused with brown. Hind wing grayish fuscous; cilia white with grayish-fuscous basal band. Legs white suffused with fuscous; tarsi of hind legs with a fuscous spot at the base of each. Abdomen grayish ochreous above suffused with fuscous; beneath, whitish sparsely irrorated with fuscous scales and with a row of blackish-fuscous spots on each side; between these rows of spots two rows of smaller spots of the same color.

Male genitalia.—Harpe broad, profusely clothed with fine hairs, particularly basally; cucullus pointed; sacculus moderately sclerotized, broad; clasper slender, heavily sclerotized, hooked, reaching two-thirds distance toward costa and without basal protuberance; anellus moderately sclerotized, oval, broader than long, with weak lateral hairy lobes. Vinculum with a well-developed dorsoanterior process. Aedeagus nearly straight, wedge-shaped, bluntly pointed. Transtilla a narrow sclerotized band, with sparsely hairy, lateral lobes. Gnathos a finely spined, elongate-oval knob. Socii weakly sclerotized, broad, hairy flaps.

Female genitalia.—Genital plate moderately sclerotized. Ostium near middle of genital plate. Ductus bursae long, slender, membranous. Bursa copulatrix oval; signum a small, irregular, sclerotized plate, armed with short thornlike teeth.

Alar expanse, 15–20 mm.

Type.—In the United States National Museum.

Type locality.—"New York."

Distribution.—Eastern United States and Canada.

United States records

District of Columbia: Chain Bridge, 2 ♀♀ (October 20, 1920, A. Busck).

Maryland: Cabin John (II-26-11, F. Knab); Plummers Island, 29 ♂♂, 14 ♀♀ (March and April dates; A. Busck and H. S. Barber).

New Jersey: Essex County Park, ♀ ("June 10," W. D. Kearfott).

New York: 2 ♀♀ (Beutenmüller); Ithaca, 2 ♀♀ (6-15-V-30, A. B. Klots); Rochester, 2 ♀♀ (8-VII-33, A. B. Klots).

Pennsylvania: New Brighton, 10 ♂♂, 10 ♀♀ (May and August to November dates, H. D. Merrick); Oak Station, Allegheny County, 3 ♂♂, ♀ (July and September dates; Fred Marloff).

Canadian records

Manitoba: Aweme (28-IX-23, N. Criddle); Winnipeg, ♂ (A. W. Hanham, no date); ♀ ("1-5-98," no collector).

Ontario: Ottawa (28-VII-2-VIII-1905, C. H. Young).

AGONOPTERIX MURICOLORELLA (Busck)

PLATE 26, FIGURES 158, 158a; PLATE 42, FIGURE 243

Depressaria muricolorella BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 741, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5873, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6416, 1903.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 333, 1939.

Agonopteryx muricolorella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.

Agonopterix muricolorella (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8441, 1939.

Agnopteryx muricolorella (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6455, 1917.

Labial palpus creamy white; outside of second and all of third segment suffused with ochreous-gray; second segment sparsely irrorated with fuscous. Antenna dark ochreous-gray. Head, thorax, base and basal third of costa of fore wing light grayish brown; fore wing dark mouse gray with sparse blackish-fuscous irrorations and with a purple tint around edges and at apex; at end of cell a white discal spot edged outwardly with a semicircle of blackish-fuscous scales; first discal spot indicated by a few scattered blackish-fuscous scales at basal third; on costa and around termen a series of indistinct blackish-fuscous spots; cilia mouse gray with some mixture of pale whitish ochreous. Hind wing grayish fuscous; cilia a shade lighter with light fuscous band and whitish tips. Legs light grayish ochreous suffused with fuscous. Abdomen dark purplish gray above; beneath grayish ochreous shaded with fuscous.

Male genitalia.—Harpe moderately clothed with fine hairs; cucullus pointed; clasper rather stout, lightly sclerotized, constricted just before middle and having a twisted appearance; apex heavily sclerotized, rough. Anellus oval, longer than broad, with large hairy lateral lobes; posterior edge concave. Vinculum rounded with a well developed dorso-anterior process. Aedeagus stout, curved, and terminating in a sharp, slightly upturned point. Transtilla a sclerotized band with well developed hairy lateral lobes. Gnathos oval, clothed with spines. Socii broad, hairy lobes. Tegumen terminating in a single short median projection.

Female genitalia.—Genital plate moderately broad; deeply cleft on posterior edge. Ostium small; near anterior margin of genital plate; at posterior end of ostium two small, sclerotized lateral areas. Ductus bursae long, gradually enlarged to form the small oval bursa copulatrix. Signum an oblong, sclerotized plate with projections on the anterior and posterior edges.

Alar expanse, 17–18 mm.

Type.—In the United States National Museum.

Type locality.—Golden, Colo.

Food plants.—"An umbelliferous plant" (Dyar); *Lomatium grayi* Coult. and Rose (Clarke).

Distribution.—Western United States.

United States records

Colorado: Golden, ♀ (Dyar and Caudell, no date).

Washington: Snake River, Whitman County, opposite Clarkston, 3 ♂♂, 3 ♀♀ (V-30-31, VI-4 to 18-33, and V-11-34, J. F. G. Clarke).

Remarks.—With Busck's unique type male I associate six reared specimens from the Snake River, Wash. (Clarke Nos. 2944, 4416, 4417, 4418, 4419, and 5209). The Washington specimens fit the description in every detail except that some of them show two discal spots, the single discal spot not being present. In specimen 5209 veins 3 and 4 of the hind wing are short stalked as described, but in the remaining specimens they are connate. In spite of the variation in venation it would be illogical to consider the Washington specimens anything but one species. The male genitalia show some slight variation in the length of the harpe and shape of the cucullus, but this is not significant.

AGONOPTERIX OREGONENSIS, new species

PLATE 31, FIGURES 176, 176a; PLATE 42, FIGURE 241

A small reddish species with contrastingly lighter costa.

Antenna with basal segment blackish fuscous; remainder shining grayish fuscous, darker distally; narrowly annulated with blackish fuscous; the whole with a faint reddish sheen. Labial palpus with second segment light whitish ochreous, the brush pink beneath both inwardly and outwardly; outwardly, and at apex inwardly, irrorated with fuscous; third segment blackish fuscous with a pink-tinged whitish-ochreous median fascia. Head light brownish fuscous with a pink suffusion; scales tipped with whitish ochreous; face shining whitish ochreous. Thorax, tegula, and fore wing brownish fuscous, the fore wing so heavily overlaid with brick-red scales that it appears dark reddish. Thorax and tegula with a strong reddish suffusion anteriorly and much whitish-ochreous scaling posteriorly. Base of fore wing and costa to middle a contrasting light gray; beyond middle of wing the light-gray scaling diminishes; extreme costal edge bright pink spotted with black; along costa, inside the grayish area, and along veins toward the apex, with abundant black scaling. At the end of cell a conspicuous white spot encircled with black scales; at basal third two small, obliquely placed black spots followed by white scaling; cilia fuscous with pink suffusion. Hind wing dark smoky fuscous; cilia fuscous; pink tinged apically. Legs whitish ochreous

much suffused and irrorated with fuscous; tarsi fuscous above except for narrow band of whitish-ochreous at distal ends of segments. Abdomen grayish fuscous above, whitish ochreous below; posterior edges of segments above whitish ochreous; on underside a lateral row of black spots; anal tuft tinged with pink.

Male genitalia.—Harpe clothed with many long hairs; cucullus pointed; costa strongly sclerotized; clasper stout, pointed, reaching three-fourths of way to costa; definitely curved distally; sacculus moderately sclerotized. Anellus an elongate, moderately sclerotized plate, lateral edges concave; anterior edge convex, posterior edge deeply cleft, lateral lobes small. Vinculum rounded. Aedeagus slender, gently curved, pointed. Transtilla a narrow, strongly sclerotized band, lateral lobes large, hairy. Socii large, fleshy, hairy lobes. Tegumen pointed.

Female genitalia.—Genital plate broad. Ostium large, broadly elliptical. Lobes of ovipositor clothed with long coarse hairs. Ductus bursae long, membranous; inception of ductus seminalis just before ostium. Bursa copulatrix large with well developed diamond-shaped signum.

Alar expanse, 15–18 mm.

Type.—U.S.N.M. No. 52079.

Type locality.—Salem, Oreg. (March; E. Y. Lansing, Jr.)

Described from the ♂ type and 5 ♂♂ and 10 ♀♀ paratypes as follows: ♂, Pullman, Wash. (8-II-30, J. F. G. Clarke); 2 ♂♂, Duncan, British Columbia (26-II-21, W. Downes); ♂, Duncan, British Columbia (25-III-21, A. W. Hanham); ♂, Fitzgerald, British Columbia (14-V-22, E. H. Blackmore); ♀, Salem, Oreg. (March; E. Y. Lansing); ♀, Logan Hill, Chehalis, Wash. (15-X-29, T. M. Clarke); ♀, Departure Bay, British Columbia (4-II-29); ♀, Fitzgerald, British Columbia (14-V-22, E. H. Blackmore); ♀, Fraser Mills, British Columbia (22-XI-23, L. E. Marmont); ♀, Quamichan Lake, British Columbia (1-IV-23, E. H. Blackmore); 2 ♀♀, Victoria, British Columbia (21-III-21, E. H. Blackmore; 23-VI-23, W. R. Carter); 2 ♀♀, no locality but British Columbia, specimens under Blackmore No. 160 (13-IV-23; 5-V-23).

Remarks.—This species has been placed under the name *gelidella* in collections.

AGONOPTERIX CLARKEI Keifer

PLATE 31, FIGURES 178, 178a; PLATE 40, FIGURES 230, 230a

Agonopteryx clarkei KEIFER, Bull. Southern California Acad. Sci., vol. 35, p. 10, pl. 4; pl. 7, fig. 6, 1936.

Agonopterix clarkei (Keifer) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8415, 1939.

Depressaria clarkei (Keifer) GAEDE, in Bryk, *Lepidopterorum catalogus*, pt. 92, p. 315, 1939.

Labial palpus luteous; second segment irrorated with fuscous outwardly and in brush; third segment somewhat darker than second with poorly defined blackish-fuscous basal and subterminal annuli. Antenna fuscous with narrow, darker annulations, the latter obscured below. Head, thorax, base and costa of fore wing luteous, the head infuscated above; thorax infuscated particularly anteriorly; costa with fuscous spots and dashes throughout its length; beyond luteous basal patch deeply infuscated, this color rapidly fading; at middle a dark blotch from costa; first and second discal spots minute, black, obliquely one above the other; third discal spot at end of cell whitish followed by a black scale or two; all discal spots practically obsolete; cilia fuscous tipped with luteous. Hind wing luteous, darker apically; cilia with a fuscous basal band. Legs luteous overlaid and suffused except at joints; posterior legs somewhat lighter. Abdomen luteous, darker above than below; on each side, beneath, a blackish-fuscous line.

Male genitalia.—Harpe heavily clothed with long hairs; cucullus bluntly pointed, sacculus moderately sclerotized, narrow; clasper long, slender, straight, nearly reaching costa. Anellus a simple sclerotized plate with deeply excavated lateral, and convex posterior edges; longer than broad; hairy lateral lobes well developed. Vinculum evenly rounded. Aedeagus short, stout, strongly bent; vesica armed with many small spinules. Transtilla a narrow sclerotized band with well-developed hairy lateral lobes. Socii large, hairy, fleshy flaps.

Female genitalia.—Genital plate broad, moderately sclerotized, anterior margin cleft. Ostium small, situated near posterior edge of plate. Ductus bursae membranous, moderately long; inception of ductus seminalis just before ostium. Bursa copulatrix large, with a large, strongly sclerotized, toothed signum. Lobe of ovipositor with a few long, strong hairs and numerous moderately long stout spines. Alar expanse, 18–20 mm.

Type.—U.S.N.M. No. 52092.

Type locality.—Missouri Flat, Placerville District, Calif.

Food plant.—*Artemisia vulgaris* L. var.

Remarks.—Keifer has discussed and figured this species in his paper, but I have refigured it for completeness' sake.

I have before me the specimens from Aweme, Manitoba, which Keifer discusses, but I do not believe these represent a different species. Although they could possibly be considered as a race, they differ from the typical specimens only in the slightly paler pink coloration in the cilia of the fore wing and in the apparently slightly

shorter spines of the lobes of the ovipositor. Until we know more about the specimens from Aweme I decline to give them a separate designation.

The type of ovipositor found in this species is unique for the genus.

AGONOPTERIX CLEMENSELLA (Chambers)

PLATE 26, FIGURES 159, 159a; PLATE 42, FIGURE 242

Gelechia clemensella CHAMBERS, Can. Ent., vol. 8, p. 173, 1876.

Depressaria clemensella (Chambers) BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 766, 1904.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 176, 1922.—GAEDE, in BRYK, Lepidopterorum catalogus, pt. 92, p. 315, 1939.

Depressaria applana (Fabricius) WALSINGHAM, Trans. Amer. Ent. Soc., vol. 10, p. 175, 1882.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5251, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5862, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6405, 1903.

Agonopteryx clemensella (Chambers) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.

Agonopteryx clemensella (Chambers) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8430, 1939.

Agonopteryx clemensella (Chambers) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6447, 1917.

Agonopteryx applana clemensella (Chambers) FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 239, 1923.

Labial palpus yellowish white; second segment irrorated with fuscous exteriorly and with a strong pink suffusion in the brush; third segment with basal and broad subapical annuli black. Antenna fuscous, somewhat lighter beneath. Head, thorax, and base of fore wing very light yellowish gray with fuscous and reddish-brown irrorations and a rosy suffusion. Ground color of fore wing reddish brown; costa and termen blotched with alternate fuscous and yellowish-white spots; whole surface of wing marked with scattered yellowish-white scales; discal spots four, white; one at end of cell preceded by one at middle of wing; at basal third two, one obliquely above the other; the outer surrounded by a dull fuscous cloud, the inner, oblique pair preceded by a few black scales; cilia reddish brown suffused with fuscous and irrorated with yellowish white. Hind wing and cilia shining yellowish fuscous, the latter with a fuscous basal band. Legs yellowish white overlaid and irrorated with fuscous exteriorly; posterior pair lighter in color, all with a rosy tint. Abdomen grayish fuscous above, yellowish white beneath with four longitudinal rows of fuscous spots.

Male genitalia.—Harpe slender, heavily clothed with hairs; sacculus moderately sclerotized; clasper slender, nearly reaching costa of harpe, slightly thicker at middle, strongly curved toward the cucullus. Anellus broadly rectangular, slightly constricted posteriorly; posterior

margin concave and with well developed lateral lobes. Vinculum broad with a pointed dorso-anterior process. Aedeagus long, curved, terminating in a sharp slender point; basally there is a sclerotized biramous arm by which the aedeagus articulates with the anellus. Transtilla a narrow sclerotized band, with large, profusely hairy, lateral lobes. Gnathos long, oval, slender, clothed with fine spines. Socii broad fleshy lobes.

Female genitalia.—Genital plate broad, lightly sclerotized; ostium small oval, at posterior edge of genital plate. Ductus bursae membranous, inception of ductus seminalis rather remote from ostium; bursa copulatrix oval. Signum a small, more or less rectangular plate, slightly cupped and covered with thornlike teeth.

Alar expanse, 16–20 mm.

Type.—In the Museum of Comparative Zoology, Cambridge, Mass.

Type locality.—Easton, Pa.

Food plant.—Parsnip; wild parsnip?

Distribution.—Northeastern United States and eastern Canada.

United States records

Connecticut: ♂ (Beutenmüller).

District of Columbia: Chain Bridge, ♀ (“2–4–85”); Washington, ♀ (“21–4–85”).

Illinois: Putnam County, ♂ (M. O. Glenn).

Maryland: Plummers Island, ♂ (March 1908, H. S. Barber).

New Hampshire: Hampton, ♂ (IV–26–04, S. A. Shaw).

New York: Ilion, ♂ (IX–3–11, McElhose); Ithaca, 2 ♀♀ (5–19–V–31, A. B. Klots); Lockport, ♀ (XI–30–35, L. L. Pechuman); Long Island: Orient, ♂ (VII–27–26; Ray Latham); Montvale, ♀ (November 26, 1923, F. M. Schott); Rochester, ♀ (3–IV–33, A. B. Klots).

Pennsylvania: New Brighton, 12 ♂♂, 7 ♀♀ (March and July to November dates, H. D. Merrick); Oak Station, Allegheny County, 2 ♀♀ (Oct. 15, 1908, and March 30, 1910, Fred Marloff); Pittsburgh, ♂ (IV–7–06, Henry Engel).

Vermont: Clarendon, ♂ (no date or collector).

Wisconsin: Millwood County, ♂ (“X–14–08”).

Canadian records

Ontario: Ottawa (VIII–21–05, C. H. Young); Toronto (“III–2 to 8–95”).

Remarks.—Busck¹⁸ pointed out that in all probability *clemensella* is distinct from the European *applana*. There can be no doubt about the close relationship between the two species, but they can be separated easily on genitalic characters as well as pattern.

The ground color of *applana* is much lighter than that of *clemensella*; in the former there is a tendency to coalescence of the discal spots, whereas in the latter the spots are smaller and distinctly separated.

The male genitalia of *clemensella* show a slender, gradually finely

¹⁸ Busck, Proc. U. S. Nat. Mus., vol. 27, p. 766, 1904.

pointed aedeagus and a very slender clasper as compared to a more abruptly pointed aedeagus and a stouter clasper in *applana*. The female genitalia show fewer differences, but those examined indicate that the ductus bursae of *applana* is longer in proportion to the other structures than that of *clemensella*. I have examined 16 European and 41 American specimens, all of which bear out the above conclusion.

In view of this evidence, I believe it is certain that the European *applana* does not occur in North America.

AGONOPTERIX ATRODORSELLA (Clemens)

PLATE 26, FIGURES 160, 160a; PLATE 43, FIGURE 252

- Depressaria atrodorsella* CLEMENS, Proc. Ent. Soc. Philadelphia, vol. 2, p. 124, 1863.—PACKARD, Guide to the study of insects, p. 349, 1869.—ROBINSON, Ann. Lye. Nat. Hist. New York, vol. 9, p. 156, pl. 1, fig. 7, 1870.—CLEMENS, in Stainton, Tineina of North America, p. 91, 1872.—CHAMBERS, Can. Ent., vol. 4, p. 91, 1872.—ZELLER, Verh. zool.-bot. Ges. Wien, vol. 23, p. 233, 1873.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 138, 1878.—WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 312.—COQUILLET, Papilio, vol. 3, p. 98, 1883.—BEUTENMÜLLER, in Smith, Catalogue of the insects of New Jersey, p. 355, 1890.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5255, 1891.—DIETZ, in Smith, Catalogue of the insects of New Jersey, p. 473, 1900.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 736, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5854, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6397, 1903.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 173, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 310, 1939.
- Agonopteryx atrodorsella* (Clemens) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 238, 1923.
- Agonopterix atrodorsella* (Clemens) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8409, 1939.
- Agonopteryx atrodorsella* (Clemens) SMITH, Catalogue of the insects of New Jersey, p. 561, 1910.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6433, 1917.

Labial palpus and face yellowish white; second segment of palpus irrorated with fuscous exteriorly and in the brush, the latter also tinted with pink; third segment with basal and subapical annuli and tip blackish fuscous. Antenna with black, ochreous-tipped basal segment; remainder fuscous annulated with ochreous-fuscous. Head reddish ochreous with median fuscous area. Thorax and extreme base of fore wing blackish fuscous; collar whitish. Fore wing yellowish ochreous with sparse blackish irrorations; costa with four to six or seven blackish-fuscous spots; at basal third a black discal dot followed by a white one at the end of cell; from center of cell a longitudinal reddish blotch extending to apical third and enclosing the white discal spot; on costa, from apical third to apex, a longitudinal fuscous and ochreous cloud; cilia reddish ochreous. Hind wing light

reddish fuscous; cilia whitish with basal and two subapical bands fuscous. Legs yellowish white strongly overlaid with blackish fuscous except at joints; the latter suffused with pink. Abdomen light brownish ochreous, lighter on posterior margins of segments; beneath, yellowish white with broad, blackish-fuscous longitudinal, lateral stripes and two rows of similarly colored spots between.

Male genitalia.—Harpe broad basally but abruptly narrowed beyond clasper; moderately clothed with hairs; clasper long, slender, slightly bent, not quite reaching costa. Anellus a sclerotized plate, longer than broad, concave on posterior edge, constricted anteriorly, with prominent hairy lateral lobes. Aedeagus stout, slightly curved, pointed, with large spinulate patch in basal two-thirds of vesica. Transtilla a narrow sclerotized band with well developed, hairy, lateral lobes. Gnathos an elongate, oval, spined knob. Socii large fleshy, hairy flaps.

Female genitalia.—Ostium large, near posterior edge of genital plate. Genital plate very broad, produced anteriorly; anterior edge deeply cleft, the cleft semicircular, the anterior points nearly touching. Ductus bursae long, membranous, gradually tapering to form the large oval bursa copulatrix; inception of ductus seminalis just anterior to ostium. Signum a large diamond-shaped, spined plate.

Alar expanse, 18–24 mm.

Type.—In the Academy of Natural Sciences of Philadelphia.

Type locality.—Pennsylvania.

Food plants.—*Bidens frondosa* L., *Myrica asplenifolia* L., *Eupatorium* sp.

Distribution.—Eastern United States and Canada.

United States records

Connecticut: ♂ (Beutenmüller, coll.).

District of Columbia: Washington, ♂ (X-25-02).

Illinois: Flosmoor, ♂, ♀ (no date or collector); Evanston, ♂ ("4-99").

Massachusetts: Cummington, ♂ (no date or collector); Dover, ♂ (8-7-33, no collector); Marthas Vineyard, ♂ ("1-3," George D. Eustis); Winchendon, ♂ (IX-28-02, no collector).

New Hampshire: Hampton, 3 ♂♂ (V-10-13, S. A. Shaw).

New Jersey: Cedar Grove, ♂ (IV-9-24, F. M. Schott).

New York: Ilion, ♂, ♀ (V-3-13, H. McElhose); Ithaca, ♀ (X-24-35, J. G. Franclemont); 2 ♂♂ (12-V-31, 5-V-31, A. B. Klots); Liberty, ♀ (no date or collector); New Windsor, 2 ♂♂ (13-VIII-'93; 23-VIII-'97, E. L. Morton).

Pennsylvania: New Brighton, 4 ♂♂ (IX-7-02, IX-27-02, V-25-06, IX-29-06, H. D. Merrick).

Vermont: Clarendon, ♂ (W. D. Kearfott).

Wisconsin: Cranmoor, Wood County, ♀ (IV-22-08, C. B. Hardenberg); Madison, ♂ (XI-10-23, S. B. Fracker).

Canadian records

- Ontario: Bobcaygeon (July 24, 1931, J. McDunnough); Hymers, ♂ (IX-16-23); Merivale (May 1, 1936, W. J. Brown); Ottawa, ♂ (IV-21-1900); (3 specimens, May 9, 1904, C. H. Young; March 29, 1906, May 1, 1906, J. Fletcher); Toronto (no further data); Trenton (May 5-21, 1911, Evans).
- Quebec: Aylmer (April 29, 1904, C. B. Hutchings); Chelsea (July 17, 1915, J. McDunnough); Fairy Lake (April 24, 1932); Knowlton (September 11, 1929, J. McDunnough); Meach Lake (March 29, April 25, 1900; September 25, 1902; May 4, 1901, C. H. Young).

Remarks.—In addition to a long collected series of this species I have a specimen before me from Madison, Wis., reared from *Myrica asplenifolia* by S. B. Fracker, and four from Dover, Mass. (Gipsy Moth Lab.), reared from "*Coreopsis*" (synonym of *Bidens*). The wide difference in food plant is very surprising in view of the fact that nearly all species are either host specific or feed on very closely related species of plants. The specimen from Bobcaygeon, Ontario, was reared from *Eupatorium*.

AGONOPTERIX SCABELLA (Zeller)

PLATE 43, FIGURE 250

- Depressaria scabella* ZELLER, Verh. zool.-bot. Ges. Wien, vol. 23, p. 236, 1873.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 138, 1878.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5280, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 749, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5892, 1903.—KEARFOTR, in Smith, List of the Lepidoptera of Boreal America, No. 6435, 1903.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 177, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 348, 1939.
- Depressaria scabrella* WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 312.
- Agonopteryx scabella* (Zeller) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 239, 1923.
- Agonopterix scabella* (Zeller) McDUNNOUGH, Check List of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8453, 1939.
- Agonopteryx scabella* (Zeller) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6439, 1917.

Alar expanse, 24 mm.

Type.—In the British Museum.

Type locality.—"Ohio."

Remarks.—I have one specimen, supposedly this species, before me and have figured the genitalia (fig. 250, ♀), which show it is very close to *atrodorsella*.

AGONOPTERIX PTELEAE Barnes and Busck

PLATE 27, FIGURES 162, 162a; PLATE 43, FIGURE 251

- Agonopteryx pteleae* BARNES and BUSCK, Contr. Lepid. North America, vol. 4, p. 231, pl. 28, fig. 13; pl. 38, fig. 1, 1920.

Agonopterix pteleae (Barnes and Busck) McDUNNOUGH, Check list of Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8426, 1939.

Depressaria pteleae (Barnes and Busck) MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 175, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 342, 1939.

Labial palpus light ochreous; second segment with fuscous base and irrorations exteriorly; third segment with fuscous basal and sub-apical annuli. Antenna fuscous. Head reddish ochreous above; face light silvery ochreous. Thorax and fore wing light ochreous-brown mottled and suffused with black and brown, the entire surface roughened with raised scales; extreme base at inner angle whitish ochreous broadly edged with black; from costa to end of cell a large blackish-fuscous blotch; along costa and around termen a series of blackish-fuscous spots; first and second discal spots black, the latter obscured by the large costal blotch. Hind wing light ochreous fuscous; cilia light ochreous brown with basal band a shade lighter. Legs light ochreous brown suffused and annulated with blackish fuscous. Abdomen light ochreous-brown, with two lateral longitudinal rows of black spots on the underside.

Male genitalia.—Harpe moderately sclerotized, pointed, and almost entirely clothed with fine hairs; at base, just inside costa, is a group of long fine spines; clasper and a narrow "spur" of the sacculus adjacent to it, heavily sclerotized. The clasper tapers gently to a fine point, is slightly curved, and reaches almost to costa. Anellus a heavily sclerotized oval plate, longer than broad, with truncated posterior edge; lateral lobes large, hairy. Transtilla a narrow sclerotized band with well-developed, hairy lateral lobes. Aedeagus rather stout, curved, and pointed, with a lateral, lightly sclerotized flap from about the middle to the apex. Gnathos a short oval knob armed with many spines. Socii small, mainly indicated by hairs. Tegumen with a single apical projection.

Female genitalia.—Ostium large, near posterior edge of genital plate. Genital plate greatly produced anteriorly and narrowly cleft on anterior margin. Extreme posterior portion of ductus bursae abruptly constricted before ostium, where ductus seminalis enters; ductus bursae gently tapering to form the large bursae copulatrix. Signum a roughly diamond shaped, sclerotized, spined plate.

Alar expanse, 20–22 mm.

Type.—In the United States National Museum.

Type locality.—Decatur, Ill.

Food plant.—*Ptelea trifoliata* L. (hoptree).

Remarks.—This species is exceedingly close to *pulvipennella* but differs from it by the rough-scaled fore wing, smaller anellus, and less sharply pointed anterior margin of the genital plate.

Besides the type series in the National collection from Decatur, Ill. (June 1-15), there are two specimens from Rockford, Ill. (collector "O. H. S.") among the undetermined material, which, although somewhat larger and darker than the types, undoubtedly belong here. This species has an unmistakable roughened appearance due to the presence of many long, slender, almost hairlike, upturned scales on practically the entire insect.

AGONOPTERIX EUPATORIHELLA (Chambers)

PLATE 27, FIGURES 163, 163a; PLATE 43, FIGURE 249

- Depressaria eupatoriella* CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 82, 115, 1878.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5261, 1891.
- Agonopteryx plummerella* BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 239, 1923. (New synonymy.)
- Agonopterix plummerella* (Busck) McDUNNOUGH, Check List of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8454, 1939.
- Agonopteryx plummerella* (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6456, 1917.
- Depressaria plummerella* MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 177, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 340, 1939.
- Depressaria pulvipennella* BUSCK, not Clemens (in part), Proc. U. S. Nat. Mus. vol. 24, p. 737, 1902.

Labial palpus light ochreous-gray: second segment lightly irrorated with black scales; third segment almost wholly black, with only narrow, poorly defined, median and apical bands of the light ground color showing; long, recurved. Antenna dark fuscous narrowly annulated with light ochreous. Head, thorax, and fore wing ochreous-fuscous; face shining light ochreous-gray; thorax and fore wing speckled with numerous black and white scales, the majority of the former raised; at the end of cell a white discal spot surrounded by a few black scales and preceded by two black discal spots at basal third, the latter obliquely one above the other; along costa a series of poorly defined blackish spots; cilia ochreous-fuscous. Hind wing shining fuscous, lighter basally than apically; cilia light fuscous, whitish distally with a narrow dark basal band. Legs whitish ochreous overlaid and mottled with fuscous except at joints. Abdomen ochreous-fuscous above, whitish ochreous beneath with four longitudinal rows of blackish-fuscous spots.

Male genitalia.—Harpe rather short, broad, with the costal two-thirds clothed with fine hairs; cucullus rounded; sacculus and clasper moderately sclerotized; clasper slightly curved toward cucullus distally and reaching about two-thirds distance across harpe. Anellus oval, longer than broad, well sclerotized, with posterior edge concave; lateral lobes clothed with fine hairs. Vinculum rounded. Aedeagus

slender, bent just before middle, apex pointed, upturned. Transtilla a narrow, weakly sclerotized band with well-developed, hairy lateral lobes. Gnathos an oval spined knob. Socii broad flaps, weakly sclerotized and with few hairs.

Female genitalia.—Ostial opening very large, occupying over half the length of the genital plate; genital plate broad; anterior margin with semicircular cleft, the anterior points of which are widely separated. Ductus bursae long, gradually broadening into the large bursa copulatrix; at posterior end of ductus bursae an elongate, lightly sclerotized patch. Signum a large, strongly sclerotized, diamond-shaped plate with the anterior and posterior points of the diamond curled. The plate is armed with short stout teeth.

Alar expanse, 22-24 mm.

Types.—In the Museum of Comparative Zoology, Cambridge, Mass. (*eupatoriella*); in the United States National Museum (No. 11943) (*plummerella*).

Type localities.—"Kentucky" (*eupatoriella*); Plummers Island, Md. (Busck); Cincinnati, Ohio (Dr. A. F. Braun) (*plummerella*).

Food plant.—*Eupatorium*.

Distribution.—Eastern United States probably as far north as New England.

United States records

Illinois: Putnam County, ♀ (14-IV-1939, M. O. Glenn).

Maryland: Plummers Island, 10 ♂♂, 6 ♀♀ (March to August dates, 1905-1908, A. Busck and H. S. Barber).

Ohio: Athens, 3 ♂♂, 2 ♀♀ (11-XI-39, 29-I-40, 10-II-40, R. C. Barnes); Noble County, ♂, ♀ (10-IX-39, 31-XII-40, R. C. Barnes).

Pennsylvania: Pittsburgh, ♂, ♀ (4-IV-06, 18-XI-06, Henry Engel).

Remarks.—This species is apparently very close to *scabella* Zeller, but since I have no authentic material of the latter species, I cannot be sure of the genitalia. I quote, in part, a letter from Mr. Stringer of the British Museum, to Mr. Busck concerning *plummerella* and *scabella*, which was written before I had an opportunity to examine *eupatoriella*:

"I have carefully compared *plummerella* with our type of *scabella* Z., and have no doubt that they are distinct. The labial palpi of *scabella* have the *Depressaria* "furrow" on second joint but much more compact and the terminal joint is shorter, not so pointed or recurved as in your species and *nebulosa* Z.; in color markings there is no difference. In size and color of fore wings your species is nearer to *nebulosa*; *scabella* is a smaller species with much narrower fore wing and is brown-gray, not salt and pepper; it is also devoid of any markings on the underside of either wing as in *plummerella* and almost all of the species of the genus."

I have examined the type of *eupatoriella* in the Museum of Comparative Zoology and have made a slide of the female genitalia. This and *plummerella* appear to be identical; *eupatoriella* was synonymized with *pulvipennella* Clemens through misidentifications made by Lord Walsingham. The specimens in the United States National Museum, referred to by Busck,¹⁹ are clearly *pulvipennella*; *pulvipennella* lacks the rough scaling which is found on the wings of *eupatoriella* and so cannot be confused with it. Chambers clearly states in his description of *eupatoriella*, "the palpi and wings dusted with blackish atoms, each of which is a minute tuft * * *"

AGONOPTERYX PULVIPENNELLA (Clemens)

PLATE 27, FIGURES 164, 164a; PLATE 43, FIGURE 253

Depressaria pulvipennella CLEMENS, Proc. Ent. Soc. Philadelphia, vol. 2, p. 421, 1864.—ROBINSON, Ann. Lyc. Nat. Hist. New York, vol. 9, p. 157, 1868.—CHAMBERS, Can. Ent., vol. 4, p. 91, 1872.—CLEMENS, in Stainton, Tineina of North America, p. 244, 1872.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5276, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 737, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5858, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6401, 1903.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 342, 1939.

Depressaria pulvipennella DIETZ, in Smith, Catalogue of the insects of New Jersey, p. 474, 1900.

Depressaria solidaginis WALSINGHAM, Ins. Life, vol. 1, p. 255, 1899.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5281, 1891.

Agonopteryx pulvipennella (Clemens) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 238, 1923.

Agonopteryx pulvipennella (Clemens) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8440, 1939.

Agonopteryx pulvipennella (Clemens) SMITH, Catalogue of the insects of New Jersey, p. 561, 1910.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6449, 1917.

Agonopteryx pulvipennella BRIMLEY, The insects of North Carolina, p. 304, 1938.

Labial palpus whitish ochreous tinged with pink; second segment irrorated with blackish fuscous exteriorly; third segment with basal and subapical annuli and tip black. Antenna fuscous. Face shining whitish ochreous. Head reddish ochreous suffused with fuscous posteriorly. Thorax and fore wing light reddish ochreous mottled and irrorated with blackish fuscous; extreme base of the light ground color and followed by a rapidly fading fuscous shade that does not reach costa; at basal third two black discal spots obliquely one above the other, followed by a third, white discal spot at the end of cell; in center of wing beyond the first and second discal spots a blackish-fuscous shade surrounding the third discal spot; along costa and around

¹⁹ Busck, Proc. U. S. Nat. Mus., vol. 24, p. 737, 1902.

termen a series of blackish-fuscous blotches and spots; cilia light ochreous-fuscous. Hind wing light fuscous; cilia somewhat lighter with a dark basal band. Legs whitish ochreous suffused and mottled with blackish fuscous except at joints; at joints the ochreous is strongly tinged with pink. Abdomen grayish ochreous above; beneath whitish ochreous with broad blackish-fuscous longitudinal lateral lines and two rows of blackish-fuscous spots between the lateral lines.

Male genitalia.—Harpe broad, clothed with fine hairs; clasper straight, slender, reaching well beyond middle of harpe; cucullus bluntly pointed. Anellus a large oval plate, longer than broad, with concave posterior margin, narrow biramous, strongly sclerotized median area and well developed hairy, lateral lobes. Aedeagus slender, sharply curved, pointed; vesica with large spinulate patch. Vinculum rounded. Transtilla a moderately broad, sclerotized band, with well developed, hairy, lateral lobes. Gnathos an oval, spined knob. Socii large, sparsely hairy, fleshy flaps.

Female genitalia.—Ostium small, near posterior margin of genital plate. Genital plate very broad, produced anteriorly and deeply and narrowly cleft on median anterior edge. Ductus bursae long, membranous, gradually tapering into the large bursa copulatrix; inception of ductus seminalis very near ostial opening. Signum a large, diamond-shaped, spined plate; posterior and anterior points curled.

Alar expanse, 18-24 mm.

Type.—In the Academy of Natural Sciences of Philadelphia.

Type locality.—"Illinois."

Food plants.—*Solidago* and *Urtica*.

Distribution.—Eastern United States and Canada.

United States records

Connecticut: East River, ♀ (September 3, 1908, Chas. R. Ely).

District of Columbia: Washington, 3 ♂♂, ♀ (IV-21-85); ♂ (IV-7-1900); ♂ (IV-21-1900).

Louisiana: Natchitoches, ♂ (August, G. Coverdale).

Maine: Orono, 2 ♂♂ (October 8, '88, one, no date).

Maryland: Plummers Island, 17 ♂♂, 4 ♀♀ (March, April, and September dates, collected by H. S. Barber, A. Busck, E. A. Schwarz).

Massachusetts: Chilmark, ♂ (IX-3-1935, George D. Eustis); Cohasset, ♀ (May 11, '07, Owen Bryant); Framingham, ♀ (April 21, 1905); Springfield, ♂ (no date, G. Dimmock); Winchendon, ♂ (IX-28-02).

Missouri: (One specimen, no date.)

New Hampshire: Hampton, ♂ (IV-30-04, S. A. Shaw).

New Jersey: Denville, ♀ ("X-14"); Essex County, ♀ (IV-20-09, W. D. Kearfott).

New York: Ilion, ♂, 2 ♀♀ (IX-3-11, H. McElhose); ♀, same (IX-2-12); Ithaca (many ♂♂ and ♀♀, various dates in coll. Cornell Univ.).

Ohio: Athens, 2 ♀♀ (29-I-40, R. C. Barnes).

Pennsylvania: New Brighton, ♂, ♀ (IX-27-02, X-23-07, H. D. Merrick).

Virginia: Vienna, ♀ (February 14, 1915, R. A. Cushman).

Wisconsin: Cranmoor, Wood County, ♂ (IV-22-08, C. B. Hardenberg).

Canadian records

Manitoba: Cartwright, ♀ (X-11-03, E. F. Heath).

Nova Scotia: Bridgetown, ♂, ♀ (5-9-IX-1912, G. E. Saunders).

Ontario: Ottawa (♀, April 28, 1905; ♂, May 7, 1905, C. H. Young); Trenton, ♂ (25-IV-1911, Evans).

Quebec: Meach Lake (♀, April 19, 1902; October 12, 1907, C. H. Young); Montreal, ♂ (V-3-04, "A. F. W.").

Remarks.—The variety of food plants indicates that this species is a rather general feeder. I believe we are dealing with at least two very closely related species, which can be separated only by a careful comparison of larvae and pupae, the adult characters not being sufficient for separation. Moths reared from *Solidago* are darker, and the coloring is more suffused than in the majority of specimens. This may be due entirely to the difference in food plant, but there is not sufficient material at hand to determine this definitely.

The species appears to be confined to midwestern and eastern North America.

AGONOPTERIX WALSINGHAMELLA (Busck)

PLATE 28, FIGURES 165, 165a; PLATE 44, FIGURE 254

Depressaria walsinghamella BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 739, 1902.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 356, 1939.

Depressaria fernaldella WALSINGHAM, Ins. Life, vol. 1, p. 256, 1889.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5864, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6407, 1903.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 176, 1922. [Not *Depressaria fernaldella* Chambers, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 82, p. 138, 1878.]

Agnopteryx fernaldella BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6443, 1917.

Agonopterix fernaldella (Walsingham) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8443, 1939.

Agonopterix walsinghamella FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 239, 1923.

Agonopterix walsinghamiella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.

Agonopterix walsinghamiella McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8443, 1939. [As synonym of *fernalabella* (Walsingham).]

Labial palpus pale cinereous strongly suffused with reddish; second segment irrorated with blackish scales exteriorly; third segment with blackish scales exteriorly; third segment with blackish-fuscous basal and median annuli (the former poorly defined) and apex. Antenna fuscous annulated with dull cinereous and tinged with reddish. Head tawny-red with slight cinereous irrorations; face pale cinereous. Thorax and base of fore wing, except costal part, cinereous; fore part

of thorax and tegula suffused and irrorated with reddish. Fore wing deep crimson-red sparsely irrorated with black and cinereous scales; costa, nearly to apex, broadly tawny-red with veins 9 to 12 strongly indicated by cinereous and irrorated with black scales and with poorly defined fuscous spots on extreme edge; discal spots white; first discal spot at basal third edged with carmine; second at end of cell preceded by a few carmine scales; cilia reddish fuscous edged with carmine. Hind wing light fuscous, darker apically than basally; cilia light fuscous with whitish irrorations and pale pink suffusions. Legs pale cinereous overlaid and irrorated with fuscous, except at joints, and suffused with reddish. Abdomen pale grayish fuscous above; beneath, pale cinereous with two black longitudinal lateral stripes.

Male genitalia.—Harpe moderately clothed with fine hairs, tapering gently to a pointed cucullus; clasper short, stout, straight, scarcely exceeding middle of harpe, slightly rugose on exterior edge. Sacculus narrow, moderately sclerotized. Anellus longer than broad, concave on posterior edge, narrowed basally, with well-developed, sparsely hairy lateral lobes. Aedeagus stout, curved, much narrower in distal than proximal half; vesica armed with numerous spinulate cornuti. Vinculum rounded. Transtilla a narrow, lightly sclerotized band with moderately well developed, hairy lateral lobes. Gnathos a spined oval knob. Socii fleshy, hairy flaps. Tegumen terminating in a moderately long, pointed process.

Female genitalia.—Genital plate broad, lightly sclerotized. Ostium round, opening at posterior edge of genital plate; the area around ostium slightly raised above the remainder of surface of plate. Ductus bursae long, membranous; ductus seminalis opening well before ostium. Bursa copulatrix large with small signum situated about middle.

Alar expanse, 20–22 mm.

Type.—In the British Museum.

Type localities.—Orono, Maine; Wisconsin.

Food plants.—*Myrica asplenifolia* L. and *Myrica carolinensis* Mill.

Distribution.—Eastern United States and Canada.

United States records

Connecticut: East River, ♂ (August 5–13, Chas. R. Elŷ).

Maine: Bar Harbor, 8 ♂♂, ♀ (May to November dates, 1934–1938, A. E. Brower); Kennebunkport, 2 ♀♀ (September 24–30); Orono, ♀.

Massachusetts: Springfield (a series of 4 ♂♂ and 3 ♀♀ reared from *Myrica asplenifolia* by Dimmock).

New Hampshire: Hampton, 8 ♂♂ (March and April dates; S. A. Shaw, coll.).

New York: Albany.

Pennsylvania: Hazelton, ♂ ("9–12–04").

Wisconsin: (Acc. Forbes.)

Canadian records

Nova Scotia: Digby, ♂ (IX-19-07, J. Russell); White Point Beach, Queens County, ♀ (VIII-20-34, reared, J. McDunnough).

Ontario: Biscotasing (May 16, 1931, Karl Schedl); Constance Bay (October 3, 1932, W. J. Brown).

Quebec: Kazubazua (August 13-23, 1933, G. S. Walley); Laniel (June 3, 1932, H. S. Fleming).

Remarks.—The identity of this species and the invalidity of Walsingham's name have been established by Busck.²⁰

AGONOPTERIX FUSCITERMINELLA, new species

PLATE 28, FIGURES 167, 167a; PLATE 44, FIGURE 258

Depressaria yeatiana WALSINGHAM (not Fabricius) Proc. Zool. Soc. London, 1881, p. 316.

Depressaria arenella WALSINGHAM (not Schiffermüller), Trans. Amer. Ent. Soc., vol. 10, p. 175, 1882.—RILEY, in Smith, List of the Lepidoptera of Boreal America. No. 5253, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 743, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5877, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6420, 1903.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 174, 1922.

Agonopteryx arenella BUSCK (not Schiffermüller), Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6446, 1917.

Antenna fuscous, faintly and narrowly annulated with ochreous; apex and underside of basal segment whitish ochreous sprinkled with black or dark-brown scales outwardly; palpus with brush well developed; terminal segment with black subbasal and supramedial annuli and black tip. Face and head whitish ochreous, the latter intermixed with brownish scales. Thorax whitish ochreous; dorsally the ground color is liberally mixed with brown and blackish scales. In the posterior half are two crests of raised scales. Fore wing with ochreous ground color strongly overlaid with reddish brown and liberally sprinkled with fuscous to black scales; extreme base ochreous followed, in dorsal half, by a strong red-brown patch, the latter mixed with black in basal part; at the base of cell two small obliquely placed black spots followed by a strong fuscous or black cloud; the latter surrounded by a reddish-brown suffusion; at the end of cell another small black spot. Costa and termen with conspicuous black spots. Cilia ochreous with brown scales intermixed and the whole with a distinct rosy tinge. Hind wing whitish, strongly suffused apically with fuscous; scales at base of cilia, along termen, and frequently around posterior margin, black. Cilia light brownish ochreous. Underside of hind wing with many black scales in apical half. Legs ochreous; fore leg with femur fuscous inwardly; anterior surface of tibia bright pink with overlying brownish scales, the

²⁰ Busck, Proc. U. S. Nat. Mus., vol. 24, p. 739, 1902.

latter having a purplish sheen: tarsi broadly edged with fuscous. Mesothoracic legs like anterior pair but without fuscous femora and with more fuscous on tibiae and tarsi. Hind legs almost wholly whitish ochreous except for delicate pink suffusion on tibiae and fuscous tibial spurs. Abdomen ochreous with broken black lateral lines beneath and suffused with fuscous above.

Male genitalia.—Harpe elongate, narrow; weakly sclerotized except for clasper, sparsely clothed with fine hairs; clasper straight, blunt, pointed, reaching about two-thirds distance across harpe. Anellus longer than broad, subrectangular, moderately sclerotized; posterior edge convex; lateral lobes little developed. Transtilla a narrow sclerotized band with weak lateral lobes. Aedeagus moderately slender, with sharp, upturned point. Gnathos an oval, spined knob. Socii well developed hairy flaps.

Female genitalia.—Base of lobe of ovipositor with a row of long stout hairs. Ostium moderately large, round. Genital plate broad, moderately sclerotized. Ductus bursae long, membranous; inception of ductus seminalis near opening of ostium. Bursa copulatrix large, oval, symmetrical, merging gradually with the ductus; signum a large, roughly diamond-shaped, spined, sclerotized plate.

Alar expanse, 22–25 mm.

Type.—U.S.N.M. No. 52077.

Type locality.—Duncan, Vancouver Island, British Columbia.

Food plant.—*Cynoglossum grande* Dougl. ex Lehm.

Remarks.—Described from the ♂ type and 5 ♂♂ and 13 ♀♀ paratypes as follows: Type ♂, Duncan, Vancouver Island, British Columbia (July 1, 1910, Hanham); paratypes, 3 ♂♂ and 7 ♀♀, Duncan, British Columbia (June and July dates, Hanham); ♂ and 2 ♀♀, Wellington, British Columbia (April and October dates, G. W. Taylor); ♂ and 4 ♀♀, Phoenix Lake, Marin County, Calif. (V-11 to VI-2-1927, H. H. Keifer).

Paratypes in the U. S. National Museum and H. H. Keifer collection, Sacramento, Calif.

In superficial appearance very much like the European *arenella* but easily differentiated from it by the genitalia; in the male of *arenella* the clasper is very broad and flattened, with a deep excavation on the outer edge, while the clasper of *fusciterminella* is straight, fingerlike; the harpe of *arenella* is shorter and broader than that of *fusciterminella*. In the female of *arenella* the anterior edge of the genital plate is strongly convex but that of *fusciterminella* is much less strongly so.

The California specimens are somewhat darker than those from British Columbia, but this may be due to their having been reared.

The northern specimens show more pink on the legs also, but they are identical in other characters, including genitalia.

This species has been confused with *pallidella* Busck and has been placed in collections under that name.

AGONOPTERIX CAJONENSIS, new species

PLATE 31, FIGURES 180, 180a; PLATE 42, FIGURES 244, 244a

This species is much like *argillacea* but lacks the median dark shade of the fore wing.

Labial palpus light ochreous-white, lightly mottled exteriorly on second segment with fuscous; third segment with black subbasal and supramedial bands and tip; the basal band is poorly defined. Antenna fuscous with ochreous-white scaling on basal segment and basal third. Head, thorax, and ground color of fore wing grayish fuscous heavily overlaid with ochreous-white; face light ochreous-white; base of fore wing and basal third of costa ochreous-white; the light basal portion is followed by a dark fuscous shade; whole surface of fore wing sparsely irrorated with small fuscous spots; at the end of cell a conspicuous ochreous-white spot narrowly edged with fuscous; cilia grayish fuscous. Hind wing grayish fuscous; cilia concolorous with light basal band. Legs grayish fuscous strongly overlaid with ochreous-white. Abdomen grayish fuscous above with posterior margins of segments ochreous-white; beneath ochreous-white with a well-defined lateral stripe on each side and a pair of black spots on the posterior margin of each segment between the lateral lines.

Male genitalia.—Harpe rather sharply narrowed before cucullus; cucullus bluntly pointed; clasper long, curved, slightly dilated distally; sacculus moderately sclerotized. Anellus longer than broad, slightly constricted at about middle; posterior edge concave; lateral lobes large, extending nearly to posterior edge of central plate. Aedeagus slender, curved, pointed, with ventral sclerotized arm by which it is attached to the anellus; vesica armed with an elongate patch of fine cornuti. Vinculum rounded, with well-developed dorso-anterior process. Transtilla a moderately broad sclerotized band with well-developed lateral lobes. Tegumen pointed.

Female genitalia.—Genital plate very broad, strongly sclerotized. Ostium small, crescentic, opening slightly posterior to middle. Ductus bursae long, membranous; inception of ductus seminalis just before ostium. Bursa copulatrix large, oval, symmetrical, with well-developed 4-pointed signum.

Alar expanse, 20–23 mm.

Type.—U.S.N.M. No. 52948.

Type locality.—Cajon Valley, Calif.

Food plant.—Unknown.

Remarks.—Described from the type ♂ and 1 ♀ paratype (Cajon Valley, Calif., 25-VI-1937, Grace H. and John L. Sperry).

Both specimens were received from Mr. Sperry in material submitted for determination.

AGONOPTERIX ROSACILIELLA (Busck)

PLATE 28, FIGURES 166, 166a; PLATE 44, FIGURE 257

Depressaria rosaciliella BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 763, 1904.—ANDERSON, Catalogue of British Columbia Lepidoptera, No. 1093, 1904.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 346, 1939.

Depressaria ciliella WALSINGHAM (not Stainton), Proc. Zool. Soc. London, 1881, p. 316.—BUSCK (not Stainton), Proc. U. S. Nat. Mus., vol. 24, p. 739, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5863, 1903. [Not *Depressaria ciliella* Stainton, Trans. Ent. Soc. London, 1849, p. 161, pl. 17, fig. 7; or Rebel, in Staudinger and Rebel, Catalog der Lepidopteren des palaearktischen Faunengebietes, vol. 2, No. 3234, 1901.]

Depressaria rosiciliella MEYERICK, in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922.

Agonopteryx rosaciliella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.—BRAUN, Proc. Acad. Nat. Sci. Philadelphia, vol. 73, pt. 1, p. 10, 1921.

Agonopteryx rosaciliella (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8431, 1939.

Agonopteryx ciliella FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 239, 1923.

Agonopteryx rosaciliella (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6448, 1917.

Labial palpus ochreous-white suffused with pale reddish; second segment mottled exteriorly with blackish fuscous; third segment with basal and subterminal bands and tip black. Head, thorax, and fore wing ochreous-white heavily overlaid with reddish, suffused with reddish fuscous, and irrorated with sparse blackish scales; face whitish; light basal portion of fore wing containing a fuscous spot and followed by a deep reddish-fuscous shade, the latter diminishing in intensity outwardly; costa and termen with a series of more or less distinct fuscous spots, those on costa alternated with small whitish-ochreous spots; discal spots four, white, edged with black; first and second obliquely one above the other, third and fourth in line with second, the fourth at end of cell; cilia fuscous with strong reddish suffusion. Hind wing and cilia light fuscous, the latter with a strong reddish suffusion. Legs ochreous-white with reddish tinge and strongly overlaid and irrorated with blackish fuscous except at joints.

Male genitalia.—Harpe long, lightly sclerotized, bluntly pointed, very hairy, especially in costal half. Clasper straight, slender, gradually tapering to a blunt point, reaching beyond middle of harpe. Vinculum produced anteriorly to form a broad, rounded, short projection. Anellus a more or less rectangular plate, longer than broad, slightly emarginate on posterior edge, with large, hairy, lateral lobes.

Aedeagus slender, not heavily sclerotized; dilated basally and sharply pointed distally; the point is slightly upturned; vesica armed with numerous fine, long cornuti. Transtilla a weakly sclerotized band with slightly hairy, lateral lobes. Gnathos conical, slender; covered with fine spines. Socii fleshy lobes mainly indicated by hairs.

Female genitalia.—Genital plate broad, moderately sclerotized. ostium situated at about center of plate. Ductus bursae very long (permitting the bursa copulatrix to reach extreme anterior portion of abdomen), slender, gradually becoming larger to form the symmetrical bursa copulatrix; inception of ductus seminalis well before ostium. Signum a small, lightly sclerotized, spined, bilobed plate.

Alar expanse, 20–26 mm.

Type.—In the United States National Museum.

Type locality.—"Camp Watson," Oreg. (III-IV-1872, Walsingham).

Food plants.—*Osmorhiza* (Dr. A. F. Braun, 1921); *O. occidentalis* Torr. (Clarke, 1935).

Note.—*Osmorhiza occidentalis* Torr. Although the three species of *Osmorhiza* (*occidentalis*, *divaricata*, and *brevipes*) that are indigenous to the State of Washington were found at Godman Springs, Blue Mountains, at an altitude of approximately 6,000 feet, larvae infested only *O. occidentalis*. An extended search was made to determine the host specificity of the species, and in all localities where the food plants were found *rosaciliella* attacked only *O. occidentalis*.

Distribution.—Northwestern United States and southwestern Canada.

United States records

Montana: Glacier National Park, ♂ (August 7, 1920, A. F. Braun).

Oregon: "Camp Watson," ♀ (III-IV-1872, Walsingham).

Washington: Godman Springs, Blue Mountains, alt. 6,000 feet, 8 ♂♂ (VIII-3 to 8-35); Pullman, ♀ (III-1-98, C. V. Piper).

Canadian records

British Columbia: Kaslo, ♂ (Dyar and Cockle); Trout Lake, ♂ (18-VIII-1937, H. Leech).

Saskatchewan: Scott, ♀ (20-X-1923, Kenneth M. King).

Remarks.—I have before me a series of 12 specimens reared from *Osmorhiza occidentalis* and 90 from *Echinopanax horridum*. The former series is from the interior of Washington State, while the latter is from the Puget Sound (coastal) region.

For some time I have thought that these two series represented two distinct but closely related species. I am now of the opinion, however, that they are conspecific, but that the coastal specimens represent a distinct race. The interior specimens are, with one exception, considerably darker and more suffused than those from the Puget Sound

area, but on genitalia characters they are identical, and for this reason I do not feel justified in separating them specifically. The larvae show a few differences in coloration, but larvae of this group are likely to vary even though they may come from eggs of the same female. No doubt the color variation existing between the two groups of specimens is induced by differences in food plants. The habits of the larvae are much the same, both forming rolls, but those on *Osmorhiza* have an easier time of it because of the small size of the leaves on which they work; those on *Echinopanax* have to cut the leaf from the edge inwardly first and then form the roll.

I am including a description of the larvae from both localities so that their similarities and differences may be appreciated better. In the main the larvae are the same.

Dr. Braun has been kind enough to send me a specimen from Yellowstone National Park reared by her from *Osmorhiza*. It resembles the Puget Sound series more closely than do the eastern Washington specimens.

The larva is as follows: Length, 15-16 mm. Head dull yellowish brown, spotted with a darker brown posterolaterally; from the base of the antenna, extending in a line to the posterior edge of the head, is a broad blackish-brown band constricted in the middle (in some specimens the band is considerably broader than in others); ocelli light brown. The margins of the underside of the head are blackish brown. Cervical shield pale green, broadly edged laterally and posteriorly with black and bisected with a fine whitish-green median line. Thoracic and abdominal segments bright green heavily suffused with reddish purple in the dorsal half when the larva is mature. Posteriorly on the segments the reddish-purple color entirely obscures the green. In the dorsal half there are three brownish-fuscous longitudinal stripes, the outer ones fully twice as broad as the median one. On abdominal segments 2-7 inclusive, near the dorsoanterior margin, on each side of the dorsal stripe, is an outwardly oblique line of 4 to 6 small green spots. Between the longitudinal lines are several small green spots generally following folds in the skin. Anal plate green, heavily suffused with reddish purple. Tubercles black centrally, whitish green outwardly. Spiracles ringed with black, with a whitish-green suffusion outwardly. Thoracic legs concolorous with segments.

Dr. A. F. Braun first discovered larvae of this species in Yellowstone National Park. She has sent me one bred specimen from this lot of larvae. Although the food plant is widespread throughout the inland empire, the larvae are very difficult to locate. Much time has been spent in a search for these larvae in order to clear up the status of this and related species. On July 13, 1935, a stand of *Osmorhiza* was found at Godman Springs, Blue Mountains, Columbia County,

Wash., at an altitude of 6,000 feet. After a somewhat prolonged search ten larvae and one pupa were collected, the latter being the first found.

The larva is distinctly a leaf roller, not invading the umbels as is done so commonly by members of *Agonopterix* and *Depressaria*. The pupa was found in an umbel, but there was no sign of feeding having taken place, and I do not think it is the usual habit for pupation to occur there. It seems more likely that pupation generally occurs about the base of the plant in debris. This larva is one of the most active in the group, being easily disturbed and very difficult to capture.

Pupa: Normal for group: Wing, antenna, and leg sheaths bright green. Abdominal segments green heavily suffused with reddish purple dorsally. On the second day the color begins to deepen; the sheaths become a duller and darker green and the abdominals a light reddish brown. The color gradually becomes darker until the pupa is almost black.

The pupal period is 13-14 days.

This species is very close to the European *ciliella* and was identified as such by Walsingham. The American *rosaciliella* has a much more slanting termen and appears to be a more narrow-winged species than *ciliella*. The genitalia of the male of *rosaciliella* show a truncated anellus, while in *ciliella* the anellus is concave. The harpes of the former species are less pointed and broader than those of the latter.

The abdomen of the type is lost, but I do not hesitate to place the reared series under this name.

AGONOPTERIX ROSACILIELLA ECHINOPANICIS, new variety

Similar to typical *rosaciliella* but may be distinguished from it by the generally lighter color and less suffused and less smoky appearance. The black scaling is sparser and more sharply contrasted.

The male and female genitalia are the same as those of typical *rosaciliella*.

Alar expanse, 20-26 mm.

Type.—U. S. N. M. No. 52252.

Type locality.—Skyline Ridge, Mount Baker district, Whatcom County, Wash. Altitude 2,500-3,000 feet.

Food plant.—*Echinopanax horridum* (Smith) Dene. and Planch.

Remarks.—Described from the type ♂ and 78 ♂ and ♀ paratypes as follows: Skyline Ridge and Bagley Creek, Whatcom County, Wash., altitude 2,500-3,000 feet, 35 ♂ ♂ and 40 ♀ ♀ (September 5-12, 1933 and 1935, J. F. G. Clarke); Fraser Mills, British Columbia, 2 ♀ ♀ (IV-10-21, IV-4-23, L. E. Marmont); Vancouver, British Columbia, ♀ (no date).

Paratypes in the United States National Museum, Canadian National collection, and the collection of H. H. Keifer, Sacramento, Calif.

The larva is as follows: Length, 14–16 mm.; head dark brown to black. Thoracic shield greenish to light brown bisected by a whitish median line and broadly bordered with black on the posterolateral edges. Thoracic and abdominal segments green, the latter suffused dorsally with reddish; from the mesothorax, in the dorsal half, two broad longitudinal brown stripes; a third median longitudinal stripe of the same color beginning at the first abdominal segment and continuing posteriorly the full length of the body. Thoracic legs greenish. Tubercles black. Spiracles edged with black. Anal plate light brown.

Pupa: At first yellowish green with the abdominal segments suffused with reddish dorsally. In 24 hours the wing sheaths become green and the abdominal segments reddish brown. The pupa finally turns deep reddish brown; wing sheaths nearly black, but they still retain a greenish sheen.

The pupal period of 12 to 15 days.

AGONOPTERIX NOVI-MUNDI (Walsingham)

PLATE 28, FIGURES 168, 168a

Depressaria parilella novi-mundi WALSINGHAM, *Ibs. Life*, vol. 1, p. 256, 1889.—

RILEY, in Smith, *List of the Lepidoptera of Boreal America*, No. 5273, 1891.—BUSCK, *Proc. U. S. Nat. Mus.*, vol. 24, p. 74, 1902.

Depressaria novimundi (Walsingham) BUSCK, in Dyar, *U. S. Nat. Mus. Bull.* 52, No. 5866, 1903.—KEARFOTT, in Smith, *List of the Lepidoptera of Boreal America*, No. 6409, 1903.—MEYRICK, in Wytzman, *Genera insectorum*, fasc. 180, p. 175, 1922.—GAEDE, in Bryk, *Lepidopterorum catalogus*, pt. 92, p. 335, 1939.

Agonopteryx novimundi (Walsingham) BUSCK, *Proc. U. S. Nat. Mus.*, vol. 35, p. 198, 1908.

Agonopteryx novimundi (Walsingham) McDUNNOUGH, *Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera)*, No. 8428, 1939.

Agonopteryx novimundi (Walsingham) BARNES and McDUNNOUGH, *Check list of the Lepidoptera of Boreal America*, No. 6454, 1917.

Labial palpus sordid whitish; irrorated with blackish fuscous inwardly and outwardly on the second segment and in the brush; third segment with black subbasal and supramedial annuli. Antenna blackish fuscous with grayish annulations. Head, thorax, and ground color of fore wing grayish fuscous, the latter heavily overlaid with dull purplish fuscous; head scales and dark scales of fore wing tipped with cinereous; at base of fore wing an indistinct fuscous patch followed by a poorly defined yellowish-brown shade; at basal third an outwardly oblique black dash in disk edged with yellowish

brown; at end of cell an indistinct white discal spot; between veins, in apical third, yellowish-brown shading; along costa and around termen a series of poorly defined fuscous spots; cilia fuscous tipped with white. Hind wing shining yellowish fuscous; cilia concolorous, lighter apically. Legs cinereous strongly overlaid with shining yellowish fuscous except at joints.

Male genitalia.—Harpe broad, sparsely clothed with hairs; clasper slender, pointed, dilated about middle, reaching two-thirds distance to costa. Anellus more or less rectangular, longer than broad, concave on each side before posterior end and also on posterior margin; lateral lobes weak, hairy. Vinculum rounded. Aedeagus stout, bent, pointed, the point slightly upturned; vesica with a weak spinulate patch about middle. Transtilla a broad, sclerotized band with large hairy lateral lobes. Gnathos an oval, spined knob. Socii large hairy, fleshy flaps.

Alar expanse, 16 mm.

Type.—In the British Museum.

Type localities.—Mount Shasta, Siskiyou County, Calif., and "North Oregon."

Remarks.—Various specimens in collections have been associated with this species, but the only two I have seen that belong under this name are paratypes of Lord Walsingham's that he deposited in the National collection. I have seen no females.

AGONOPTERIX PALLIDELLA (Busck)

PLATE 32, FIGURES 182, 182a; PLATE 44, FIGURE 256

Depressaria pallidella BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 765, 1904.—ANDERSON, Catalogue of British Columbia Lepidoptera, No. 1095, 1904.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 174, 1922.—GAEDE, in BRYK, Lepidopterorum catalogus, pt. 92, p. 337, 1939.

Agnopteryx pallidella (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6461, 1917.

Agonopterix pallidella (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8418, 1939.

Agonopteryx terinella BARNES and BUSCK, Contr. Lepid. North America, vol. 4, p. 232, pl. 28, fig. 15, 1920.

Agonopterix terinella (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8418, 1939. (As synonym of *pallidella* (Busck).)

Depressaria terinella MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 174, 1922.

Agonopteryx serrae CLARKE, Can. Ent., vol. 65, p. 84, pl. 5, 1933.

Agonopterix serrae (Clarke) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8418, 1939. (As synonym of *pallidella* (Busck).)

Depressaria serrae (Clarke) GAEDE, in BRYK, Lepidopterorum catalogus, pt. 92, p. 350, 1939

Labial palpus whitish ochreous, second segment irrorated with blackish fuscous exteriorly; third segment with subbasal and supra-medial bands blackish fuscous. Antenna fuscous. Head, thorax, and fore wing light ochreous. Face shining light silvery ochreous; head with light infuscation anteriorly; thorax and fore wing irrorated with blackish fuscous and shaded with fuscous; extreme base whitish ochreous, with a single blackish fuscous spot in the fold and followed by a rapidly fading fuscous shade; along costa and around termen a series of blackish fuscous spots; at basal third, in cell, two black discal spots, obliquely one above the other, followed by a fuscous cloud; the latter is in turn followed by a blackish fuscous spot at end of cell; cilia light grayish fuscous irrorated with whitish ochreous. Hind wing grayish fuscous, cilia concolorous, with a slightly darker basal band. Legs whitish ochreous; fore and mid legs heavily overlaid with fuscous except at joints; hind leg overlaid with fuscous on femur with slight infuscation on tibia and tarsus. Abdomen fuscous above; beneath whitish ochreous with broad, fuscous lateral line on each side.

Male genitalia.—Harpe almost entirely clothed with fine hairs; cucullus rounded, with several long, coarse marginal hairs; clasper straight, reaching just beyond middle of harpe; anellus a moderately sclerotized plate (with the posterior edge convex), with large sparsely hairy lobes laterally. Vinculum rounded, with dorsoanterior process well developed. Aedeagus stout, slightly bent about middle, and bearing a flat, sclerotized basal process by which the aedeagus articulates with the anellus. Transtilla a narrow, lightly sclerotized band. Gnathos a heavily spined cone. Socii flat, hairy lobes. Terminal portion of tegumen pointed.

Female genitalia.—Genital plate narrow. Ostium semicircular. Ductus bursae membranous, becoming gradually larger to form the symmetrical bursa copulatrix. Signum an oblong-oval, toothed plate.

Alar expanse, 17-24 mm.

Types.—In the United States National Museum.

Type localities.—Kaslo, British Columbia (*pallidella*); Silverton, Colo. (*terinella*); Pullman, Wash. (*serrae*).

Food plant.—*Senecio serra* Hook.

Distribution.—Western United States and southwestern Canada.

United States records

California: Warner Mountains, 3 miles east of Davis Creek, Modoc County, alt. 5,500 feet, 2 ♂♂ and ♀ (VII-8 to 15-22, A. W. Lindsey).

Colorado: Silverton, 3 ♂♂ and ♀ (August 24-30).

Utah: Stockton, 2 ♂♂ and ♀ (VII-8-07, VII-30-13, VII-21-07, Tom Spalding); Warner Ranger Station, La Sal Mountains, 9,000 feet, (July 1933, A. B. Klots).

Washington: Pullman, 31 ♂♂ and 37 ♀♀ (VI-15 to VII-3-1932-35, J. F. G. Clarke [reared]).

Canadian records

British Columbia: Kaslo, ♂ (Dyar and Cockle); Keremeos, 3 ♂♂ (VI-30 to VII-11-23, C. B. Garrett).

Remarks.—I do not hesitate to accept the above synonymy after carefully studying the types of all three species. It is not surprising that the three species should have been described because of the apparent differences. When carefully compared these differences are reduced to mere shades of coloration. The specimens of *terinella* are somewhat darker than the type of *pallidella*, and this is no doubt due to the fact that they are in better condition than the rubbed type of the latter species. A long reared series of *serrae* shows all but one or two decidedly darker than either of the two types above, but this depth of color is purely environmental. There are no differences in the genitalia of either the males or females.

Under this name a long series of both reared and captured specimens from British Columbia and California has previously been placed. Although the genitalia of these specimens are similar to *pallidella* they are amply different in other respects. They are described on an earlier page of this paper as *A. fusciterminella*, new species.

AGONOPTERIX ARNICELLA (Walsingham)

PLATE 33, FIGURE 186

Depressaria arnicella WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 313, pl. 36, fig. 3.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5254, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 738, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5859, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6402 1903.—ANDERSON, Catalogue of British Columbia Lepidoptera, No. 1089, 1904.—KEARFOTT, Can. Ent., vol. 37, p. 296, 1905.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 174, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 307, 1939.

Agonopteryx arnicella (Walsingham) BUSCK, Proc. U. S. Nat. Mus., vol 35, p. 198, 1908.

Agonopterix arnicella (Walsingham) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera) No. 8414, 1939.

Agonopteryx arnicella (Walsingham) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6452, 1917.

Labial palpus pale whitish ochreous; second segment heavily overlaid with fuscous exteriorly and with a pink spot, about the middle of brush, inwardly; third segment with apex and subterminal annulus black and a poorly defined subbasal annulus fuscous. Antenna dark grayish fuscous. Face shining whitish. Head yellowish ochreous; tuft beneath eye brilliant carmine. Thorax and fore wing pale whitish

ochreous; thorax suffused and irrorated with fuscous; pale basal shade of fore wing with black suffusion on extreme base of costa, a black spot in fold and followed by a fuscous shade that does not reach costa; on the inner margin, at angle, an elongate black blotch in the fuscous shade; along costa and around termen a series of blackish-fuscous spots; apical third of costa roseate; at basal third two black discal spots, obliquely one above the other, followed by a fuscous shade; at end of cell a white discal spot edged with black; cilia grayish fuscous suffused with reddish. Hind wing shining gray; cilia concolorous, with strong reddish suffusion. Legs whitish ochreous strongly overlaid with fuscous except at joints; tip of tibia of first leg and the tips of tibia and first tarsal segment of second leg, carmine; tibia of hind leg with strong reddish suffusion.

Male genitalia.—Harpe broad, moderately sclerotized, sparsely clothed with fine hairs; sacculus slightly emarginate at base of clasper, otherwise parallel with costa; harpe not narrowing toward the broad, rounded cucullus; clasper very short and slender, scarcely reaching past the middle of the harpe. Anellus an oval plate constricted basally and produced posteriorly, with hairy, lateral lobes. Vinculum rounded. Transtilla a broad but lightly sclerotized band with small narrow, lateral lobes. Gnathos an oval, spined knob. Socii moderately clothed with fine hairs. Aedeagus slender, curved, pointed; dilated slightly basally and with a well developed sclerotized arm by which the aedeagus articulates with the anellus; vesica armed with numerous fine, weak cornuti.

Alar expanse, 22 mm.

Type.—In the British Museum.

Type locality.—Mount Shasta, Calif.

Food plants.—*Arnica angustifolia* (Vahl) (?); *Erigeron* sp. (Dr. Braun's record).

Remarks.—I have received a male and a female of this species from Dr. Annette F. Braun, of Cincinnati, Ohio. This is the first record of the occurrence of this species since its discovery at Mount Shasta, Calif., by Lord Walsingham in 1871. Dr. Braun's material was reared from larvae collected at Hoh Lake, Olympic Mountains, Wash., August 13, 1936. The moths emerged September 2, 1936. This record extends the known range of the species 1,000 miles northward.

Notes made in the field by Dr. Braun are as follows: "Larvae in the top of *Erigeron* shoot, webbing together the uppermost leaves and flowerbuds; very dark purplish in color, with paler tubercles."

The food plant, as recorded by Dr. Braun, casts some doubt on the correctness of Lord Walsingham's determination of the host of *arnicella*. Both food plants are Compositae, but I question Lord Walsingham's record.

The female submitted by Dr. Braun is the first I have seen. Lord Walsingham did not specify the sexes of the five specimens in his type series, and, although he probably had a female or two, the one before me is the only authentic one in this country. There are two male paratypes from Lord Walsingham's series in the National collection and one male in the Museum of Comparative Zoology at Cambridge, Mass. I have compared the genitalia of one of the National Museum paratypes with the genitalia of Dr. Braun's male and find them identical. The male genitalia of *arnicella* are unique in the genus so there can be no doubt about the identity of the Washington specimens.

I am greatly indebted to Dr. Braun for this interesting record and also for the male specimen she has deposited in the National collection.

AGONOPTERYX ROBINIELLA (Packard)

PLATE 29, FIGURES 169, 169a ; PLATE 44, FIGURE 259

- Depressaria robiniella* PACKARD, Guide to the study of insects, p. 349, pl. 8, fig. 14, 1869.—CHAMBERS, Can. Ent., vol. 4, p. 91, 107, 1872; Cincinnati Quart. Journ. Sci., vol. 1, p. 208, 1874.—WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 312.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5278, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 745, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5882, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6425, 1903.—TRAVER, Psyche, vol. 26, p. 78, 1919.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 346, 1939.
- Agonopteryx robiniella* (Packard) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 241, 1923.
- Agonopteryx robiniella* (Packard) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8448, 1939.
- Agonopteryx robiniella* (Packard) SMITH, Catalogue of the insects of New Jersey, p. 561, 1910.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6471, 1917.—BRIMLEY, The insects of North Carolina, p. 304, 1938.—PROCTER, Biological survey of the Mount Desert region, Part 6, The insect fauna, p. 273, 1938.
- Depressaria hilarella* ZELLER [not Coquillett, Papilio, vol. 3, p. 98, 1883], Verh. zool.-bot. Ges. Wien, vol. 23, p. 234, 1873.—WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 312.—SMITH, Catalogue of the insects of New Jersey, p. 355, 1890.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5266, 1891.—DIETZ, in Smith, Catalogue of the insects of New Jersey, p. 474, 1900.
- Agonopteryx hilarella* (Zeller) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8448, 1939. (As synonym of *robiniella* (Packard).)

Labial palpus whitish ochreous basally, gradually becoming more yellowish toward the apex; second segment mottled with brick red and fuscous exteriorly and in the brush; third segment with subbasal and subterminal annuli brick red and fuscous, respectively, the former redder, the latter more fuscous. Antenna fuscous with considerable

red scaling basally, especially above. Head, thorax, and ground color of fore wing yellow, mottled and overlaid with brick red and irrorated and shaded with fuscous and black; at basal third two black discal spots, the one nearer the inner margin less distinct than that toward costa; discal spot at end of cell absent or very indistinct; replaced by a subtriangular fuscous shade; before termen a poorly defined dark band not attaining costa; along costa and around termen a series of indistinct blackish spots; cilia light fuscous, tinged with red. Hind wing grayish fuscous with terminal edge narrowly blackish fuscous; cilia light fuscous with narrow subbasal and subterminal bands. Legs whitish ochreous suffused and mottled with brick red and fuscous. Abdomen whitish ochreous strongly overlaid with fuscous above; beneath sparsely irrorated with fuscous and black and with a row of black spots on each side.

Male genitalia.—Harpe elongate, clothed with fine hairs, cucullus pointed; clasper short, stout, straight. Anellus oval, slightly longer than broad, posterior edge truncated; lateral lobes weak, clothed with short hairs. Aedeagus stout, slightly curved; vesica with an elongate patch of fine, spiculate cornuti. Vinculum rounded. Transtilla a broad sclerotized band with large lateral lobes. Gnathos an elongate, oval, spined knob. Socii large, hairy, fleshy flaps.

Female genitalia.—Genital plate broad; area posterior to ostium with two small sclerotized patches. Ostium oval, near center of plate. Ductus bursae long, membranous, dilated at point of inception of ductus seminalis. Bursa copulatrix with minute signum.

Alar expanse, 14–20 mm.

Type.—Lost?

Type locality.—Massachusetts?

Food plants.—*Robinia pseudoacacia* L.; *Sanicula*?

Distribution.—Northeastern United States and eastern Canada.

United States records

Illinois: Oconee, ♂ (July 1–7).

Maine: Freedom, ♀ (J. C. Parlin); Salisbury Cove (July 27; acc. Procter).

Maryland: Plummers Island, 2 ♂♂ (August 1903, A. Busck; 2–VIII–20, H. S. Barber).

Massachusetts: Manchester, ♂ (Bentenmüller coll.); Marthas Vineyard, 5 ♂♂, 2 ♀♀ (July and August, F. M. Jones); Vineyard Haven, ♂ (“VII–13,” F. M. Jones); Woods Hole (♂, 19–VII–1919; ♀, 15–VIII–1914, W. T. M. Forbes).

New Hampshire: Hampton, 3 ♀♀ (VII–2–05, VII–8–08, S. A. Shaw).

New York: Bedford, 2 ♀♀ (15–VII–34, A. B. Klots); Ithaca (5 ♂♂, July and August dates, W. T. M. Forbes; ♂, 8–VIII–33, E. C. Hodson; ♂, 11–VII–1928, ♂, 22–VII–1928, A. B. Klots; ♀, 27–VII–1929, A. G. Richards); Mattituck, Long Island, ♀ (4–VI–1933, Roy Latham); New Windsor, ♂ (June 1891); Orient, Long Island, 8 ♂♂, 8 ♀♀ (April to October dates, 1933–1934, Roy Latham); Rochester, ♀ (31–VII–33, A. B. Klots); Southold, Long Island, ♀ (August, Roy Latham).

North Carolina: Black Mountains, ♀ ("July 4").

Ohio: Cincinnati, ♂, ♀ (VII-11-04, A. F. Braun).

Pennsylvania: New Brighton, ♂, ♀ (VIII-9-07, VII-20-02, H. D. Merrick);
Oak Station, Allegheny County, ♂ (26-VI-1911, Fred Marloff).

Canadian records

Nova Scotia: Bridgetown, ♀ (VIII-8-1912, "G. E. S."); Truro, ♀ (25-VII-1913, R. Matheson).

Ontario: Point Pelee, ♂, ♀ (26-VII and 11-VII-1927, F. P. Ide [reared from *Robinia pseudoacacia*]); Port Hope, 2 ♀♀ (one, 24-VII-1897; the other without date or collector); Toronto, ♀ (no date or collector); Trenton, ♂ (12-VII-1908, Evans); Vineland Station, 2 ♀♀ (5-VII-1938, W. L. Putnam [reared from *Robinia pseudoacacia*]).

Remarks.—This and the following three species have been confused repeatedly in collections because of the difficulty of separating them on superficial characters. The moths of all four intergrade to some extent, but *dimorphella*, and less so *lecontella*, can be distinguished rather readily. Under the respective species I have discussed their separation from *robinella*.

I have described what I consider to be typical *robinella*. It must be borne in mind that there is considerable variation between specimens and that many lack the red coloration found in the typical form. The characters I have used in the key, and those I have discussed in my remarks under the various species, should suffice to place any doubtful specimens.

AGONOPTERYX LECONTELLA (Clemens)

PLATE 44, FIGURE 260

- Depressaria lecontella* CLEMENS, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 174.—ROBINSON, Ann. Lyc. Nat. Hist. New York, vol. 9, p. 157, pl. 1, fig. 9, 1870.—CLEMENS, in Stainton, Tineina of North America, p. 137, 1872.—CHAMBERS, Can. Ent., vol. 4, p. 146, 1872; U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 138, 1878.—WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 312.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5268, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 745, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5883, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6426, 1903.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 330, 1939.
- Agonopteryx lecontella* (Clemens) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.
- Agonopteryx lecontella* (Clemens) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6472, 1917.
- Agonopteryx lecontella* (Clemens) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8447, 1939.

Labial palpus pale ochreous; second segment irrorated exteriorly with fuscous; third segment with subbasal and median bands fuscous. Antenna fuscous. Head, thorax, and ground color of fore wing light ochreous; the thorax, except collar, and fore wing, except base and basal third of costa, strongly overlaid and suffused with brown; fore wing sparsely irrorated with black scales, more so in distal half; a spot at extreme base of costa, one subcostally and another on inner angle near base, black; at basal third two conspicuous, black discal spots, one above the other, surrounded by a pale ochreous shade, the latter followed by a poorly defined fuscous cloud; at the end of cell a poorly defined whitish-ochreous spot; along costa, around termen to inner margin a series of small fuscous spots; cilia pale ochreous-fuscous edged outwardly with pale ochreous. Hind wing grayish fuscous; cilia somewhat lighter with ochreous-fuscous terminal band. Legs pale ochreous slightly irrorated and suffused with fuscous. Abdomen light ochreous, suffused with fuscous.

Female genitalia.—Genital plate moderately narrow with a strongly sclerotized, slightly produced anterior edge. Ostium large, occupying most of length of genital plate. Ductus bursae very long, gradually tapering into the large asymmetrical bursa copulatrix. Inception of ductus seminalis on right side of ductus bursae just before ostium. Bursa bulged out to the right, the evaginated part annulated with a series of concentric ridges; the signum is a moderately large, strongly sclerotized, toothed plate with well developed anterior and posterior points and is situated at the periphery of the evaginated portion of the bursa copulatrix.

Alar expanse, 18–25 mm.

Type.—In the Academy of Natural Science of Philadelphia.

Type locality.—"Pennsylvania."

Food plant.—*Baptisia tinctoria* R. Brown.

Distribution.—Known only from the type locality (presumably Pennsylvania) and one other specimen from Arendtsville, Pa. (7-4-29, S. W. Frost).

Remarks.—In the National collection there is a single female of this species. Aside from the type it is the only other specimen I have seen. Everything else I have seen in the collections under this name is referable to other species and is dealt with accordingly.

This species can be distinguished from the others with which it has been confused by the pale area surrounding the two conspicuous black discal spots at basal third, by the pale whitish-ochreous spot at the end of the cell, and by the strong signum of the bursa.

This species is not included in the key based on genitalia.

AGONOPTERYX THELMAE, new species

PLATE 44, FIGURE 259A

Depressaria lecontella SMITH [not Clemens], Catalogue of the insects of New Jersey, p. 355, 1890.—DIETZ, in Smith, Catalogue of the insects of New Jersey, p. 474, 1900.

Agonopteryx lecontella FORBES [not (Clemens)], Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 241, 1923.

Agonopteryx lecontella SMITH [not (Clemens)], Catalogue of the insects of New Jersey, p. 561, 1910.

Labial palpus whitish ochreous; second segment irrorated exteriorly with reddish fuscous; third segment with blackish-fuscous subbasal and supramedial bands. Antenna with basal segment whitish ochreous indistinctly annulated with fuscous basally, finally becoming fuscous in apical third. Head, thorax, and ground color of fore wing whitish ochreous. Thorax and fore wing irrorated with fuscous and suffused with dull reddish; beneath inner edge of tegula, on each side, a fuscous spot; extreme base of costa and a narrow line beyond light basal area, fuscous; at basal third two superposed blackish-fuscous spots; a similar one at end of cell preceded by an orange-red streak; between this streak and the costa a small fuscous shade; along costa and around termen a series of indistinct fuscous spots, those around termen more reddish; cilia whitish ochreous with a reddish tint. Hind wing fuscous; cilia whitish ochreous banded with fuscous. Legs whitish ochreous suffused and irrorated with reddish fuscous except at joints. Abdomen whitish ochreous heavily overlaid with fuscous above and with a row of black spots on each side beneath.

Male genitalia.—Similar to *robiniella* but with slightly narrower transtilla and with coarse, though small, cornuti.

Female genitalia.—Genital plate narrow, convexly produced anteriorly. Ostium large, broad, oval, about middle of genital plate. Ductus bursae membranous except for a strongly dilated, lightly sclerotized area near posterior third; inception of ductus seminalis near ostium. Bursa copulatrix moderately large, without signum.

Alar expanse, 17–25 mm.

Type.—U. S. N. M. No. 53175.

Type locality.—Oak Station, Allegheny County, Pa. (24–VIII–1910, Fred Marloff).

Food plant.—Unknown.

Remarks.—Described from the ♂ type, 16 ♂ and 14 ♀ paratypes as follows: ♀, "Connecticut"; 3 ♂ ♂, Plummers Island, Md. (July, August, 1903, A. Busck; 2–VII–1920, H. S. Barber); ♀ Marthas Vineyard, Mass. (September 1, F. M. Jones); ♀, Ithaca, N. Y. (2–IX–1924, W. T. M. Forbes); ♀, Lenox ([New York?]; Beutenmüller); 2 ♀ ♀ "New York"; ♂, Linwood Hill, N. Y. (14–VII–1888, H. G. Dyar); ♂,

Sea Cliff, Long Island, N. Y. ("August"); 12 ♂ ♂, ♀ Oak Station, Allegheny County, Pa. (July and August dates, 1908–1911, Fred Marloff); ♀, Lobo, Ontario (29–VIII–1924, H. F. Hudson); 2 ♀ ♀, Port Hope, Ontario (17–VIII–1896, 15–VIII–1897, no collector); 2 ♀ ♀, Toronto, Ontario (no date or collector); 2 ♀ ♀, Montreal, Quebec (10–IX–1904, no collector).

Paratypes in the United States National Museum, Canadian National, and Cornell University collections.

This species is difficult to separate, with certainty, from *robiniella* on superficial characters and on male genitalia. All the specimens I have seen, however, have a distinct orange-red bar or dash in the cell before the outer discal spot; all specimens of *robiniella* I have seen lack it. The females can be easily separated by genitalia. The genital plate of *thelmae* is narrow, that of *robiniella* broad.

In addition to the type series I have seen 2 ♀ ♀ from Massachusetts (Chilmark, "VIII–6" George D. Eustis; Vineyard Haven, VIII–10–36, F. M. Jones) and 1 ♀ from Maine (October 12, 1938, A. E. Brower).

AGONOPTERIX DIMORPHELLA, new species

PLATE 31, FIGURES 179, 179a; PLATE 40, FIGURE 229

A medium-sized species superficially resembling *lecontella* and *robinella* but darker and smaller than either.

Labial palpus with second segment creamy white irrorated with fuscous outwardly; third segment fuscous with each scale tip and a median, inner fascia creamy white. Antenna with basal segment and proximal fourth creamy white beneath and fuscous above; distal three-fourths fuscous with narrow, lighter annulations. Head, thorax, and fore wing reddish ochreous, suffused with fuscous. From costa a fuscous median shade extending almost to inner margin; well before termen a similar but narrower, less conspicuous outwardly curved shade; before middle of cell two small black discal spots, one above the other; at end of cell a conspicuous yellow discal spot; cilia fuscous, irrorated with creamy white, and with a distinct pink tinge; underside of fore wing blackish fuscous. Hind wing blackish fuscous; cilia a lighter shade of the same color. Fore leg with femur fuscous inwardly, creamy white outwardly; tibia creamy white overlaid or irrorated with fuscous outwardly; tarsi fuscous annulated with creamy white. Mid legs and hind legs creamy white with tibiae fuscous outwardly; tarsi fuscous with creamy white annulations. Abdomen fuscous above, creamy white beneath with a black lateral line on each side.

Male genitalia.—Harpe moderately clothed with hairs; cucullus pointed; clasper stout, short, scarcely exceeding middle of harpe,

bluntly pointed; sacculus moderately sclerotized. Annellus longer than broad, constricted basally; lateral edges convex; posterior edge concave; lateral lobes poorly developed. Aedeagus stout, slightly curved, bluntly pointed; vesica armed with a large patch of small cornuti. Vinculum rounded, with prominent dorsoanterior process. Transtilla a narrow sclerotized band with well developed, hairy lateral lobes. Socii moderately large hairy lobes. Tegumen pointed.

Female genitalia.—Genital plate moderately sclerotized, with produced, truncate anterior margin. Ostium small, round. Ductus bursae membranous; inception of ductus seminalis well before ostium. Signum absent.

Alar expanse, 11–18 mm.

Type.—U.S.N.M. No. 52947.

Type locality.—Henry, Putnam County, Ill.

Food plant.—*Amorpha fruticosa* L.

Remarks.—Described from the ♂ type, 78 ♂ and 65 ♀ paratypes all from the same locality. These are all reared specimens, bearing May and June dates, from larvae collected by Murray O. Glenn.

Paratypes in the collections of Murray O. Glenn, Magnolia, Ill.; H. H. Keifer, Sacramento, Calif.; Dr. Annette F. Braun, Cincinnati, Ohio.; Los Angeles Museum; and Canadian National Museum.

In this species the males are strikingly darker and smaller and the markings less contrasting than in the females.

I am indebted to Mr. Glenn for the long series of reared specimens which make up the type series. Some of the specimens were reared by Mr. Glenn while others were reared in Washington from larvae submitted by him. The specimens reared at Washington are identical with those reared in Illinois, although the emergence dates are earlier for the former than for the latter.

Of this species Mr. Glenn writes, "The first emergence was June 4 (1938), and the heaviest from June 10–13. Pupation in the field occurs immediately (after the larva matures) at the base of the plant. In many instances this is the only place available as the shrub is often completely surrounded by water, except for a small hummock, about a foot in diameter, formed by the plant roots."

This species may be separated readily from *robiniella* or *lecontella* by the yellow discal spot of the fore wing.

AGONOPTERIX ARGILLACEA (Walsingham)

PLATE 29, FIGURES 171, 171a; PLATE 44, FIGURE 255

Depressaria argillacea WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 313, pl. 36, fig. 2.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5252, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 738, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5860, 1903; Proc. U. S. Nat. Mus., vol. 27, p.

763, 1904.—ANDERSON, Catalogue of British Columbia Lepidoptera, No. 1090, 1904.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6403, 1903; Can. Ent., vol. 37, p. 296, 1905.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 174, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 306, 1939.

Agonopteryx argillacea (Walsingham) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 238, 1923.

Agonopterix argillacea (Walsingham) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8413, 1939.

Agonopteryx argillacea (Walsingham) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6459, 1917.

Agonopteryx blacella BARNES and BUSCK, Contr. Lepid. N. Amer., vol. 4, p. 232, pl. 38, fig. 2, 1920. (New synonymy.)

Agonopterix blacella (Barnes and Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8422, 1939.

Depressaria blacella (Barnes and Busck) MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 174, 1922.

Labial palpus, antenna, head, thorax, and fore wing pale grayish ochreous; labial palpus suffused and lightly irrorated exteriorly on second segment with fuscous; third segment with subbasal and subapical annuli (the former poorly defined) and tip blackish fuscous; antenna darker apically; face lighter than rest of head; pale basal patch of fore wing diffused along costa and bounded below it by an outwardly diffused but inwardly distinct blackish-fuscous shade; remainder of fore wing sparsely irrorated with black scales; along costa and around termen a series of indistinct fuscous spots; at basal third, in cell, two black discal spots (sometimes containing some brown scales) obliquely one above the other, followed by a blackish fuscous cloud above the middle of the wing and reaching a sordid-whitish discal spot at the end of cell; the spot at end of cell is narrowly edged with blackish fuscous and brown scales and usually preceded by a similar, brown-edged white spot; cilia concolorous with ground color of fore wing. Hind wing and cilia pale grayish ochreous, the latter with light-fuscous basal band. Legs pale grayish ochreous suffused with blackish fuscous except at joints. Abdomen light grayish fuscous above; beneath, pale grayish ochreous with a lateral row of black spots on each side.

Male genitalia.—Harpe ample, moderately sclerotized and clothed with hair; cucullus rounded; clasper slender, straight, reaching beyond center of harpe. Anellus broadly rectangular, somewhat narrower basally, longer than broad and with weakly developed lateral lobes. Vinculum rounded. Aedeagus moderately sclerotized; stout, curved with apex pointed and sometimes slightly dorsally upturned. Gnathos an elongate oval spined knob. Socii fleshy, hairy lobes.

Female genitalia.—Ostium spindle-shaped (transverse). Genital plate moderately broad, produced anteriorly, the production of the anterior margin as wide as the genital plate is long. Ductus bursae membranous, variable in length; inception of ductus seminalis just anterior to ostium. Bursa copulatrix not abruptly defined but formed by the gradual broadening of the ductus bursae. Signum a sclerotized, toothed, diamond-shaped plate.

Alar expanse, 19–24 mm.

Types.—In the British Museum (*argillacea*); in the United States National Museum (*blacella*).

Type localities.—Newville, Tehama County, Calif. (*argillacea*); Shasta Retreat and Truckee, Calif. (*blacella*).

Food plant.—*Salix* spp.

Distribution.—Western United States and western Canada and northeastern United States and eastern Canada.

United States records

California: Sacramento, 11 ♂♂, 2 ♀♀ (V–10 to 24–33, H. H. Keifer [reared]);

Truckee, 8 ♂♂, 8 ♀♀ (August and October dates, Ximena McGlashan).

Idaho: Johnson's Bar, Snake River, ♀ (IV–10–26, J. F. G. Clarke).

Oregon: Fort Klamath, Fort Watson (Walsingham).

Pennsylvania: New Brighton, ♀ (VI–20–07, H. D. Merrick).

Washington: Dieringer, ♀ (VIII–1–32, W. W. Baker [reared]); Battleground, Clark County, ♂ (VIII–22–30, J. F. G. Clarke); Logan Hill, Chehalis, ♂, ♀ (II–5–30, III–28–30, T. M. Clarke); Pullman (4 ♂♂, 3 ♀♀, March to November dates, T. M. and J. F. G. Clarke [reared]).

Canadian records

British Columbia: Duncan, ♀ ("1–10–12", Hanham); Vancouver, ♂ (IV–6–03); Victoria, ♂, ♀ ("7–9–03"; "3–7–03"); Wellington, 2 ♂♂ (IV–30–02), ♀♀ ("2–5–02"; "20–4–07") 4 ♂♂ (April, G. W. Taylor).

New Brunswick: Frederickton, ♀ (Aug. 27, 1929, R. P. Gorham).

Ontario: Biscotasing, ♂ (VIII–4–31, Karl Schedl); Bobcaygeon, ♂ (VIII–16–32, J. McDunnough); Stittsville, ♂ (21–VIII–1939, E. G. Lester).

Remarks.—The study of 22 male and female genitalia slides, together with host records, convinces me that the above synonymy is correct.

A paratype of Walsingham's *argillacea* is before me. This specimen, in good condition, although somewhat faded, exactly matches specimens of *blacella*. All the male genitalia are identical except for slight variations in the harpe, a phenomenon frequently encountered in this group. The female genitalia show wide variation in the length of the ductus bursae, but a study of Busck's cotypes of *blacella* show this wide variation in length even in the type series. The length of the ductus bursae is not a reliable character for the separation of species of this group.

I have before me long bred series from various localities, all showing some variation. Specimens from Sacramento, Calif., match Walsingham's description of *argillacea*, while other bred specimens from Washington State match the types of *blacella*. The pattern of both is identical. The depth of color and the definition of the discal spots vary throughout the series. These characters cannot be used for differentiation of species since, in any long bred series, all degrees of depth of color or definition of spots may be found.

AGONOPTERIX NIGRINOTELLA (Busck)

PLATE 29, FIGURES 170, 170a; PLATE 45, FIGURE 265

Depressaria nigrinotella BUSCK, Proc. Ent. Soc. Washington, vol. 9, p. 88, 1908.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 334, 1939.

Agonopteryx nigrinotella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.—BARNES and BUSCK, Contr. Lepid. N. Amer., vol. 4, p. 232, 1920.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 240, 1923.

Agonopteryx nigrinotella (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8444, 1939.

Agonopteryx nigrinotella (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6444, 1917.

Labial palpus pale yellowish brown; second segment sparsely irrorated with blackish fuscous exteriorly; third segment with basal three-fourths and apex black. Antenna fuscous. Head light reddish brown. Thorax, base, and basal half of costa of fore wing light yellowish brown; anterior edge of thorax and tegula somewhat darker brown; posterior tip of thorax blackish fuscous. Fore wing brownish fuscous faintly irrorated with blackish fuscous; beyond light basal part of wing a blackish-fuscous shade, which fades rapidly into the lighter ground color; at basal third, in cell a black discal dot followed at end of cell by a yellowish-white discal spot; cilia brownish fuscous, more whitish at tornus. Hind wing shining light yellowish fuscous; cilia somewhat lighter with pale fuscous subbasal and subterminal bands. Legs pale yellowish brown, irrorated and suffused with blackish fuscous except at joints. Abdomen yellowish.

Male genitalia.—Harpe broad, pointed, clothed with long hairs; clasper moderately sclerotized, slender, reaching almost to costa. Anellus a rectangular plate longer than broad, with the posterior edge truncated; lateral lobes weak with only a few hairs. Vinculum rounded with a well developed dorsoanterior process. Aedeagus robust, curved, pointed. Transtilla a narrow sclerotized band with elongated lateral lobes. Gnathos an elongated cone armed with fine spines. Socii moderate, clothed with many long hairs.

Female genitalia.—Ostium large, round, near anterior margin of genital plate; anterior edge of genital plate produced, the production nearly as wide as the plate is long. Ductus bursae membranous, long; ductus seminalis entering well before ostium. Bursa copulatrix relatively small; signum a weakly sclerotized, oval, toothed plate.

Alar expanse, 20–23 mm.

Type.—In the United States National Museum.

Type locality.—Cincinnati, Ohio.

Food plants.—*Xanthoxylum americanum* Mill. and *Carya* (sp. ?).

Distribution.—Eastern United States and Canada and probably as far west as Texas in the South, following the distribution of the food plant.

United States records

Ohio: Cincinnati, 2 ♂♂, 4 ♀♀ (June and July dates, A. F. Braun).

Canadian records

Ontario: St. Davids, 2 ♀♀ (VII-16-34, W. L. Putnam).

Remarks.—Busck²¹ recorded this species from *Ptelea trifoliata*, but the food plants of *nigrinotella* are *Xanthoxylum americanum* and *Carya* (sp. ?). The species referred to by Mr. Busck is an undescribed species, the description of which follows.

AGONOPTERIX COSTIMACULA, new species

PLATE 30, FIGURES 174, 174a; PLATE 45, FIGURE 261

Agonopteryx nigrinotella BARNES and BUSCK (not Busck), Contr. Lepid. North America, vol. 4, p. 232, 1920.

Superficially much like *nigrinotella* but lighter, less immaculate, and averaging larger with correspondingly wider wings.

Head light ochreous-fuscous; face whitish ochreous; labial palpus light ochreous-fuscous, lighter interiorly on second segment and irrorated with blackish fuscous exteriorly; terminal segment with blackish-fuscous subbasal and suprasedial annuli and apex; antenna ochreous-fuscous, darker toward apex, narrowly annulated with blackish fuscous. Thorax light ochreous-fuscous mixed with fuscous anteriorly; ground color of fore wing ochreous-fuscous, the base and costa to about middle slightly lighter; light basal area followed by a blackish-fuscous shading; at basal third two obliquely placed black discal spots, the upper, inner one large, the outer, lower one small; at end of cell a light whitish-ochreous discal spot narrowly edged with fuscous; on costa, six or eight conspicuous fuscous spots and a series of smaller ones at ends of veins around termen; the whole

²¹ Busck, Contr. Lepid. North America, vol. 4, p. 232, 1920.

wing is irrorated with black scales; cilia ochreous-fuscous with many lighter tipped scales. Hind wing light smoky fuscous, lighter basally, underside heavily shaded with black toward apex; cilia light fuscous with narrow, dark, subbasal band. Legs, except tarsi, yellowish ochreous shaded with blackish fuscous; tarsi blackish fuscous annulated with yellowish ochreous. Abdomen fuscous and whitish ochreous above and whitish ochreous below with broad, black, lateral lines.

Male genitalia.—Harpe long, moderately wide; cucullus pointed; clasper long, stout, straight, reaching costa; sacculus narrowly folded. Anellus oval, truncated on posterior edge; lateral lobes weak with few hairs. Vinculum rounded. Aedeagus long, curved, bluntly pointed; vesica with large spinulate patch in basal half. Transtilla a narrow sclerotized band with large, hairy, lateral lobes. Gnathos an oval spined knob. Socii large hairy flaps.

Female genitalia.—Genital plate long; anterior edge folded narrowly. Ostium near anterior margin of plate. Ductus bursae long, membranous; inception of ductus seminalis well before ostium. Bursa copulatrix large with small signum.

Alar expanse, 21–25 mm.

Type.—U. S. N. M. No. 52080.

Type locality.—Plummers Island, Md.

Food plant.—*Ptelea trifoliata* L.

Remarks.—Described from the ♂ type and 51 ♂ and ♀ paratypes as follows: 13 ♂♂ and 5 ♀♀, Plummers Island, Md. (March and April dates, H. S. Barber and August Busck); Decatur, Ill., ♂ and 2 ♀♀ (June 8–15, no collector); Cincinnati, ♂ and 2 ♀♀ (X–8–04, X–8–07, VI–25–08, A. F. Braun); Clermont County, Ohio, 2 ♀♀ (VI–14–14, A. F. Braun); Point Pelee, Ontario, 13 ♂♂, 8 ♀♀ (VII–15 to VIII–11–27, F. P. Ide; VII–30–31, G. S. Walley; VII–27–31, W. J. Brown); Pelee Island, Ontario, 2 ♂♂ (VII–30–31, G. S. Walley).

Paratypes in U. S. National Museum, Canadian National collection, and collection of Dr. A. F. Braun, Cincinnati, Ohio.

This species has been mixed in collections, being placed under *eupatoriella* (= *plummerella*), *argillacea*, and *nigrinotella*. Obscurely marked specimens of any of these species might easily be confused. The long clasper which reaches the costa of harpe immediately distinguishes the present species from the others.

I am indebted to Dr. J. McDunnough for a long, reared series from Point Pelee, Ontario, which has greatly supplemented the material here.

AGONOPTERIX CANADENSIS (Busck)

PLATE 45, FIGURE 262

Depressaria canadensis BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 744, 1902; in DYAR, U. S. Nat. Mus. Bull. 52, No. 5878, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6421, 1903.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 174, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 311, 1939.

Agonopteryx canadensis BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 240, 1923.

Agonopteryx canadensis (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8424, 1939.

Agonopteryx canadensis (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6467, 1917.

Labial palpus pale ochreous-white; second segment evenly springled with blackish fuscous exteriorly; third segment with broad subbasal and subapical annuli and tip black. Antenna fuscous with indistinct black annulations. Head, thorax, and fore wing pale yellowish gray; face creamy white; thorax with a few light-reddish scales mixed; pale base of fore wing diffused along costa, containing a small black spot in fold and bounded below with a rapidly fading blackish-fuscous shade; remainder of fore wing irrorated with blackish-fuscous and black; along costa and around termen to near middle of inner margin a pronounced series of well-defined black spots; on costa, in apical third of wing, and on basal half of inner margin a rosy tint; at basal third a pair of rather large black discal spots, obliquely one above the other and followed by a blackish-fuscous shade above the middle of the wing; at the end of cell a black discal spot; cilia yellowish gray, slightly darker than ground color of fore wing. Hind wing light fuscous; cilia sordid whitish with yellowish tint. Legs ochreous-white mottled and suffused with blackish fuscous except at joints.

Female genitalia.—Genital plate narrow, weakly sclerotized, produced anteriorly. Ostium occupying nearly all central portion of genital plate; inception of ductus seminalis well before ostium. Ductus bursae membranous, very long, slender, gently tapering to form the small bursa copulatrix. Signum of bursa a small, narrow, 4-pointed plate, with anterior point longer than posterior.

Alar expanse, 17 mm.

Type.—In the United States National Museum.

Type locality.—Winnipeg, Manitoba (A. W. Hanham).

Remarks.—The female type is the only specimen of this species I have seen. It is very distinct and should not be confused with any other described North American species.

Specimens from British Columbia and Ontario have been sent to me under this name, but all these are referable to other species (*klamathiana* or *sciadopa*) to which there is, in some cases, a superficial resemblance. The genitalia of *canadensis* show no close resemblance to those of the other species, and *canadensis* is further distinguishable from them by lacking discal spots that the others possess.

AGONOPTERIX FLAVICOMELLA (Engel)

PLATE 30, FIGURES 173, 173a; PLATE 45, FIGURE 267

Depressaria flavicomella ENGEL, Ent. News, vol. 18, p. 276, 1907.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 174, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 324, 1939.

Agonopteryx flavicomella (Engel) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 240, 1923.

Agonopteryx flavicomella (Engel) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8420, 1939.

Agnopteryx flavicomella (Engel) SMITH, Catalogue of the insects of New Jersey, p. 561, 1910.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6463, 1917.—BRIMLEY, The insects of North Carolina, p. 304, 1938.

Labial palpus and head pale whitish ochreous; second segment of palpus strongly irrorated and suffused with blackish fuscous exteriorly and in brush; third segment immaculate; sides of head slightly darker. Antenna grayish fuscous narrowly annulated with fuscous. Thorax and basal part of fore wing (except costa) light ochreous; thorax suffused and lightly irrorated with reddish brown and with a blackish-fuscous spot on each side beneath inner edges of tegulae. Ground color of fore wing light ochreous heavily overlaid with reddish brown and fuscous and irrorated with black; beyond the light basal patch a dark blackish-fuscous shade, which rapidly fades to reddish, then to ochreous at apical part of wing; basal part of costa suffused with fuscous; costa and termen marked with a series of black spots, those around termen more conspicuous than those on costa; at basal third a conspicuous black discal spot followed by a similar but larger one at middle and another larger more diffused one at end of cell; between the first and second discal spots and the inner margin (on vein 1c) a somewhat diffused black spot; cilia fuscous, darker basally. Hind wing grayish fuscous with a series of blackish-fuscous dashes around apex and outer margin; cilia yellowish fuscous with an indistinct dark subbasal band. Legs light whitish ochreous strongly overlaid or suffused with shining sooty black except at joints and on posterior tibiae. Abdomen pale whitish ochreous irrorated with fuscous above; ventrally with a broad blackish-fuscous longitudinal line on

each side and two indistinct median longitudinal rows of similarly colored spots.

Male genitalia.—Harpe rather broad basally, tapering gently to the bluntly pointed cucullus, profusely clothed with coarse hairs; costa narrowly sclerotized; sacculus moderately sclerotized; clasper slender, gently excurved, bluntly pointed, with small basal protuberance, reaching well beyond center of harpe; distal end serrate; clasper and inner edge of sacculus heavily sclerotized. Anellus broader than long, convex laterally and slightly concave on posterior edge; lateral lobes large, sparsely hairy. Aedeagus stout, gently curved, pointed; vesica armed with a large elongate patch of strong but moderately small cornuti. Vinculum rounded with small dorsoanterior process. Transtilla a narrow lightly sclerotized band with large, hairy, lateral lobes. Gnathos rather long, slender. Tegumen pointed. Socii large, hairy, fleshy flaps.

Female genitalia.—Genital plate moderately narrow; weakly sclerotized around ostium with a broad convex anterior margin. Ostium round, slightly nearer to anterior than posterior edge; margin narrowly sclerotized except posteriorly. Ductus bursae long, membranous with entire inner surface studded with numerous minute stout teeth anterior to inception of ductus seminalis; ductus seminalis well before ostium. Bursa copulatrix rather small, inner surface also with numerous small teeth, but fewer than in ductus bursae; signum a moderately large irregularly shaped toothed plate.

Alar expanse, 15–17 mm.

Type.—In the United States National Museum.

Type locality.—New Brighton, Pa.

Food plant.—*Heracleum* sp.

Distribution.—Eastern United States and Canada west to British Columbia.

United States records

Illinois: Chicago, ♀ (no date or collector); Monee, 2 ♂♂ (VI-21-12, A. Kwiat).

New Jersey: Essex County Park, 5 ♂♂ (VII-2-06, W. D. Kearfott).

Pennsylvania: New Brighton, 22 ♂♂, ♀ (June and July dates, H. D. Merrick);

Oak Station, Allegheny County, 16 ♂♂, 4 ♀♀ (June dates, Fred Marloff).

Canadian records

British Columbia: Rolla (5-VIII-1927, P. N. Vroom).

Manitoba: Riding Mountain Park, 2 ♂♂, 3 ♀♀ (25-VI-33, J. McDunnough).

Ontario: Trenton (VII-22-12, Evans).

Saskatchewan: Indian Head (VII-22-25, J. J. de Gryse).

Remarks.—The abdomen of the type is missing. The genitalia are figured from a "cotype" male and a typical female.

AGONOPTERIX SENICIONELLA (Busck)

PLATE 30, FIGURES 172, 172a; PLATE 45, FIGURES 263

Depressaria senicionella BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 742, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5875, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6418, 1903.—ENGEL, Ent. News, vol. 18, p. 276, 1907.

Depressaria seniciella BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 743, 1902.

Depressaria senecionella MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 174, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 350, 1939.

Agonopteryx senecionella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 240, 1923.

Agonopteryx senicionella (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8423, 1939.

Agonopteryx senicionella (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6464, 1917.

Labial palpus light ochreous; second segment irrorated with blackish fuscous exteriorly; third segment with subbasal and subterminal annuli and apex black. Antenna fuscous with grayish-ochreous annulations. Head and thorax light ochreous; face yellowish white; thorax with brownish-ochreous suffusion and irrorations. Fore wing dark ochreous-gray, strongly overlaid and suffused with brownish ochreous; light basal patch suffused on costa with fuscous, containing a blackish-fuscous spot in fold and bordered outwardly by a rapidly fading fuscous shade; at basal third, in cell, two black discal dots, obliquely one above the other; the lower one of these two is often lacking; at the end of cell an inconspicuous black discal dot preceded by an indistinct fuscous shade; termen and costa indistinctly marked with poorly defined fuscous spots; cilia ochreous-gray with two narrow ochreous-white lines, one at middle and one around outer edge. Hind wing grayish fuscous, darker apically; cilia light yellowish fuscous with grayish-fuscous subbasal and subterminal bands. Legs light ochreous overlaid with fuscous except at joints. Abdomen grayish ochreous above; beneath light ochreous with a broad blackish-fuscous line on each side; between these two lines a pair of indistinct longitudinal rows of blackish-fuscous spots.

Male genitalia.—Harpe rather broad, well sclerotized along costa; clothed with fine hairs; cucullus rounded; clasper nearly straight, moderately sclerotized and reaching slightly beyond middle of harpe. Anellus oval, longer than broad, lateral lobes well developed, clothed with few fine hairs. Vinculum narrow, rounded, with well-developed dorsoanterior process. Aedeagus stout, slightly curved, bluntly pointed; ventral arm by which it is attached to anellus short, broad, and situated near base of aedeagus. Transtilla a narrow sclerotized

band with large, hairy, lateral lobes. Gnathos an oval spined knob. Socii very large flaps clothed with many fine hairs. Tegumen pointed.

Female genitalia.—Genital plate narrow, strongly sclerotized and produced anteriorly. Ostium round. Ductus bursae membranous, gradually becoming larger to form the large oval bursa copulatrix. Signum a large four-pointed plate, the anterior and posterior points of about equal length but smaller than the lateral points.

Alar expanse, 18–22 mm.

Type.—In the United States National Museum.

Type locality.—Cabin John, Md.

Food plant.—*Senecio aureus* L.

Distribution.—Eastern United States.

United States records

District of Columbia: Washington, 8 ♂♂, ♀ (May 28 to June 16, 1900, August Busck).

Maryland: Cabin John, 2 ♂♂ (IV–28 and 30–1900, August Busck); Plummers Island, 3 ♂♂, 11 ♀♀ (May and June dates, A. Busck and Chas. R. Ely).

Virginia: Great Falls, ♀ (May 28, 1900, no collector).

AGONOPTERIX ANTENNARIELLA, new species

PLATE 30, FIGURES 175, 175a; PLATE 45, FIGURE 264

A medium-sized red-brown species unlike any other described from North America.

Head dark reddish fuscous above mixed with carmine and whitish-ochreous-tipped scales; face shining whitish ochreous; second segment of palpus whitish ochreous tinged with carmine inwardly and irrorated with fuscous exteriorly; brush trumpet-shaped; terminal segment whitish ochreous with broad blackish-fuscous basal and subterminal annuli. Antenna fuscous, annulated with whitish ochreous.

Thorax, base of fore wing, and costa to well beyond middle cinereous; anterior portion of thorax and extreme base of costa suffused with rich brown; ground color of fore wing red-brown, scales lightly tipped with carmine; at basal third two small obliquely placed black discal spots followed by a few cinereous scales; at end of cell a third white discal spot edged with black; apical third of wing heavily shaded with cinereous; cilia reddish fuscous, tipped with carmine; a row of fuscous spots around termen at base of cilia. Hind wing light fuscous above; with much white scaling beneath in apical third and a black line at base of cilia; cilia light fuscous with distinct rosy hue, and darker subbasal band. Legs fuscous overlaid with whitish ochreous and strongly suffused with carmine; hind tibiae whitish, suf-

fused with carmine; tarsi annulated with whitish ochreous. Abdomen grayish fuscous above, whitish ochreous below; ventrolateral lines poorly defined, black; anal tuft yellowish ochreous, suffused with carmine.

Male genitalia.—Harpe moderately sclerotized and covered with hairs over entire inner surface; costa and sacculus parallel beyond middle then converging to form a narrowly rounded cucullus. Clasper heavily sclerotized, smooth, short, terminating in a blunt point. Anellus longer than broad, truncated on posterior edge; lateral lobes weak. Vinculum with a very short, small dorsoanterior process. Transtilla a very narrow, moderately sclerotized band with small lateral lobes. Aedeagus stout, rather short and evenly tapered, terminating in a sharp point. Armature consisting of many fine spinules. Gnathos a heavily spined cone.

Female genitalia.—Genital plate moderately sclerotized, broad, slightly produced anteriorly. Ostium near posterior margin of plate. Ductus bursae slender, gradually becoming larger till it merges with the bulbous bursa copulatrix. Signum a 4-pointed, moderately sclerotized small plate with strong teeth; lateral, anterior, and posterior points about equal in length.

Alar expanse, 17–24 mm.

Type.—U. S. N. M. No. 52081.

Type locality.—Kamiack Butte, Whitman County, Wash.

Food plant.—*Antennaria luzuloides* T. and G.

Remarks.—Described from the ♂ type, 7 ♂ and 4 ♀ paratypes, as follows: Kamiack Butte, 3 ♂ ♂, 2 ♀ ♀ (V-18 to 22–34); 4 ♂ ♂, 1 ♀ same (VI-15 to 19–35); ♂, Pullman, Wash. (I-28–31 [indoor record]); ♀, Godman Springs, Blue Mountains, Wash., 6,000 feet (VIII-1–35); all reared from larvae collected by the author.

Paratypes in collections of United States National Museum, Canadian National Museum, and H. H. Keifer, Sacramento, Calif.

Dr. J. McDunnough, of Ottawa, has sent me three specimens of this species from British Columbia. The larvae, from which these moths were reared, were collected by A. N. Gartrell at Shingle Creek Road, Keremeos. The adults emerged from 30–VI to 6–VII–35.

Mr. Gartrell has labeled his specimens as reared from wild red currant. The food plant record is rather surprising since most of the species of this group are host specific, and it will be noted that the type series was reared from *Antennaria*. I have carefully compared the genitalia of specimens of the two lots and find them identical.

AGONOPTERIX NEBULOSA (Zeller)

PLATE 32, FIGURES 185, 185a; PLATE 45, FIGURE 266

- Depressaria nebulosa* ZELLER, Verh. zool.-bot. Ges. Wien, vol. 23, p. 237, 1873.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 138, 1878.—WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 312.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5269, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 741, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5870, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6413, 1903.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 177, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 334, 1939.
- Agonopteryx nebulosa* (Zeller) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68 p. 239, 1923.
- Agonopterix nebulosa* (Zeller) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8452, 1939.
- Agonopteryx nebulosa* (Zeller) SMITH, Catalogue of the insects of New Jersey, p. 516, 1910.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6438, 1917.

Labial palpus shining creamy white; second segment sprinkled with black scales outwardly and with brush suffused with white-tipped fuscous scales; brush abruptly expanded, trumpet-shaped; third segment with broad subbasal and subapical annuli black; the black scales of these annuli white tipped. Antenna fuscous annulated with gray. Head, thorax, and fore wing lavender-gray, the scales white tipped; face creamy white, tegula with a bluish iridescence; along costa and around termen a series of poorly defined light fuscous spots; at basal third two black discal dots, the upper, inner one small, the outer, lower one dashlike and both bordered outwardly with white scales; at the end of cell a white black-edged discal spot preceded by a similar one; sometimes these two are confluent, forming a white and black longitudinal dash; cilia grayish fuscous with narrow median and terminal white lines. Hind wing and cilia light yellowish fuscous, the wing darker apically; cilia with several, somewhat darker bands. Legs ochreous-white, overlaid and irrorated with grayish fuscous above, ochreous-white beneath; the usual longitudinal lines or rows of dark spots lacking or only faintly indicated by a few blackish-fuscous scales.

Male genitalia.—Harpe moderately broad, entirely clothed with fine hairs; cucullus narrowly rounded; clasper stout, curved, slightly hooked, reaching two-thirds of distance to costa. Anellus broadly oval with poorly developed lateral lobes. Vinculum rounded. Aedeagus short, stout, straight, with a blunt point; vesica armed with numerous spinulate cornuti. Transtilla a very narrow sclerotized band with moderately large, hairy, lateral lobes. Gnathos an oval, spined knob. Socii hairy flaps.

Female genitalia.—Genital plate narrow, emarginate behind; anterior margin in the form of a narrow, sclerotized, curved bar; ostium occupying nearly whole ventral portion of genital plate and without sclerotized area posterior to it. Ductus bursae membranous, abruptly constricted before ostium. Bursa copulatrix oval; signum an elongate plate with posterior pointed process.

Alar expanse, 19–20 mm.

Type.—In the British Museum.

Type locality.—Cambridge, Mass.

Food plant.—Unknown.

Distribution.—Northeastern United States.

United States records

Maine: Monmouth, ♂ (“November 30, ’05”).

Massachusetts: Amherst, 2 ♂♂ (January 21, 1906).

New Hampshire: 2 ♂♂ without further data; Hampton, ♂, ♀ (III-26-05, III-22-05, S. A. Shaw).

New York: New Windsor, ♂ (June 24, 1903, E. L. Morton).

Remarks.—Differs from all other gray American species by the accentuated trumpet-shaped palpus.

AGONOPTERIX SABULELLA (Walsingham)

PLATE 32, FIGURES 181, 181a; PLATE 46, FIGURE 270

Depressaria sabulella WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 313, pl. 36, fig. 1.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5279, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 743, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5876, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6419, 1903; Can. Ent. vol. 37, p. 296, 1905.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 174, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 348, 1939.

Agonopteryx sabulella (Walsingham) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.

Agonopterix sabulella (Walsingham) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8412, 1939.

Agonopteryx sabulella (Walsingham) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6465, 1917.

Agonopteryx callosella BARNES and BUSCK, Contr. Lepid. North America, vol. 4, p. 231, pl. 38, fig. 4, 1920. (New synonymy).

Agonopterix callosella (Barnes and Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera) No. 8421, 1939.

Depressaria callosella (Barnes and Busck) MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 174, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 311, 1939.

Labial palpus pale ochreous; second segment with slight fuscous shading and blackish-fuscous irrorations exteriorly; third segment

with subapical annulus and apex blackish fuscous. Antenna blackish fuscous. Head, thorax, and fore wing pale ochreous; face ochreous-white; base of costa and spot in anal angle blackish fuscous; forewing sparsely irrorated with fuscous and shaded with reddish scales; at basal third two fuscous discal spots obliquely one above the other; at end of cell a fuscous spot preceded above by a less conspicuous one of the same color; between the outer and inner pairs of spots a poorly defined fuscous cloud in costal half of wing; apical half of costa and termen and the cilia with a reddish suffusion, cilia light ochreous. Hind wing grayish ochreous, cilia paler, with alternating light fuscous and whitish bands. Legs ochreous-white strongly suffused and overlaid with blackish fuscous except at joints; posterior tibia and tarsus hardly more than irrorated with fuscous. Abdomen grayish fuscous above, pale ochreous beneath; on each side ventrally, a black longitudinal line.

Male genitalia.—Harpe narrow, long, pointed, clothed with very fine hairs; clasper stout, slightly curved toward cucullus, and terminating in a knob. Anellus a roughly oval plate, longer than broad, truncated posteriorly, and with well developed, hairy, lateral lobes. Vinculum rounded. Aedeagus stout with a long slender upturned point and a large, spinulate patch in basal half. Transtilla a narrow, lightly sclerotized band with well-developed, hairy, lateral lobes. Gnathos a spiny cone. Socii broad flaps clothed with fine hairs.

Female genitalia.—Ovipositor naked except for a few strong long hairs at base and a few weak hairs distally. Genital plate moderately broad, slightly produced anteriorly. Ostium is posterior half of plate. Ductus bursae membranous, slender, widening abruptly to form the large oval bursa copulatrix. Signum a diamond-shaped plate, with the anterior point shorter than the posterior.

Alar expanse, 19–23 mm.

Types.—In the British Museum (*sabulella*); in the United States National Museum (*callosella*).

Type localities.—Mendocino County, Calif. (*sabulella*); San Bernardino, Calif. (*callosella*).

Food plants.—*Eriophyllum stachaedifolium* Lag. and *Eriophyllum lantanum typicum* Constance.

Distribution.—Western United States probably as far north as southern British Columbia in the interior.

United States records

California: Land's End, San Francisco, ♂ (VII-23-09, F. X. Williams); San Francisco, ♂ (VI-12-26, H. H. Keifer); Monachee Meadows, Tulare County, 8,000 feet, ♂ ("July 8-14"); Croville, ♂ (IV-14-28, H. H. Keifer); San Bernardino, ♀ ("June 1-7"); San Diego, ♂, ♀ ("May 24-30").
Idaho: Kamiah, ♀ (VI-27-35, L. Constance).

Remarks.—The above synonymy is based on a comparison of Walsingham's figure and description with the types of *callosella*. Although there is no authentic material of Walsingham's species here, there appears to be no doubt about the synonymy. Mr. Busck concurs with me in this opinion.

H. H. Keifer, of Sacramento, Calif., was kind enough to send me three specimens, which I associate with this species, two of which were reared by him from *Eriophyllum stachaedifolium*. These specimens are identical with the types of *callosella*, which are before me.

I have another specimen before me from Kamiah, Idaho, reared from *Eriophyllum lantanum typicum*, which was collected by my friend Dr. Lincoln Constance, of the Department of Botany, University of California. This specimen is close to the types of *callosella* but differs in details. I am placing it here, however, until more material can be obtained and its specific limits ascertained.

AGONOPTERIX COSTOSA (Haworth)

PLATE 32, FIGURES 184, 184a; PLATE 46, FIGURE 273

Depressaria costosa HAWORTH, Lepidoptera Britannica, vol. 3, p. 508, 1811.—WOOD, Index entomologicus, p. 172, pl. 38, fig. 1182, 1845.—STANTON, Trans. Ent. Soc. London, vol. 5, p. 153, 1849; Insecta Britannica, p. 84, 1854.—ZELLER, Linn. Ent., vol. 9, p. 198, 1854.—STANTON, A manual of British butterflies and moths, vol. 2 p. 320, 1859.—FREY, Die Tineen und Pterophoren der Schweiz, p. 82, 1856.—HEINEMANN, Die Schmetterlinge Deutschlands und der Schweiz, vol. 2, p. 143, 1870.—MEYRICK, Ent. Monthly Mag., vol. 13, p. 281, 1870.—FREY, Die Lepidopteren der Schweiz, p. 351, 1880.—RÜSSLER, Jahrb. Nassau. Vereins Naturk., vol. 33, p. 282, 1881.—SNELEN, Die Vlinders van Nederland, vol. 2, p. 577, 1882.—STEUDEL and HOFMANN, Württemberg. Vereins vaterl. Naturk., vol. 38, p. 196, 1882.—JOURDHEUILLE, Mém. Soc. Acad. l'Aube, vol. 47, p. 176, 1883.—SORHAGEN, Die Kleinschmetterlinge der Mark Brandenburg, p. 175, 1886.—MEYRICK, A handbook of British Lepidoptera, p. 620, 1895.—REUTTI, Verh. Naturw. Vereins Karlsruhe, vol. 12, p. 228, 1898.—STANGE, Die Tineinen der umgegend von Friedland in Mecklenberg, p. 20, 1899.—STAUDINGER and REBEL, Catalog der Lepidopteren des palaearktischen Faunengebietes, vol. 2, No. 3177, 1901.—CARADJA, Bull. Soc. Sci. Bucarest, vol. 10, p. 149, 1901.—MALLOCH, Ent. Monthly Mag., vol. 37, p. 186, 1901.—DISQUÉ, Deutsche Ent. Zeitschr., Iris, vol. 14, p. 205, 1901.—LONGSTAFF, Ent. Monthly Mag., vol. 38, p. 28, 1902.—SCHÜTZE, Deutsche Ent. Zeitschr., Iris, vol. 15, p. 12, 1902.—CROMBRUGGHE, Mém. Soc. Ent. Belgique, vol. 14, p. 43, 1906.—GIBBS, Entomologist, vol. 39, p. 7, 1906 [as *D. costana*, nom. nud.].—MÜLLER-RUTZ, Bull. Soc. Ent. Suisse, vol. 11, p. 346, 1909.—SPULER, Schmetterlinge Europas, vol. 2, p. 333, pl. 89, fig. 13, 1910.—GIANELLI, Ann. Accad. Agr. Torino, vol. 53, p. 94, 1910.—SCHILLE, Kraków. Akad. Umiejtnosci Sprawozdania Komisji fizyograficznej, vol. 45, p. 29, 1911.—SKALA, Int. Ent. Zeitschr., vol. 5, 303, 1912; Verh. naturf. Vereins Brünn, vol. 51, p. 312, 1913.—VORBRODT and MÜLLER-RUTZ, Schmetterlinge der Schweiz, vol. 2, p. 456, 1914.—BUXTON, Ent. Rec., vol. 27, p. 183, 1915.—GALVAGNI, Wien. Ent. Vereins Jahresb., vol. 25, p. 32, 1915.—MARTINI, Deutsche Ent. Zeitschr., Iris, vol. 30, p. 153, 1917.—REBEL,

- Sitzungsb. Akad. Wiss. Wien, vol. 126, p. 808, 1917.—GALVAGNI, Wien. Ent. Vereins Jahreshb., vol. 28, p. 63, 1918.—STRAND, Archiv für Naturg. vol. 85A, pt. 4, p. 9, 1919.—MEYRICK, Entomologist, vol. 55, p. 254, 1922; in Wytsman, Genera insectorum, fasc. 180, p. 173, 1922.—ZIMMERMAN, Verh. zool.-bot. Ges. Wien. vol. 71, p. (43), 1922.—PREISSECKER, Wien. Ent. Vereins Jahreshb., vol. 30, p. 187, 1924.—BLAIR, Entomologist, vol. 58, p. 10, 1925.—STEPHAN, Deutsche Ent. Zeitschr., Iris, vol. 39, p. 123, 1925.—LARSEN, Ent. Meddel., vol. 17, p. 73, 1927.—ZERNY, Eos, vol. 3, p. 480, 1927.—WICKHAM, Entomologist, vol. 60, p. 43, 1927.—MEYRICK, A handbook of British Lepidoptera, p. 683, 1928.—HAYWARD, Entomologist, vol. 62, p. 50, 1929.—LHOMME, L'amateur de papillons, vol. 4, p. 209, 1929.—UFFELN, Westfälischer provincial-Verein für Wissenschaft und Kunst, Münster, Abhandl., vol. 1, p. 76, 1930.—AMSEL, Deutsche Ent. Zeitschr., Iris, vol. 44, p. 121, 1930.—VERBRODT, Deutsche Ent. Zeitschr., Iris, vol. 45, p. 126, 1931.—CHATER, Bull. Ent. Res., vol. 22, p. 231, 1931.—REBEL and ZERNY, Denkschr. Akad. Wiss. Wien, math.-nat. Kl., vol. 103, p. 150, 1931.—HERING, in Brohmer, Ehrmann, and Ulmer, Die Tierwelt Mitteleuropas, vol. 1, p. 142, 1932.—ECKSTEIN, Die Kleinschmetterlinge Deutschlands, p. 118, pl. 5, fig. 213, 1933.—STERNECK, Prodrömus der Schmetterlingsfauna Böhmens, vol. 2, p. 105, 1933.—RAPP, Beiträge zur fauna Thüringens, vol. 2, p. 131, 1936; Beiträge Schmetterlingsfauna Harz, p. 28, 1936.—GAEDE, in Bryk, Lepidopterorum catalogus pt. 92, p. 318, 1939.
- Agonopterix costosa* (Haworth) PIERCE and METCALFE, The genitalia of the tineid families of the Lepidoptera of the British Islands, p. 35, pl. 19, 1935.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8410, 1939.
- Agonopteryx blackmori* BUSCK, Can. Ent. vol. 53, p. 277, 1921.
- Depressaria blackmori* (Busck) MEYRICK, Entomologist, vol. 55, p. 254, 1922. (As synonym of *D. costosa* (Haworth).)
- Depressaria dryadoxena* MEYRICK, Exotic Microlepidoptera, vol. 2, p. 315, 1920; Entomologist vol. 55, p. 254, 1922; in Wytsman, Genera insectorum, fasc. 180, p. 173, 1922. (As synonym of *D. costosa* (Haworth).)
- Agonopterix dryadoxena* (Meyrick) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8410, 1939. (As synonym of *D. costosa* (Haworth).)
- Agonopterix blackmori* (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8410, 1939. (As synonym of *D. costosa* (Haworth).)
- Tinea depunctella* HÜBNER, Sammlung Europäischer Schmetterlinge, vol. 5, pl. 56, fig. 378, 1816.
- Pinaris depunctella* (Hübner) HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 411, 1825.
- Depressaria depunctella* (Hübner) KOLLAR, Linz. Oberösterreichischer musealverein Jahreshb., vol. 2, p. 92, 1832.—ZELLER, Isis von Oken, 1839, p. 195.—DUPONCHEL, Histoire naturelle de lépidoptères . . . de France, vol. 8, p. 148, pl. 291, fig. 2, 1838.—HERRICH-SCHÄFFER, Die Schmetterlinge von Europa, vol. 5, p. 123, 1853.
- Haemylis depunctella* (Hübner) TREITSCHKE, in Ochsenheimer, Die Schmetterlinge von Europa, vol. 9, p. 260, 1832; vol. 10, p. 185, 1835.
- Haemylis costosa* (Haworth) STEPHENS, Illustrations of British entomology, Haustellata, vol. 4, p. 203, 1835.

Labial palpus, head and face creamy white; second segment irrorated with blackish fuscous exteriorly; third segment with subapical

annulus and apex black; head frequently suffused above with fuscous; spot above base of antenna brown; tuft below eye pink. Antenna brown, darker basally than apically. Thorax and ground color of fore wing whitish ochreous; posterior tuft on thorax yellowish ochreous; light base of fore wing diffused along costa to apex, sparsely irrorated with black scales; beyond light base a dark ochreous shade, which covers posterior two-thirds of wing but becomes lighter toward termen. The whole surface of wing more or less irrorated with black scales; on costa, slightly beyond middle a sooty cloud; at basal third, two black spots obliquely one above the other sometimes edged by a few dark reddish-ochreous scales; between the outer of these two spots and inner margin a small dark reddish-ochreous spot; at the end of cell a cream-colored discal spot edged with dark reddish ochreous and preceded by a dark reddish-ochreous spot. Sometimes the latter spot and the reddish-ochreous scales of the outer discal spot are confluent, forming a dash; cilia whitish ochreous strongly suffused with reddish fuscous, especially toward apex. Hind wing light yellowish fuscous; cilia yellowish, banded with light fuscous. Legs whitish ochreous overlaid with fuscous and tinged with carmine. Abdomen light ochreous above, whitish ochreous beneath; a row of black spots on each side ventrolaterally.

Male genitalia.—Harpe long, slender, tapering into a long, pointed cucullus; moderately covered with hairs; clasper very stout, somewhat dilated distally, nearly reaching costa; sacculus short, strongly sclerotized. Anellus broader basally than apically, broader than long; posterior edge convex; hairy, lateral lobes well developed. Aedeagus stout, slightly narrower in middle, nearly straight, pointed; vesica armed with a large patch of spinulate cornuti. Vinculum rounded. Transtilla a narrow sclerotized band with large hairy lateral lobes. Gnathos a spined oval knob. Socii hairy, fleshy flaps.

Female genitalia.—Genital plate moderately broad, sclerotized; anterior edge slightly produced. Ostium round; situated about middle and occupying less than half the length of the genital plate. Ductus bursae membranous; inception of ductus seminalis just before ostium. Signum distinctly 4-pointed, with slender anterior and posterior points; teeth small and scattered.

Alar expanse, 18–22 mm.

Type.—In the British Museum.

Type locality.—"Europe."

Food plants.—*Genista*, *Quercus* (?), *Laburnum*, and *Cytisus scoparius* (L.) Link.

Distribution.—Extreme northwestern United States, southwestern and eastern Canada and Europe.

United States records

Washington: Bellingham, 3 ♂♂, ♀ (IX-1-29, VIII-4-31, IX-7-35, VIII-23-33, J. F. G. Clarke); Tacoma, ♀ (VII-15-28, T. M. Clarke).

Canadian records

British Columbia: Victoria, 19 ♂♂, 9 ♀♀ (July to October dates, E. H. Blackmore, W. Downes, W. R. Carter collectors); 2 ♂♂, ♀ (9-15-VII-1923, K. F. Auden).

Ontario: London, ♂, ♀ (19-26-IV-1933 [Good's Greenhouse]).

Note.—Well established in the Puget Sound region and no doubt wider spread than the above records indicate. May not have escaped at London, Ontario.

Remarks.—There appears to be no doubt of the synonymy as given above. Although I have not seen *dryadoxena*, Meyrick's description tallies with *costosa* and the locality for the former species agrees with that of *blackmori*. The food plant of *dryadoxena* (*Quercus*) is questionable, since the species of this genus rarely feed on such widely separated species of plants and are more frequently host specific as has already been pointed out.

The genitalia of the males and females are identical except for slight variation in the male harpes, a condition frequently encountered. Pierce²² figures the genitalia of *costosa* showing the ostium opening near the anterior margin of the genital plate. In the specimens I have seen (4), both European and North American, the ostium opens slightly nearer to the posterior than to the anterior edge (see fig. 273). Furthermore, the signum as figured by Pierce lacks the anterior and posterior points, present in all specimens I have examined. The signum, it must be admitted, may be somewhat variable, but in this species it appears to be unusually constant.

AGONOPTERYX PERGANDEELLA (Busck)

PLATE 32, FIGURES 183, 183a

Depressaria pergandella BUSCK, Proc. Ent. Soc. Washington, vol. 9, p. 89, 1908.—

MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 174, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 339, 1939.

Agonopteryx pergandella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.

Agonopteryx pergandiella BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6462, 1917.

Agonopteryx pergandiella McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8417, 1939.

Labial palpus ochreous-white; second segment sparsely irrorated with fuscous exteriorly, brush suffused with brown [third segment of both palpi missing]. Antenna with basal segment fuscous above, whitish beneath [remainder of both antennae missing]. Head

²² Pierce, F. N., The genitalia of the Tineina, pl. 19, 1935.

ochreous with a median fuscous band; face shining creamy-white. Thorax and fore wing light brown; thorax strongly suffused with brownish fuscous; surface of fore wing irrorated with poorly defined blackish-fuscous spots and with a series of similarly colored spots around termen; at basal third, in cell, two black discal spots obliquely one above the other; another similar spot at the end of cell preceded by a poorly defined blackish-fuscous cloud; extreme base of costa fuscous; a well-defined black spot in inner angle; cilia light brown suffused with fuscous. Hind wing shining light yellowish fuscous; cilia more whitish. Legs whitish ochreous overlaid and mottled with fuscous except at joints. Abdomen dark yellowish fuscous.

Male genitalia.—Harpe moderately clothed with long hairs [cucullus broken from each harpe]; sacculus only moderately sclerotized; clasper nearly straight, slightly dilated distally, reaching fully two-thirds of the distance toward the costa. Anellus broadly oval, posterior edge strongly convex, smooth; with very small lateral lobes. Vinculum rounded. Aedeagus nearly straight, stout, and deeply notched distally. Transtilla a broad, sclerotized band with large lateral lobes. Gnathos a finely spined cone. Socii small, weak, sparsely clothed with hairs. Tegumen produced into a moderately large broad flap.

Alar expanse, 21 mm.

Type.—In the United States National Museum.

Type locality.—"Nebraska."

Remarks.—The only specimen I have seen is the type male. This is very distinct from any other North American species.

AGONOPTERIX AMISSELLA (Busck)

PLATE 33, FIGURES 187, 187a; PLATE 46, FIGURE 269

Depressaria amissella BUSCK, Proc. Ent. Soc. Washington., vol. 9, p. 89, 1908.—

MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 174, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 300, 1939.

Agonopteryx amissella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.

Agonopterix amissella (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8425, 1939.

Agonopteryx amissella (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6460, 1917.

Labial palpus ochreous-white; second segment with the brush suffused with fuscous and sparsely irrorated with fuscous exteriorly; third segment with subbasal and subterminal annuli black. Antenna fuscous with light ochreous-fuscous annulations; basal segment ochreous-white beneath. Head, thorax, and fore wing light ochreous-brown; face shining ochreous-white; thorax suffused with fuscous; surface of fore wing irrorated with black and blackish-fuscous scales

and with a series of blackish-fuscous spots along costa and around termen; extreme base of costa fuscous; light basal patch bordered outwardly by a transverse fuscous dash, which contains some jet-black scales and does not reach costa; at basal third, in cell, two conspicuous jet-black spots of raised scales, obliquely one above the other and followed outwardly by a poorly defined fuscous shade; discal spot at end of cell inconspicuous or absent, but when present indicated by a few whitish scales; cilia light ochreous-brown the scales tipped with ochreous-white. Hind wing light fuscous, darker apically than basally; cilia light yellowish fuscous tipped with ochreous-white and with a narrow, fuscous subbasal band. Legs ochreous-white strongly suffused and overlaid with blackish fuscous except at joints. Abdomen ochreous-fuscous.

Male genitalia.—Harpe rather narrow, pointed, only sparsely clothed with hairs; clasper very stout, straight, reaching three-fourths of the distance to costa. Anellus roughly rectangular with truncated posterior edge; lateral lobes small. Vinculum rounded. Transtilla a narrow sclerotized band with large lateral lobes. Aedeagus stout, curved, with a heavily sclerotized band basally; vesica armed with a large patch of weak, spinulate cornuti. Gnathos an elongate, oval knob clothed with fine spines. Socii weakly sclerotized, small, with few hairs. Terminal portion of tegumen pointed.

Female genitalia.—Genital plate narrow; anterior edge in the form of a strongly sclerotized crescentic bar. Ostium broad, oval, with a small, strongly sclerotized area posterior to it. Ductus bursae membranous. Bursa copulatrix small; signum of bursa a small, oval, spined plate.

Alar expanse, 17 mm.

Type.—In the United States National Museum.

Type locality.—Kissimmee, Fla. (Wm. Beutenmüller).

Remarks.—The only specimens I have seen of this species are the type male and a paratype female. The species is quite distinct from any other North American species.

AGONOPTERIX LATIPALPELLA Barnes and Busck

PLATE 33, FIGURES 188, 188a; PLATE 46, FIGURE 268

Agonopteryx latipalpella BARNES and BUSCK, Contr. Lepid. North America, vol. 4, p. 233, 1920.

Agonopteryx latipalpella (Barnes and Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8432, 1939.

Depressaria latipalpella MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 330, 1939.

The entire insect presents a roughened appearance due to the raised scales that cover almost the whole surface. Labial palpus ochreous-

white; second segment irrorated with black and fuscous exteriorly and suffused with fuscous in the brush; third segment with broad, poorly defined blackish-fuscous basal and median annulations. Head, thorax, and fore wing light ochreous-brown, the scales suffused with fuscous and tipped with sordid whitish; collar narrowly black; base somewhat lighter than the rest of wing, the light color diffused for a short distance along costa and bordered outwardly by a strong black shade, the latter from the middle to inner margin of wing; at basal third an inconspicuous white discal spot (sometimes two) preceded by a few black scales, at the end of a cell a small white discal spot broadly edged with black; cilia light ochreous-brown with a narrow median fuscous band. Hind wing ochreous-fuscous, darker around margins; cilia ochreous with narrow fuscous subbasal and subterminal bands. Legs ochreous-white suffused and mottled with blackish fuscous and fuscous. Abdomen ochreous-fuscous edged laterally with numerous light ochreous-brown hairlike scales; beneath, two broad, black, longitudinal lines broken into spots in posterior half; between these two lines two indistinct parallel rows of spots.

Male genitalia.—Harpe elongate, moderately narrow; sparsely clothed with hairs; cucullus pointed; clasper long, slender, slightly enlarged in middle; sacculus broad. Anellus rectangular; posterior edge emarginate; lateral lobes well developed, hairy. Aedeagus stout, slightly bent, pointed; vesica with a weak spinulate patch of cornuti in basal half. Vinculum rounded. Transtilla a narrow sclerotized band, with large hairy, lateral lobes. Gnathos a spined, oval knob. Socii hairy flaps.

Female genitalia.—Genital plate broad, with a gently concave, narrow, sclerotized anterior edge. Ostium small, round, situated on posterior margin of genital plate. Ductus bursae sclerotized behind inception of ductus seminalis, short, membranous before, gradually widening into the very large bursa copulatrix; signum large, 3-pointed, with a few large teeth on posterior margin.

Alar expanse, 17–19 mm.

Type.—In the United States National Museum.

Type locality.—San Benito, Tex.

Remarks.—The species is represented only by the type series from Brownsville and San Benito, Tex.

AGONOPTERIX POSTICELLA (Walsingham)

PLATE 33, FIGURES 190, 190a; PLATE 46, FIGURE 274

Depressaria posticella WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 315, pl. 36, fig. 5.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5274, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 744, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5880, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6423, 1903.—MEYRICK, in Wytzman, Genera in-

sectorum, fasc. 180, p. 173, 1922.—GAEDE, in Bryk, *Lepidopterorum catalogus*, pt. 92, p. 340, 1939.

Agonopteryx posticella (Walsingham) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.

Agonopteryx posticella (Walsingham) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8411, 1939.

Agonopteryx posticella (Walsingham) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6469, 1917.

Labial palpus dull whitish ochreous; second segment irrorated with fuscous exteriorly; third segment with apex fuscous and, in a few specimens, a faint indication of a fuscous subterminal annulus. Antenna fuscous. Head, thorax, and fore wing dull whitish ochreous; thorax with slight infuscation; fore wing irrorated with black and fuscous and suffused with reddish especially toward apex; on costa at base and on inner angle near base a blackish-fuscous spot; at basal third a black discal spot followed by a similar one at end of cell, the latter frequently obsolete; on inner margin, before tornus a fuscous blotch not attaining costal half; cilia fuscous with reddish tinge. Hind wing light grayish fuscous; cilia lighter with rosy tinge. Legs pale whitish ochreous heavily overlaid with fuscous except at joints and on posterior tibiae, the latter with faint rosy tinge. Abdomen pale ochreous, suffused with fuscous above and with a row of more or less confluent spots on each side beneath; anal tuft usually with rosy tint.

Male genitalia.—Harpe slender, almost entirely clothed with long hairs; clasper reaching beyond costa, slightly narrowed about the middle and somewhat enlarged at the distal end, terminating in a sharp point. Anellus a sclerotized plate, posterior edge concave, and with weak lateral lobes. Vinculum rounded, broad, with well developed dorsoanterior process. Aedeagus slender, slightly curved, gradually tapering to a sharp, dorsally upturned point; at the base is a bifid sclerotized arm by which the aedeagus articulates with the anellus. Transtilla a narrow band, with well developed, hairy, lateral lobes. Gnathos a long, spined cone. Socii rather small, clothed with fine hairs.

Female genitalia.—Genital plate broad, with pronounced anterior median ventral evagination. Ostium large, oval, in posterior half of genital plate. Ductus bursae membranous, long; inception of ductus seminalis well before ostium. Bursa copulatrix large, oval; signum a small, oval plate, with serrate edges and a pointed process from the posterior margin.

Alar expanse, 17–21 mm.

Type.—In the British Museum.

Type locality.—Lake County, Calif.

Food plants.—*Psoralea physodes* Dougl., *P. macrostachya* DC., and *P. tenuiflora* Pursh.

Distribution.—Western United States.

United States records

Arizona: Yavapai County, ♂ (no date).

California: Fresno, ♂ (no date; E. A. Schwarz); Sacramento, 3 ♂♂ (V-11-53), and Applegate, Placer County, ♂ (VII-14-32), all reared and sent to me by H. H. Keifer.

Colorado: Boulder, ♀ ("May 14, Cockerell"); other specimens (Dyar and Caudell, labeled "Colorado"); Chimney Gulch, Denver, ♀ (6-13).

Oregon: McMinnville, ♂ (VII-9-22, S. E. Keen); Salem, ♀ ("March," E. Y. Lansing Jr.).

Remarks.—This far-western species seems to be confined to the area south of the Columbia River. A diligent search in the spring of 1934 by W. W. Baker, of Puyallup, Wash., failed to reveal the presence of this species in Washington State. Mr. Baker did, however, locate larvae of *psoraliella* (referred to in this paper), which is found feeding with *posticella* in California. The food plant (*P. physodes*) is rather widely distributed on the Pacific slope west of the Cascades in both Washington and British Columbia, so the species may eventually be found in both places.

AGONOPTERIX PSORALIELLA (Walsingham)

PLATE 31, FIGURES 177, 177a; PLATE 46, FIGURE 271

Depressaria psoraliella WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 317, pl. 36, fig. 7.—RILEY, in Smith, List of Lepidoptera of Boreal America, No. 5275, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 740, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5865, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6408, 1903.—MEYERICK, in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 342, 1939.

Agonopteryx psoraliella (Walsingham) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.

Agonopterix psoraliella (Walsingham) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8449, 1939.

Agonopteryx psoraliella (Walsingham) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6442, 1917.

Labial palpus pale gray; second segment strongly suffused with fuscous and dull red exteriorly; third segment slightly tinged with red and with subbasal and subapical annuli and apex black. Antenna fuscous with reddish tint. Head gray, lightly suffused with fuscous and tinted with red laterally; face shining white. Thorax, base of wing, and basal fourth of costa gray irrorated with deep red-brown and black (thorax in one specimen wholly red-brown);

posterior tuft of thorax light red, beneath the inner edge of each tegula a small black spot; fore wing deep red-brown irrorated with blackish fuscous and gray, especially toward costa and along veins; at basal third two small yellowish discal dots, one above the other, followed by another at the end of cell; frequently there is a fourth, though smaller spot between the outer and inner discal spots; all spots edged with deep red; along costa and around termen a series of indistinct blackish-fuscous spots; cilia fuscous with a reddish tinge. Hind wing dark grayish-fuscous; cilia lighter, reddish tinged with a well-defined fuscous basal band and several less distinct sub-terminal ones. Legs gray overlaid with blackish fuscous, except at joints, and tinted with red. Abdomen gray, suffused with fuscous above; beneath, lightly suffused with red, irrorated with fuscous and with a row of black spots on each side.

Male genitalia.—Harpe broad and short (when compared with those of other members of the genus), clothed over most of the surface with fine hairs; cucullus rounded (in one specimen from California the cucullus is long and slender); clasper long and slender, reaching to, or slightly beyond, the costa; occasionally the clasper is slightly hooked at the distal end. Anellus an oblong-oval plate; posterior edge nearly straight with shallow median cleft; lateral lobes well developed. Vinculum rounded, with dorsoanterior process. Aedeagus slender, tapering distally to a point just past the middle, then becoming larger and finally terminating in a sharp point. At the base of the aedeagus is a bifid arm by which it articulates with the anellus. Transtilla a broad sclerotized band, with large, hairy, lateral lobes. Gnathos a slender spined cone. Socii large hairy flaps.

Female genitalia.—Genital plate broad. Ostium small, at extreme anterior margin of plate. Ductus bursae long, membranous; inception on ductus seminalis well before ostium. Bursa copulatrix scarcely larger than the ductus. Signum a lightly sclerotized, oval plate.

Alar expanse, 20–24 mm.

Type.—In the British Museum.

Type locality.—Sonoma County, Calif.

Food plants.—*Psoralea physodes* Dougl. and *Psoralea macrostachya* DC.

Distribution.—The Pacific slope of the United States.

United States records

California: Pope Creek, Napa County, ♂, 2 ♀♀ (V-27 to V-30-32, H. H. Keifer [reared]; Mills College, Alameda County (1 specimen in Dr. Braun's collection); Dry Creek, Sonoma County, ♀ (V-21-1871, Walsingham [reared]).
Washington: Puyallup, 4 ♂♂, 5 ♀♀ (V-7 to 17-34, W. W. Baker [reared]).

Remarks.—The species is easily recognizable from Walsingham's description and figure. There is one specimen from Washington State that has the head and thorax dark reddish brown instead of the usual gray.

AGONOPTERIX SANGUINELLA (Busck)

PLATE 33, FIGURES 189, 189a

Depressaria sanguinella BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 738, 1902.—*in* Dyar, U. S. Nat. Mus. Bull. 52, No. 5861, 1903.—KEARFOTT, *in* Smith, List of the Lepidoptera of Boreal America, No. 6404, 1903.—MEYRICK, *in* WYTSMAN, Genera insectorum, fasc. 180 p. 176, 1922.—GAEDEL, *in* Bryk, Lepidopterorum catalogus, pt. 92, p. 348, 1939.

Agonopteryx sanguinella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 199, 1908.

Agonopterix sanguinella (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8445, 1939.

Agonopteryx sanguinella (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6458, 1917.

Labial palpus pale grayish ochreous; second segment sparsely irrorated with black exteriorly; third segment with a small spot near base anteriorly, and apex black. Antenna dark fuscous. Face, head, and collar of thorax light straw color, the scales of the head with a grayish suffusion. Thorax and fore wing gray, sparsely irrorated with black and with a carmine tint, the carmine color more pronounced along costa and apex of fore wing; extreme base of wing and costa pale grayish ochreous, the former followed by and the latter narrowly edged with black; at basal third two obliquely placed black discal spots edged with a few carmine scales; at end of cell a white discal spot conspicuously edged with carmine; from the discal spot at end of cell an inwardly oblique, blackish dash not reaching costa; cilia gray with reddish suffusion and sparse black irrorations; termen without row of dark spots. Hind wing light ochreous fuscous; cilia concolorous with subbasal and two parallel fuscous bands and with whitish irrorations apically. Legs pale grayish ochreous irrorated and suffused with blackish fuscous except at joints. Abdomen pale grayish ochreous irrorated with black and with a row of black spots on each side beneath.

Male genitalia.—Harpe slender, clothed with long, fine hairs; cucullus pointed; clasper short, straight, bluntly pointed; sacculus moderately sclerotized. Anellus slightly longer than broad, with small lateral lobes; posterior margin with shallow cleft; basal portion constricted. Aedeagus stout, slightly curved, bluntly pointed; vesica armed with numerous strong spinulate cornuti. Vinculum rounded. Transtilla a sclerotized band with well-developed lateral lobes. Gnathos a spined knob. Socii fleshy, hairy flaps. Tegumen terminating in a blunt point.

Alar expanse, 21 mm.

Type.—In the United States National Museum.

Type locality.—Pinal Mountains, Ariz. (R. Kunze).

Remarks.—I have seen no specimens certainly referable to this species, although I have before me a series from White Mountains, Ariz., which may belong here. The specimens from this locality average considerably larger than the type of *sanguinella* but may be well within the range of variation for this species.

AGONOPTERIX AMYRISELLA (Busck)

PLATE 46, FIGURE 272

Depressaria amyrisella BUSCK, Proc. U. S. Nat. Mus., vol. 23, p. 233, 1901.—DYAR, Proc. Ent. Soc. Washington, vol. 4, p. 476, 1901.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 741, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5872, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6415, 1903.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 175, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 300, 1939.

Agonopteryx amyrisella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.

Agonopterix amyrisella (Busck) MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8427, 1939.

Agnopteryx amyrisella (Busck) BARNES and MCDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6446, 1917.

Labial palpus yellowish white; second segment with blackish-fuscous base and with black irrorations; third segment with apical third black, subbasal fourth light reddish fuscous; the whole palpus with a reddish tinge. Antenna dark metallic greenish brown. Face yellowish with a few brown scales. Head with erect scales, yellowish at bases, purplish black toward tips, tips white with reddish tinge. Thorax yellowish brown with violaceous scales intermixed and with a transverse crest of six tufts of scales. Fore wing dark violaceous-brown sparsely irrorated with black scales; extreme base yellowish, the color not extending to costa, and containing a black spot near inner angle; beyond this light basal patch a purplish-black fascia not attaining costa; at basal third, in cell, a few scattered purplish-black scales; at end of cell a small white discal spot broadly edged with black; on costa five rather large blackish spots, the fourth (from base of wing) the largest, extending into cell and confluent with the black-edged white discal spot; around termen six to eight small black spots; cilia yellowish brown with a narrow fuscous subbasal line and tinged with reddish. Hind wing yellowish brown, much darker apically; cilia light yellowish fuscous with a broad fuscous subbasal band. Legs pale yellowish brown irrorated and suffused with purplish black except at joints. Abdomen pale yellowish brown infuscated above and with a row of black spots on each side beneath.

Female genitalia.—Genital plate moderately sclerotized; anterior edge lobed. Ostium small, round, opening about middle of plate. Ductus bursae short, not much longer than bursa copulatrix; inception of ductus seminalis just before ostium. Bursa copulatrix large, oval, without signum.

Alar expanse, 16–17 mm.

Type.—In the United States National Museum.

Type locality.—Palm Beach, Fla.

Food plant.—*Amyris floridana* Nutt.

Remarks.—This species is represented only by the type series. These are females.

2. MARTYRHILDA, new genus

PLATE 2, FIGURE 17; PLATE 6, FIGURE 44; PLATE 10, FIGURES 67, 67a; PLATE 16, FIGURE 100

Genotype.—*Depressaria canella* Busck, Proc. U. S. Nat. Mus., vol. 27, p. 764, 1904.

Similar to *Agonopterix* but palpus more slender, smooth, brush on second segment poorly developed or absent. Fore wing narrow, elongate, bluntly pointed; costa straight. Hind wing with costa straight or slightly excavate. Abdominal wall strongly sclerotized.

Male genitalia.—Clasper divided, with transverse arm and longitudinal arm, the former sometimes with lateral process from inside; gnathos broadened, sometimes reniform; vesica usually armed with strong cornuti.

Female genitalia.—Signum always large, broadly oval to elongate, never diamond-shaped. Ductus bursae membranous or partly sclerotized, sometimes with strong thornlike processes from inner surface.

Larva.—As in *Agonopterix*.

Pupa.—Pubescent. Prothoracic femora exposed. Labial palpi not exposed. Cremaster absent.

Remarks.—This genus is closely related to *Agonopterix*, differing from it by the poor development or absence of the brush of the second segment of the labial palpus, the divided clasper of the harpe, the unusually large broadly oval or elongate signum, and the exposed prothoracic femora of the pupa.

With the genotype I associate ten other species, three of which I have described as new.

The larvae of only three species of this genus are known. The larva of *sphaeralceae* is a leaf miner; those of *umbraticostella* and *canella* are leaf tiers.

KEY TO THE SPECIES OF MARTYRHILDA BASED ON
COLORATION

1. Ground color of fore wing white or whitish..... 2
Ground color of fore wing otherwise..... 4
2. Costa with a large fuscous blotch at middle..... *canella* (Busck) (p. 128)
Costa without large dark markings..... 3
3. Basal segment of antenna sordid whitish; hind wing smoky
fuscous..... *sordidella*, new species (p. 132)
Basal segment of antenna fuscous; hind wing white.. *nivalis* (Braun) (p. 139)
4. Base of fore wing dark reddish brown or blackish fuscous..... 5
Base of fore wing otherwise..... 7
5. Ground color of fore wing straw yellow..... *gracilis* (Walsingham) (p. 133)
Ground color of fore wing otherwise..... 6
6. Ground color of fore wing light reddish ochreous
umbraticostella (Walsingham) (p. 130)
Ground color of fore wing pale ochreous-gray.
thoracenigraeella (Chambers) (p. 135)
7. Costa, to about middle, lighter than general color of wing..... 8
Costa not contrastingly lighter than remainder of wing..... 10
8. Third segment of labial palpus immaculate.. *hildaella*, new species (p. 140)
Third segment of labial palpus maculate..... 9
9. Fore wing suffused or marked with reddish or brownish; alar
expanse 20 mm. or more..... *klamathiana* (Walsingham) (p. 142)
Fore wing without reddish or brownish suffusions or markings;
alar expanse 19 mm. or less..... *sciadopa* (Meyrick) (p. 144)
10. Ground color of fore wing grayish fuscous strongly overlaid with
whitish ochreous..... *sphaeralceae*, new species (p. 138)
Ground color of fore wing brownish fuscous sparsely irrorated
with whitish ochreous..... *thoracefasciella* (Chambers) (p. 136)

KEY TO THE SPECIES OF MARTYRHILDA BASED ON MALE
GENITALIA

1. Gnathos reniform (figs. 100, 143)..... 2
Gnathos not reniform (fig. 149)..... 4
2. Transverse arm of clasper extending beyond middle of harpe (figs.
67, 143)..... 3
Transverse arm of clasper short, stout, not extending beyond
middle of harpe (fig. 145)..... *sordidella*, new species (p. 132)
3. Harpe slender; both arms of clasper of about equal length; trans-
verse arm reaching costa of harpe (fig. 143)
umbraticostella (Walsingham) (p. 130)
Harpe short, broad; transverse arm of clasper longer than longi-
tudinal arm but not attaining costal edge of harpe (fig. 67)
canella (Busck) (p. 128)
4. Lobes of transtilla fused (figs. 146, 147)..... 5
Lobes of transtilla not fused (figs. 148, 149, etc.)..... 6
5. Sacculus as broad as one-third width of harpe at base; transverse
and longitudinal arms of clasper of about equal length;
aedeagus about one-half length of harpe (fig. 146)
thoracefasciella (Chambers) (p. 136)

- Sacculus broader than one-third width of harpe at base; transverse arm of clasper appreciably longer than longitudinal arm; aedeagus longer than one-half length of harpe (fig. 147)
sphaeralceae, new species (p. 138)
6. Transverse arm of clasper short, hardly extending beyond middle of harpe (fig. 148)----- *hildaella*, new species (p. 140)
- Transverse arm of clasper long, at least extending beyond middle of harpe (figs. 142, 144, etc.)----- 7
7. Aedeagus sharply bent at middle (fig. 142a)--- *gracilis* (Walsingham) (p.133)
- Aedeagus slightly curved (figs. 149, 150, etc.)----- 8
8. Transverse arm of clasper arising at middle, or slightly before middle of harpe; aedeagus strongly compressed (figs. 149, 151)----- 9
- Transverse arm of clasper arising well before middle of harpe; aedeagus not appreciably compressed (fig. 150)----- 10
9. Transverse arm of clasper reaching to or slightly beyond costa of harpe; free from below middle of harpe
klamathiana (Walsingham) (p. 142)
- Transverse arm of clasper not reaching costa of harpe; free from middle of harpe or beyond (fig. 149)---- *sciadopa* (Meyrick) (p. 144)
10. Both arms of clasper very slender, sharply pointed; vesica armed with an elongate patch of fine cornuti (figs. 150, 150a)
nivalis (Braun) (p. 139)
- Arms of clasper otherwise; vesica armed with an elongate patch of strong cornuti (fig. 144)----- *thoracenigraeella* (Chambers) (p. 135)

KEY TO THE SPECIES OF MARTYRHILDA BASED ON FEMALE GENITALIA

1. Ductus bursae partly sclerotized (figs. 100, 239)----- 2
- Ductus bursae membranous (figs. 232, 233; etc.)----- 3
2. Sclerotized portions of ductus bursae consisting of one moderately large and one small area, the former bearing several thornlike teeth inwardly (fig. 239) *thoracenigraeella* (Chambers) (p. 135)
- Sclerotized portion of ductus bursae consisting of one large area armed inwardly with 17 or 18 short, stout teeth (fig. 100)
canella (Busck) (p. 128)
3. Inner surface of ductus bursae armed with a group of 11 stout teeth (fig. 238)----- *sordidella*, new species (p. 132)
- Inner surface of ductus bursae unarmed (figs. 232, etc.)----- 4
4. Signum broadly oval (figs. 231, 233)----- 5
- Signum elongate (figs. 232, 235, etc.)----- 6
5. Ostium with a strongly sclerotized area laterally (fig. 233)
gracilis (Walsingham) (p. 133)
- Ostium without such sclerotized area (fig. 231)---- *nivalis* (Braun) (p. 139)
6. Signum with several long teeth projecting from posterior end (fig. 232)----- *umbraticostella* (Walsingham) (p. 130)
- Signum without such teeth (figs. 235, etc.)----- 7
7. Bursa copulatrix distinctly asymmetrical (figs. 234, 236)----- 8
- Bursa copulatrix symmetrical (figs. 235, 237)----- 9
8. Genital plate with two narrow raised ridges posterior to ostium (fig. 234)----- *klamathiana* (Walsingham) (p. 142)
- Genital plate without such ridges (fig. 236)---- *sciadopa* (Meyrick) (p. 144)
9. Ostium with sclerotized, cuplike structures laterally (fig. 235)
thoracefasciella (Chambers) (p. 136)
10. Ostium without such structures (fig. 237)--- *sphaeralceae*, new species (p 138)

MARTYRHILDA CANELLA (Busck)

PLATE 2, FIGURE 17; PLATE 6, FIGURE 44; PLATE 10, FIGURES 67, 67a;
PLATE 16, FIGURE 100

Depressaria canella BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 764, 1904.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 311, 1939.

Agonopteryx canella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 238, 1923.

Agonopterix canella (Busck) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8433, 1939.

Agonopteryx canella (Busck) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6437, 1917.

Agonopteryx cogitata BRAUN, Can. Ent., vol. 58, p. 47, 1926.

Agonopterix cogitata (Braun) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8433, 1939. (As synonym of *canella* (Busck)).

Depressaria cogitata (Braun) GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 316, 1939.

Labial palpus white strongly irrorated with fuscous. Antenna, head, and collar of thorax fuscous to black; face whitish. Thorax and ground color of fore wing pure white, the latter marked with black, brown, and fuscous; basal third with a few inconspicuous black and fuscous spots and fine strigulae; from costa, at middle, a large fuscous blotch extending to near middle of cell edged above and below with brown and preceded by a black crescentic dash; around termen a series of black or fuscous spots; cilia whitish strongly suffused with fuscous. Hind wing light fuscous; cilia whitish. Legs white strongly mottled and overlaid with fuscous or black. Abdomen white with a black lateral stripe on each side beneath.

Male genitalia.—Harpe lightly sclerotized except for sacculus, which is heavily sclerotized and deeply folded; sacculus produced to form a broadly bifid clasper, transverse arm long, extending beyond middle of harpe, the other produced toward cucullus. Anellus a broad, sclerotized plate, dorsoventrally concave; two dorsal projections laterally produced. Aedeagus stout, blunt; vesica armed with several stout cornuti, the terminals (1-3) at right angles to the long axis of the aedeagus forming hook. Vinculum broad, rounded. Lobes of transtilla not fused. Gnathos a reniform, heavily spined knob.

Female genitalia.—Ostium round. Genital plate heavily sclerotized at edges of ostium; ductus bursae short, constricted just before bursa copulatrix; the posterior portion broad, heavily sclerotized; near the anterior edge of the sclerotized portion of the ductus a group of 18 short, stout spines (this probably varies). Signum of bursa copulatrix a large oval plate.

Larva.—Length 11–12 mm. Head light brown with a heavy suffusion of dark brown on the margins, epicranial sutures and, especially, beneath. Body subcylindrical, considerably thicker at middle and tapering toward each end. Thoracic and abdominal segments light yellowish green, lighter ventrally. Prothoracic shield light yellowish brown. Thoracic legs yellowish with joints edged with brown. Tubercles large, black; spiracles edged with brown.

The larvae of *canella* are often abundant, and their work is characteristic and easily recognized. Early in spring the tubes, formed by the larvae from tied terminal leaves, are conspicuous as “beaked” processes at right angles to the long axis of the stem. Frequently several tubes are constructed by one larva so that it becomes necessary to inspect several tubes before the larva is finally located. From the terminal portion of the tube the woolly covering of the leaves is ejected, this often forming a conspicuous mass. Pupation occurs in debris at the base of the plant. In the laboratory larvae pupated on April 24 and 25, and the moths emerged May 8, 1934.

The species is exceedingly difficult to rear. In the spring of 1935 nearly 400 larvae were collected but only 19 moths were obtained. This might suggest faulty rearing conditions but three systems were used with the same results. This and the fact that in nature the moths are scarce, although the larvae are abundant, suggest a natural high mortality.

Alar expanse, 16–20 mm.

Type.—In the United States National Museum (*canella*); A. F. Braun collection, Cincinnati, Ohio (*cogitata*).

Type localities.—Pullman, Wash. (*canella*) (Piper); Aweme, Manitoba (*cogitata*).

Food plants.—*Antennaria luzuloides* T. & I. (Clarke); *Gnaphalium* (J. McDunnough).

Distribution.—Western United States and Canada in the Rocky Mountain and intermountain areas; northeastern United States and eastern Canada.

United States records

California: Warner Mountains, 3 mi. E., Davis Creek, Modoc County, alt. 5,500 feet, ♂ (8-15-VII-1922, A. W. Lindsey).

Connecticut: New Haven, ♂ (Dr. Britton).

Idaho: Viola, Moscow Mountains, ♀ (12-VI-35, J. F. G. Clarke [reared]).

New Hampshire: Portsmouth, ♂ (VI-9-05, C. E. Montgomery).

New York: Big Indian Valley, Catskill Mountains, ♀ (IX-2-10, R. F. Pearsall); Ilion (♂, VI-25-13, 2 ♀♀, VI-25-13, VII-11-17, H. McElhose); also Wilmington and Ithaca (according to Forbes); Ithaca, ♀ (30-VI-31, A. B. Klots).

Washington: Kamiack Butte, Whitman County, 8 ♂♂ and 9 ♀♀ (May 8, 1934; May 16-June 18, 1935, J. F. G. Clarke [reared]); Pullman, ♂ (2 September '98).

Canadian records

Alberta: Waterton Lakes (12 July, J. McDunnough).

British Columbia: Chilcotin, ♂ (VIII-22-25, George V. Copley).

Manitoba: Aweme.

Quebec: Kazubeque, ♂ (VI-24-27, J. McDunnough [reared]).

Remarks.—There is no doubt about the synonymy of this species. Dr. Braun distinguishes her *cogitata* from *canella* on the basis of the absence of the black anterior border of the thorax and the white apical portion of the hind wing of the latter species. Although Busck did not mention the black anterior portion of the thorax in his description, all specimens I have seen, including the type, have it present. The use of a white apical portion of the hind wing to distinguish further between the two is impractical, no two specimens of this species having the same amount of black scaling at the apex of the hind wing and some lacking it entirely. The difference in the male genitalia is confined to the number of cornuti present on the vesica; but this character is useless since the number differs in different specimens.

This species closely resembles the European *alstroemeriana* but is easily distinguished from it by the black or very dark-brown collar.

MARTYRHILDA UMBRATICOSTELLA (Walsingham)

PLATE 24, FIGURES 143, 143a; PLATE 41, FIGURE 232

Depressaria umbraticostella WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 318, pl. 36, fig. 8.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5283, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 736, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5855, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6398, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 763, 1904.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 177, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 356, 1939.

Agonopteryx umbraticostella (Walsingham) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.—BRAUN, Trans Amer. Ent. Soc., vol. 51, p. 197, 1925.

Agonopterix umbraticostella (Walsingham) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8455, 1939.

Agonopteryx umbraticostella (Walsingham) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6484, 1917.

Labial palpus light ochreous suffused with light fuscous; third segment with median and basal bands, the latter poorly defined. Antenna fuscous. Head ochreous irrorated with fuscous. Thorax and base of fore wing blackish fuscous to black. Fore wing light reddish ochreous with small diffused blackish-fuscous spots on costa and around termen; on middle of costa a conspicuous, outwardly diffused blackish-fuscous shade preceded by two minute (sometimes inconspicuous) discal dots of the same color; from costal patch, around termen to near middle of inner margin, a light fuscous shade;

ilia light fuscous. Hind wing shining grayish fuscous. Legs whitish ochreous, the fore and mid legs strongly overlaid with fuscous; hind legs lightly so with their tarsi fuscous and annulated with whitish ochreous. Abdomen light fuscous above, whitish ochreous beneath with a lateral stripe on each side and irrorations blackish fuscous.

Male genitalia.—Harpe lightly clothed with hairs; costa heavily sclerotized; clasper divided, the arms long, of about equal length; one arm, paralleling the sacculus, stout and sharply pointed; the transverse arm curved, reaching costa and having a lateral thornlike process projecting toward the sacculus. Anellus a more or less shield-shaped plate, deeply excavated on the posterior margin, the excavation, in the main, being formed by two heavily sclerotized, winglike processes. Vinculum broad, rounded. Aedeagus stout, straight, bluntly pointed, with a large spinulate patch about the middle. Transtilla a broad sclerotized band. Gnathos reniform. Tegumen bifid. Socii rectangular flaps bearing a few hairs.

Female genitalia.—Genital plate narrow at the middle, the entire width being taken up by the rectangular ostium, then broadening laterally. Ductus bursae short, broad, and membranous. Bursa copulatrix large, oval; signum a large, elongate oval plate, slightly broader anteriorly than posteriorly, with long, spinelike projections at the posterior end.

Alar expanse, 16–19 mm.

Type.—In the British Museum.

Type localities.—Mount Shasta, Calif., and "North Oregon."

Food plants.—*Balsamorhiza sagittata* (Pursh) Nutt. and *Helianthus pumilus* Nutt.

Distribution.—Western United States and Canada.

United States records

Arizona: White Mountains, Apache Indian Reservation, alt. 7,000 ft., 5 ♂♂, 3 ♀♀ (June 1925, O. C. Poling); ♂, ♀ (July 5–15, 1925); ♀ (August 1–15, 1925).

California: Mount Shasta, ♂; Placer County, ♂ (September).

Colorado: Williams Range, ♂ (August 8, A. J. Snyder).

New Mexico: Fort Wingate, ♀ (July 16–23).

Oregon: "Camp Watson" 2 ♂♂ (III, IV, 1872, Walsingham).

Utah: Stockton, 2 ♂♂ (IX-6, IX-7-07, Tom Spalding); Eureka (♂, VII-13-11, ♂, VIII-14-11, ♀, VIII-29-11, Tom Spalding).

Washington: Almota, Whitman County, ♂ (IV-5-30, J. F. G. Clarke); Pullman, 2 ♂♂ (III-1-98, C. V. Piper), ♀ (II-17-30, D. H. Brannon), ♂ (VII-26-32, T. M. Clarke [reared]), ♂ (IV-13-26, J. F. G. Clarke), ♀ (III-26-30, J. F. G. Clarke); Snake River, Whitman County, opposite Clarkston, ♂ (IV-28-32, J. F. G. Clarke); Wenatchee, 2 ♂♂ (VI-5-30, VI-10-30, A. Spuler), ♀ (IX-5-29, A. Spuler).

Canadian records

British Columbia: Vernon (20-XI-1927, A. A. Denny).

Remarks.—This species seems to be confined to far-western North America, where it is rather widely distributed. It was originally described from specimens collected by Lord Walsingham on Mount Shasta, Calif., and in North Oregon. Busck²³ also records specimens from Arizona. He further states that Dyar bred a specimen from *Helianthus pumilus* collected near Denver and Sedalia, Colo. Braun²⁴ bred three specimens from *Balsamorhiza sagittata* collected near Logan, Utah.

MARTYRHILDA SORDIDELLA, new species

PLATE 24, FIGURES 145, 145a; PLATE 41, FIGURE 238

Labial palpus, head, thorax, abdomen, and ground color of fore wing sordid whitish; second segment of labial palpus with sparse brown and fuscous irrorations exteriorly; third segment immaculate; antenna with basal segment sordid whitish; remainder of segments fuscous with dull golden-yellow scaling above. Thorax and fore wing irrorated with dull golden-yellow and brown; from apical third of costa around termen to inner margin a series of indistinct brownish spots, with a few dull golden-yellow scales mixed; at basal third a brown discal spot; below this spot in fold (vein 1c) an elongate dull golden-yellow patch; at end of cell a conspicuous brown discal spot; cilia white, rather shining; underside of fore wing fuscous, except around edges. Hind wing smoky fuscous; cilia white with a brown subbasal line. Legs sordid whitish, slightly overlaid and mottled with fuscous exteriorly; tarsi fuscous except at joints.

Male genitalia.—Harpe moderately broad, tapering gradually to the bluntly pointed cucullus, and lightly clothed with coarse hairs; sacculus broad and very heavily sclerotized; clasper divided, the longitudinal arm produced as a strong, long, bluntly pointed extension of the sacculus, the transverse arm as a short, stubby, moderately sclerotized projection about middle of harpe. Anellus a broad rectangular plate with concave posterior edge, moderately well developed hairy lateral lobes and a broad median process from basal edge. Aedeagus stout, moderately long, nearly straight, bluntly pointed; vesica armed with an elongate patch of strong cornuti. Vinculum broadly rounded. Transtilla a narrow sclerotized band with large, hairy, fleshy, lateral lobes. Gnathos reniform. Tegumen pointed. Socii large fleshy, hairy lobes.

Female genitalia.—Genital plate moderately broad, lightly sclerotized. Ostium large, round, with an elongate, strongly sclerotized

²³ Busck, A., Proc. U. S. Nat. Mus., vol. 24, p. 736, 1902.

²⁴ Braun, A. F., Trans. Amer. Ent. Soc., vol. 51, p. 197, 1925.

patch on each side inwardly; anterolateral edge narrowly but heavily sclerotized. Ductus bursae membranous, short, broad, with 10 or 11 short, stout, strongly sclerotized, thornlike teeth inwardly; inception of ductus seminalis adjacent to ostium. Bursa copulatrix moderately large, round; signum a large, round, toothed plate.

Alar expanse, 18–21 mm.

Type.—In the Canadian National collection.

Paratypes.—U. S. N. M. No. 53258; also in the Canadian National collection.

Type locality.—Shingle Creek, Penticton, British Columbia.

Food plant.—Unknown.

Remarks.—Described from the ♂ type, 10 ♂ and 3 ♀ paratypes from British Columbia as follows: Brent's Landing, Penticton, 3 ♂ ♂ (30-V-1935); Shingle Creek, Penticton, 6 ♂ ♂ (16-V-1936); Shingle Creek Road, Keremeos, ♂ (8-VI-1935); Summerland, 2 ♀ ♀ (25-V-1935); Vaseaux Lake, ♀ (18-V-1936), all collected by A. N. Gartrell; Penticton, ♂ (7-VI-1935, J. McDunnough). The entire type series was submitted by Dr. McDunnough.

This is the third species of the genus from North America with a white ground color to come to my attention.

The costa of the fore wing of the female is somewhat straighter than that of the male and is more nearly parallel to the inner margin, producing a wing that is narrower and of nearly equal width throughout its length.

MARTYRHILDA GRACILIS (Walsingham)

PLATE 24, FIGURES 142, 142a; PLATE 41, FIGURE 233

Depressaria gracilis WALSINGHAM, *Ins. Life*, vol. 1, p. 257, 1889.—BUSCK, *Proc. U. S. Nat. Mus.*, vol. 24, p. 737, 1902; *in* Dyar, *U. S. Nat. Mus. Bull.* 52, No. 5857, 1903.—KEARFOOT, *in* Smith, *List of the Lepidoptera of Boreal America*, No. 6400, 1903.—MEYRICK, *in* Wytzman, *Genera insectorum*, fasc. 180, p. 177, 1922.—GAEDE, *in* Bryk, *Lepidopterorum catalogus*, pt. 92, p. 325, 1939.

Agonopteryx gracilis (Walsingham) BUSCK, *Proc. U. S. Nat. Mus.*, vol. 35, p. 198, 1908.

Agonopterix gracilis (Walsingham) McDUNNOUGH, *Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera)*, No. 8457, 1939.

Agnopteryx gracilis (Walsingham) BARNES and McDUNNOUGH, *Check list of the Lepidoptera of Boreal America*, No. 6436, 1917.

Labial palpus straw yellow; second segment blotched with reddish brown outwardly; third segment with a reddish-brown subapical annulus. Antenna with basal segment dark brown, remainder brown. Head straw yellow with a light reddish-brown patch above the base of each antenna. Thorax and base of forewing dark reddish brown. Ground color of fore wing and cilia straw yellow; discal spots dark

brown, the first two, obliquely one above the other, before middle, the third at end of cell; from costa, just before apex, around termen a series of six or seven dark brown spots; cilia strongly mixed with dark brown. Hind wing pale grayish fuscous; cilia pale straw yellow with a faint, narrow, brown subbasal line. Legs straw yellow; anterior femora and tarsi strongly overlaid with brown; tarsi of middle and hind legs tinged with brown. Abdomen brownish above with posterior edges of segments and ventral surface straw yellow.

Male genitalia.—Harpe moderately broad; costa heavily sclerotized to a point just before cucullus; clothing of hairs confined to the apical half except for a group of coarse hairs on base just below the costa; clasper divided, one arm, paralleling the sacculus, short and acutely pointed, the other, long, reaching to a point just below the costa, with a short, blunt lateral projection. Anellus a broad, sclerotized plate with an elongated troughlike articulation on which the aedeagus rests. Vinculum rounded. Aedeagus stout, bent sharply at middle and tapering gently to a blunt point. Transtilla a narrow band with hairy lateral lobes. Gnathos an oval, spined knob. Tegumen rounded at apex. Socii fleshy flaps with a few hairs.

Female genitalia.—Genital plate broad, rather heavily sclerotized around the ostium. Ostium deeply concave. The edges immediately around the ostium and the posterior portion of the ductus bursae are spinulate. Just before the ostium the ductus bursae is constricted. Ductus bursae short, membranous, unarmed on inner surface, widening gently into the large bursa copulatrix. Signum a large, broadly oval, slightly sclerotized plate.

Alar expanse, 15-18 mm.

Type.—In the British Museum.

Type locality.—Texas.

Food plant.—Unknown.

Distribution.—Western United States.

United States records

California: Laguna Beach, ♀; Loma Linda, San Bernardino County, ♀ (Oct. 8-15); San Diego, 2 ♂♂ (Nov. 21, 1921, Karl R. Coolidge), 3 ♂♂ (May 24-30), ♀ (June 16-23), ♀ (April 16-23), ♀ (IV-26-08, Geo. H. Field).

Colorado: Colorado Springs (Fountain Valley School), 3 ♂♂ (20-31-VIII-32, A. B. Klots); Denver, ♂ (Osler); 2 ♀♀ (no data).

Iowa: Iowa City, ♀ (G. G. Ainslie).

South Dakota: Elk Point, ♀ (Aug. 1918, C. N. Ainslie).

Texas: 2 ♂♂ (X-06, H. Lacey).

Remarks.—This very distinct species cannot be confused with any other described North American *Martyrhilda*, but it closely resembles the European *culcitella*.

MARTYRHILDA THORACENIGRAEELLA (Chambers)

PLATE 24, FIGURE 144; PLATE 41, FIGURE 239

Gelechia thoracenigraeella CHAMBERS, Cincinnati Quart. Journ. Sci., vol. 2, p. 246, 1875; U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 147, 1878.

Depressaria thoracnigracella (Chambers) RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5495, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 736, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5856, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6399, 1903.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 355, 1939.

Agonopteryx thoracenigraeella (Chambers) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.

Agonopteryx thoracenigraeella (Chambers) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8456, 1939.

Agnopteryx thoracenigraeella (Chambers) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6435, 1917.

Labial palpus whitish ochreous; second segment irrorated with fuscous; third segment with a broad, well-defined black subapical annulus and a narrower, poorly defined basal annulus of the same color. Antenna fuscous. Head, thorax, and ground color of fore wing pale ochreous-gray; fore part of thorax and base of fore wing blackish fuscous; from costa to middle of cell a fuscous shade edged above and below with brown and preceded by a conspicuous outwardly oblique black dash; on costa and around termen a series of grayish-fuscous spots; cilia light fuscous irrorated with whitish ochreous. Hind wing brownish fuscous; cilia somewhat lighter with a white terminal edge. Legs light grayish ochreous overlaid and mottled with fuscous; hind tarsi fuscous, annulated with whitish ochreous. Abdomen grayish ochreous above, beneath whitish ochreous with a black lateral line on each side.

Male genitalia.—Essentially like *gracilis*, differing chiefly in the characters of the aedeagus. Harpe moderately broad and clothed with fine hairs, especially in apical half; clasper divided, one arm paralleling sacculus, the other transverse, arising well before middle of harpe, reaching nearly to costa, and without lateral process; sacculus heavily sclerotized; anellus a sclerotized plate with median trough on which the aedeagus articulates; lateral hairy lobes present. Aedeagus stout, only slightly curved; cornuti numerous, strong, in an elongate patch. Vinculum rounded, broad. Transtilla a narrow sclerotized band with lateral hairy lobes. Gnathos an oval spined knob. Socii fleshy hairy lobes. Apex of tegumen with median cleft.

Female genitalia.—Ostium moderately large, located near anterior edge of genital plate. Ductus seminalis entering ductus bursae just anterior to ostium. Ductus bursae membranous except for two sclero-

tized patches, one large, the other small, each set with sharp thornlike projections. Signum of bursa very large, oval.

Alar expanse, 16-17 mm.

Type.—In the Museum of Comparative Zoology, Cambridge, Mass.

Type locality.—Behrens, Calif.

Food plant.—Unknown.

Distribution.—Known only from California.

United States records

California: Carmel, 4 ♂♂, ♀ ("June," A. H. Vachell).

Remarks.—The type of *thoracenigraella*, in the Museum of Comparative Zoology, Cambridge, is in very poor condition. The right fore wing, in good condition, is still attached to the thorax, but the abdomen, most of the legs, and all the other wings are gone.

Despite the poor condition of the type I have been able to recognize five specimens as this species. The figures of the genitalia have been made from two of these specimens.

MARTYRHILDA THORACEFASCIELLA (Chambers)

PLATE 24, FIGURES 146, 146a; PLATE 41, FIGURE 235

Gelechia thoracefasciella CHAMBERS, Cincinnati Quart. Journ. Sci., vol. 2, p. 246, 1875; Can. Ent., vol. 10, p. 50, 1878; U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 147, 1878.

Depressaria thoracefasciella (Chambers) RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5494, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 740, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5867, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6410, 1903.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 354, 1939.

Depressaria thoracifasciella (Chambers) MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 176, 1922.

Agnopteryx thoracefasciella (Chambers) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6451, 1917.

Agnopteryx thoracefasciella (Chambers) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8442, 1939.

Labial palpus with second segment ochreous-white, mottled with fuscous exteriorly; third segment blackish fuscous with a poorly defined ochreous-white median band and ochreous-white tip. Antenna blackish fuscous. Head, thorax, base and basal fourth of costa of fore wing whitish ochreous. Ground color of fore wing brownish fuscous sparsely irrorated with whitish ochreous; extreme base of costa, and shade beyond whitish-ochreous base, blackish fuscous; first two discal spots small, black, obliquely placed one above the other; at the end of cell a conspicuous white or whitish-ochreous discal spot surrounded by a blackish-fuscous suffusion; along costa and around termen a series of poorly defined blackish-fuscous spots; cilia fuscous, mixed with ochreous-white. Hind wing brownish

fuscous, lighter basally; cilia fuscous. Legs blackish fuscous irrorated with ochreous-white; tarsi annulated with ochreous-white. Abdomen fuscous above; beneath, ochreous-white overlaid and irrorated with fuscous.

Male genitalia.—Harpe moderately sclerotized; cucullus rounded and clothed with fine hairs. Transverse and longitudinal arms of clasper of about equal length, the former extending beyond the costa; sacculus as broad as one-third the width of harpe at base. Anellus a roughly rectangular sclerotized plate emarginate on the posterior edge; lateral lobes minute. Transtilla a narrow band with fused hairy lobes. Vinculum rounded, broad. Aedeagus slender, about one-half the length of harpe, slightly curved, unarmed; apex slightly recurved. Gnathos an oval spined knob; supporting arms moderately sclerotized. Socii small, clothed with few hairs; widely separated. Tegumen truncated, slightly emarginate.

Female genitalia.—Ostium large, rounded; on each side of the ostium the genital plate is produced into a strongly sclerotized pocket. Inception of the ductus seminalis slightly anterior to the sclerotized pockets. Ductus bursae membranous, unarmed on inner surface, tapering gradually into the symmetrical bursa copulatrix. Signum an elongate scobinate plate attenuated and broken posteriorly.

The abdominal wall of this species differs from that of *sphaeralceae* in being much less strongly sclerotized. The harpes of the male are broader and correspondingly shorter, and much less sclerotized. The aedeagus is shorter than that of *sphaeralceae* and the apex is more strongly recurved. The female genitalia show marked differences. The signum of *sphaeralceae* is smaller and less strongly sclerotized than that of *thoracefasciella* and the sclerotized pockets of the latter species are totally wanting in the former.

Alar expanse, 15–17 mm.

Type.—In the Museum of Comparative Zoology, Cambridge, Mass.

Type locality.—Behrens, Calif.

Food plants.—*Sidalcea malvaeflora* A. Gray (Keifer rearing) and *Malva?* (C. M. Dammers).

Distribution.—Southwestern United States.

United States records

Arizona: Hualapi Mountains, Mojave County, 2 ♂♂, ♀ (May 24–31, no collector).

California: Diamond Spring, Eldorado County, 3 ♂♂, 3 ♀♀ (V-26 to V-3-35, H. H. Keifer); Canyon Valley, San Bernardino County, ♂ (VII-1-32, no collector); Riverside, ♀ (June 1930, C. M. Dammers); Mill Valley, Marin County, 4 ♂♂ (5-12-III-20, E. P. Van Duzee).

Remarks.—I have examined the type of this species and have made a slide of the male genitalia. These agree exactly with specimens from our reared series.

MARTYRHILDA SPHAERALCEAE, new species

PLATE 24, FIGURES 147, 147a; PLATE 41, FIGURE 237

A small, gray, narrow-winged western species, closely related to the foregoing, but easily distinguished from it by the genitalia.

Head, palpus, and antenna dark grayish fuscous; face whitish ochreous; second segment of labial palpus whitish ochreous inwardly and above with a liberal sprinkling of whitish-ochreous scales outwardly; third segment whitish ochreous above, the color extending around middle to form an incomplete annulus; apex whitish ochreous; antenna with narrow fuscous annulations. Thorax and ground color of fore wing grayish fuscous, the tips of the scales narrowly whitish ochreous; basal part of fore wing, usually with more whitish-ochreous scaling, appearing lighter than ground color and followed by a dark fuscous shading; at basal third two black obliquely placed discal spots followed by white scales, the spots frequently confluent, forming an outwardly oblique discal dash; at end of cell a white discal spot surrounded by blackish-fuscous scales; along costa and around termen a series of indistinct fuscous spots; underside of costa whitish ochreous to apex; a row of black scales around termen; cilia gray mixed with fuscous and whitish-ochreous scales. Hind wing grayish fuscous with light fuscous cilia; a fuscous band around margin at base of cilia; a blackish-fuscous line around apex and termen beneath. Legs fuscous irrorated with whitish ochreous; tarsi annulated with whitish ochreous. Abdomen fuscous above with grayish at the posterior margin of each segment; grayish laterally and beneath with a row of black lateral spots.

Male genitalia.—Harpe ample, strongly sclerotized; cucullus blunt-pointed, clothed with fine hairs; transverse arm of clasper appreciably longer than longitudinal arm, reaching well beyond costa; sacculus broader than one-third the width of harpe at base. Anellus roughly rectangular, emarginate on the posterior edge; lateral lobes scarcely developed. Transtilla a narrow band with well-developed, fused, lateral hairy lobes. Aedeagus slender, slightly curved, longer than one-half the length of harpe, pointed, unarmed. Vinculum rounded. Gnathos an oval spined knob; supporting arms strongly sclerotized. Socii fleshy hairy lobes, well separated. Tegumen with the apex emarginate.

Female genitalia.—Ostium small, round at extreme anterior edge of genital plate. Genital plate broad, weakly sclerotized. Ductus bursae moderately stout, membranous, tapering gradually into bursa; inception of ductus seminalis just anterior to the ostium. Bursa copulatrix symmetrical, oval; signum a small, weakly sclerotized, elongate plate.

Alar expanse, 15–18 mm.

Larva.—Length 9–11 mm. Head and cervical shield light brown, the former broadly suffused laterally and posteriorly with dark brown; epicranial sutures dark brown; ocelli light brown surrounded by a blackish area. Underside of head yellowish brown. The shield is bisected by a narrow light-green or yellowish longitudinal line; posterior half of shield dark brown; beyond this, on dorsal half, prothorax whitish. Thoracic and abdominal segments apple green with a broad suffusion of whitish around the dark brown tubercles and on the posterior edges of the segments. Setae long, yellowish brown proximally, whitish distally. Anal plate pale green with whitish posterolateral edges. Thoracic legs yellowish brown with lighter annulations at the joints.

The larva is a leaf miner forming a blotch mine. In the early stages frass is ejected from the mine through a small silken tube, which is constructed at one edge of the mine, usually parallel to the midrib of the leaf. In the later instars the larva folds a leaf and completely mines out the spongy material between the upper and lower epidermal layers. The larva remains in this large, roomy mine until ready to pupate. Pupation occurs in sand or soil at the base of the plant.

The larvae are abundant in the Grand Coulee, where nearly all plants of *Sphaeralcea munroana*, which are numerous, are heavily infested. The leaves are badly discolored owing to the thoroughness with which they are mined.

Type.—U.S.N.M. No. 52076.

Type locality.—Park Lake, Grant County, Grand Coulee, Wash.

Food plant.—*Sphaeralcea munroana* (Dougl.) Spach.

Remarks.—Described from the ♂ type, 5 ♂ and 4 ♀ paratypes (V-15 to VI-12, 1935, J. F. G. Clarke). Paratypes in United States National Museum, Canadian National, and H. H. Keifer collections.

MARTYRHILDA NIVALIS (Braun)

PLATE 25, FIGURES 150, 150a; PLATE 40, FIGURE 231

Agonopteryx nivalis BRAUN, Proc. Acad. Nat. Sci. Philadelphia, vol. 73, p. 10, 1921.

Agonopterix nivalis (BRAUN) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8-119, 1939.

Depressaria nivalis (BRAUN) GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 334, 1939.

Labial palpus white except for some light-brown scaling on the outside of second segment. Antenna fuscous. Head, thorax, and fore and hind wings white; slightly beyond base of fore wing, in inner angle and along inner margin, a faint light-brown shade; two discal spots, obliquely one above the other, at basal third, another, larger, white-centered discal spot at end of cell, a series of spots along costa and

around termen and sparse irrorations over entire surface of fore wing fuscous to blackish fuscous. Legs and abdomen white, the former strongly suffused with fuscous.

Male genitalia.—Harpe ample, gently tapering toward cucullus, the latter rounded. Sacculus strongly sclerotized; both arms of clasper very slender, sharply pointed, the transverse arm arising well before middle of harpe and reaching two-thirds distance toward costa. Anellus a weakly sclerotized broad plate with well developed, slightly hairy, lateral lobes. Transtilla a weakly sclerotized band with well developed lateral lobes. Aedeagus slender, slightly curved, not appreciably compressed, bluntly pointed with elongate, spinulate patch on vesica. Vinculum rounded. Gnathos an oval spined knob. Socii weakly sclerotized, sparsely hairy, fleshy lobes.

Female genitalia.—Ostium small, round, without strongly sclerotized area laterally. Ductus bursae membranous, slender, inception of ductus seminalis on right side just before ostium. Bursa copulatrix large, pear-shaped, with strongly sclerotized oval signum.

Alar expanse, 21–23 mm.

Type.—In collection of Dr. A. F. Braun, Cincinnati, Ohio.

Type locality.—Two Medicine Lake, Glacier National Park, Mont.

Food plant.—Unknown.

Distribution.—Western United States and Canada in Mountains.

United States records

Washington: Skyline Ridge, Mount Baker district, Whatcom County, alt. 6,000 feet, ♂, 3 ♀♀ (26–VII–25 and 16–VIII–30, J. F. G. Clarke).

Wyoming: Green River Lake, Wind River Range, 12 ♂♂, ♀ (July 24 to August 7, 1935, A. B. Klots).

Canadian records

Alberta: Lake Louise, ♂ (“VIII–1918”).

Remarks.—This is one of three known white species in this genus from North America. The others, *canella* and *sordidella* (new species), cannot be confused with it.

Dr. Braun has compared a male with her type and has kindly verified my determination of the species.

The venation is subject to considerable variation, one female having, on the right side, an accessory cell in the fore wing between veins 9 and 11 that is included in the discal cell; vein 7 of the hind wing is forked.

MARTYRHILDA HILDAELLA, new species

PLATE 24, FIGURES 148, 148a

Labial palpus sordid whitish; second segment with sparse black and fuscous irrorations exteriorly, mostly confined to basal half, and with slight infuscation in the undivided slender brush; third segment im-

maculate. Antenna grayish fuscous with narrow fuscous annulations. Head, thorax, and base of fore wing sordid whitish, the latter diffused along costa to slightly beyond basal third; tegula with a pale brownish suffusion toward apex; fore wing strongly irrorated with contrasting black spots, especially along veins; in the light basal patch, slightly below costa, a conspicuous black spot; beyond basal patch a transverse dark fuscous dash, which does not reach costa and which rapidly fades to a pale brownish ochreous, becomes stronger in color from middle to apical third, where it is followed by sordid whitish or cinereous and is narrowly diffused along costa to apex; at middle of cell a conspicuous though small black discal spot; at end of cell a white discal spot edged with black; above and below the latter spot considerable black scaling fusing with the brownish-ochreous shade; from apical third of costa, around termen to inner margin a series of blackish dashes edged inwardly and narrowly with pale yellowish brown; whole surface of wing somewhat lustrous and appearing predominantly gray; cilia light fuscous, darker basally. Hind wing shining grayish fuscous; cilia brownish fuscous with a fuscous basal band. Legs ochreous-white strongly overlaid and suffused with fuscous except at joints. Abdomen light grayish fuscous with some cinereous and white scales mixed and with a median longitudinal fuscous shade beneath.

Male genitalia.—Harpe rather broad, clothed with coarse hairs in outer half; basal half heavily sclerotized except for a small membranous median area; costa and ventral margin parallel and evenly curved; cucullus rounded; sacculus rather narrow, very strongly sclerotized; clasper divided, the longitudinal arm produced as a strong pointed extension of the sacculus, the transverse arm a slender pointed process extending but slightly beyond middle of harpe. Anellus a broad, subrectangular plate with large hairy lateral lobes, concave posterior edge and broad sagittate basal process. Aedeagus stout, moderately long, gently curved; vesica armed with a large elongate patch of rather strong cornuti. Vinculum narrowly rounded. Transstilla a narrow sclerotized band with large hairy lateral lobes. Gnathos oval. Tegumen truncate. Socii fleshy, hairy lobes.

Alar expanse, 18–21 mm.

Type.—In the Canadian National Collection.

Paratypes.—U. S. N. M. No. 53259; also in the Canadian National Collection.

Type locality.—Cameron Bay, Great Bear Lake, Northwest Territories, Canada.

Food plant.—Unknown.

Remarks.—Described from the ♂ type and 5 ♂ paratypes all from the type locality (8–12–VII–1937, T. N. Freeman). I have seen no females.

MARTYRHILDA KLAMATHIANA (Walsingham)

PLATE 25, FIGURE 151; PLATE 41, FIGURE 234

- Depressaria klamathiana* WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 314, pl. 36, fig. 4.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5267, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 740, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5868, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6411, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 762, 1904.—DYAR, Proc. U. S. Nat. Mus., vol. 27, p. 934, 1904.—ANDERSON, Catalogue of British Columbia Lepidoptera, No. 1091, 1904.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 328, 1939.
- Agonopteryx klamathiana* (Walsingham) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.
- Agonopterix klamathiana* (Walsingham) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8435, 1939.
- Agonopteryx klamathiana* (Walsingham) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6441, 1917.
- Depressaria ciniflonella* WALSINGHAM (not Zeller), Ins. Life, vol. 1, p. 256, 1889.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5259, 1891.—BUSCK (not Zeller), Proc. U. S. Nat. Mus., vol. 24, p. 740, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5869, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6412, 1903.—ANDERSON, Catalogue of British Columbia Lepidoptera, No. 1092, 1904.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 176, 1922 (part).—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 314, 1939.
- Agonopteryx ciniflonella* Busck (not Zeller), Proc. U. S. Nat. Mus., vol. 35, p. 198, 1908.
- Agonopteryx ciniflonella* BARNES and McDUNNOUGH (not Zeller), Check list of the Lepidoptera of Boreal America, No. 6440, 1917.
- Agonopterix ciniflonella* McDUNNOUGH (not Zeller), Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8436, 1939.

Labial palpus gray; second segment strongly mixed with reddish fuscous; third segment with a broad, fuscous annulus before apex. Antenna reddish gray. Thorax, base of fore wing, and costa to about middle sordid whitish; anterior part of thorax suffused with reddish fuscous; ground color of fore wing reddish gray strongly suffused with reddish fuscous; at basal third two obliquely placed black discal dashes of raised scales followed by white or grayish scales; beyond this light patch a fuscous shade; at the end of cell a white discal spot margined by blackish fuscous; around termen a series of fuscous dots; cilia dull reddish with a narrow, fuscous median band; under side of costa narrowly edged with carmine. Hind wing grayish fuscous; cilia light fuscous with a rosy tinge and a fuscous basal band. Legs grayish overlaid with fuscous and strongly suffused with carmine. Abdomen grayish fuscous above; beneath sordid whitish with a broken, black lateral line on each side.

Male genitalia.—Harpe with the apical and basal portion just below costa clothed with coarse hairs; marginal hairs fine; sacculus heavily sclerotized; clasper divided; transverse arm straight, slender, arising at or before middle of harpe and reaching to or slightly beyond costa; at the base of the arm a sclerotized portion forming a short, sharp thorn (in some specimens this is scarcely noticeable); the other arm is short, sharply pointed and parallel to the sacculus; cucullus rounded. Anellus a rectangular plate, deeply cleft on the posterior edge; lateral lobes weak. Vinculum rounded. Aedeagus broad dorsoventrally and compressed laterally. The dorsal edge is strongly sclerotized; both ends slightly enlarged; vesica with a spinulate patch at middle. Transtilla a narrow sclerotized band; lateral lobes large, not fused. Gnathos a spined oval knob. The gnathos varies slightly in different specimens. Socii broad hairy flaps.

Female genitalia.—Genital plate broad, with two narrow, raised ridges posterior to ostium. Ostium small, round and situated at extreme anterior edge of plate. Ductus bursae membranous, short, and tapering into the bursa copulatrix. The latter is large, asymmetrical. Signum an elongate-oval, sclerotized, scobinate plate, extending almost the entire length of the bursa.

Alar expanse, 20–25 mm.

Type.—In the British Museum.

Type locality.—Fort Klamath, Oreg.

Food plant.—Apple?

Distribution.—Western United States and Canada as far east as Ontario.

United States Records

Montana: Ravalli County, 3 ♂♂, ♀ (1–29–33, from magpie nests).

Oregon: Fort Klamath, 2 ♂♂ (IX–20–71, Walsingham).

Washington: Bellingham, ♀ (VIII–22–26, J. F. G. Clarke); Logan Hill, Chehalis, 3 ♂♂, 2 ♀♀ (II–16 to III–28–30, T. M. Clarke).

Canadian records

British Columbia: Duncan, ♀ (Apr. 1–7, Hanham); Fraser Mills, ♀ (IX–5–20, L. E. Marmont); Hazelton, ♀ (IX, 14–21, W. B. Anderson); Kalso, ♀ (IV–24–15, J. W. Cockle); Marron Lake, ♂ (Apr. 1924, C. B. Green); Quamichan Lake, Vancouver Island, ♀ (IX–27–02); Vancouver, ♀ (III–18–96, Livingston); Victoria, ♂ (IV–18–17, E. H. Blackmore), ♂ (VIII–29–23, K. F. Auden), ♀ (III–10–23, W. R. Carter); Wellington, 3 ♂♂, 6 ♀♀ (V–25–07, April [3 specimens]; 3 specimens, III–22–03, G. W. Taylor).

Ontario: Hymers, 2 ♂♂ (no date or collector); Ottawa, ♀ (III–18–05, C. H. Young).

Remarks.—After studying 45 specimens and 29 wing and genitalia slides, I am convinced that all the above material is referable to this species. I admit that the series studied shows many minor superficial differences existing between specimens. In genitalia, however, even

though slight variations occur, there are no major differences and none which would separate one group of specimens from another.

In addition, some specimens are more gray than others, having little of the red scaling that is characteristic of the species; others possess a white, rather than gray, head.

The European *ciniflonella* is a gray species with very narrow wings. The costa is not strikingly lighter as in most specimens of *klamathiana*. One or two North American specimens I have seen approach *ciniflonella* very closely. The wing form appears to vary considerably due to the differences in length of veins 2-9 of the fore wing. In some specimens these veins are considerably longer than in others, and the fore wings are correspondingly longer. It is possible that what I consider *klamathiana* actually includes more than one species, or one in a state of flux, but this entire group (*klamathiana*, *sciadop*, *ciniflonella*, and a fourth unnamed) represents a very difficult complex of species. Only careful rearing will determine the status of these.

MARTYRHILDA SCIADOPA (Meyrick)

PLATE 24, FIGURES 149, 149a; PLATE 41, FIGURE 236

Depressaria sciadop MEYRICK, Exotic Microlepidoptera, vol. 2, p. 315, 1920; in Wytman, Genera insectorum, fasc. 180, p. 176, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 348, 1939.

Agonopterix sciadop (Meyrick) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8434, 1939.

This species is like the foregoing, *klamathiana*, but lacks the red or brown scaling of that species, is without carmine suffusion, and averages smaller in size.

Labial palpus whitish gray; second segment irrorated and suffused with grayish fuscous exteriorly; third segment with broad supra-medial grayish-fuscous annulus. Antenna grayish fuscous above, whitish gray beneath. Head, thorax, and ground color of fore wing whitish gray. Head lightly irrorated with grayish fuscous. Thorax strongly overlaid with grayish fuscous and irrorated with black, the darker colors almost obscuring the lighter ground color. Fore wing suffused with grayish fuscous and irrorated with black; extreme base of wing and basal half of costa whitish gray strigulated with grayish fuscous and with a small black spot near base slightly inside the costal edge; beyond the light costal and basal areas a strong blackish to grayish fuscous shade rapidly fading to the light ground color slightly beyond basal third; a similar, but smaller, dark shade at middle of wing; at basal third a pair of small black discal spots, one above the other, followed by white scales; sometimes these two spots are confluent, forming a short, outwardly oblique black dash; at the end of cell a small white spot edged with black; at apical fourth a

narrow, faint, outwardly curved grayish-fuscous shade; along costa and around termen a series of small black spots; cilia whitish gray irrorated with grayish fuscous. Hind wing whitish gray basally, grayish fuscous apically; cilia whitish gray with a grayish-fuscous subbasal band. Legs whitish gray overlaid and suffused with grayish fuscous except at joints. Abdomen whitish gray suffused with grayish fuscous above and with a poorly defined row of black spots on each side beneath.

Male genitalia.—Harpe rather heavily sclerotized except for the cucullus and a small area about the middle; cucullus and the sclerotized costal area moderately clothed with fine hairs (the cucullus of one male is considerably rounded while those of four other males are somewhat pointed); clasper strongly sclerotized; the free transverse arm originating about the middle of the harpe; longitudinal arm short, sharply pointed; sacculus heavily sclerotized. Anellus a narrow concave plate forming a trough on which the aedeagus articulates; lateral lobes weak. Vinculum rounded. Aedeagus stout, slightly curved, very much compressed, rather broad dorsoventrally, constricted at about the middle; dorsal edge heavily sclerotized; vesica armed with a patch of very small cornuti. Transtilla a narrow sclerotized band with well-developed lateral lobes. Gnathos an oval spined knob. Socii fleshy lobes clothed with fine hairs. Apex of tegumen bluntly pointed; ventral edges with rather well developed outgrowths. Abdomen of male heavily sclerotized.

Female genitalia.—Genital plate broad with the small round ostium situated at the extreme anterior edge. Ductus bursae short, membranous, stout, tapering into the large asymmetrical bursa copulatrix; signum an elongate sclerotized plate with small thornlike projections covering the surface.

Alar expanse, 15–19 mm.

Type.—In the British Museum.

Type locality.—Field, British Columbia, Canada.

Distribution.—Canada and northeastern United States.

United States records

New Hampshire: Jefferson, 2 ♀♀ (30-III-36, 21-X-1936, A. E. Brower).

New York: Oswegatchie, ♂, 2 ♀♀ (31-III-33, A. B. Klots).

Canadian records

Alberta: Edmonton, 2 ♂♂, 2 ♀♀ (IV-10-21, K. Bowman); 3 ♀♀ (IV-5 to 13-24, Owen Bryant); Red Deer, 7 ♂♂, 1 ♀ (VI-1 to 16-23, K. Bowman).

Manitoba: Aweme, 1 ♂, 5 ♀♀ (XI-9-05), ♂ (III-31-04), ♀ (IX-29-20), ♂, ♀ (X-16-20), all collected by N. Criddle; Cartwright, ♂ (XI-23-05, E. F. Heath); Winnipeg, ♂ (no date, A. W. Hanham).

Ontario: Ottawa, ♂ (X-17-07, C. H. Young).

Quebec: Chelsea, ♂ (IV-21-23, J. McDunnough).

Remarks.—This species, *klamathiana*, *ciniflonella*, and a few miscellaneous unnamed specimens form a very complex group in which the species are exceedingly difficult to separate. On genitalia it is difficult to separate one from the other, only one specimen, an unnamed unique female from the Moscow Mountains, Idaho, showing good specific characters in the genitalia. The harpes of *sciadopa* are clothed with seemingly finer hairs than those found in *klamathiana* or *ciniflonella*, but this character, even though probably sufficient to distinguish *sciadopa* from the others, fails in separating the latter two. The point of origin of the transverse arm of the clasper and the comparative lengths seem to be the safest characters for separating the males of the two species. The length of the wings of *ciniflonella* is proportionately greater than in *klamathiana*, but I am skeptical of the value of this character. In some long reared series of other species both long- and short-winged forms are found. In some specimens the lengthening of the wings seems to be retarded. The venation shows some variation in all species, thus eliminating venation as a means of specific separation.

On pattern and size it is possible, with exceptions, to distinguish the three; *sciadopa* may be separated from the other two by its much smaller size, grayer appearance, and total absence of brown or red scales. Under this name I place with some doubt the specimens listed above. Meyrick's description of *sciadopa* could actually fit any one of two or three species before me, but because of the type locality and the fact that Meyrick has placed *sciadopa* in the "*ciniflonella* group." I prefer to use his name instead of proposing another. An examination of the type will be necessary to determine definitely what the name really represents.

3. BIBARRAMBLA, new genus

PLATE 4, FIGURES 29, 30; PLATE 9, FIGURES 65, 65a; PLATE 18, FIGURE 109

Genotype.—*Semioscopis allenella* Walsingham, Trans. Amer. Ent. Soc., vol. 10, p. 174, 1882.

Similar to *Agonopterix* but the second segment of the labial palpus without furrow; socii and uncus fused to form hood.

Head with appressed scales; side tufts spreading; antenna simple in both sexes; basal segment short, with pecten. Labial palpus long, recurved, second segment much longer than third, without furrow. Thorax with two minute crests. Abdomen not flattened. Fore wing with arched costa; scale tufts present; 12 veins; 2 and 3 stalked from angle; 2 and 3, 4 and 5 closely approximate; 7 and 8 stalked, both to costa; stalk of 7 and 8 approximate to 9; 11 from well before middle; termen straight, oblique.

Hind wing as broad as fore wing; 8 veins; 3 and 4 connate; 6 and 7 subparallel.

Male genitalia.—With clasper. Anellus well developed, without lateral processes. Uncus and socii fused. Gnathos a spined knob.

Female genitalia.—Genital plate strongly sclerotized, signum present.

Remarks.—This genus is closely allied to *Agonopteryx*.

BIBARRAMBLA ALLENELLA (Walsingham), new combination

PLATE 4, FIGURES 29, 30; PLATE 9, FIGURES 65, 65a; PLATE 18, FIGURE 109

Semioscopsis allenella WALSINGHAM, Trans. Amer. Ent. Soc., vol. 10, p. 174, 1882.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5894, 1903; Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6489, 1917.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 186, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8464, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 369, 1939.

Agonopteryx allenella (Walsingham) FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 241, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 545, 1928.—PROCTER, Biological survey of the Mount Desert region: The insect fauna, p. 273, 1938.

Labial palpus sordid whitish; second segment shaded with fuscous on basal half and irrorated distally; slightly before apex a narrow, incomplete, brownish-fuscous annulus; third segment with a spot anteriorly at base and a broad, supra-medial annulus brownish fuscous. Antenna sordid whitish, narrowly annulated with fuscous; basal segment fuscous above. Head, thorax, and fore wing grayish white, suffused and irrorated with fuscous; at basal third, in cell, two fuscous discal spots (sometimes confluent) of raised scales followed by some ochreous scaling and with a few scales of white mixed; at the end of cell a black-edged white discal spot of raised scales followed by some ochreous scaling; along costa, and around termen to inner margin, a series of fuscous spots; costa narrowly edged with pink (this pink tint is obscure in some specimens but is strongly continued through the cilia in others); cilia sordid whitish with a broad, pale grayish-fuscous subbasal band. Hind wing pale grayish fuscous, darker apically; cilia sordid whitish with a broad, pale grayish fuscous subbasal band. Legs sordid whitish suffused and annulated with fuscous except at joints and on hind tibia, the latter with pale ochreous suffusion and a faint pink tint. Abdomen pale ochreous suffused with fuscous above.

Male genitalia.—Harpe broad basally, tapering to the pointed cucullus, hairy; sacculus broad, strongly sclerotized, clasper stout, dilated distally, recurved. Anellus a large sclerotized plate, pointed anteriorly, slightly concave posteriorly and without lateral hairy lobes. Aedeagus long, slender, narrowly S-shaped; basally, on ventral side a small, flat protuberance; vesica armed with minute cornuti. Vinculum broad, rounded, with a well-developed dorsoanterior process.

Transtilla a narrow, weakly sclerotized band with small hairy lateral lobes. Gnathos a spined, oval knob. Socii small, hairy, fused with uncus to form a narrow hood.

Female genitalia.—Genital plate narrow, produced anteriorly, strongly sclerotized; anterior edge produced ventrally to form a small shelf. Ostium small, elongate; on each side a shallow, narrow cavity. Ductus bursae membranous, slender, gradually tapering into the large bursa copulatrix; ductus seminalis opening just before ostium. Signum a small, strongly sclerotized plate with two or three strong teeth.

Alar expanse, 19–22 mm.

Type.—In the British Museum.

Type locality.—Maine (?).

Food plants.—*Alnus* sp.; oak; birch.

Distribution.—Northeastern United States and eastern Canada.

United States records

District of Columbia: Washington, ♂ (May 1902, A. Busck).

Maine: Kingsfield, ♂ (10–VII–1936, no collector); Rangeley, ♀ (12–VII–1936, V. H. dos Passos); Sebec Lake, ♂, 2 ♀♀ (June and July; no collector); Wales, ♀ (21–VI–1907; no collector).

Maryland: Plummers Island, 3 ♂♂ (May and August 1903, 1919, A. Busck).

New Hampshire: Center Harbor, ♂ (July 27, 1902, H. G. Dyar); Dublin, 2 ♂♂ (no date; A. Busck); Hampton, ♀ (4–VII–1906, S. A. Shaw).

New Jersey: Essex County Park, ♂ (11–VI–1899, W. D. Kearfott).

New York: McLean, Rhinebeck, Lond Island, etc. (*teste* Forbes).

Pennsylvania: New Brighton, 19 ♂♂, 8 ♀♀ (May and June dates, 1901–1907, H. D. Merrick).

Virginia: Upton, ♀ (25–IV–1913, F. Johansen [Hopkins No. 9861d]).

Canadian records

Nova Scotia: Petite Riviere (July 11–18, 1935, J. McDunnough); S. Milford (June 29, 30, 1934, J. McDunnough); White Point Beach (July 1934 and Feb. 8, 1936 [indoor record?] J. McDunnough).

Ontario: Biscotasing (June 14–20, 1931, K. Schedl); Ottawa (June 3–24, 1906, C. H. Young; July 19, 1926, C. H. Curran).

Quebec: Alcove (July 8, 1936, F. A. Urquhart); Brome (June 4, 1936, G. S. Walley); Gracefield (June 16, 1937, O. Peck); Kazubazua (June 8, 1927, F. P. Ide); Knowlton (Feb. 13, 1930 [indoor record?], J. McDunnough); Meach Lake (July 20, C. H. Young); Mount Lyall (July 15, 16, 1933, W. J. Brown).

Remarks.—Forbes correctly removed *allenella* from *Semioscopis*, but I do not agree with him in placing it in *Agonopterix*. The genus is close to *Agonopterix*, but the absence of the furrow or brush on the labial palpus, absence of lateral lobes of the anellus, fused socii and uncus in the male, and the unique signum of the female indicate that this species is generically distinct.

The genotype is the only species I have seen referable to this genus.

4. Genus SEMIOSCOPIS Hübner

PLATE 2, FIGURE 15; PLATE 5, FIGURE 35; PLATE 11, FIGURES 73, 73a;
PLATE 16, FIGURE 97

Semioscopis HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 402, 1826.—WALSINGHAM, Trans. Amer. Ent. Soc., vol. 10, p. 174, 1882.—RILEY, in Smith, List of Lepidoptera of Boreal America, p. 99, 100, 1891.—DYAR, Can. Ent., vol. 34, p. 319-320, 1902.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, p. 523, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, p. 114, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.—KEARFOTT, in Smith, Catalogue of the insects of New Jersey, p. 562, 1910.—BUSCK, Journ. Ent. Zool., Claremont, vol. 5, p. 100, 1913.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 161, 1917.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 186, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 234-244, 1923. (Genotype: *Phalaenae Tortrix steinkellneriana* Schiffermüller, Systematisches Verzeichniss der Schmetterlinge der Wiener Gegend, p. 130, 1776).—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 369, 1930.

Epigraphia STEPHENS, Catalogue of British insects, p. 304, 1872.—GROTE, North Amer. Ent., vol. 1, p. 53, 1880.—WALSINGHAM, Trans. Amer. Ent. Soc., vol. 10, p. 174, 1882.—BEUTENMÜLLER, in Smith, Catalogue of the insects of New Jersey, p. 355, 1890.—DIETZ, in Smith, Catalogue of the insects of New Jersey, p. 473, 1900.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 185-186, 1922. (Genotype: *Tinca avellanella* Hübner, Sammlung europäischer Schmetterlinge, No. 8, fig. 27, 1796.)

Head smooth, side tufts somewhat spreading. Tongue developed but short. Antenna shortly ciliated in male, simple in female; basal segment without pecten. Labial palpus moderately long, curved; second segment with appressed scales which protrude at apex; terminal segment much shorter than second, slender, acute.

Fore wing ample, elongate; 12 veins; 2 and 3 approximate, connate or stalked, 7 and 8 stalked, 7 to costa or apex, 11 from well before middle.

Hind wing as broad as fore wing, ovate; 8 veins; 3 and 4 closely approximate or connate.

Male genitalia.—Harpe elongate; sacculus frequently produced. Anellus with lateral processes that are sometimes reduced. Transtilla membranous; lateral lobes usually slender, digitate but greatly reduced. Gnathos a spined, oval knob. Socii mainly indicated by hairs.

Female genitalia.—Ductus bursae membranous or partially sclerotized; signum present.

Remarks.—Meyrick²⁵ separates *Epigraphia* from *Semioscopis* on the condition of veins 2 and 3 of the fore wing (stalked or separate), yet he ignores this same character in the case of *Agonopterix* and *Depressaria* except to use it to divide *Depressaria* into two sections. In *Semioscopis* veins 2 and 3 are much more unstable than in *Agonopterix* and *Depressaria*, indicating that *Semioscopis* is in a state of flux and not

²⁵ Meyrick, in Wytzman, Genera insectorum, fasc. 180, p. 185-186, 1922.

yet clearly definable into two genera. I have examined several hundred specimens and find that veins 2 and 3 of the fore wing vary from remote to stalked in every species, frequently differing on the two sides of a specimen. The genitalia support the view that in the case of the species of *Semioscopis* we are actually dealing with one genus. In *Agonopterix* and *Depressaria* their separation is supported by genitalic evidence.

Busck²⁶ recognized six species in this genus. Forbes²⁷ later removed *allenella* to *Agonopterix*. For this species I have erected a new genus. Two species, *mcdunnoughi* and *braunae*, are described as new in this paper bringing to a total of seven the number of species for the genus.

KEY TO THE SPECIES OF SEMIOSCOPIS BASED ON COLORATION

1. Fore wing with a dark, outwardly curved bar at end of cell..... 2
Fore wing without such bar at end of cell; ground color gray or whitish, strongly irrorated with grayish fuscous and without large, conspicuous dark spots or dashes.... *inornata* Walsingham (p. 155)
2. Discal mark continued toward base as a straight or curved bar or series of short lines..... 4
Discal mark not continued toward base..... 3
3. Fore wing sordid whitish marked with small contrasting black irrorations..... *braunae*, new species (p. 159)
Fore wing whitish gray marked with small black irrorations and generally suffused with fuscous..... *megamicrella* Dyar (p. 157)
4. Discal mark continued toward base as a strongly contrasted curved bar..... 5
Discal mark not continued toward base as a curved bar..... 6
5. Discal bar reaching base of fore wing..... *packardella* (Clemens) (p. 151)
Discal bar sharply terminated at basal third of fore wing..... *merricella* Dyar (p. 153)
6. Second segment of labial palpus suffused with blackish on distal half; third segment contrastingly marked black and white..... *aurella* Dyar (p. 160)
Second segment of labial palpus almost wholly blackish exteriorly; third segment weakly mottled black and white..... *mcdunnoughi*, new species (p. 162)

KEY TO THE SPECIES OF SEMIOSCOPIS BASED ON MALE GENITALIA

1. Ventral margin of sacculus with prominent extension (figs. 137, 138, etc.)... 2
Ventral margin of sacculus without prominent extension (fig. 135) 6
2. Extension of sacculus slender, simple, pointed (fig. 137)..... *inornata* Walsingham (p. 155)
Extension of sacculus otherwise..... 3
3. Extension of sacculus bifurcate (figs. 140, 141)..... 4
Extension of sacculus otherwise (figs. 133, 139)..... 5

²⁶ Busck, A., Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.

²⁷ Forbes, W. T. M., Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 241, 1923.

4. Vesica with one or two slender cornuti (fig. 141) - *merricella* Dyar (p. 153)
 Vesica with cluster of slender cornuti (fig. 140) *packardella* (Clemens) (p. 151)
5. Outer dorsal edge of sacculus evenly curved (fig. 138) *megamicrella* Dyar (p. 157)
 Outer dorsal edge of sacculus sharply angulate (fig. 139) *braunae*, new species (p. 159)
6. Vesica armed with a stout, moderately short curved cornutus (fig. 135a)----- *aurorella* Dyar (p. 160)
 Vesica armed with a stout, long, straight cornutus (fig. 136) *mcDunnoughi*, new species (p. 162)

KEY TO THE SPECIES OF SEMIOSCOPIS BASED ON FEMALE GENITALIA

1. Ductus bursae with a conspicuous, large sclerotized area (figs. 223, 224, 226)----- 2
 Ductus bursae membranous or with a minute subtriangular sclerotized area adjacent to ostium (figs. 225, 227, 228)----- 4
2. Ductus bursae sclerotized adjacent to bursa copulatrix (fig. 223) *aurorella* Dyar (p. 160)
 Ductus bursae membranous adjacent to bursa copulatrix (figs. 224, 226)--- 3
3. Ostial opening as narrow as or narrower than portion of genital plate posterior to it; loop of ductus bursae sclerotized for less than half its length (fig. 224)----- *braunae*, new species (p. 159)
 Ostial opening wider than portion of genital plate posterior to it; loop of ductus bursae sclerotized for more than half of its length (fig. 226)----- *megamicrella* Dyar (p. 157)
4. Ovipositor lobes armed with hooked macrosetae (fig. 225) *inornata* Walsingham (p. 155)
 Ovipositor lobes without hooked macrosetae----- 5
5. Bursa copulatrix elongate, definitely asymmetrical; signum minute, in posterior part of bursa (fig. 228a) - *packardella* (Clemens) (p. 151)
 Bursa copulatrix oval, not definitely asymmetrical; signum small, about middle of bursa copulatrix (fig. 227)----- *merricella* Dyar (p. 153)

SEMIOSCOPIS PACKARDELLA (Clemens)

PLATE 23, FIGURE 140, 140a; PLATE 40, FIGURES 228, 228a

Enicostoma packardella CLEMENS, Proc. Ent. Soc. Philadelphia, vol. 2, p. 125, 1863; in Stainton, The Tineina of North America, p. 231, 1872.—BUSCK, Proc. Ent. Soc. Washington, vol. 5, p. 214, 1903.

Semioscopis packardella (Clemens) DYAR, Can. Ent., vol. 34, p. 319, 1902.—Busck, in Dyar, U. S. Nat. Mus., Bull. 52, No. 5893, 1903; Proc. Ent. Soc. Washington, vol. 5, p. 214, 1903.—KEARFOTT, in Smith, Check List of the Lepidoptera of Boreal America, No. 6436, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.—BARNES and MCDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6484, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 244, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 546, 1928.

Epigraphia packardella (Clemens) WALSINGHAM, Trans. Amer. Ent. Soc. Philadelphia, vol. 10, p. 174, 1882.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 186, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada

and the United States of America (Part 2, Microlepidoptera), No. 8459, 1939 [cited as synonym of *Epigraphia steinkellneriana* (Schiffermüller)].

Epigraphia eruditella GROTE, North Amer. Ent., vol. 1, p. 53, pl. 5, fig. 12, 1880.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 186, 1922.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8459, 1939 [cited as synonym of *Epigraphia steinkellneriana* (Schiffermüller)].

Labial palpus sordid white; second segment overlaid with blackish fuscous exteriorly, except at base and apex, and lightly suffused with pink; third segment with a small black spot at base anteriorly and a broad, black subapical annulus. Antenna light fuscous, narrowly annulated with gray. Head with the scales light brown, tipped with white and appearing gray. Thorax gray suffused with brown anteriorly and with a faint carmine tint. Fore wing light shining gray marked with numerous faint, short transverse strigulae; at the end of cell an outwardly curved transverse black bar continued as a longitudinal curved black line to extreme base of costa; between the bar at the end of the cell and the costa two longitudinal brown-edged black dashes (sometimes fused) followed on costa by a small, indistinct light brown shade; costa marked with poorly defined, light-brown spots and dashes and narrowly edged with pink to slightly beyond middle; around termen to inner margin a series of small black spots; cilia pale gray with a light-brown suffusion outwardly. Hind wing pale, shining gray, darker apically; cilia paler, with narrow light brown bands. Legs pale ochreous-white overlaid exteriorly, except joints and hind tibiae, with blackish fuscous; pale areas with a faint pink tint. Abdomen sordid ochreous with a slight fuscous suffusion beneath.

Male genitalia.—Very similar to *merricella*, differing primarily in characters of the aedeagus.

Harpe long, rather narrow, slightly wider before cucullus; costa and cucullus sclerotized, area between membranous; cucullus narrow, rounded; sacculus produced to form a large forked process. Anellus long, strongly curved posteriorly to form a semicylinder; basolateral lobes reduced to slight swellings, chiefly indicated by hairs. Aedeagus long, sharply curved, pointed; vesica armed with an elongate patch of small straight cornuti. Vinculum rounded. Lobes of transtilla long, digitate, hairy, fused with anellus at base. Tegumen rounded. Socii reduced to small hairy lobes.

Female genitalia.—Much as in *merricella* but differing by the longer bursa and minute signum. Genital plate narrow, broadened at middle to form the cup-shaped ostium. Ductus bursae a long, slender, convoluted tube with a small, subtriangular sclerotized area near ostium; inception of ductus seminalis at the sclerotized part.

Bursa copulatrix large, definitely asymmetrical, elongate; signum a minute toothed plate in posterior end of bursa.

Alar expanse, 21–28 mm.

Type.—In the Academy of Natural Sciences of Philadelphia.

Type locality.—Not stated; probably Massachusetts.

Food plant.—Unknown.

Distribution.—Northeastern United States and eastern Canada.

United States records

Maine: Bar Harbor, ♂ (2–V–1936, A. E. Brower).

Michigan: No specific locality, ♂, ♀ (male without date; ♀, 14–V–1885, Gillette).

New Jersey: Montclair, ♂, ♀ (13–V–1900, 1–V–1899, W. D. Kearfott).

New York: Ithaca, Big Indian Valley, Albany (acc. Forbes).

Ohio: Cincinnati, 2 ♂♂, ♀ (18–IV–1911, A. F. Braun).

Pennsylvania: Franconia, Montgomery County, ♀ (no date or collector); New Brighton, 3 ♂♂, 3 ♀♀ (April 1902–1903, H. D. Merrick); Oak Station, Allegheny County, 7 ♂♂, 5 ♀♀ (April and May dates, 1902–1915, Fred Marloff).

Canadian records

Manitoba: Cartwright, ♀ (no date; E. F. Heath).

Quebec: Burbridge (May 25, 1937, F. A. Urquhart); Meach Lake (April 27, 1899, C. H. Young).

Remarks.—This species will probably be found throughout the midwestern United States and Canada as far west as British Columbia.

SEMIOSCOPIUS MERRICELLA Dyar

PLATE 23, FIGURE 141; PLATE 40, FIGURE 227

Semioscopis merricella DYAR, Can. Ent., vol. 34, p. 319, 1902.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6437, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6485, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 224, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat., Memoir 101, p. 546, 1928.

Epigraphia merrickella MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 186, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8459, 1939 [amended spelling for *S. merricella* Dyar and cited as synonym of *Epigraphia steinkellneriana* (Schifferrmüller)].

Labial palpus white; second segment suffused with blackish fuscous exteriorly; third segment with a fuscous spot at base anteriorly and a broad black subapical annulus. Antenna with basal segment blackish fuscous; remainder light fuscous, narrowly and indistinctly annulated with gray. Head and thorax gray, the latter rather strongly suffused with fuscous. Fore wing light, shining gray lightly shaded and strigulated with brown; costa, from base to middle of wing, lighter; at the end of cell an outwardly curved blackish-fuscous bar followed

by a rapidly fading and spreading brownish shade; between the discal bar and costa a short, poorly defined blackish-fuscous bar followed by a blackish-fuscous spot before apex; before the discal bar, in cell, a conspicuous, broad, curved, longitudinal, blackish-fuscous bar, which does not reach base of wing but is preceded by a similarly colored narrow dash and one or two spots from base of wing at costa; from apex, around termen, a series of blackish-fuscous spots; cilia pale gray lightly suffused with brown. Hind wing shining gray with a fine terminal brown line; cilia lighter, shining, with narrow subbasal and two subterminal, faint brown bands. Legs shining creamy white strongly overlaid with blackish fuscous except at joints and on hind tibiae. Abdomen sordid ochreous, faintly suffused with fuscous beneath.

Male genitalia.—Harpe long, narrow, slightly wider before cucullus; clasper absent, sacculus produced as a forked process; cucullus narrow, bluntly pointed; costa and sacculus sclerotized, with area between them membranous. Anellus a broad plate produced posteriorly as a semicylinder; basolateral lobes indicated by a few hairs. Aedeagus long, slender, curved, terminating in a slender, curved point; vesica armed with two, long, slender cornuti, one about half the length of the other. Vinculum rounded. Lobes of transtilla long, digitate, hairy, and fused with anellus at base. Tegumen rounded. Socii mainly indicated by a few hairs.

Female genitalia.—Genital plate narrow. Ostium cup-shaped. Ductus bursae a long convoluted tube with a small subtriangular sclerotized area near ostium; inception of ductus seminalis just before ostium. Bursa copulatrix large, oval; signum a small toothed plate about middle of bursa copulatrix.

Alar expanse, 24–31 mm.

Type.—In the United States National Museum.

Type locality.—New Brighton, Pa.

Food plant.—Unknown.

Distribution.—Northeastern United States and Canada to western British Columbia.

United States records

Maine: Bar Harbor, ♀ (13-V-1937, A. E. Brower).

New Hampshire: Hampton, ♀ (1-IV-1907, S. A. Shaw).

New York: Big Indian Valley, Albany (acc. Forbes).

Pennsylvania: New Brighton, 12 ♂♂, 4 ♀♀ (March and April dates, 1902–1904, H. D. Merrick).

Canadian records

British Columbia: Salmon Arm, ♂ (16-V-1922, W. R. Buckell).

Manitoba: Aweme, ♀ (15-V-1905, N. Criddle); Cartwright, ♂ (no date, E. F. Heath).

Remarks.—This species is very much like *packardella* but may be distinguished from it by the broken discal bar, its more striate appearance, and usually larger size. The genitalia of the two species are strikingly similar, but they can be distinguished by the characters given in the keys.

The single male from British Columbia is worn but undoubtedly belongs to this species. The distribution of the species indicates this specimen might be mislabeled or only a stray although further collecting may reveal that the species is well established in the far West.

SEMIOSCOPIIS INORNATA Walsingham

PLATE 22, FIGURES 137, 137a; PLATE 40, FIGURE 225

Semioscopis inornata WALSINGHAM, Trans. Amer. Ent. Soc., vol. 10, p. 174, 1882.—DYAR, Can. Ent., vol. 34, p. 320, 1902.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5895, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6440, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6488, 1917.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 186, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 244, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 546, 1928.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8460, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 372, 1939.

Semioscopis inornatella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.

Labial palpus white; second segment black externally, especially in distal half except extreme apex; third segment with a subbasal spot and a subapical annulus black. Antenna blackish fuscous and broadly annulated with white on basal third, the color fading to a light yellowish fuscous, and the annulations disappearing apically. Head and thorax sordid white suffused and clouded with grayish fuscous. Fore wing sordid white, profusely irrorated and suffused with grayish fuscous; outer discal mark reduced to two indistinct grayish-fuscous spots edged with whitish scales; at basal third two blackish-fuscous spots, one above the other; costa spotted with grayish fuscous especially before apex; around termen a series of poorly defined blackish-fuscous spots; cilia sordid white with basal and narrow subterminal bands light grayish fuscous. Hind wing shining grayish fuscous, cilia sordid white with subbasal and narrow subterminal bands light grayish fuscous. Fore and middle legs sordid white strongly overlaid with blackish fuscous except at joints; posterior leg pale ochreous-white; femur and tarsus suffused with fuscous. Abdomen dull ochreous above, whitish ochreous beneath with a poorly defined fuscous line on each side.

Male genitalia.—Harpe broad basally, narrowed beyond the ventral extension of the sacculus, sacculus moderately and narrowly sclero-

tized and produced as a long bluntly pointed process; cucullus narrow, rounded; clasper absent. Anellus an elongate sclerotized plate, convex laterally beyond middle and basolaterally produced to form small, hairy lobes; posterior edge deeply and broadly V-shaped. Aedeagus stout, long, twisted, terminating in a blunt point; vesica armed with a single, stout, forked cornutus. Vinculum rounded. Lobes of transtilla rather thick, clothed with thick, short hairs apically and fused to harpe. Tegumen rounded. Socii poorly developed, moderately hairy lobes.

Female genitalia.—Lobes of ovipositor with conspicuous, hooked macrosetae. Genital plate narrow, especially so at ostium where the sclerotized portion is no more than the narrow anterior edge of the ostium. Ductus bursae a long convoluted membranous tube; inception of ductus seminalis well before ostium. Bursa copulatrix large, oval; signum a small toothed plate.

Alar expanse, 25–35 mm.

Type.—In the United States National Museum.

Type locality.—Orono, Maine?.

Food plant.—Unknown.

Distribution.—Northeastern United States, Canada, west to British Columbia and Alaska. The species probably will be found in some of the Northwestern States.

United States and Alaskan records

Alaska: Rampart, 6 ♂♂ (no date or collector).

Illinois: Putnam County, ♂ (8–VI–1936, Murray O. Glenn).

Maine: Orono, 3 ♂♂ (April; no collector).

New Jersey: Essex County Park, ♂, ♀ (29–III–1905, 15–V–1906, W. D. Kearfott).

New York: Ithaca, Karner (acc. Forbes).

Pennsylvania: New Brighton, ♂ (25–IV–1908, H. D. Merrick).

Canadian records

Alberta: Calgary (April 24, 1908, F. H. Wolley-Dod); Edmonton, 5 ♂♂ (25–IV–1924, R. Aitchison; IV–26–29–1924, Owen Bryant; 19–IV–28–IV–1921, no collector); Red Deer, ♂ (18–IV–1903, no collector).

British Columbia: Victoria, 3 ♂♂ (29–III–1920, 7–IV–1922, W. Downes).

Manitoba: Aweme, 7 ♂♂, 2 ♀♀ (April 3 to May 2, 1904–1905, N. Criddle; also April 14 to May 12, 1920–1924); Cartwright, 8 ♂♂ (3 ♂♂–11–13–IV–1913, no collector; 5 ♂♂, 7–IV–1905, E. F. Heath); Miniota, ♀ (18–IV–1903, no collector).

Ontario: Bells Corners (25–IV–1937, G. S. Walley); Biscotasing (16–V–1931, K. Schedl); Constance Bay (26–IV–1935, J. McDunnough); Ingersoll (1–V–1934, G. S. Walley); Merivale (2–V–1934, W. J. Brown; 1–V–1936, G. S. Walley); Ottawa, (21–IV–1906, C. H. Young; 18–IV–1927, G. S. Walley); Port Hope (H. Bowers); Toronto (no date or collector).

Quebec: Aylmer (3–V–1923, C. H. Curran); Wright (19–V–1932, J. McDunnough).

Remarks.—The British Columbia specimens, although larger and more contrastingly marked, are otherwise indistinguishable from the average specimens.

Walsingham did not state the type locality when he described the species, but it is presumably Orono, Maine; several specimens before me with serial numbers corresponding to that of the type bear that locality label. The type label bears an "O" (=Orono?) in Walsingham's handwriting.

The hooked macrosetae of this species are found on the European *strigulana* also. These and other similarities lead me to believe that *inornata* is only a race of *strigulana*. For the time being, however, I am retaining *inornata* as a distinct species.

SEMIOSCOPIS MEGAMICRELLA Dyar

PLATE 23, FIGURES 138, 138a; PLATE 40, FIGURE 226

Semioscopis megamicrella DYAR, Can. Ent., vol. 34, p. 320, 1902.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6439, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6487, 1917.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 186, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 244, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 546, 1928.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2. Microlepidoptera), No. 8461, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 372, 1939.

Labial palpus white; second segment blackish fuscous in apical two-thirds except for a narrow longitudinal area inwardly; third segment with a minute subbasal spot anteriorly and subapical annulus blackish fuscous. Antenna with basal segment blackish fuscous above, whitish beneath; remainder light fuscous, narrowly and indistinctly annulated with grayish fuscous. Head, thorax, and ground color of fore wing whitish gray irrorated with black and brown scales and lightly shaded with fuscous; at the end of cell a blackish-fuscous, outwardly curved, crescentic bar (sometimes inconspicuous or broken into a series of dots) preceded by some white scaling; at basal third a pair of superposed blackish-fuscous dots; in some specimens a longitudinal dash of the same color; costa narrowly edged with pink (this absent in some specimens) and spotted with blackish scales; a submarginal and terminal row of blackish-fuscous spots, the former usually poorly defined; cilia light gray, with pale fuscous subbasal and apical bands. Hind wing shining pale grayish fuscous, cilia somewhat lighter, with pale fuscous subbasal and apical bands. Legs sordid whitish overlaid with blackish fuscous except at joints and on hind tibiae. Abdomen light fuscous.

Male genitalia.—Harpe short, broad, sacculus produced as a broad truncate sclerotized process, cucullus bluntly pointed; clasper a small tooth about middle of harpe. Anellus a broad oval plate narrowly produced posteriorly, basolateral lobes small, sparsely hairy. Aedeagus long, slender, curved and terminating in a long, slender, curved point; vesica armed with a slender, curved cornutus. Vinculum narrowly rounded. Lobes of transtilla short, broad, hairy, and closely attached to the harpe. Tegumen rounded. Socii moderately well developed hairy lobes.

Female genitalia.—Genital plate moderately broad at ostium, narrower laterally. Ostium broad with a strongly sclerotized anterior edge. Ductus bursae convoluted, the loop of the ductus sclerotized for more than half its length; ostium preceded by a broadly dilated, sclerotized part of ductus bursae; before this a narrow membranous band, anterior to which is a longer sclerotized portion of the ductus bursae; inception of ductus seminalis at the dorsoposterior edge of the latter sclerotized part. Bursa copulatrix large oval with a moderately large toothed signum.

Alar expanse, 16–27 mm.

Type.—In the United States National Museum.

Type locality.—New Brighton, Pa.

Food plant.—Unknown.

Distribution.—Northeastern United States and Canada westward to Idaho and Alberta.

United States records

Idaho: Wallace, ♂ (17-IV-23, Otto Huelleman).

Massachusetts: Forest Hills, ♂ (25-III-1930, no collector); Newton, ♂ (25-IV-1909, William Reiff); Winchendon, ♂ (12-IV-1902, no collector).

New York: Ithaca, Long Island (acc. Forbes).

Pennsylvania: New Brighton, 72 ♂♂, 15 ♀♀ (March 1902–1907, H. D. Merrick); Oak Station, Allegheny County, ♂, ♀ (4-IV-1909, 23-III-1907, Fred Marloff).

Canadian records

Alberta: Edmonton, ♂, ♀ (2-V-1924, Owen Bryant).

Quebec: Aylmer, ♂ (9-V-1932, W. J. Brown); Meach Lake (April 28, 1903, C. H. Young).

Remarks.—In this species there is unusually great variation in the size of the specimens. This variation is not associated with sex or locality.

The Idaho and Alberta specimens are considerably darker than the types, but I can find no other external differences, and the genitalia are identical.

SEMIOSCOPIS BRAUNAE, new species

PLATE 23, FIGURES 139, 139a; PLATE 40, FIGURE 224

Semioscopsis megamicrella FORBES (not Dyar), in part, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 244, 1923.

Labial palpus white, second segment suffused with blackish fuscous except for a narrow line inwardly and at tip; third segment with sub-basal spot anteriorly and a subterminal annulus black. Antenna fuscous, spotted with white above on basal fourth. Head, thorax, and ground color of fore wing white; the head sordid, thorax strongly infused with grayish brown and with posterodorsal crests blackish fuscous, and the fore wing irrorated with blackish fuscous and black; at the end of cell an outwardly curved crescentic discal bar and at basal third two spots, one above the other, black; along costa and around termen a series of blackish-fuscous spots; before apex, subcostally, one or two conspicuous black spots; cilia pale grayish white, with light brown subbasal and subterminal bands. Hind wing shining grayish fuscous, with a narrow fuscous terminal line; cilia pale grayish white, with light fuscous basal band and pale brownish terminal suffusion. Legs light creamy white strongly suffused and overlaid with blackish fuscous except at joints and on hind tibiae. Abdomen pale shining ochreous-fuscous, suffused with fuscous beneath.

Male genitalia.—Harpe broad, short; cucullus long, narrowly rounded; sacculus narrow basally and with a broad, strongly sclerotized expansion distally; outer dorsal margin angulate; clasper minute, pointed. Anellus a moderately small oval plate, somewhat narrowed posteriorly; posterior edge convex; lateral lobes absent or indicated by a few hairs. Aedeagus long, slender, narrowed at middle, curved and terminating in a slender, curved point; vesica armed with a single slender, pointed cornutus. Vinculum narrowly rounded. Transtilla membranous; lateral lobes mainly indicated by a few hairs. Tegumen rounded. Socii small fleshy lobes.

Female genitalia.—Genital plate narrow, slightly broader posterior to ostium. Ostium as narrow as or narrower than portion of genital plate posterior to it, bordered anteriorly by a strongly sclerotized and dilated portion of the ductus bursae. Ductus bursae membranous except for less than half the length of a posterior loop, and the dilated part before the ostium; inception of ductus seminalis at anterior edge of dilated section. Bursa copulatrix large oval; signum a moderately large, narrow, transverse, toothed plate about middle of bursa.

Alar expanse, 22–26 mm.

Type.—U. S. N. M. No. 53118.

Type locality.—Cincinnati, Ohio.

Food plant.—Unknown.

Remarks.—Described from ♂ type and 5 ♀ paratypes all from the type locality (March and April dates, 1904–1908, Dr. Annette F. Braun). Paratypes in the Canadian National and Dr. A. F. Braun collections.

This species is much like *megamicrella* but is lighter in color, lacks the fuscous or brown suffusion, and is more contrastingly and more sparsely marked than that species. In male genitalia it differs from *megamicrella* in the stouter expansion and the angulate outer dorsal margin of the sacculus. In the female the ostium is smaller as is the posterior dilated portion of the ductus bursae adjacent to it. The posterior loop of the ductus bursae is less strongly sclerotized.

This is the species placed under *megamicrella* by Forbes.

I take pleasure in naming this species after Dr. Annette F. Braun, who collected the type series.

SEMIOSCOPIIS AURORELLA Dyar

PLATE 22, FIGURE 135, 135a; PLATE 40, FIGURE 223

Semioscopis aurorella DYAR, Can. Ent., vol. 34, p. 319, 1902.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6438, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6486, 1917.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 186, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 244, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 546, 1928.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8463, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 370, 1939.

Labial palpus white with a faint roseate tinge; second segment overlaid with blackish fuscous exteriorly on distal half except at apex; third segment with a black spot anteriorly above base and a black subapical annulus. Antenna light fuscous, with poorly defined, narrow, grayish annulations. Head and thorax gray, the former more whitish and with some brown intermixed, the latter suffused with fuscous and with fuscous posterior tufts. Fore wing shining gray suffused with brown, with a roseate tinge and variously marked with blackish fuscous; at the end of cell an outwardly curved blackish-fuscous bar preceded by a whitish or light-gray patch; in cell a pair of superposed dashes, sometimes fused to form an elongate V-shaped mark; a short basal subcostal dash and a basal dash following vein 1c to slightly beyond basal third, blackish fuscous; a subterminal row of five more or less well defined dashes between the veins and a series of spots from costa around termen, blackish fuscous; cilia pale grayish fuscous, darker apically and with a

roseate tinge. Hind wing shining grayish fuscous, darker toward margin and with a fine fuscous terminal line; cilia pale grayish fuscous, with subbasal and terminal bands fuscous. Legs yellowish white heavily overlaid with blackish fuscous except at joints and on hind tibiae. Abdomen light fuscous narrowly annulated with pale yellowish fuscous at posterior ends of segments; anal tuft yellowish fuscous.

Male genitalia.—Harpe narrow, long; costa gently and evenly concave; cucullus bluntly pointed; sacculus narrowly but strongly sclerotized; clasper long, slender, curved inwardly, attaining or slightly exceeding costa. Anellus a subrectangular plate with convex lateral edges; posterior edge concave, basolateral lobes indicated by a few hairs. Aedeagus stout, curved, moderately long, bluntly pointed; vesica armed with a single stout, curved cornutus. Vinculum broadly rounded. Transtilla indicated only by a weak membrane; lateral lobes absent. Tegumen rounded. Socii moderately well developed hairy lobes.

Female genitalia.—Genital plate moderately broad, strongly sclerotized. Ostium large, oval, with a narrow, strongly sclerotized anterior edge. Ductus bursae membranous in posterior half, strongly sclerotized, convoluted and broadened in anterior half; inception of ductus seminalis well before ostium. Bursa copulatrix large, round; signum a small toothed plate.

Alar expanse, 24–31 mm.

Type.—In the United States National Museum.

Type locality.—New Brighton, Pa.

Food plant.—Unknown.

Distribution.—Northeastern United States and eastern Canada.

United States records

New York: Ithaca, Big Indian Valley (acc. Forbes).

Ohio: Cincinnati, 2 ♀ (27-III-1903, A. F. Braun).

Pennsylvania: New Brighton, 20 ♂♂, 16 ♀♀ (March and April dates, 1901–1905, H. D. Merrick); Oak Station, Allegheny County, 9 ♂♂, 10 ♀♀ (March and April dates, 1908–1914, Fred Marloff).

Canadian records

Alberta: Red Deer, 4 ♂♂, 2 ♀♀ (16–24 April, 1922–1923, K. Bowman).

Manitoba: Aweme, ♂ (3-V-1924, N. Criddle); Cartwright, ♂ (no date, E. F. Heath).

Ontario: Constance Bay, 2 ♀♀ (26-IV-1935, W. J. Brown; 26-IV-1935, J. McDunnough); Ottawa, 5 ♀♀ (26-IV-1909, 1-V-1906, C. H. Young).

Remarks.—The specimens from Canada, which I have before me, are considerably darker and, for the most part, are less conspicuously marked than the specimens from the United States, owing to

a strong brownish or fuscous suffusion which appears to be characteristic of the northern specimens. The genitalia of the two forms are identical.

SEMIOSCOPIS MCDUNNOUGH, new species

PLATE 22, FIGURE 136

Semioscopis aurorella BLACKMORE (not Dyar), Rept. Prov. Mus. Nat. Hist. British Columbia for 1921, p. 32, pl. 4, 1922.

Similar to *aurorella* but slightly broader winged, less distinctly marked and with a longer, straight cornutus.

Labial palpus white with a carmine tinge; second segment strongly overlaid with blackish fuscous exteriorly for its whole length; third segment with poorly defined blackish-fuscous subbasal spot and subapical annulus. Head whitish with some brown scales. Thorax cinereous strongly infused with fuscous and with median longitudinal streak and tufts blackish fuscous; tegula blackish fuscous, white-edged. Fore wing shining gray suffused with brown and with a roseate tinge; discal bar, reduced to a poorly defined crescentic dash or a spot, a dash in cell, a basal dash following vein 1c, and a basal shade, blackish fuscous; along costa and around termen a well-defined series of blackish-fuscous spots; cilia light fuscous with a median grayish band and a whitish pink-tinged terminal line. Hind wing grayish fuscous, darker toward margins and with a narrow fuscous terminal line; cilia pale yellowish fuscous with basal and subterminal fuscous bands. Legs yellowish white strongly overlaid with blackish fuscous except at joints and on hind tibiae where the lighter ground color is carmine tinted. Abdomen ochreous-fuscous lightly suffused with fuscous beneath.

Male genitalia.—Harpe narrow, long; cucullus rounded; clasper long, reaching almost or quite to costa, slightly curved, pointed; sacculus narrow, strongly sclerotized. Anellus a broad, oval plate, narrowed, produced, and curved posteriorly to form a semicylindrical articulation for the aedeagus; lateral lobes absent or at most only indicated by a few hairs. Aedeagus stout, moderately long; apex flattened, rounded; vesica armed with a single long, stout, straight, sharply pointed cornutus. Vinculum broadly rounded. Transtilla membranous; lateral lobes vestigial, mainly indicated by a few hairs. Tegumen bluntly pointed. Socii small hairy lobes.

Alar expanse, 28–29 mm.

Type.—U. S. N. M. No. 53117.

Type locality.—Bellingham, Wash.

Food plant.—Unknown.

Remarks.—Described from the ♂ type (Bellingham, Wash., 14-III-1923, J. F. G. Clarke, No. 573) and 1 ♂ paratype (Fraser

Mills, British Columbia, 14-III-1921, L. E. Marmont), the latter in the Canadian National collection.

This species is much like *aurorella* and is the one reported by Blackmore from British Columbia by that name. It can be distinguished from *aurorella* by the poorly defined markings of the third segment and the blackish-fuscous shading of the second segment of the labial palpus, the absence or only faint indication of the subterminal row of spots on the fore wing, the presence of a rather strong basal blackish-fuscous suffusion and the long straight cornutus.

There is another known specimen in the collection of the University of British Columbia, the one figured by Blackmore, from Millardville, British Columbia.

I have seen no females certainly referable to this species. There are before me, however, two females from southeastern Washington that may belong here, although they are considerably smaller and probably represent an undescribed species. Females must be obtained from the coastal region before these two can be definitely placed here or described as new.

5. Genus DEPRESSARIA Haworth

PLATE 2, FIGURE 11; PLATE 6, FIGURE 48; PLATE 10, FIGURES 68, 68a; PLATE 17, FIGURE 102

Depressaria HAWORTH, Lepidoptera Britannica, p. 505, 1812.—CHAMBERS (in part), Can. Ent., vol. 4, p. 91, 146-148, 1872.—WALSINGHAM, (in part), Proc. Zool. Soc. London, 1881, p. 311-319; Trans. Amer. Ent. Soc., vol. 10, p. 175, 1882.—BEUTENMÜLLER (in part), in Smith, Catalogue of the insects of New Jersey, p. 355, 1890.—RILEY (in part), in Smith, List of the Lepidoptera of Boreal America, p. 99, 1891.—DIETZ (in part), in Smith, Catalogue of the insects of New Jersey, p. 474, 1900.—BUSCK (in part), Proc. U. S. Nat. Mus., vol. 24, p. 731-749, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, p. 520-522, 1903.—KEARFOTT (in part), in Smith, List of the Lepidoptera of Boreal America, p. 114, 1903.—BUSCK (in part), Proc. U. S. Nat. Mus., vol. 27, p. 763-766, 1904.—DYAR (in part), Proc. U. S. Nat. Mus., vol. 27, p. 934, 1904.—ANDERSON (in part), Catalogue of British Columbia Lepidoptera, p. 54, 1904.—BUSCK (in part), Proc. Ent. Soc. Washington, vol. 9, p. 88-91, 1908.—KEARFOTT, in Smith, Catalogue of the insects of New Jersey, p. 561, 1910.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 161, 1917.—MEYRICK (in part), Exotic Microlepidoptera, vol. 2, p. 223, 1918; p. 315, 1920; pp. 391-392, 1921; p. 513, 1922; in Wytzman (in part), Genera insectorum, fasc. 180, pp. 169-177, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 241-243, 1923.—PIERCE, The genitalia of the tineid families of the Lepidoptera of the British Islands, p. 33, 1935.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), p. 78, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 269, 1939. (Genotype: *Phalaena Tortrix heracliata* Linnaeus, Systema naturae, ed. 10, p. 532, No. 225, 1758.)

Siganorosis WALLENGREN, Ent. Tidskr., vol. 2, p. 94, 1881. (Genotype: *Phalaena Tortrix heracliiana* Linnaeus, Systema naturae, ed. 10, p. 532, No. 225, 1758.)

Head with appressed scales; tongue developed; antenna simple or moderately ciliated; basal segment elongate, with pecten. Labial palpus long, recurved; second segment reaching base of antenna, with rough, projecting scales and furrowed beneath; terminal segment shorter than, or rarely as long as, second, acute. Thorax smooth or crested. Abdomen flattened.

Fore wing with 12 veins; 2 and 3 separate, 7 and 8 stalked; 7 to costa or apex, 11 from middle.

Hind wing as broad as or broader than the fore wing; 8 veins, 3 and 4 connate or short stalked; 6 and 7 subparallel.

Male genitalia.—Harpe with or without clasper and with or without process from base of sacculus. Anellus a well sclerotized plate without long lateral processes. Aedeagus stout with or without cornuti. Gnathos an oval, spined knob. Socii well developed.

Female genitalia.—Genital plate strongly sclerotized; ductus bursae frequently sclerotized for a considerable portion of its length; signum present (in all species seen) though frequently weak.

Larva.—Ninth abdominal segment with setae I and II well separated; seta VI not on the same pinaculum with IV and V, remote from VII. Setal group VII bisetose or trisetose on first abdominal segment, bisetose on seventh and eighth abdominal segments,²⁸ and unisetose on ninth abdominal segment. Ocelli normal. Submentum without pit.

GROUP A: Setal group VII on first abdominal segment *bisetose*.

heracliiana
juliella
dracunculi

GROUP B: Setal group VII on first abdominal segment *trisetose*.

multifidae
leptotaeniae
angustati

Pupa.—Pubescent. Prothoracic femora exposed. Labial palpi not exposed. Cremaster absent.

Remarks.—The separation of *Depressaria* from *Agonopterix* is discussed under the latter genus.

In this genus there are five distinct species groups. The first, consisting of *atrostrigella* and *dracunculi*, and probably *palousella* (males not known), is characterized by the process from the costa of the harpe in the male and the broad, somewhat dilated sclerotized band in the ductus bursae of the female. The second group consists of

²⁸ Rarely unisetose on eighth segment and if so trisetose on first.

juliella, *eleanorae*, *heracliana*, and *cinereocostella* with the European *nervosa*. These have a strong basal process from the sacculus and no clasper in the male and an elongated, sclerotized section of the ductus bursae posteriorly. We have two species in the third group, *artemisiella* and *alienella*, in which the clasper is present but the basal process of the sacculus is absent in the male and the ductus bursae is wholly membranous. The fourth group, consisting of the *togata-angustati-multifidae* complex, forms a perplexing assemblage of species characterized by their similarity in coloration, by the peculiar spined process from the base of the sacculus in the male, and by the frequently present sclerites anterior to the genital plate in the female. The fifth and final group is composed of three broad-winged forms, *maculatella*, *betulella*, and *grotella*. In the males the divided clasper, extending beyond the ventral margin of the harpe, and the spiraled ductus bursae of the female are characteristic.

Although rather a large number of species have been reared, the larvae of only six were available for study. By a comparison of the larval characters it will be seen that the first two groups (Group A under larvae) are closely similar. The fourth group (Group B under larva) suggests generic separation, and I am inclined to believe that this group does represent a distinct genus. Likewise I believe that the fifth group should be given a separate generic designation, which would be consistent with other generic separations in this paper. Nevertheless I prefer to wait for the collection of more larvae before making the separations which are suggested or before concluding that the species all belong to one genus and merely represent species groups.

KEY TO THE SPECIES OF DEPRESSARIA BASED ON COLORATION

- | | | |
|---|--|---|
| 1. Thorax white..... | <i>alienella</i> Busck (p. 180) | |
| Thorax otherwise..... | | 2 |
| 2. Fore wing distinctly reddish..... | | 3 |
| Fore wing otherwise..... | | 5 |
| 3. Costa contrastingly lighter than ground color of fore wing | | |
| | <i>cinereocostella</i> Clemens (p. 171) | |
| Costa not contrastingly lighter than ground color of fore wing..... | | 4 |
| 4. Alar expanse 21 mm. or more..... | <i>juliella</i> ²⁹ Busck (p. 176) | |
| Alar expanse 20 mm. or less..... | <i>eleanorae</i> , new species (p.178) | |
| 5. Ventral side of abdomen with two distinct rows of blackish spots | | |
| or lines..... | | 6 |
| Ventral side of abdomen without such spots or lines..... | | 8 |
| 6. Fore wing with light discal spot at end of cell..... | | 7 |
| Fore wing without such spot..... | <i>heracliana</i> (Linnaeus) (p. 173) | |

²⁹ I have examined over 150 specimens of *juliella* none of which measures as small as 20 mm. The larger specimens of *eleanorae* approach the smaller specimens of *juliella* in size but none has been found exceeding 20 mm.

7. Fore wing with distinct elongate blackish dash between two discal spots..... *grotella* Robinson (p. 192)
 Fore wing without such dash..... *betulella* Busck (p. 195)
8. Second segment of labial palpus white irrorated with black and fuscous..... 9
 Second segment of labial palpus otherwise..... 11
9. Third segment of palpus white with blackish-fuscous subbasal annulus and apex..... *maculatella* Busck (p. 194)
 Third segment otherwise..... 10
10. Third segment of palpus fuscous irrorated with whitish and with whitish apex..... *yakimae*, new species (p. 185)
 Third segment whitish with black basal and subapical annulations..... *palousella*, new species (p. 171)
11. Fore wing blackish fuscous or brownish fuscous, at least always dark..... 12
 Fore wing grayish or light brownish..... 14
12. ³⁰ The two species of this couplet cannot be separated on characters of coloration; genitalia and food plant must be used. Costa of fore wing with a distinct pinkish cast on underside; Upper Sonoran or Arid Transition Zones.
whitmani, new species (p. 182); *leptotaeniae* Clarke (p. 184)
 Costa without such pink color..... 13
13. The two species of this couplet (*angustati* and *multifidae*) cannot be separated by the use of superficial characters. Collected specimens may be separated as follows:
 (a) Hudsonian Zone, altitude about 6,000 feet, Cascade Range..... *angustati*, new species (p. 189)
 (b) Upper Sonoran Zone to Arid Transition timbered Zone in "intermountain" area; altitude 1,000 to 5,700 feet
multifidae Clarke (p. 187)
14. Alar expanse 19 mm. or less..... *artemisiae dracunculi* Clarke (p. 169)
 Alar expanse over 20 mm..... 15
15. Fore wing with conspicuous blackish-fuscous streak in cell.
atrostrigella, new species (p. 168)
 Fore wing without conspicuous blackish-fuscous streak in cell.
artemisiella McDunnough (p. 181)

KEY TO THE SPECIES OF DEPRESSARIA BASED ON MALE GENITALIA

1. Harpe with process from base of sacculus (figs. 198-205)..... 8
 Harpe without such process (figs. 191-197)..... 2
2. Costa with prominent process before cucullus (figs. 194, 197)..... 3
 Costa without such process (figs. 191-193; 195, 196)..... 4
3. Vesica armed with two or three straight terminal cornuti and a cluster of stout curved ones near middle (fig. 194a).
atrostrigella, new species (p. 168)
 Vesica armed with a cluster of straight, strong cornuti about middle (fig. 197a)..... *artemisiae dracunculi* Clarke (p. 169)

³⁰ The species of this group are very difficult to separate and must be carefully examined for characters under the microscope. A careful examination of characters coupled with data on habitat will serve to distinguish them.

4. Clasper slender, armed with small spines and never projecting beyond ventral edge of harpe (figs. 195, 196)-----	5
Clasper broad, without spines and at least part of it extending beyond ventral edge of harpe (figs. 191-193)-----	6
5. Lateral edge of anellus strongly produced (fig. 196) <i>artemisiella</i> McDunnough (p. 181)	
Lateral edge of anellus not strongly produced (fig. 195) <i>alienella</i> Busck (p. 180)	
6. Transtilla roughly diamond-shaped (figs. 192b, 193b)-----	7
Transtilla roughly rectangular (fig. 191b)-----	<i>maculatella</i> Busck (p. 194)
7. Width of clasper half, or less than half width of harpe (fig. 193) <i>betulella</i> Busck (p. 195)	
Width of clasper more than half width of harpe (fig. 192). <i>grotella</i> Robinson (p. 192)	
8. Clasper present (figs. 198-202)-----	9
Clasper absent (figs. 203-205)-----	13
9. Aedeagus as long or longer than harpe (figs. 198a-200a)-----	10
Aedeagus much shorter than harpe (figs. 201a, 202a)-----	12
10. Anellus longer than wide; spines of basal process of sacculus long, stout (fig. 199)-----	<i>multifidae</i> Clarke (p. 187)
Anellus much broader than long; spines of basal process of sacculus fine, slender (figs. 198, 200)-----	11
11. Posterior edge of anellus deeply cleft; transtillar lobes large, broad; harpe short, broad (fig. 200)-----	<i>whitmani</i> , new species (p. 182)
Posterior edge of anellus not cleft; transtillar lobes large, narrow, harpe narrow (fig. 198)-----	<i>angustati</i> , new species (p. 189)
12. Basal process of sacculus curved toward cucullus; spines few, large; clasper sharply angulate; transtillar lobes weak (fig. 201) <i>yakimae</i> , new species (p. 185)	
Basal process of sacculus transverse; spines numerous, rather small; transtillar lobes strong (fig. 202)-----	<i>leptotaeniae</i> Clarke (p. 184)
13. Basal process of sacculus pointed (figs. 68, 205)-----	14
Basal process of sacculus not pointed (figs. 203, 204)-----	15
14. Costa of harpe deeply excavated before cucullus (fig. 68) <i>heracliana</i> (Linnaeus) (p. 173)	
Costa of harpe not excavated before cucullus (fig. 205). <i>cinereocostella</i> Clemens (p. 171)	
15. Basal process of sacculus armed with spines for most of its length (fig. 203)-----	<i>juliella</i> Busck (p. 176)
Basal process of sacculus armed with spines only at distal end (fig. 204)-----	<i>eleanorae</i> , new species (p. 178)

KEY TO THE SPECIES OF DEPRESSARIA BASED ON FEMALE GENITALIA

1. Ductus bursae membranous (figs. 102, 275-278, 282)-----	2
Ductus bursae at least partly sclerotized (figs. 279-281; 283-289)-----	7
2. Ductus bursae spiraled (fig. 275)-----	3
Ductus bursae not spiraled (figs. 102, 278, 282)-----	5
3. Ostium a longitudinal slit between raised edges (figs. 275, 277)-----	4
Ostium nearly round, within triangular raised portion of genital plate (fig. 276)-----	<i>betulella</i> Busck (p. 195)

4. Ostium considerably shorter than width of genital plate; genital plate with a long row of hairs posteriorly (fig. 277) *-grotella* Robinson (p. 192)
Ostium as long as width of genital plate; posterior row of hairs reduced to about half a dozen (fig. 275) *-maculatella* Busck (p. 194)
5. Ductus bursae bulbous before ostium (fig. 102) *-heracliana* (Linnaeus) (p. 173)
Ductus bursae not bulbous at any point (figs. 278, 282) ----- 6
6. Anterior edge of ostium convex (fig. 278) *-artemisiella* McDunnough (p. 181)
Anterior edge of ostium cleft (fig. 282) *-alienella* Busck (p. 180)
7. Ductus bursae sclerotized for at least two-thirds of its length (fig. 279) *-eleanorae*, new species (p. 178)
Ductus bursae otherwise (figs. 280, 281; 283-289) ----- 8
8. Sclerotized portion of ductus bursae limited to a narrow band (figs. 283, 284) ----- 9
Sclerotized portion of ductus bursae otherwise (figs. 196, 197, 285, 289) ----- 10
9. Sclerotized portion of ductus bursae armed with small teeth (fig. 284) *-palousella*, new species (p. 171)
Sclerotized portion of ductus bursae unarmed (fig. 283) *-artemisiae dracunculi* Clarke (p. 169)
10. Sclerotized portion of ductus bursae strongly curved (figs. 286-288) ----- 11
Sclerotized portion of ductus bursae straight or only slightly curved (figs. 280, 281, 285, 289) ----- 13
11. Genital plate with a pair of shallow, cupped sclerites on anterior margin (fig. 288) *-multifidae* Clarke (p. 187)
Genital plate without such sclerites (figs. 286, 287) ----- 12
12. Genital plate abruptly narrowed laterally; ostium a narrow slit (fig. 287) *-angustati*, new species (p. 189)
Genital plate of nearly equal width throughout, ostium triangular (fig. 286) *-whitmani*, new species (p. 182)
13. Signum in posterior part of bursa copulatrix (figs. 285, 289) ----- 14
Signum in anterior part of bursa copulatrix (figs. 280, 281) ----- 15
14. Sclerotized ventral sclerites of genital plate equal to length of sclerotized portion of ductus bursae (fig. 285) *-yakimae*, new species (p. 185)
Sclerotized ventral sclerites of genital plate shorter than length of sclerotized portion of ductus bursae (fig. 289) *-leptotaeniae* Clarke (p. 184)
15. Ductus bursae sclerotized for less than half its length; a small protuberance from the side of the sclerotized part (fig. 281) *-cinereocostella* Clemens (p. 171)
Ductus bursae sclerotized for about half its length and without small protuberance from the sclerotized part (fig. 280) *-juliella* Busck (p. 176)

DEPRESSARIA ATROSTRIGELLA, new species

PLATE 35, FIGURES 194, 194a

Labial palpus light ochreous-white; second segment suffused with fuscous in the brush; third segment immaculate. Antenna light fuscous somewhat mottled basally with gray; basal segment gray beneath. Head, thorax, and fore wing ochreous-white. The whole so strongly suffused with deep gray that the ground color is nearly obliterated. Vertex and the head behind the antennae infuscated.

Thorax lightly irrorated with fuscous. Inner angle of fore wing, veins, a strong longitudinal dash in cell and a series of poorly defined spots around termen, blackish fuscous. The veins are, for the most part, weakly marked, but vein 1c is marked with blackish fuscous for its entire length; cilia deep gray, tipped with ochreous-white. Hind wing pale smoky gray; cilia lighter. Legs ochreous-white, the fore and mid legs suffused with grayish fuscous exteriorly. Abdomen pale grayish fuscous, faintly annulated with dull ochreous-white.

Male genitalia.—Harpe moderately broad, clothed apically with numerous stout, straight hairs; cucullus rounded; on costa, before cucullus, a large flat process that terminates in a small hook; sacculus moderately broad and sclerotized, without basal process; clasper a minute papillate process about middle of harpe, with three or four strong hairs from surface. Anellus a large subrectangular plate constricted posteriorly; posterior edge truncate. Aedeagus rather long, stout, tapering gradually to a slender, curved point; vesica armed with two or three long straight cornuti and a cluster of short, stout, curved ones about middle. Vinculum rounded with well developed dorsoanterior process. Transtilla a broad, sclerotized, curved band; lateral lobes indicated chiefly by hairs and constituting the lateral extremities of the transtilla proper. Socii long digitate hairy lobes. Tegumen reduced, truncate.

Alar expanse, 21–24 mm.

Type.—In the Canadian National Collection.

Type locality.—Aweme, Manitoba.

Paratype.—U. S. N. M. No. 53299.

Food plant.—Unknown.

Remarks.—Described from the ♂ type and 1 ♂ paratype, both from the type locality (6-IX-1928, N. Criddle).

The genitalia of this species are nearest to *dracunculi* but differ from it chiefly by the cornuti and the transtilla. The figures of the two will show these differences adequately. I have seen no females of *atrostrigella*.

The paratype is not marked so contrastingly as the type male and is the larger of the two specimens.

DEPRESSARIA ARTEMISIAE DRACUNCULI Clarke

PLATE 35, FIGURES 197, 197a; PLATE 48, FIGURE 233

Depressaria dracunculi CLARKE, Can. Ent., vol. 65, p. 90, pl. 5, 1933.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8395, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 282, 1939.

Labial palpus creamy white; second segment suffused and irrorated in the brush with fuscous; third segment with subbasal and supra-

medial annuli black, these sometimes poorly defined and almost wholly replaced by the lighter ground color. Antenna fuscous with grayish or white annulations. Head light fawn, the scales tipped with sordid white. Thorax light fuscous, the scales tipped with gray or white; anteriorly the fuscous is more pronounced. Fore wing with costal third fuscous mixed with gray, remainder light to dark fawn irrorated with fuscous and gray; toward apex the colors merge and are indistinguishable; at base, in anal angle, a small blackish-fuscous patch; in cell a series of three blackish-fuscous spots, sometimes confluent, forming a single longitudinal dash; cilia grayish fuscous with a broad, dark, subbasal band. Legs creamy white, strongly overlaid with fuscous except at joints. Abdomen silvery grayish above; creamy white beneath suffused with fuscous laterally.

Male genitalia.—Harpe broad, with very few coarse hairs; cucullus rounded, densely clothed with coarse, stiff hairs; before cucullus, from costa, a prominent dull-pointed projection; clasper minute; emitting a few long hairs; sacculus broadly folded and without basal process. Anellus a moderately small sclerotized plate, constricted at middle; anterior and posterior edges strongly convex. Vinculum broad, rounded. Aedeagus long, slightly curved, terminating in a long, attenuated point; vesica armed with a cluster of straight, strong cornuti. Transtilla a very broad, sclerotized band with well-developed hairy lobes, the whole fused with the posterior portion of the anellus. Socii small, narrow, hairy lobes.

Female genitalia.—Genital plate moderately broad. Ostium large, round, situated at the extreme anterior edge of the genital plate. A narrow area of the ductus bursae, just posterior to the bursa copulatrix, moderately sclerotized, unarmed; the remainder of the ductus membranous; inception of the ductus seminalis about midway between the sclerotized part of the ductus bursae and the ostium. Bursa copulatrix large with a very small signum in the anterior half.

Alar expanse, 12.5–19 mm.

Type.—In the United States National Museum.

Type locality.—Snake River, Whitman County, opposite Clarkston, Wash.

Food plant.—*Artemisia dracunculoides* Pursh.

Distribution.—Northwestern United States and southwestern Canada.

United States records

Washington: Almota, Whitman County, 12 ♂♂, 12 ♀♀ (5-23-IV-34); Snake River, Whitman County, opposite Clarkston, 5 ♂♂, 7 ♀♀ (February to May dates, 1931-32; the February and March dates are for specimens reared in a greenhouse); Truax, Whitman County, 7 ♂♂, 10 ♀♀ (4-12-V-35). (All these specimens were reared from larvae collected by the writer.)

Canadian records

British Columbia: Vernon (2 ♂♂, 6-VI-1926; ♀, 12-VII-1927, E. P. Venables).

DEPRESSARIA PALOUSELLA, new species

PLATE 48, FIGURE 284

A distinct, medium-sized moth resembling *yakimae* but smoother in appearance.

Labial palpus with second segment shining white with much black scaling exteriorly; the white scales show a faint pinkish iridescence; third segment white with black basal and subapical annulations. Antenna with basal segment blackish fuscous with a few whitish scales mixed; remainder grayish with blackish-fuscous annulations. Head light fuscous, the scales white tipped. Thorax, base of tegula, and base of fore wing black. The posterior two-thirds of tegula, the costa to middle of fore wing and the major portion of the thorax strongly marked with cinereous. Ground color of fore wing a light brownish fuscous, darker basally and faintly irrorated with cinereous; in the cell a strongly marked, longitudinal black dash edged anteriorly with cinereous; veins, especially 9, 10, and 11 strongly marked with black and around termen a series of indistinct, blackish spots at ends of veins; cilia light brownish fuscous. Hind wing light grayish-fuscous but darker at extreme apex and around termen; cilia light brownish fuscous, darker basally. Legs blackish fuscous irrorated with white. Abdomen grayish fuscous above, blackish fuscous with much white scaling below.

Female genitalia.—Genital plate broad, moderately sclerotized, not appreciably produced ventrally around ostium. Ostium oval, transverse. Posterior fourth of ductus bursae broadly expanded with the major portion of this section strongly sclerotized and armed with small teeth; the remainder of the ductus is membranous. Inception of ductus seminalis on the posterior margin of the sclerotized part of the ductus bursae. Bursa copulatrix moderately large with a small but well-defined signum.

Alar expanse, 19–20 mm.

Type and paratypes.—U.S.N.M. No. 52074.

Type locality.—Pullman, Wash.

Remarks.—Described from the ♀ type (26-VI-30) and 1 ♀ paratype (20-IX-30), both collected by the author.

DEPRESSARIA CINEREOCOSTELLA Clemens

PLATE 38, FIGURES 205, 205a; PLATE 48, FIGURE 281

Depressaria cinereocostella CLEMENS, Proc. Ent. Soc. Philadelphia, vol. 2, p. 422, 1864.—ROBINSON, Ann. Lyc. Nat. Hist. New York, vol. 9, p. 155, pl. 1, fig. 6, 1869.—CLEMENS, in Stainton, *Tineina of North America*, p. 245, 1872.—

CHAMBERS, Can. Ent., vol. 4, p. 91, 1872; U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 133, 1878.—WALSINGHAM, Ins. Life, vol. 1, p. 255, 1889.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5258, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 749, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5891, 1903; Proc. Ent. Soc. Washington, vol. 5, p. 217, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6434, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 200, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6482, 1917.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 172, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 242, 1923.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8408, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 278, 1939.

Depressaria clausella WALKER, List of the lepidopterous insects in the collections of the British Museum, vol. 29, p. 564, 1864.—WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 312.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8408, 1939 (cited as synonym of *cinereocostella* Clemens).

Labial palpus pale cinereous; second segment with submedial and subterminal spots exteriorly blackish fuscous and with the brush suffused with reddish; third segment with a dull blackish-fuscous suprasedial annulus. Antenna cinereous, narrowly annulated with fuscous basally and suffused with reddish; beyond middle strongly suffused with fuscous; extreme tip cinereous. Face, head, thorax, and ground color of fore wing cinereous; collar fuscous; head and thorax irrorated with fuscous and suffused with red, the thorax and tegula especially so anteriorly. Fore wing, except costa, heavily overlaid with dull brownish red, so much so that the wing appears red with a contrasting light costa, suffused with blackish fuscous in basal half and irrorated with black and cinereous scales; in fold and along veins a series of longitudinal black dashes; extreme base of costa and anal angle blackish fuscous; from middle of costa, around termen to inner margin, a series of poorly defined blackish-fuscous spots; cilia fuscous suffused with red. Hind wing grayish fuscous, lighter basally; cilia pale fuscous, white tipped, with rosy tinge and with dark fuscous subbasal and subterminal bands. Legs cinereous with dull blackish irrorations and suffusion except at joints. Hind tibia with a dull smoky streak exteriorly; outer pair of spurs dull black. Abdomen cinereous with fuscous suffusion dorsally and a blackish-fuscous longitudinal line on each side beneath.

Male genitalia.—Harpe broadest at middle, sparsely clothed with fine hairs; cucullus rounded; clasper absent; sacculus broadly folded, with long, pointed basal process; the basal process of the sacculus is clothed with short, stout spines over its entire length. Anellus rectangular, narrowed posteriorly; lateral edges concave in anterior part. Vinculum bluntly pointed. Aedeagus long, slender, and slightly curved; bluntly pointed; vesica with three to seven stout

cornuti. Transtilla a large rectangular plate, produced anteriorly at middle, with well-developed hairy lobes, the latter fused. Socii large fleshy, hairy flaps.

Female genitalia.—Genital plate broad. Ostium a long transverse slit. Posterior two-fifths of ductus bursae sclerotized, straight; a small protuberance from the side of the sclerotized portion of the ductus bursae; inception of ductus seminalis just before ostium. Bursa copulatrix small with well developed signum in the anterior end.

Alar expanse, 15–22 mm.

Type.—In the Academy of Natural Sciences of Philadelphia.

Type locality.—“Virginia.”

Food plants.—*Carum carvi* L., *Sium lineare* Michx., and *Ligusticum scoticum* L.

Distribution.—Northeastern United States and eastern Canada.

United States records

District of Columbia: 2 ♂♂ (19–VII–99, A. Busck).

Iowa: Ames ♂ (22–VIII–1918; A. W. Lindsey); Iowa City, ♂ (15–IV–1917).

Missouri: St. Louis, ♂ (20–VIII–05, H. McElhose).

New Hampshire: Hampton, 9 ♂♂, 10 ♀♀ (February to August dates, 1906–1908, S. A. Shaw [reared]).

Pennsylvania: Philadelphia (no date or collector).

Canadian records

Manitoba: Cartwright, ♂ (no date; E. F. Heath).

Nova Scotia: White Point Beach, Queens County, 13 ♂♂, 11 ♀♀ (2–10–VIII–1934, J. McDunnough [reared]).

Ontario: Toronto, ♀ (2–III–95).

Remarks.—The number of cornuti on the vesica seems to be of no significance in this species. Such differences in the number of cornuti are usually specific but in the present case all intergrades may be found in any one group of specimens. It is also rather strange that *cinereocostella* should feed on so many species of plants, a habit which is unusual for species of this genus. The specimens reared from the different food plants exhibit no characters by which any one group can be separated from another.

This species is of some economic importance. Although it has not done great damage to crops of caraway, it is potentially dangerous because of its unusual habit of feeding on a number of food plants.

DEPRESSARIA HERACLIANA (Linnaeus)

PLATE 2, FIGURE 11; PLATE 6, FIGURE 48; PLATE 10, FIGURES 68, 68a;
PLATE 17, FIGURE 102

Phalaena Tortrix heracliana LINNAEUS, Systema naturae, ed. 10, p. 532, No. 225, 1758; *ibid.*, ed. 12, p. 380, No. 326, 1767.—DE GEER, Mémoires pour servir à l'histoire des insectes, vol. 2, p. 407, No. 5, 1771.

- Phalaena Tortrix heracleana* LINNAEUS, Fauna Suecia, p. 347, No. 1334, 1761.
- Phalaena heracliana* (Linnaeus) MÜLLER, Natursystem, p. 731, No. 326, 1774.
- Phalaena heracleana* RETZIUS, Genera et species insectorum, p. 45, 1783.
- Pyralis heracleana* FABRICIUS, Systema entomologiae, p. 655, No. 56, 1775; Entomologia systematica, vol. 3, pt. 2, p. 286, No. 178, 1794.
- Depressaria heracliana* (Linnaeus) ZELLER, Isis von Oken, vol. 4, p. 305, 1839; Linnaea Ent., vol. 9, p. 312, 1854.—BETHUNE, Can. Ent., vol. 2, p. 19, 1870.—LINTNER, Can. Ent., vol. 5, p. 82, 1873.—ZELLER, Verh. zool.-bot. Ges. Wien, vol. 23, p. 235, 1873.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 138, 1878.—WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 312.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5265, 1891.—DIETZ, in Smith, Catalogue of the insects of New Jersey, p. 474, 1900.—REBEL, in Staudinger and Rebel, Catalog der palaearktischen Lepidopteren, vol. 2, No. 3280, 1901.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 748, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5889, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6432, 1903.—PETTIT, Michigan Agr. Exp. Stat. Bull. 233, p. 189, 1906.—CHITTENDEN, Insects injurious to vegetation, p. 187, 1907.—JARVIS, Ontario Ent. Soc. Rept., vol. 37, p. 48, 1907.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 200, 1908.—BETHUNE, Ontario Agr. Coll. Bull., vol. 171, p. 28, 1909.—FULTON, WRIGHT, and GREGG, Pennsylvania Agr. Exp. Stat. Bull. 110, p. 29, 1911.—SANDERSON, Insect pests of farm, garden, and orchard, p. 417, 1912.—GOODERHAM, Proc. Ent. Soc. Nova Scotia, vol. 1, p. 94, 1915.—BRETTAIN and GOODERHAM, Can. Ent., vol. 48, p. 37, 1916.—DU PORTE, Ontario Ent. Soc. Rept., vol. 46, p. 50, 1916.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6478, 1917.—BETHUNE, Ontario Dept. Agr. Bull. 251, p. 24, 1917.—GIBSON, Ontario Ent. Soc. Rept., vol. 47, p. 16, 1917.—GOSSARD, Ohio Monthly Bull., vol. 4, p. 379, 1919.—MOSHER, Journ. Econ. Ent., vol. 12, p. 261, 1919.—TRAYER, Psyche, vol. 26 p. 77, 1919.—GIBSON, Can. Dept. Agr. Ent. Circ., vol. 14, p. 13, 1920.—LEONARD, Journ. Econ. Ent., vol. 13, p. 491, 1920.—HUDSON, Ontario Ent. Soc. Rept., vol. 21, p. 35, 1921.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 171, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 243, 1923.—ELLIS, Journ. Agr. Res., vol. 30, p. 789-790, 1925.—CAESAR, Ontario Dept. Agr. Bull. 325, p. 27, 1927.—BRETTAIN, Nova Scotia Dept. Nat. Res. Bull. 12, p. 86-87, 1927.—DRAKE and DECKER, Iowa Agr. Exp. Stat. Circ. 103, p. 16, 1927.—PETTIT, Michigan State Board Agr. Rept., vol. 66, p. 343-344, 1927.—CAESAR, Ontario Dept. Agr. Bull. 359, p. 29-30, 1931.—DUSTAN, Can. Dept. Agr. Ent. Bull., vol. 32, p. 51, 1932.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8404, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 283, 1939.
- Phalaena heraclei* RETZIUS, Genera et species insectorum, p. 45, 1783.
- Pyralis umbellana* FABRICIUS, Entomologia systematica, vol. 3, p. 286, No. 177, 1794.
- Haemilis pastinacella* DUPONCHEL, Histoire naturelle des Lepidoptères de la France, vol. 11, p. 153, pl. 291, figs. 4 and 5, 1838.—BRUAND, Ann. Ent. Soc. France (ser. 2), 1844, p. 189, pl. 6, fig. A, B, a, b.
- Haemylis heracleella* ZETTERSTEDT, Insecta Lapponica, p. 999, 1840.
- Depressaria ontariella* BETHUNE, Can. Ent., vol. 2, p. 3, 19, 1870.
- Labial palpus whitish ochreous; second segment suffused in the brush and irrorated exteriorly with fuscous and brown; third segment with subbasal and supramedial annuli blackish fuscous, the former

narrow and poorly defined. Antenna luteous annulated with fuscous; basal segment blackish fuscous above. Face pale, shining grayish fuscous. Head, thorax, and fore wing luteous shaded and streaked with brown and blackish fuscous; extreme base of costa, anal angle, discal spot at the end of the cell, and a series of spots from apex, around termen to inner margin, blackish fuscous; veins rather strongly indicated by blackish-fuscous scaling; apical area with whitish irrorations and an indistinct, narrow, outwardly curved fascia of the same color from apical third of costa; cilia grayish-fuscous. Hind wing pale yellowish-fuscous, darker apically and with a narrow, fuscous terminal line; cilia paler with a fuscous subbasal band. Legs luteous shaded and irrorated with fuscous except at joints. Abdomen luteous above, lightly infuscated; beneath, whitish-ochreous with a row of blackish-fuscous spots on each side.

Male genitalia.—Harpe with cucullus and distal half of ventral margin clothed with stout hairs; costa excavated before cucullus; clasper absent, sacculus moderately broad, strongly sclerotized, and with a long slender process from base. Anellus an elongate slightly sclerotized plate narrower at distal than at proximal end. Transtilla a broad band with well-developed hairy lobes. Aedeagus stout, elongate, pointed; vesica armed with eight or ten long slender cornuti, Vinculum rounded. Gnathos a spined knob. Socii elongate hairy lobes, widely separated. Tegumen truncated; uncus absent.

Female genitalia.—Lobe of ovipositor somewhat sclerotized basally. Genital plate broad, strongly sclerotized. Ostium round; anterior edge strongly sclerotized. Ductus bursae membranous, dilated at posterior three-fourths; inception of ductus seminalis just before ostium. Bursa copulatrix moderately large with small diamond-shaped signum.

Alar expanse, 21–29 mm.

Types.—Lost? ³¹

Type localities.—Europe (*heracliana*, *heraclei*, *umbellana*, *pastinacella*); Ontario, Canada (*ontariella*).

Food plants.—Parsnip (*Pastinacea sativa* L.); *Angelica* sp. (boring in stem).

Distribution.—Throughout United States and southern Canada.

United States records

Arizona: Walton, Yuma County, ♀ (1–6–III–1925, O. C. Poling).

Illinois: Chicago, 3 ♂♂ (June, 1900; 12–VII–'02, W. D. Kearfott; one without date, K. Wyatt collector); Decatur, 2 ♂♂ (July 1–7).

Indiana: Morgan County, ♂ (10–VII–1931, B. E. Montgomery; "reared from wild parsnip").

³¹ Dr. McDunnough states (*in litt.*): "Regarding the type of *ontariella* Bethune, I have no information. It is certainly not in Ottawa and I imagine that most of Bethune's types have been destroyed by *Dermestes*. . . . What remains of his collection has been scattered about, but Dr. Ide of the Royal Ontario Museum who went over the specimens stated that there were no types amongst them."

- Massachusetts: Cliftondale, 2 ♂♂ (August 1920, J. D. Caffrey).
 New Jersey: Caldwell, 3 ♂♂, 5 ♀♀ (August, W. D. Kearfott).
 New York: Rye, 6 ♂♂, 10 ♀♀ (2-20-VIII-1939, J. F. G. Clarke); ♂ (no date or locality; Wm. Beutenmüller).
 Oregon: Portland, ♂ (1-VIII-1914, L. Leland).
 Pennsylvania: Bristol, 8 ♂♂, 8 ♀♀ (June to August dates, 1888, T. Pergande; reared from parsnip); New Brighton, 3 ♂♂, 2 ♀♀ (5-13-VIII-1907, H. D. Merrick); Oak Station, Allegheny County, ♂ (30-VII-'10, Fred Marloff); Pittsburgh, ♂, ♀ (10-IV-'06, 13-IV-'06, Henry Engel); West Chester, 2 ♂♂, ♀ (July, 1919, F. M. Trimble; reared from parsnip).
 Rhode Island: Bristol, ♂ (15-VII-1920, no collector).
 Utah: Logan, ♀ (10-VIII-1907, E. S. G. Titus; reared from wild parsnip); Murray, ♂ (12-VII-1913, Timberlake); Vineyard, ♀ (1-IX-1912, Tom Spalding).
 Washington: Bellingham, 12 ♂♂, ♀ (4-VIII-1930, W. W. Baker; reared from parsnip); Oroville, ♂ (18-VII-1933, Judson Murray; reared from parsnip); Pullman, ♂ (29-IV-24, J. F. G. Clarke.)

Canadian records

- British Columbia: Fraser Mills, ♀ (18-IX-1925, L. E. Marmont); Lillooet (2-VIII-1934, A. W. A. Phair); Summerland (12-IV-1934; 22-24-VII-1935, A. N. Gartrell).
 Nova Scotia: Truro (17-VIII-1915, no collector).
 Ontario: London (28-29-VII-1931, G. S. Walley); Ottawa (19-VIII-1903; 11-VIII-1908, J. Fletcher); Port Hope (8-IV-1895, no collector).
 Quebec: Meach Lake (29-VII to 6-VIII-1903, C. H. Young).

Remarks.—This is the notorious “parsnip webworm,” which has appeared so frequently in the literature in America and abroad.

The name has repeatedly been credited to De Geer (1771) but should be attributed to Linnaeus (1758). Sherborn (*Index Animalium*, 1902) credits the name to Linnaeus, but others have failed to acknowledge this authorship.

The species is undoubtedly more widespread in America than is indicated by the distribution given; but I have included in the distribution only the localities from which I have seen specimens. At New Castle, Del., however, I have seen abundant evidence of the work of this species.

I have been unable to locate any of the types, although some may be in existence.

DEPRESSARIA JULIELLA Busck

PLATE 38, FIGURES 203, 203a; PLATE 47, FIGURE 280

- Depressaria juliella* BUSCK, Proc. Ent. Soc. Washington, vol. 9, pl. 91, 1908; Proc. U. S. Nat. Mus., vol. 35, p. 200, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6475, 1917.—MEYRICK, in WYTSMAN, *Genera Insectorum*, fasc. 180, p. 171, 1922.—CLARKE, *Can. Ent.*, vol. 66, p. 178, 1934.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8399, 1939.—GAEDE, in BRYK, *Lepidopterorum catalogus*, pt. 92, p. 286, 1939.

Labial palpus ochreous; second segment with a dark reddish-fuscous spot near base externally and with the brush suffused with red and irrorated with reddish fuscous; third segment suffused with red anteriorly and with poorly defined reddish-fuscous subbasal and supramedial annuli. Antenna light reddish fuscous, narrowly and faintly annulated with fuscous; basal segment ochreous beneath. Face shining whitish ochreous. Head, thorax, and fore wing light ochreous suffused and mottled with red. Below antenna, in front, a vertical reddish-fuscous patch; from base of costa, following fold, a reddish-fuscous streak to about basal fourth; in anal angle a small reddish-fuscous patch; both of these dark markings mixed with black scales. Along costa and inner margin and in apical third numerous white scales; all the veins are more or less indicated by reddish fuscous and black mixed; discal spot at end of cell faintly indicated by a few red scales; cilia fuscous, strongly suffused with red and with a blackish-fuscous subbasal band. Hind wing fuscous, lighter basally; cilia red with a fuscous subbasal band. Legs ochreous suffused with red and mottled with reddish fuscous. Abdomen ochreous suffused with fuscous dorsally and with a blackish-fuscous line on each side ventrally.

Male genitalia.—Harpe gradually tapering to the rounded cucullus; clasper absent, sacculus broadly folded, with a large, elongate, truncated process from its base; this elongate process is more or less armed with spines over most of its length; at the distal end the spines are numerous. Anellus a sclerotized plate; broad anteriorly, narrow posteriorly; anterior edge with a shallow median cleft; posterior edge convex. Vinculum produced anteriorly. Aedeagus long, nearly straight, dilated at proximal end; vesica armed with 7–10 stout cornuti. Transtilla membranous, with small hairy lobes. Socii long, narrow, hairy flaps.

Female genitalia.—Genital plate broad, moderately sclerotized. Ostium transverse, elliptical, situated at anterior margin of the genital plate. Ductus bursae sclerotized, slightly curved and dilated in posterior half, without protuberance; membranous in anterior half; inception of ductus seminalis just anterior to ostium. Bursa copulatrix large with a small, but well developed signum near anterior end.

Alar expanse, 21–25 mm.

Type.—In United States National Museum.

Type locality.—Pecos, N. Mex.

Food plant.—*Cicuta occidentalis* Greene.

Distribution.—Western United States.

United States records

Colorado: Alamosa, ♀ (Oslar).

New Mexico: Pecos, ♂ (September, T. D. A. Cockerell).

Utah: Provo, 5 ♂♂, 3 ♀♀ (August and September dates); Vineyard, 16 ♂♂, 17 ♀♀ (September and October dates, Tom Spalding).

Washington: Pullman, 56 ♂♂, 52 ♀♀ (reared, July, August dates, 1933-1935, J. F. G. Clarke).

Remarks.—I have already given ³² a summary of the habits and have briefly described the larva of this species but it seems appropriate to give a brief description of the pupa at this time.

Pupa.—First day: Wing, antennal and leg sheaths, also dorsal part of head and thorax light lemon yellow. Abdominal segments light whitish ochreous except the last caudal segment which is strongly tinged with reddish brown. The last five segments are free and movable.

Second day: Pupa light reddish brown; last segment somewhat darker. From the second day on the color becomes progressively darker. The wing sheaths become very dark brown first. The abdominal segments gradually become darker until at the time of emergence the entire pupa is nearly black.

Busck's remark ³³ concerning the close relationship of *juliella* to the European *nervosa* is borne out by a study of both the male and female genitalia. The differences in genitalia (although admittedly slight) and the difference in food plant will serve to distinguish the two. The coloration of *juliella*, as indicated by a reared and a collected series of over 150 specimens, is usually brighter and lighter than that of *nervosa*.

DEPRESSARIA ELEANORAE, new species

PLATE 38, FIGURES 204, 204a; PLATE 47, FIGURE 279

Similar to *D. juliella* Busck but smaller.

Antenna reddish ochreous above, lighter beneath and toward tip; narrowly annulated with reddish fuscous. Second segment of labial palpus whitish ochreous strongly suffused with red and reddish fuscous exteriorly; third segment whitish ochreous with broad reddish-fuscous basal and subapical fasciae. Head light reddish ochreous; face light yellowish ochreous. Thorax, tegula, and fore wing ochreous strongly overlaid with red, reddish fuscous, and white scales; at base of wing a black spot on costa and a similar one on dorsum; narrowly but strongly tinged with bright red; in middle of cell an indistinct longitudinal streak of reddish fuscous and white scales mixed; cilia light reddish fuscous. Hind wing light fuscous, lighter basally with a distinct reddish hue; cilia light reddish fuscous with a fuscous sub-

³² Clarke, J. F. G., Can. Ent. vol. 66, p. 178, 1934.

³³ Proc. Ent. Soc. Washington, vol. 9, p. 91, 1908.

basal band. Legs: Femora whitish ochreous; fore and mid femora strongly marked with reddish fuscous exteriorly; tibiae and tarsi of fore and mid legs reddish fuscous with whitish ochreous inwardly. Hind tibia whitish ochreous strongly tinged with pink; tarsi strongly marked with fuscous. Abdomen whitish ochreous; basal segments suffused with light fuscous; underside with well-defined lateral row of fuscous spots on each side.

Male genitalia.—Harpe sparsely clothed with fine hairs; clasper absent; cucullus rounded; sacculus broadly folded and with a long, distally dilated, curved basal process; the latter armed with spines only at distal end. Anellus a broad, sclerotized plate abruptly narrowed in posterior half; posterior edge strongly convex; anterior margin indented. Vinculum with a strongly produced, acutely pointed anterior process. Aedeagus long, slender, nearly straight; vesica with 12 or more stout cornuti. Transtilla membranous with weakly developed, hairy lobes. Socii long, slender, hairy flaps.

Female genitalia.—Genital plate broad, moderately sclerotized; ostium transverse, slitlike; anterior edge of ostium slightly convex. Posterior two-thirds of ductus bursae strongly sclerotized. Bursa copulatrix large; signum small and situated at the anterior end.

Alar expanse, 18–20 mm.

Type.—U.S.N.M. No. 52082.

Type locality.—Hymers, Ontario (August 16–23).

Remarks.—Described from the ♂ type, 1 ♀ and 6 ♂ paratypes as follows: Ottawa, Ontario 3 ♂♂ (28–VIII–1906; 5–IX–1908, James Fletcher; 19–III–1933, C. H. Young); ♀ (20–V–1925, C. H. Curran); Trenton, Ontario, ♂ (9–IX–10, Evans). The other two paratype ♂♂ are without locality labels; one with “In office, 21–X–1903” and the other “23–X–04 J. F.” (James Fletcher?). Paratypes in U. S. National and Canadian National collections. I am indebted to Dr. J. McDunnough for seven of the eight specimens of the type series.

This species is the eastern analogue of the western *juliella* but is immediately distinguished from *juliella* by its smaller size. The genitalia of the two are similar but differ as follows: In the male of *juliella* the vinculum is bluntly pointed, in *eleanorae* sharply pointed; the basal process from the sacculus of *juliella* is spiny over practically its entire length while that of *eleanorae* has spines only on the distal half; on the vesica of *juliella* there is one cornutus which is noticeably much larger than the rest, but in *eleanorae* the differences in the lengths of the cornuti are not so striking. The ductus bursae of the female genitalia of *eleanorae* exhibits a sclerotized portion of much greater length than that found in *juliella*.

I take pleasure in naming this species for Mrs. Eleanor A. Carlin, staff artist for the Bureau of Entomology and Plant Quarantine.

DEPRESSARIA ALIENELLA Busck

PLATE 35, FIGURES 195, 195a; PLATE 48, FIGURE 282

- Depressaria alienella* BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 765, 1904.—ANDERSON, Catalogue of British Columbia Lepidoptera, No. 1094, 1904.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 200, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6473, 1917.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 171, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part. 2, Microlepidoptera), No. 8393, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 273, 1939.
- Depressaria emeritella* WALSINGHAM (not Stainton), Proc. Zool. Soc. London, 1881, p. 381.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5261, 1891.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 746, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5884, 1903.
- Depressaria emeritella alienella* (Busck) FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 243, 1923.

Labial palpus white; second segment irrorated exteriorly, and suffused in the brush, with reddish fuscous and with a distinct blackish-fuscous spot near base exteriorly; third segment with a broad blackish-fuscous supramedial annulus. Head and thorax white; thorax sparsely irrorated with reddish fuscous anteriorly; tegula dark reddish fuscous. Fore wing light fuscous strongly overlaid with red or reddish fuscous, irrorated with cinereous and fuscous and streaked with blackish fuscous; at the end of cell a white discal spot preceded and followed with fuscous; around termen a poorly defined row of fuscous spots. Legs white, suffused and irrorated with blackish fuscous except at joints. Abdomen pale fuscous above, ochreous-white beneath, irrorated with fuscous.

Male genitalia.—Harpe moderately clothed with long fine hairs, clasper long, pointed, not projecting beyond ventral edge of harpe, armed with numerous fine spines; sacculus narrowly folded, without basal process; cucullus bluntly pointed. Anellus broadly oval; lateral edge not strongly produced. Vinculum bluntly pointed. Transtilla a broad sclerotized band with hairy lobes moderately well developed. Aedeagus long, slender, gently curved. Tegumen truncated; socii small, hairy lobes.

Female genitalia.—Ostium slitlike transverse, with shallow median cleft on anterior edge; situated near the anterior edge of the genital plate. Ductus bursae membranous, straight; inception of the ductus seminalis well before ostium and anterior to the sclerotized portion of the ductus bursae. Bursa copulatrix large with well-developed toothed signum.

Alar expanse, 18–21 mm.

Type.—In the United States National Museum.

Type locality.—Kaslo, British Columbia, Canada.

Food plant.—*Artemisia* sp., yarrow.

Distribution.—Northeastern and Western United States and Canada from the Atlantic to Pacific.

United States records

California: Shasta Retreat, Siskiyou County, 2 ♂♂, 3 ♀♀ (July 1–7).

Maine: Bar Harbor, 4 ♂♂ (24–VIII–35; 26–IX–36, A. E. Brower).

Massachusetts: Worcester, ♂ (2–VIII–1902).

New York: Ilion, ♂, 2 ♀♀ (2–3–IX–11, H. McElhose).

Oregon: Rogue River, Josephine County (VI–1872, Walsingham).

Canadian records

Alberta: Nordegg, 3 ♂♂ (16–18–IX–1921, K. Bowman).

British Columbia: Kaslo.

Manitoba: ♂ (10–VIII–1905, L. E. Marmont); Rounthwaite, ♀ (10–VIII–06, L. E. Marmont).

New Brunswick: Fredericton, ♂ (22–VII–35, A. E. Brower).

Nova Scotia: Round Hill, ♂ (28–VII–1935, F. C. Gilliatt).

Ontario: Ottawa, 3 ♂♂ (30–VII–07, 11–VIII–1905, C. H. Young; 17–VII–1933 [reared from Yarrow] C. H. Young); Trenton, 3 ♂♂ (9–IX–11, 5–IX–04, 5–IX–12, Evans).

Quebec: Meach Lake, ♀ (16–VII–1902, C. H. Young).

Remarks.—The specimens I have placed under this name show considerable variation in coloration, but all have one character in common, white head and thorax. The variation in the color of the fore wings is of no value in distinguishing this species, and, further, the color forms cannot be separated on genitalia.

The only North American species with which *alienella* might be confused is *artemisiella*, to which it is very closely related, but the two may be easily distinguished on characters of the anellus, and *artemisiella* lacks the white head and thorax so characteristic of *alienella*.

The European *emeritella* has the thorax white as in *alienella*, but the two are easily distinguished by their genitalia.

DEPRESSARIA ARTEMISIELLA McDunnough

PLATE 35, FIGURES 196, 196a; PLATE 47, FIGURE 278

Depressaria artemisiella McDUNNOUGH, Can. Ent., vol. 59, p. 271, 1927; Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8402, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 273, 1939.

Labial palpus ochreous; base of second segment deep brown and the brush suffused and profusely irrorated with brown; third segment with poorly defined brown subbasal annulus. Head ochreous mixed with brown; anterior margin of front deep brown. Thorax deep purplish brown mixed with ochreous. Ground color of fore wing light wood brown, shaded with deep brown on costal half at base and streaked with white and black; subcostal vein black irrorated with white on outer half; veins 5 to 9 indicated by black scaling; at apical third a transverse, outwardly curved, crescentic, whitish fascia; at basal third, in cell, an indistinct black discal spot followed by a white streak, the latter confluent with the poorly defined white outer discal spot at the end of cell; vein 2 largely white with brown shading above and below; veins 3 and 4 liberally sprinkled with white, 5 sparsely so; from apical third of costa, around termen to middle of inner margin, a series of poorly defined blackish spots; cilia concolorous with slight pink tinge. Hind wing and cilia pale smoky; wing darker apically with blackish terminal line. Legs ochreous suffused and irrorated with fuscous except at joints. Abdomen ochreous.

Male genitalia.—Similar to *alienella* except that the lateral edges of the anellus of *artemisiella* are strongly produced (see key and fig. 196). The clasper of *artemisiella* appears to be armed with fewer and coarser spines than that of *alienella*, but I have not seen sufficient material to determine whether this character is constant.

Female genitalia.—Similar to *alienella* except that the anterior edge of ostial opening is convex in *artemisiella* but slightly cleft in *alienella*.

Alar expanse, 22 mm.

Type.—In the Canadian National Museum.

Type locality.—Seton Lake, Lillooet, British Columbia, Canada.

Food plant.—*Artemisia*.

Distribution.—Known only from the type locality.

Remarks.—In addition to the differences in genitalia the thorax in *artemisiella* is not white as it is in *alienella* and the fore wing lacks the red coloration of the latter species.

DEPRESSARIA WHITMANI, new species

PLATE 36, FIGURES 200, 200a; PLATE 48, FIGURE 286

A medium-sized dark species similar to *leptotaeniae*.

Labial palpus with tuft of second segment blackish fuscous below and outwardly; inwardly and above this segment is olive-buff; terminal segment blackish fuscous; apex olive-buff. Antenna blackish fuscous narrowly annulated with grayish fuscous; basal segment shining black above, olive-buff below. Head light fuscous, scales

gray tipped. Thorax and tegula blackish fuscous anteriorly, drab posteriorly. Fore wing blackish fuscous irrorated with drab and olive-buff scales; wing, at extreme base in angle, three short dashes at basal third, the bases of veins 9, 10, and 11, and a series of small spots at the ends of all veins around termen, black; at end of cell a well-defined olive-buff spot preceded by a few black scales; at apical third a poorly defined, narrow, outwardly curved olive-buff fascia; extreme edge of costa faintly pink; cilia grayish fuscous. Hind wing light fuscous, darker apically; cilia very light shining fuscous with a darker subbasal line. Legs fuscous strongly overlaid with olive-buff; tarsi annulated with olive-buff. Abdomen fuscous, the posterior edges of the segments dorsally grayish; under surface heavily overlaid with olive-buff.

Male genitalia.—Harpe broad, sparsely clothed with hairs; clasper stout, abruptly excurved just below middle; at base of clasper a series of four or five short, stout bristles; sacculus narrowly folded but strongly sclerotized; from base of sacculus an elongate, gently excurved process armed with fine, slender spines. Anellus a broad sclerotized plate broader than long; posterior edge narrowly produced to middle and deeply cleft. Aedeagus longer than harpe, slender, evenly curved; at base a broad, flat dorsal winglike expansion; opposite this a broad concave plate by which the aedeagus articulates with the anellus. Vinculum rounded with prominent ventroposterior ridge. Transtilla membranous with large, hairy, broad lateral lobes. Gnathos a spined, oval knob. Socii minute, mainly indicated by a few hairs.

Female genitalia.—Genital plate narrow, of nearly equal width throughout; ventroanterior edge produced into a narrow flap. Ostium small, somewhat triangular. Ductus bursae membranous except for a small, strongly sclerotized, curved section from middle to posterior three-fourths; entire posterior half rigid and slightly curved; inception of ductus seminalis just before ostium. Bursa copulatrix large; signum a large, sclerotized, toothed plate with prominent anterior and posterior points.

Alar expanse, 18–22 mm.

Type.—U.S.N.M. No. 52083.

Type locality.—Snake River, Whitman County, Wash., opposite Clarkston.

Food plant.—*Lomatium macrocarpum* (Hook. and Arn.) Coult. and Rose.

Remarks.—Described from the ♂ type, 2 ♂ and 1 ♀ paratypes all from the same locality. These specimens were reared from larvae which I collected. The moths issued 26–27–V–1935.

The species appears to be closest to *leptotaeniae* in coloration but nearest *angustati* on characters of the genitalia. In coloration it is inseparable from *leptotaeniae* but may easily be separated from *angustati* by the presence of the pink cast of the costa which *angustati* lacks. *D. whitmani* can be separated from *leptotaeniae* by its long slender aedeagus; from *angustati* by the more evenly curved aedeagus, the more strongly excurved spine cluster from the base of the sacculus, the series of four or five short bristles as the base of the clasper, and the deeply incised posterior margin of the anellus. The females are at once distinguishable by their genitalia. *D. leptotaeniae* lacks the curved, sclerotized posterior portion of the ductus bursae; *angustati* lacks the produced ventroanterior flap of the genital plate and the pronounced anterior and posterior points of the signum; the sclerotized portion of the ductus bursae is longer in *angustati* than in *whitmani*.

DEPRESSARIA LEPTOTAENIAE Clarke

PLATE 37, FIGURES 202, 202a; PLATE 48, FIGURE 289

Depressaria leptotaeniae CLARKE, Can. Ent., vol. 65, p. 87, pl. 4, 1933.—McDUNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8396, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 286, 1939.

Male genitalia.—Harpe rather short, broad, sparsely clothed with hairs; clasper stout, long, curved toward the cucullus; cucullus pointed; sacculus narrowly curved, with a prominent transverse, spinous basal process, the spines numerous, rather small. Anellus a long sclerotized plate; posterior and anterior edges deeply concave; lateral edges convex. Vinculum rounded. Aedeagus stout, pointed, curved. Transstilla a moderately broad sclerotized band with well-developed hairy lobes. Socii small, hairy.

Female genitalia.—Genital plate narrow with narrow, strongly sclerotized ventral sclerites, the latter narrower than the sclerotized part of ductus bursae. Ostium triangular. Posterior portion of ductus bursae broad, slightly curved, sclerotized; inception of ductus seminalis just anterior to ostium. Bursa copulatrix large with a well-developed signum near posterior end.

Alar expanse, 17–23 mm.

Type.—In the United States National Museum.

Type locality.—Pullman, Wash.

Food plants.—*Leptotaenia multifida* Nutt. and *L. salmoniflora* Coult. and Rose.

Distribution.—Northwestern United States and Canada in the intermountain area.

United States records

Idaho: Viola, Moscow Mountains (=Thatuna Hills), altitude 3,000 feet, 11 ♂♂, 7 ♀♀ (10-16-VI-35).

Utah: Eureka, ♂, ♀ (13-VII-1911, 28-VI-1911, Tom Spalding).

Washington: Almota, Whitman County, altitude, 2,000 feet, ♀ (11-VI-35); Cashmere (Hay Canyon), 2 ♂♂, 7 ♀♀ (24-V to 7-VI-35, I. W. Bales); Dry Falls, Grant County, 2 ♂♂, ♀ (14-V-35); Entiat, ♂ (9-V-1934, A. N. Gartrell); Grand Coulee City, 17 ♂♂, 10 ♀♀ (20-22-IV-34; 12-21-V-35); Kamiack Butte, Whitman County, altitude 3000 ft., 66 ♂♂, 63 ♀♀ (5-13-V-34; 27-V to 19-VI-35); Park Lake, Grant County, 15 ♂♂, 12 ♀♀ (9-21-V-35); Pullman, altitude 2,500 feet, 5 ♂♂, 8 ♀♀ (30-V to 16-VI-32).

(Unless otherwise stated all were reared from larvae collected by the writer.)

Canadian records

Alberta: Waterton Lakes, ♀ (18-VII-1923, J. McDunnough [rf. yellow flowered umbel]).

Remarks.—In this large series are two specimens (approximately 1 o/o) with short broad wings which otherwise are quite normal and apparently functional. These two are not crippled in any sense, and were reared under the same conditions as were the rest, which suggests that this short-winged form may be the result of a Mendelian factor such as has been demonstrated in experiments with *Drosophila*.

I mention these short-winged forms merely to show that if they were collected in nature they would undoubtedly be described as a distinct species (distinct from that to which they actually belong).

Since this species was described I have been able to rear a series of over 200 moths from various localities in the states of Idaho and Washington. The Utah specimens are somewhat smaller than those from Idaho and Washington and show slight variations in the genitalia but unquestionably belong here.

DEPRESSARIA YAKIMAE, new species

PLATE 37 FIGURES 201, 201a; PLATE 48, FIGURE 285

A very distinct, medium-sized, grayish species close to *leptotaeniae*.

Labial palpus with second segment white strongly irrorated with blackish fuscous; third segment blackish fuscous sparsely irrorated with white; apex white. Antenna with basal segment blackish fuscous with a whitish-ochreous patch beneath at apex; remainder of antenna brown above, whitish ochreous beneath, narrowly annulated with blackish fuscous. Head light brownish fuscous, the tips of the scales whitish. Thorax and ground color of fore wing brownish ochreous mixed with white scales. Bases of tegula and fore wing blackish fuscous; costa of fore wing fuscous mixed with white; an indistinct longitudinal dash, and streaks following

the veins, black; at apical third an indistinct outwardly curved, broken, white fascia formed by short series of white scales following the veins; around termen a series of seven indistinct black spots; cilia light smoky. Hind wing fuscous, lighter basally; cilia light brownish ochreous with a distinct fuscous subbasal line. Legs blackish fuscous outwardly, mixed with whitish ochreous inwardly; annulations of tarsi whitish ochreous. Abdomen grayish above, whitish ochreous beneath.

Male genitalia.—Harpe broad, sparsely clothed with hairs; cucullus broadly rounded; clasper stout, sharply and outwardly angled; distal end with small scobinations; sacculus narrowly folded, with spinous process from base curved toward cucullus; elements of spinous basal process long, stout, rather few in number. Anellus longer than broad; anterior margin deeply cleft; lateral edge convex, undulating; posterior margin concave. Aedeagus stout, gently curved, sharply pointed; base with large, winglike dorsal expansion and spoon-shaped ventral process by which the aedeagus articulates with the anellus. Vinculum rounded. Transtilla broad, narrowly hood-shaped; lobes of transtilla mainly indicated by hairs. Socii small, hairy.

Female genitalia.—Ostium large, oval; genital plate broad, strongly sclerotized, somewhat evaginated ventrally around ostium; anteriorly the ventral sclerites are produced to form two conspicuous, shallow, sclerotized pockets equal in length to the sclerotized part of the ductus bursae; ductus bursae strongly sclerotized in posterior third, the remainder membranous; inception of ductus seminalis just before ostium; bursa copulatrix large, with a conspicuous, strongly sclerotized, toothed signum in posterior part.

Alar expanse, 20–22 mm.

Type.—U.S.N.M. No. 52073.

Type locality.—Yakima, Yakima County, Wash. (18–V–31, Fred P. Dean, collector).

Food plant.—Unknown.

Remarks.—Described from the ♀ type, 3 ♂ and 3 ♀ paratypes as follows: Walla Walla, Wash., 3 ♂ ♂ and 3 ♀ ♀ (Clarke, No. 4731–4736; [8–14–VI–1931, D. H. Brannon]).

This very distinct species cannot be confused with any other described from North America. A few species (*leptotaeniae*, *multifidae*, and *angustati*) show a slight tendency toward the formation of the shallow anterior pockets of the genital plate but none has them so well developed as *yakimae*.

I suspect that the larva will be found on some species of *Lomatium* or a closely allied plant.

DEPRESSARIA MULTIFIDAE Clarke

PLATE 36, FIGURES 199, 199a; PLATE 48, FIGURE 288

Depressaria multifidae CLARKE, Can. Ent., vol. 65, p. 85, pl. 4, 1933; vol. 66, p. 179, 1934.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8394, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 288, 1939.

Male genitalia.—Harpe broad, sparsely covered with fine hairs; cucullus pointed; clasper slender, fingerlike, curved toward cucullus; sacculus narrowly folded with a prominent basal process armed with long stout spines. Anellus a sclerotized plate longer than wide, with sides convex; posterior and anterior margins concave. Vinculum rounded. Aedeagus longer than harpe, slender, pointed; sharply curved at distal third, less strongly so at basal third; base of aedeagus with a small bulbous process dorsally and a long, broad, shovel-shaped process ventrally. Transtilla a broad, lightly sclerotized band with moderately developed hairy lobes. Socii very small, mainly indicated by hairs.

Female genitalia.—Genital plate narrow with a pair of shallow, cupped sclerites anteriorly. Ostium a longitudinal slit, wider at anterior end. Ductus bursae with a sharply curved sclerotized portion near its middle; inception of ductus seminalis just before ostium. Bursa copulatrix large with a well-developed signum near posterior end.

Alar expanse, 17–21 mm.

Type.—In the United States National Museum.

Type locality.—Snake River, Whitman County, opposite Clarkston, Wash.

Food plant.—*Lomatium grayi* Coult. and Rose.

Distribution.—Northwestern United States.

United States records

Idaho: Lapwai, Nez Perce County, 23 ♂♂, 20 ♀♀ (21–26–V–35).

Washington: Penawawa, Whitman County, 6 ♂♂, 4 ♀♀ (3–12–V–35); Snake River, Whitman County, opposite Clarkston, 6 ♂♂, 10 ♀♀ (May dates 1932–34); Truax, Whitman County, ♂, 2 ♀♀ (4–9–V–35); Godman Springs, Blue Mountains, Columbia County, altitude 5700 feet, 2 ♂♂, 4 ♀♀ (23–31–VII–35).

(All the above specimens were reared from larvae collected by the writer.)

Remarks.—Although the male and female genitalia were characterized in the original description, it seems advisable to make necessary corrections at this time. They have been correctly redescribed above.

The name of this insect is unfortunate and resulted from a misidentification of the host. The plant, upon which the larva feeds, grows to a very large size on the sandy or gravelly bars of the Snake

River. Because of the large size of these individual plants they have, for many years, been considered conspecific with the true *Leptotaenia multifida* of the high plateau of the Palouse region around Pullman, Wash.

Suspecting some error in my rearing records of this and allied species, or in the identification of the hosts, I supplied larvae feeding on true *Leptotaenia* with food from the Snake River locality. They refused this substitute food. When this evidence was obtained further investigations were carried out which proved, beyond doubt, that the food plant is *Lomatium grayi*.

A long series of moths has been reared from larvae collected in several localities. These moths show some variation in structure and habits, but not enough, I think, to warrant separation. Superficially the moths cannot be distinguished, nor can the larvae or pupae.

The differences in habits are directly the result of the variations in the host plants themselves. As already pointed out, the plants growing in the sandy or gravelly bars of the river are unusually large, while those growing on the dry banks a few yards away are scarcely recognizable as the same species. This plant grows also in the Blue Mountains of Washington and Oregon up to altitudes of slightly over 6,000 feet. As might be expected it varies greatly in its different habitats there, from a small, sessile plant to one almost reaching the proportions of the individuals of the Snake River bars.

The moth, however, apparently does not go above 5,700 feet, although it is common at that altitude at Godman Springs, in the Blue Mountains.

The larvae collected at Godman Springs show some colorational differences but I think these unimportant specifically; one often finds such differences in larvae from one locality. The larvae from Godman Springs measured 12-14 mm. in length, 2 to 3 mm. smaller than the mature larvae from the Snake River. This difference, I believe, is purely the result of the different environments.

The larval habits of the mountain insects are much the same as those of the desert-inhabiting individuals. The former differ, however, in producing much more webbing of the parts of the plants affected, with pupation frequently taking place in the webbed leaf sheaths. I failed to find a pupa (living or dead) in the stalks of the mountain plants although I did find a few larvae in the flower stalks. All of the larvae found in the stalks were parasitized. Because of the small number of larvae and pupae found I suspect that many larvae pupate in debris at the base of the plant. A brief description of the pupa is as follows: Wing, antennal and leg sheaths bright green gradually becoming darker and duller, tinged with brown. Abdomi-

nal segments yellow-brown shaded with green. Just preceding emergence the wing, antennal and leg sheaths become very dark brown while the abdominal segments remain a deep reddish brown. Last five segments free. Pupation period 8–10 days.

DEPRESSARIA ANGUSTATI, new species

PLATE 36, FIGURES 19S, 19Sa; PLATE 48, FIGURE 2S7

A medium-sized dark species close to *multifidae* and *whitmani*.

Second segment of labial palpus ochreous with much blackish scaling intermixed, especially exteriorly; third segment blackish fuscous, ochreous tipped. Antenna blackish fuscous, slightly lighter beneath, the whole becoming lighter toward the distal end. Head ochreous with much fuscous scaling above. Thorax and fore wing blackish fuscous with scattered ochreous scales. Tip of tegula and posterior portion of thorax ochreous. Discal spot at middle of cell black with some ochreous scales mixed; frequently this spot is very indistinct; at end of cell a usually conspicuous ochreous spot preceded and followed by black scales. From the costa, at the middle, to the center of the cell an indistinct broad ochreous fascia; at two-thirds from costa, outwardly to vein 6 then inwardly to inner margin, a similarly colored but narrower fascia; costa sprinkled with ochreous scales above and ochreous beneath mixed with fuscous scales; cilia light brownish fuscous. Hind wing fuscous, lighter basally; cilia light brownish fuscous with a narrow fuscous subbasal line. Legs with femora ochreous, strongly (usually) suffused with fuscous; tibiae and tarsi ochreous inwardly, fuscous outwardly; tarsi ochreous annulated. Abdomen grayish above with ochreous at posterior edges of segments; beneath fuscous except midventrally where it is ochreous; anal tuft ochreous.

Male genitalia.—Harpe narrow with the cucullus bluntly rounded; clasper strongly sclerotized, moderately slender and strongly curved outwardly in distal half; sacculus moderately broad with a prominent spinous basal process the elements of which are fine, slender and compactly associated, Anellus a very broad, sclerotized plate, broader than long; posterior edge not cleft; from each basolateral edge of the plate a pointed projection articulating with the sacculus of the harpe. Vinculum very broad and only slightly curved on its anterior edge. Transtilla scarcely sclerotized but with well-developed, narrow hairy lobes. Aedeagus about as long as harpe, slender, pointed and sharply curved at basal and distal ends; at the base are a small bulbous process dorsally and a broad spoon-shaped sclerotized portion ventrally by which the aedeagus articulates with the anellus. Tegumen broad, rather short. Socii small.

Female genitalia.—Genital plate narrow, more so laterally. Ostium small, elongate. Ductus bursae membranous except an elongate, curved, sclerotized area on one side about the middle; inception of ductus seminalis just before ostium. Bursa copulatrix large with well developed signum.

Alar expanse, 17–21 mm.

Type.—U. S. N. M. No. 52075.

Type locality.—Skyline Ridge, Mount Baker District, Whatcom County, Wash., altitude 6,200 feet.

Food plant.—*Lomatium angustatum* (Coult. and Rose) St. John.

Remarks.—Described from the ♂ type, 9 ♂ and 6 ♀ paratypes all from the type locality. All were collected by the author. Paratypes in the United States National, Canadian National, and H. H. Keifer collections.

The larvae, from which the type series was reared, were collected on August 17 and 18, 1933. From the larvae collected 25 pupae were obtained. From these pupae 16 moths emerged. Pupation began on August 21 and ended August 24; emergence of the moths began on August 31 and ended September 2.

The host of this species is a small plant growing on open gravelly slopes or on rock outcrops where considerable fracturing of the basic rocks has taken place. The basal leaves of the plant are frequently closely appressed to the ground and it is in these leaves that the larva does most of its feeding. Frequently, however, the more erect leaves are involved by the tubes and webs spun by the larva. The silken tubes in which the larva lives are constructed among the broken rocks and soil and frequently extend several inches down cracks in the rock, thus providing an excellent hiding place for the larva when not feeding.

This species is clearly related to *multifidæ* but may readily be distinguished from that species by its genitalia.

DEPRESSARIA TOGATA Walsingham

PLATE 37, FIGURE 200B

Depressaria togata WALSINGHAM, *Ins. Life*, vol. 1, p. 254, 1889.—RILEY, *in* Smith, *List of Lepidoptera of Boreal America*, No. 5282, 1891.—BUSCK, *Proc. U. S. Nat. Mus.*, vol. 24, p. 746, 1902; *in* Dyar, *U. S. Nat. Mus. Bull.* 52, No. 5885, 1903.—KEARFOTT, *in* Smith, *Check list of the Lepidoptera of Boreal America*, No. 6428, 1903.—BUSCK, *Proc. U. S. Nat. Mus.*, vol. 35, p. 200, 1908.—BARNES and McDUNNOUGH, *Check list of the Lepidoptera of Boreal America*, No. 6474, 1917.—MEYRICK, *in* Wytzman, *Genera insectorum*, fasc. 180, p. 172, 1922.—FORBES, *Cornell Univ. Agr. Exp. Stat. Memoir* 68, p. 242, 1923.—MCDUNNOUGH, *Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera)*, No. 8397, 1939.—GAEDE, *in* Bryk, *Lepidopterorum catalogus*, pt. 92, p. 294, 1939.

"Antenna purplish-fuscous. Palpi cinereous, speckled with fuscous externally on the second joint; apical joint entirely suffused with fuscous, with the exception of the apex which is ochreous. Head, dull grayish-ochreous; face paler. Thorax, cinereous, speckled with fuscous. Fore wings pale grayish-ochreous, thickly suffused and streaked with purplish-fuscous, the markings ill-defined, consisting of a dark fuscous patch at the base of the dorsal margin, a dash of the same color immediately above the middle of the wing at one third from base, followed by some pale grayish-ochreous scales; a pale grayish-ochreous spot on the middle of the wing at about the end of the cell is preceded and followed by fuscous scales, and beyond and above it are several fuscous dashes radiating outwards to the costal and to the upper half of the apical margin, where is a row of obscure fuscous spots preceding the somewhat paler mottled cilia. Hind wings, pale shining whitish-gray, with the cilia scarcely darker in which a slight tinge of grayish-ochreous is traceable. Abdomen, grayish-ochreous."

Male genitalia.—Essentially like *angustati* but with the posterior margin of the anellus narrower and the lateral edge entire, convex. The clasper is outwardly angulate instead of evenly curved.

Alar expanse, 20 mm.

Type.—In the British Museum.

Type locality.—"Montana."

Food plant.—Unknown.

Distribution.—Known only from the type locality.

Remarks.—The above color description is taken from the original. I have drawn up the brief description of the male genitalia from a sketch (see fig. 200B) kindly submitted by Herbert Stringer, of the British Museum.

Mr. Stringer states (*in litt.*) that "*togata* is nearest to *angustati* but not that species," or any of the others included in this paper, and of which I submitted drawings of the genitalia.

The figure of the male genitalia is a copy of the sketch sent by Mr. Stringer and shows adequately the differences between *togata* and the other species.

In 1902³⁴ Busck applied the name *togata* to specimens from Colorado and Vermont. The Colorado specimens, which are before me, are not this species, as the genitalia indicate, but represent an undescribed species. I am leaving this series undescribed until more and better material comes to hand, because the moths are now faded and were none too good when collected. The Vermont specimens were probably *betulella*; I know of no species in the *togata-angustati* complex east of the Rocky Mountains.

³⁴ Busck, A., Proc. U. S. Nat. Mus., vol. 24, p. 746, 1902.

In this complex the moths are so much alike superficially that it is almost impossible to separate the various species except by a comparison of genitalia. The species are widespread throughout the far west and each appears to be confined to its particular food plant and restricted geographical area.

I have not included *togata* in the keys because of my inadequate knowledge of the species and because of the uselessness of trying to separate the species of this group entirely on coloration.

DEPRESSARIA GROTELLA Robinson

PLATE 34, FIGURES 192-192b; PLATE 47, FIGURES 277, 277a

- Depressaria grotella* ROBINSON, Ann. Lyc. Nat. Hist. New York, vol. 9, p. 157, pl. 1, fig. 10, 1870.—WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 312.—COQUILLET, Papilio, vol. 3, p. 98, 1883.—BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 748, 1902.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 172, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 242, 1923.
- Depressaria grotella* CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 138, 1878.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5264, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5890, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, No. 6433, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 200, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6479, 1917.—TRAVER, Psyche, vol. 26, p. 78, 1919.—BARNES and BUSCK, Contr. Lepid. North America, vol. 4, p. 233, 1920.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8405, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 283, 1939.
- Depressaria symmochlota* MEYRICK, Exotic Microlepidoptera, vol. 2, p. 223, 1918.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 242, 1923.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8405, 1939 (cited as synonym of *groteella* Chambers).

Labial palpus pale whitish ochreous; second segment irrorated with fuscous exteriorly and suffused with fuscous in the brush; third segment with blackish-fuscous subbasal and supramediial annuli, the former poorly defined. Head, thorax, and fore wing pale ochreous; head infuscated above; collar blackish fuscous; tegula suffused and thorax irrorated with fuscous; fore wing heavily overlaid with brown and streaked and irrorated with blackish fuscous, especially along veins; at basal third a whitish discal spot, followed at the end of cell by a similarly colored spot; between the two a prominent, longitudinal, blackish-fuscous streak; base of wing, in anal angle, blackish fuscous rapidly fading to brown; from middle of costa, around termen to inner margin, a series of blackish-fuscous spots; cilia light fuscous with a darker fuscous, median band. Hind wing very pale fuscous with considerable white scaling apically and with a narrow blackish-fuscous terminal line; cilia pale fuscous, white tipped and with a fuscous subbasal band. Legs pale whitish-ochreous overlaid

and mottled with fuscous except at joints. Abdomen pale ochreous slightly infuscated above and with a fuscous line (sometimes rather poorly defined) on each side beneath.

Male genitalia.—Harpe broad, sparsely clothed with long hairs; cucullus pointed; clasper very broad, wider than half the width of harpe, terminating in two widely separated points, one of which extends beyond ventral edge of harpe; sacculus short, narrowly folded. Anellus a moderately sclerotized plate abruptly constricted posteriorly; posterior edge concave; anterior edge convex, produced laterally; sides oblique; anterior end of anellus broader than posterior end. Vinculum rounded. Transtilla a diamond-shaped plate with moderately well-developed, hairy lobes. Aedeagus short, stout, with a slight twist; vesica armed with very fine spinules. Tegumen and socii greatly elongated, fused; socii with few hairs.

Female genitalia.—Genital plate broad, moderately sclerotized with a long row of hairs posteriorly; ostium a longitudinal slit between raised edges. Ductus bursae a long membranous spiral; inception of ductus seminalis just before the ostium. Bursa copulatrix large, with a well-developed signum.

Alar expanse, 20–22 mm.

Type.—In American Museum of Natural History.

Type localities.—"New York," "Pennsylvania."

Food plant.—*Corylus americana* Walt.

Distribution.—Northeastern United States and eastern Canada.

United States records

Maine: Sebec Lake, 2 ♂♂, 2 ♀♀ (July 16–23).

New York: (no data).

Pennsylvania: (no data).

Canadian records

Manitoba: Aweme (July 8, 1925, R. Bird [rf. *Corylus*]).

Ontario: Bobcaygeon (June 28, 1931, J. McDunnough [rf. *Corylus*]); Ottawa (July 27, 1905, July 21, August 16, 1906, C. H. Young; June 21, 1927, J. McDunnough).

Quebec: Aylmer (June 23, 1927, J. McDunnough [rf. Hazelwood]); Gracefield (no other data); Kazubazua (June 30–July 4, 1927, J. McDunnough).

Remarks.—This and the following species (*maculatella*) are very closely related. In superficial appearance *grotella* is much darker than *maculatella* and the males can be easily separated on genitalic characters. The female genitalia of *grotella* have a long row of hairs on the posterior edge of the genital plate and the ostium is considerably shorter than the width of the genital plate; in *maculatella* the row of hairs is reduced to about half a dozen and the ostium is much longer.

DEPRESSARIA MACULATELLA Busck

PLATE 34, FIGURES 191-191b; PLATE 47, FIGURE 275

Depressaria maculatella BUSCK, Proc. Ent. Soc. Washington, vol. 9, p. 90, 1908.—Proc. U. S. Nat. Mus., vol. 35, p. 200, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6481, 1917.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 172, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 242, 1923.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8407, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 287, 1939.

Labial palpus white; second segment irrorated with fuscous and black and suffused with fuscous in the brush; third segment with subbasal annulus and apex blackish fuscous. Antenna brown, broadly annulated with dull ochreous-white; basal segment ochreous-white beneath. Head, thorax, and ground color of fore wing ochreous-white suffused with brown and irrorated and streaked with blackish fuscous, with much ochreous scaling; at extreme base, from costa to inner angle a transverse blackish fuscous line interrupted at middle by the white ground color; at basal third a poorly defined white discal spot preceded by some blackish fuscous scales; at the end of cell a similar spot; between the two a conspicuous longitudinal, blackish-fuscous streak; veins 9 and 10 strongly marked with blackish fuscous; the bases of the other veins less conspicuously so; on costa, about middle, a blackish-fuscous spot; from apical third of costa, around termen to inner margin, a series of blackish-fuscous spots; cilia concolorous, white, with fuscous suffusion and irrorations. Hind wing whitish fuscous, darker apically; cilia white with fuscous subbasal band. Legs whitish ochreous suffused and mottled with fuscous except at joints; metatarsus of fore leg white. Abdomen ochreous, sparsely irrorated with blackish fuscous beneath.

Male genitalia.—Harpe broad, without process from base of sacculus or costal margin; sparsely clothed with long hairs; cucullus narrowly rounded; clasper wide, flattened, extending beyond ventral edge of harpe, terminating in one long and one short point; sacculus short, broadly folded. Anellus a flat plate, constricted posteriorly; sides strongly convex; posterior edge deeply concave; anterior edge produced laterally. Vinculum rounded. Transtilla roughly rectangular; without hairy lobes. Aedeagus short, stout, with a slight twist; vesica armed with small spinules. Tegumen and socii greatly produced posteriorly forming an elongated hood.

Female genitalia.—Genital plate broad, moderately sclerotized with a row of about half a dozen hairs posteriorly; ostium narrow, elongate, bordered on either side by a raised edge. Ductus bursae a long mem-

branous spiral; inception of ductus seminalis just before ostium. Bursa copulatrix large, with a well-developed, though small signum.

Alar expanse, 21–23 mm.

Type.—In the United States National Museum.

Type locality.—"Ontario," Canada.

Food plant.—?

Distribution.—Northeastern United States.

United States records

Connecticut: East River, ♂ (13–VIII–1910, Chas. R. Ely).

New York: Ithaca, 2 ♀♀ (36–IX–35, J. G. Franclemont); Onteora Mountain, ♀ (1927, L. O. Howard).

Ohio: Cincinnati, ♀ (19–IX–1903, A. F. Braun).

Pennsylvania: New Brighton, 5 ♂♂ (August and September dates; H. D. Merrick).

Remarks.—Although very close to *grotella* and *betulella*, this species is distinct from both in genitalia and coloration. From *grotella* it may be distinguished by the narrower clasper and from *betulella* by the rectangular transtilla in the males; in the female it may be distinguished from *grotella* by the small number of hairs on the posterior part of the genital plate and from *betulella* by the slitlike ostium.

DEPRESSARIA BETULELLA Busck

PLATE 34, FIGURES 193–193b; PLATE 47, FIGURES 276, 276a

Depressaria betulella BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 746, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5886, 1903; Proc. U. S. Nat. Mus., vol. 35, p. 200, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6480, 1917.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 172, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 242, 1923.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8406, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 275, 1939.

Labial palpus light ochreous; second segment irrorated exteriorly with black; third segment with indistinct subbasal and broad supra-medial annuli, black. Antenna light ochreous with purplish-black annulations; basal segment black above. Face pale whitish ochreous. Head and thorax light ochreous, irrorated with brown; collar blackish fuscous; tegula blackish fuscous. Fore wing light ochreous suffused with fuscous and irrorated and streaked with black; extreme base of costa and base of wing in inner angle black, the latter rapidly fading to fuscous; at basal third, in cell, a whitish-ochreous discal spot preceded and followed by a few black scales; at the end of cell a similar discal spot. At apical third a poorly defined, outwardly curved,

narrow, pale ochreous fascia; from middle of costa, around termen to inner margin, a series of pronounced black spots; cilia pale ochreous strongly infuscated. Hind wing yellowish fuscous, darker apically and with a narrow, blackish-fuscous line before cilia; cilia whitish ochreous, banded with fuscous. Legs pale ochreous suffused and mottled with blackish fuscous except at joints. Abdomen ochreous suffused with fuscous above and with a blackish-fuscous line on each side beneath.

Male genitalia.—Harpe without process from base of sacculus or costa; moderately clothed with long hairs; cucullus bluntly pointed; clasper broad, less than half the width of harpe, flattened, extending beyond ventral margin and terminating in one long and one short point; sacculus short, narrowly folded. Anellus a sclerotized plate abruptly constricted posteriorly; posterior edge concave; anterior and lateral edges convex, the former more than the latter; posterior edge produced laterally. Vinculum rounded. Transtilla a diamond-shaped sclerotized plate with slightly developed hairy lobes. Aedeagus short, stout, with a twist; vesica armed with many small spinules. Tegumen and socii distinctly rounded, sparsely clothed with hairs.

Female genitalia.—Genital plate broad, moderately sclerotized except around the ostium where it is nearly membranous; the portion of the plate surrounding the ostium is raised and roughly triangular in shape (apex posteriorly). Ostium broadly oval. Ductus bursae a long membranous spiral; inception of ductus seminalis well before ostium. Bursa copulatrix large with well-developed signum.

Alar expanse, 20–23 mm.

Type.—In United States National Museum.

Type locality.—"Pennsylvania."

Food plant.—*Betula* (sp. ?); *Ostrya virginiana* (Mill.) Koch.

Distribution.—Northeastern United States and eastern Canada.

United States records

Connecticut: East River, 2 ♂♂ (14–VII–14; 2–VIII–10, Chas. R. Ely).

District of Columbia: ♀ ("11–VI-'84").

New Jersey: Greenwood Lake, 2 ♀♀ (26–VI, W. D. Kearfott).

Pennsylvania: New Brighton, 13 ♂♂, 8 ♀♀ (July to September dates, H. D. Merrick).

Canadian records

Ontario: Biscotasing (August 16, 1931, K. Schedl); Bobcaygeon (July 5, 1932, J. McDunnough); Ottawa (July 19–30, 1905 and 1906, C. H. Young).

Quebec: Meach Lake (July 23, 1933, C. H. Young); Otter Lake (August 6, 1931, G. S. Walley).

Remarks.—This species is close to *grotella* and *maculatella* but is amply distinct in genitalia (both male and female) and lacks the black discal dash so prominent in both the other species.

6. APACHEA, new genus

PLATE 2, FIGURE 16; PLATE 6, FIGURE 40; PLATE 13, FIGURES 86, 86a, 86b;
PLATE 15, FIGURE 94

Genotype.—*Depressaria barberella* Busck, Proc. U. S. Nat. Mus., vol. 24, p. 747, 1902.

Similar to *Depressaria* but with broadly triangular brush on second segment of palpus, fused anellus and transtilla in the male genitalia and with the signum of the female genitalia a distinct cross.

Head with appressed scales; side tufts spreading; tongue developed; antenna simple in both sexes; basal segment elongate, with pecten. Labial palpus moderately long, recurved; third segment nearly as long as second, acute; brush of second segment broadly triangular, flared. Thorax with two small crests. Abdomen flattened. Fore wing with 12 veins; 2 and 3 closely approximate; 7 and 8 stalked, 7 to costa; 11 from before middle. Hind wing broader than fore wing; 8 veins; 3 and 4 short stalked, 5 separate from 4; 6 and 7 subparallel.

Male genitalia.—Harpe with clasper. Anellus and transtilla fused. Uncus distinctly wanting. Aedeagus armed. Gnathos a spined knob. Socii wanting.

Female genitalia.—Genital plate strongly sclerotized. Signum present.

Larva.—Ninth abdominal segment with setae I and II well separated; setae VI on the same pinaculum with IV and V, remote from VII. Setal group VII with multiple hairs (4 to 6) on abdominal segments 2 to 7, trisetose on eighth and unisetose on ninth abdominal segments. A few secondary hairs on anterior margin of prothoracic shield and on anal prolegs. Ocelli normal. Submentum without pit.

Pupa.—Pubescent. Prothoracic femora and labial palpi not exposed. Cremaster absent.

Remarks.—This genus is closely allied to both *Depressaria* and *Agonopterix* but appears to be a specialized offshoot from the former. It can be distinguished readily from both by the fused anellus and transtilla and armed aedeagus of male, the 4-pointed signum of female, and the proximity of veins 2, 3, and 4 of fore wing.

In the larval stage *Apachea* is distinguished from other genera of American Oecophoridae by the presence of secondary hairs in setal group VII, a character which otherwise distinguishes the family Ethmiidae. The pupa is typically oecophorid with essentially the same characters as the pupae of *Agonopterix* and *Hofmannophila*.

The genotype is the only species I have seen referable to this genus.

APACHEA BARBERELLA (Busck), new combination

Depressaria barberella BUSCK, Proc. U. S. Nat. Mus., vol. 24, p. 747, 1902.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5887, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6431, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 200, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6477, 1917.—MEYERICK, in Wytzman, Genera insectorum, fasc. 180, p. 171, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8401, 1939.—GAEDE, in Bryk, Lepidoptero-rum catalogus, pt. 92, p. 275, 1939.

Male genitalia.—Harpe clothed with fine hairs; clasper broad basally, flat, sharply pointed and situated near cucullus; sacculus narrow, strongly sclerotized. Anellus consisting of a small sclerotized plate, which is deeply cleft on the anterior margin; a narrow lightly sclerotized band connecting the above plate with a strongly sclerotized rectangular part posteriorly; the posterior part consists of the transtilla and part of the anellus which form a ring through which the aedeagus passes; on the lateroposterior corner of the transtilla is a conical, fleshy lobe. Vinculum produced anteriorly into a point. Aedeagus stout, curved and sharply pointed, and armed with many sharp teeth in the middle portion. Gnathos a spined oval knob. Socii and uncus lacking (a few hairs indicate the position of the socii).

Female genitalia.—Genital plate moderately broad. Ostium large, protruding, round, lateral margins slightly produced, winglike; anterior margin very narrow. Ductus bursae stout, sclerotized posteriorly; inception of ductus seminalis well before ostium. Bursa copulatrix large, elongate with a large cross-shaped signum in posterior end.

Alar expanse, 21–31 mm.

Type.—In the United States National Museum.

Type locality.—Williams, Ariz.

Food plant.—*Prunus* sp.

Distribution.—Southwestern United States.

United States records

Arizona: Paradise, Cochise County, ♂; Santa Catalina Mountains, 4 ♂♂, 4 ♀♀ (June 10–24, 1913, Carl Heinrich [Hopkins No. 12114]); Huachuca Mountains, ♂.

Colorado: Boulder ♀ (April 15, T. D. A. Cockerell).

New Mexico: Jemez Springs, 2 ♂♂, 2 ♀♀ (April 8–15); Jemez Mountains, 6,600 feet, 4 ♂♂, 1 ♀ (June 28–September 13, 1915, John Woodgate).

7. Genus MACHIMIA Clemens

PLATE 3, FIGURE 26; PLATE 5, FIGURE 33; PLATE 10, FIGURES 70, 70a; PLATE 14, FIGURE 92

Machimia CLEMENS, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 211; Stainton, Tineina of North America, p. 147–148, 1872.—ZELLER, Verh. zool.-bot. Ges.

Wien, vol. 23, p. 239, 1873; Hor. Soc. Ent. Ross., vol. 13, p. 258-259, 1877.—CHAMBERS, U. S. Geol. Surv. Terr. Bull. 4, p. 156, 1878.—BUTLER, Trans. Ent. Soc. London, 1883, p. 50.—WALSINGHAM, Ins. Life, vol. 2, p. 150-151, 1889.—RILEY, in Smith, List of the Lepidoptera of Boreal America, p. 98, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, p. 520, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, p. 113, 1903.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 79, 1922.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 131, 1929.—GAEDE, in Bryk (part), Lepidopterorum catalogus, pt. 88, p. 135, 1938. (Genotype: *Machimia tentoriferella* Clemens, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 212.)

Labial palpus long, recurved; terminal segment shorter than second, acute; second segment roughened beneath. Antenna strongly ciliated in male, simple in female; basal segment without pecten. Tongue well developed.

Fore wing with costa slightly arched, termen slightly oblique, weakly concave; 12 veins; 2 remote from 3; 3, 4 and 5 approximate, 7 and 8 stalked, 7 to termen just below apex; 11 from before middle.

Hind wing as broad as fore wing; apex rounded, termen oblique; 8 veins; 3 and 4 connate or short stalked, 6 and 7 parallel at base, divergent distally; discocellulars inwardly oblique between 3 and 7.

Male genitalia.—Clasper present. Anellus with lateral projections. Gnathos spined. Vesica armed (*tentoriferella*). Socii absent. Uncus well developed.

Female genitalia.—Signum absent. Ductus bursae partly sclerotized.

Larva.—Characters essentially as in *Agonopterix*: Ninth abdominal segment with setae I and II well separated; seta VI not on the same pinaculum with IV and V, remote from VII. Setal group VII bisetose on first and seventh, unisetose on eighth and ninth abdominal segments. Ocelli normal. Submentum without pit.

Pupa.—Smooth. Prothoracic femora and labial palpi not exposed. Cremaster absent.

Remarks.—The absence of the cremaster distinguishes the pupa of this genus from *Carcina*.

I agree with Meyrick³⁵ in separating *Machimia* from *Cryptolechia* but cannot agree with his synonymizing of *Hoplitica* with *Machimia*. The former does not agree with the latter at all on genitalia. Meyrick also places in synonymy the three following Australian genera:

Garrha WALKER, List of the specimens of lepidopterous insects in the collection of the British Museum, vol. 35, p. 1835, 1866. (Genotype: *Garrha sincerella* Walker.)

Hoplomorpha TURNER, Proc. Linn. Soc. New South Wales, vol. 41, p. 373, 1916. (Genotype: *Cryptolechia abalienella* Walker, List of the specimens of lepidopterous insects in the collection of the British Museum, vol. 29, p. 762, 1864.)

³⁵ Meyrick, in Wytzman, Genera insectorum, fasc. 180, p. 79, 1922.

Lepidozancla TURNER, *ibid.*, vol. 41, p. 375, 1916. (Genotype: *Lepidozancla zatrephes* Turner, *ibid.*, vol. 41, p. 376, 1916.)

It does not seem likely that these genera and *Machimia* are congeneric, but until the genitalia of the genotypes are carefully studied we must accept Meyrick's classification.

Busck³⁶ and Walsingham³⁷ have correctly separated *Psilocorsis* from *Cryptolechia* and *Machimia*, on the distance of veins 2, 3, and 4 from each other, but have synonymized the latter two. As stated above, I follow Meyrick in the separation of *Cryptolechia* and *Machimia*, his contention being borne out by genitalic as well as palpal characters. Of the American species formerly included in this genus all but *tentoriferella* are referable to other genera.

MACHIMIA TENTORIFERELLA Clemens

- Machimia tentoriferella* CLEMENS, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 212; in Stainton, The Tineina of North America, p. 148, 1872.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, pp. 120, 156, 1878.—RILEY, in Smith, List of Lepidoptera of Boreal America, No. 5225, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5853, 1903; Proc. Ent. Soc. Washington, vol. 5, p. 205, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6396, 1903.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 82, 1922.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 131, 1929.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 143, 1938.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8383, 1939.
- Machimia tentorifuella* CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 83, 1878.
- Cryptolechia tentoriferella* (Clemens) ZELLER, Verh. zool.-bot. Ges. Wien, vol. 23, p. 238, 1873; Hor. Soc. Ent. Ross., vol. 13, p. 259, 1877.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 137, 1878.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 195, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6424, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 235, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 544, 1928.
- Depressaria fernaldella* CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 83, 1878.
- Depressaria confertella* WALKER, List of the specimens of lepidopterous insects in the collection of the British Museum, vol. 29, p. 563, 1864.—WALSINGHAM, Proc. Zool. Soc. London, 1881, p. 312.
- Machimia confertella* (Walker) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8383, 1939 (cited as synonym of *M. tentoriferella* Clemens).
- Machimia fernaldella* (Chambers) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8383, 1939 (cited as synonym of *M. tentoriferella* Clemens).

Labial palpus pale yellowish white; second segment strongly suffused with blackish fuscous exteriorly on basal half; basal third,

³⁶ Busck, Proc. U. S. Nat. Mus., vol. 35, p. 194, 1908.

³⁷ Walsingham, Biol. Centr.-Amer. Lepidoptera-Heterocera, vol. 4, p. 122, 1912.

inwardly, irrorated with blackish fuscous. Antenna ochreous, annulated with fuscous. Head pale whitish ochreous. Thorax and fore wing reddish ochreous, sparsely irrorated with blackish fuscous; at basal third, in cell, a blackish-fuscous spot followed by a similar one at the end of cell; on vein 1c, about equidistant from both discal dots, a third blackish-fuscous spot; from costa, about middle, a row of blackish-fuscous spots to vein 7 then sharply angulated to inner margin at about two-thirds; around termen a series of small, blackish-fuscous spots; cilia ochreous. Hind wing fuscous with reddish cast; cilia ochreous with a fuscous subbasal band. Legs ochreous, heavily overlaid with fuscous except at joints. Abdomen ochreous, irrorated and suffused with blackish fuscous.

Male genitalia.—Harpe long, narrow, slightly clothed with hairs; cucullus rounded; clasper small, stout, pointed; sacculus narrowly folded. Anellus with lateral projections well developed. Gnathos large, spined. Aedeagus large, stout; vesica armed with numerous strong cornuti. Socii undeveloped; uncus broad, spoon-shaped.

Female genitalia.—Bursa copulatrix without signum. Ductus bursae membranous except just before ostium, there sclerotized.

Alar expanse, 19–28 mm.

Types.—In the Academy of Natural Sciences of Philadelphia (*tentoriferella*); in the Museum of Comparative Zoology, Cambridge, Mass. (?) (*fernaldella*); in the British Museum (*confertella*).

Type localities.—Unknown (*tentoriferella*); Maine (*fernaldella*); Nova Scotia (*confertella*).

Food plants.—*Castanea dentata* (Marsh.) Borkh., *Cephalanthus occidentalis* L., *Syringa vulgaris* L., apple, cherry, elm, hazel, hickory, oak.

Distribution.—Eastern United States and eastern Canada.

United States records

District of Columbia: Washington, 7 ♂♂ (17–IX–1884, no collector; 16–10–82, no collector; 1–6–XI–1914 and 27–IX–1933, A. Busck).

Iowa: Iowa City, ♀ (September 1917, A. W. Lindsey); Sioux City, ♂ (September 3, 1921, A. W. Lindsey).

Maine: 2 ♀♀ (one September 28, 1909; the other without date or collector).

Maryland: Plummers Island, 3 ♂♂ (29–IX–1905, A. Busck); ♂ (October 4, 1932, George P. Engelhardt).

Massachusetts: Cambridge, ♂ (no date or collector); Newton Highlands, ♂ (no date); Springfield, 2 ♀♀ (9–IX–1897 and 30–VII–1897, George Dimmock, Nos. 1204, 1208).

Michigan: St. Clair County, ♂ (September 1, 1927; no collector).

New Hampshire: Canobie Lake, ♀ (14–IX–1892, George Dimmock, No. 1054).

New Jersey: Elizabeth, ♀ ("9–19," A. J. Weidt); Essex County, 2 ♀♀ (27–IX–1902, W. D. Kearfott); Montclair, ♂, ♀ (10–IX–1899, 25–IX–1899, W. D. Kearfott); Woodside, ♂ ("9–19," A. J. Weidt).

New York: Iilon, ♀ (23-IX-1911, H. McElhose); Kendall, ♂, 2 ♀♀ (no date; H. S. Burnett); Onteora Mountain, Greene County, ♂ (1-IX-1929, L. O. Howard); Staten Island, 2 ♂♂ (17-IX-1902, no collector); Utica, ♀ (4-IX-1911, H. McElhose).

Ohio: Cincinnati, ♂ (20-IX-1909, A. F. Braun).

Pennsylvania: Arendtsville, 2 ♂♂ (2-IX-1918; 11-IX-1918, S. W. Frost); Hazleton, ♂ (no date; Dr. Dietz); New Brighton, 7 ♂♂, 4 ♀♀ (September and October dates, 1902-1905, H. D. Merrick); Oak Station, Allegheny County, 8 ♂♂, 4 ♀♀ (September dates, 1903-1911, Fred Marloff).

Rhode Island: Newport, 2 ♂♂ (no date; W. Barnes); Weekapaug, 2 ♀♀ (September 14, 1904, H. G. Dyar).

Virginia: Falls Church, 2 ♀♀ (19-IX-1913 and 1-X-1913, C. Heinrich [Hopkins No. 11132b]).

Canadian records

Ontario: Bobcaygeon (August 16-28, 1932, J. McDunnough); Ottawa (August 27, 1905; August 21-26, 1931, C. H. Young).

Remarks.—The habit of feeding on a large assortment of food plants is unusual for species of this family, and I know no other in North America that is such a general feeder.

8. HIMMACIA, new genus

PLATE 4, FIGURES 31, 32; PLATE 9, FIGURES 64, 64a; PLATE 18, FIGURE 110

Genotype.—*Cryptolechia huachucella* Busck, Proc. U. S. Nat. Mus., vol. 35, p. 195, 1908.

Labial palpus long, slender, recurved; terminal segment shorter than second, acute; second segment slightly roughened beneath. Antenna strongly ciliated in male, simple in female; basal segment without pecten. Tongue well developed.

Fore wing with costa slightly arched, termen slightly oblique, straight; 12 veins; 2 rather distant from 3; 4 and 5 closely approximate; 7 and 8 stalked; 7 to apex; 11 from before middle.

Hind wing as broad as fore wing, apex rather pointed, termen oblique, slightly convex; 8 veins; 3 and 4 connate; 6 and 7 subparallel; discocellulars strongly outwardly oblique between 4 and 6; inwardly oblique between 6 and 7.

Male genitalia.—Harpe with clasper. Gnathos broad, spined. Socii absent. Vesica armed. Uncus present.

Female genitalia.—Signum present. Ostium large.

Remarks.—This genus appears to be closely allied to *Machimia*, *Psilocorsis*, and *Inga*. It may be distinguished from all these genera by the direction of the discocellulars of the hind wing. The male genitalia differ from those of *Machimia* in lacking the lateral processes of the anellus, from *Inga* in having a spined gnathos, and from *Psilocorsis* in possessing a clasper. The female genitalia differ from those of *Machimia* and *Inga* in possessing a signum; from *Psilocorsis* in having a single bursa. The only species I have seen that is referable to this genus is the genotype.

HIMMACIA HUACHUCELLA (Busck), new combination

Cryptolechia huachucella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 195, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6421, 1917.

Machimia huachucella (Busck) MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 82, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 139, 1938.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8381, 1939.

Cryptolechia diligenda MEYRICK, Exotic Microlepidoptera, vol. 3, p. 477, 1928. (New synonymy.)

Labial palpus ochreous-white with reddish tinge; second segment shaded with brown exteriorly on basal half and with an indistinct rose-red shade at apex; third segment with an indistinct, brown sub-basal annulus and a narrow, indistinct, longitudinal blackish line anteriorly. Antenna ochreous-white suffused with salmon above; basal segment red above; in male the antenna is strongly ciliate (about 4). Face shining ochreous-white. Head, thorax, and fore wing unicolorous salmon-ochreous; costa slightly more red. Cilia pale ochreous preceded by sparse, red irrorations. Hind wing light ochreous-fuscous slightly darker around margins; cilia ochreous. Legs ochreous-white suffused with dark brown exteriorly except at joints. Abdomen ochreous-white suffused with reddish-ochreous above.

Male genitalia.—Harpe slender, clothed with hairs; clasper long, slender, nearly attaining costa; cucullus rounded, narrow; sacculus broadly folded, strongly sclerotized. Anellus a simple V-shaped plate. Aedeagus long, slightly bent; vesica armed with 5 or 6 strong, sharply pointed cornuti and two triangular, sclerotized plates, each with a finely serrated edge. Vinculum broadly pointed. Transtilla membranous with well developed lateral, hairy lobes. Gnathos broad, armed with spines. Uncus moderately short, curved, pointed.

Female genitalia.—Genital plate simple. Ostium very large, nearly as wide as plate. Ductus bursae sclerotized just before ostium and also before the inception of the ductus seminalis; inception of ductus seminalis at posterior two-thirds of ductus bursae. Bursa copulatrix large, round; signum a simple, small, sclerotized plate with median keel, and situated in posterior part of bursa copulatrix.

Alar expanse, 21–25 mm.

Type.—In the United States National Museum (*huachucella*); in the British Museum (*diligenda*).

Type localities.—Huachuca Mountains, Ariz. (*huachucella*); "Texas" (*diligenda*).

Distribution.—Southwestern United States.

United States records

Arizona: Baboquivari Mountains, Pima County, 3 ♂♂ (15-30 July 1924, O. C. Poling); Huachuca Mountains, 3 ♂♂; Palmerlee, Cochise County, 5 ♂♂, 2 ♀♀; Redington, 2 ♂♂.

Texas: No further data.

Remarks.—The description of *diligenda* agrees in every detail with the type of *huachucella* so there appears to be no doubt about the synonymy.

9. Genus *PSILOCORSIS* Clemens

PLATE 3, FIGURE 24; PLATE 5, FIGURE 38; PLATE 8, FIGURES 59, 59a; PLATE 17, FIGURE 105

Psilocorsis CLEMENS, Proc. Acad. Nat. Sci. Philadelphia, vol. 12, p. 212, 1860; in Stainton, *Tineina* of North America, p. 149-151, 1872.—ZELLER, Verh. zool.-bot. Ges. Wien, vol. 23, p. 239, 1873.—BUSCK, Proc. Ent. Soc. Washington, vol. 5, p. 207, 1903; Proc. U. S. Nat. Mus., vol. 35, p. 196, 1908.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 118-119, 1912.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 160, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 235-236, 1923.—BRIMLEY, The insects of North Carolina, p. 304, 1938. (Genotype: *Psilocorsis quercicella* Clemens, Proc. Acad. Nat. Sci. Philadelphia, vol. 12, p. 212, 1860.)

Hagno CHAMBERS, Can. Ent., vol. 4, p. 129-132, 191, 1872; Journ. Cincinnati Soc. Nat. Hist., vol. 2, p. 198, 1880. (Genotype: *Hagno faginella* Chambers, Can. Ent., vol. 4, p. 131, 1872.)

Labial palpus long, slender, smooth, always with conspicuous longitudinal stripes; terminal segment scarcely shorter than second. Antenna simple, without pecten on basal segment; tongue well developed.

Fore wing with costa arched, termen slightly oblique, straight; 12 veins; 2 from near angle, 3-5 approximate, 5 and 6 parallel, 7 and 8 stalked, 7 to apex, 11 from before middle of cell.

Hind wing as broad as fore wing; apex rounded, termen oblique; 8 veins; 3 and 4 connate or short stalked, 5 equidistant from 4 and 6; 6 and 7 nearly parallel, slightly divergent at tip.

Male genitalia.—Harpe long, narrow, without clasper, moderately clothed with hairs. Anellus membranous, with long, fingerlike lateral lobes. Aedeagus stout; vesica armed with one or more strong cornuti. Gnathos large, broad, spined. Uncus simple. Socii absent.

Female genitalia.—Signum large, many branched. Bursa copulatrix double.

Larva.—Ninth abdominal segment with setae I and II well separated. Seta VI closely associated and on the same pinaculum with setae IV and V. Setal group VII (as in *Agonopterix*) bisetose on first and seventh, unisetose on eighth and ninth abdominal segments. Ocelli normal. Submentum without pit.

Pupa.—Smooth. Prothoracic femora exposed. Labial palpi not exposed. Cremaster present (short but distinctly developed), straight (not hooklike).

Remarks.—This genus is remarkably homogeneous and the species, for the most part, are difficult to separate.

The larva is at once distinguished from larvae of other American oecophorid genera (studied) by the above association of setae IV, V, and VI of the ninth abdominal segment on a single pinaculum.

The pupa is characterized by exposed femora, developed cremaster and lack of exposed labial palpi and absence of pubescence.

The specific separation, based on genitalia, is especially difficult in the males. The simplicity of the genital structures and the similarity in the armature of the vesica prohibit the selection of suitable characters for keying out the larger part of the species. A key is presented, but when more preparations of the genitalia are made and larger series of bred specimens are studied the characters used may prove unstable.

The females appear to possess better characters for separation. Although the sclerotized portions of the ductus bursae are strikingly similar and, with few exceptions, useless for separating the species, I believe the number of branches on the signa are relatively constant within a species. With this in mind I have used the signa, in most cases, for separating the various species.

As good superficial characters for the separation of species are lacking, I have used alar expanse in several cases. This is admittedly weak but is the only tangible character available. Large bred series will, in some cases, render the use of alar expanse valueless, but for the present we must rely upon it.

Busck³⁸ placed seven species in the genus. Gibson³⁹ added *fletcherella* in 1909 and I have described one other (*caryae*) as new in this paper. I have made *ferruginosa* a synonym of *faginella* because I can find nothing except its lighter color on which to base separation. Two of the species are retained only because I do not feel justified in placing them in synonymy on present evidence, bringing to eight the total number of described species from North America.

Despite the fact that we have many food-plant records comparatively little is known of the larvae. Two species, *obsoletella* and *quercicella*, can be separated easily on larval characters, but we know nothing about the characters of the larvae of the other species. The larvae, with one or two exceptions, feed on the leaves of trees and shrubs and pupate between two tied leaves.

³⁸ Busck, Proc. U. S. Nat. Mus., vol. 35, p. 197, 1908.

³⁹ Gibson, A., Ottawa Nat., vol. 22, p. 226, 1909.

At present I have before me several species that appear to be distinct from those already described, but their description must await the receipt of more carefully reared material accompanied by larvae that have been properly associated with the moths.

The generic synonymy as given by Meyrick,⁴⁰ cannot be considered correct for our North American species. Until more careful study of all the genotypes can be made we must accept Meyrick's synonymy for the species outside of North American, but the American genera (*Psilocorsis* and *Inga*) certainly do not belong with *Cryptotechia*. The double bursa and the remarkable signum of the females of *Psilocorsis* immediately distinguish this genus from all other American oecophorids.

KEY TO SPECIES OF PSILOCORSIS BASED PRIMARILY ON COLORATION

1. Fore wing with a broad, dark, transverse fascia at outer two-thirds..... *obsoletella* (Zeller) (p. 209)
Fore wing without such fascia..... 2
2. Fore wing with distinct purplish luster; species dark colored..... 3
Fore wing without purplish luster, or if this is present, it is only faintly indicated; light-colored species..... 4
3. Alar expanse 19 mm..... *fletcherella* Gibson (p. 216)
Alar expanse 18 mm. or less..... *caryae*, new species (p. 215)
4. Alar expanse 18 mm. or more..... 5
Alar expanse 16 mm. or less ⁴¹..... *quercicella* Clemens (p. 207)
5. Fore wing with dark markings confined to the outer discal spot and a few spots around termen..... *faginella* (Chambers) (part) (p. 213)
Fore wing otherwise..... 6
6. Thorax much darker than head..... *reflexella* Clemens (p. 212)
Thorax and head nearly concolorous... *faginella* (Chambers) (part) (p. 213)

KEY TO SPECIES OF PSILOCORSIS BASED PRIMARILY ON MALE GENITALIA

1. ^r First abdominal segment with hair pencil..... 2
| First abdominal segment without hair pencil..... 3
2. Vesica armed with one large cornutus and a patch of smaller ones (fig. 133)..... *obsoletella* (Zeller) (p. 209)
Vesica armed only with a patch of small cornuti (fig. 59a)..... *quercicella* Clemens (p. 207)
3. Base of large cornutus broad, strongly sclerotized; the cornutus short, stout, curved (figs. 131, 134)..... 4
Base of large cornutus not appreciably broadened and weakly sclerotized; the cornutus straight, nearly as long as distal width of aedeagus (fig. 132)..... *caryae*, new species (p. 215)
4. Vinculum broad ventrally..... *faginella* (Chambers) (p. 213)
Vinculum narrow ventrally..... *reflexella* Clemens (p. 212)

⁴⁰ Meyrick, in Wytsman, *Genera insectorum*, fasc. 180, pp. 195-196, 1922.

⁴¹ In this couplet *dubitella* (Zeller) and *cryptotechiella* (Chambers) should be included, but they have been omitted because of the lack of information concerning them.

KEY TO SPECIES OF PSILOCORSIS BASED ON FEMALE GENITALIA

- | | |
|--|-------------------------------|
| 1. Ductus bursae dilated before ostium (figs. 217, 220)----- | 2 |
| Ductus bursae not dilated before ostium (fig. 105) | |
| | quercicella Clemens (p. 207) |
| 2. Ostium and sclerotized portion of ductus bursae well separated | |
| (fig. 220)----- | obsoletella (Zeller) (p. 209) |
| Ostium and sclerotized portion of ductus bursae contiguous | |
| (fig. 217)----- | 3 |
| 3. Branches of the signum 22-24 on each side (fig. 222) | |
| | reflexella Clemens (p. 212) |
| Branches of the signum 21 or less on each side (figs. 218, 221)----- | 4 |
| 4. Branches of the signum 15-16 on each side (fig. 221) | |
| | fletcherella Gibson (p. 216) |
| Branches of the signum 17-21 on each side----- | 5 |
| 5. Sclerotized anterior band of genital plate broad (fig. 217) | |
| | faginella (Chambers) (p. 213) |
| Sclerotized anterior band of genital plate narrow (fig. 219) | |
| | caryae, new species (p. 215) |

PSILOCORSIS QUERCICELLA Clemens

PLATE 3, FIGURE 24; PLATE 5, FIGURE 38; PLATE 8, FIGURES 59, 59a; PLATE 17,
FIGURE 105

- Psilocorsis quercicella* CLEMENS, Proc. Acad. Nat. Sci. Philadelphia, vol. 12, p. 212, 1860; in Stainton, Tineina of North America, p. 147, 1872.—BUSCK, Proc. Ent. Soc. Washington, vol. 5, p. 206, 1903.—KEARFOTT, in Smith, Check List of the Lepidoptera of Boreal America, No. 6390, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 197, 1908.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 118, 119, 1912.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6425, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 235, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat., Memoir 101, p. 545, 1928.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 190, 1929.—BRIMLEY, The insects of North Carolina, p. 304, 1938.
- Cryptolechia quercicella* (Clemens) ZELLER, Verh. zool.-bots. Ges. Wien, vol. 23, p. 240, 1873.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 120, 137, 1878.—WALSINGHAM, Ins. Life, vol. 2, p. 151, 1889.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5223, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5851, 1903.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 197, 1922.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8473, 1939.
- Psilocorsis querciella* CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 162, 1878.

Head and thorax dark yellowish brown. Second segment of labial palpus ochreous with the usual dark fuscous longitudinal stripe beneath; third segment fuscous with median and lateral longitudinal whitish stripes. Basal segment of antenna dark yellowish brown above with fuscous and white longitudinal stripes beneath; remainder of antenna whitish ochreous with longitudinal fuscous stripes, the latter breaking up into spots toward the distal end. Fore wing yellowish brown mottled with short fuscous lines and spots; at the end of cell a blackish-fuscous spot; around termen a narrow blackish fuscous line; before tornus, on inner margin, a fuscous shading; cilia

fuscous with a slightly darker subbasal band. Hind wing and cilia pale ochreous-fuscous. Legs whitish ochreous, the fore tibiae and tarsi shaded with fuscous. Abdomen yellowish brown above, whitish-ochreous beneath.

Hair pencil from first abdominal segment of male strongly developed.

Male genitalia.—Harpe slightly longer than twice its width; sacculus ill defined, narrow, weakly sclerotized. Anellus a broad, oval, weakly sclerotized plate with a small, broadly obtuse, strongly sclerotized base; lateral fingerlike lobes hardly exceeding central plate, broadly dilated distally. Aedeagus stout, acutely pointed. Vesica armed with a large patch of strong, but slender, cornuti.

Female genitalia.—Genital plate membranous except for a narrow sclerotized band at anterior edge. Ostium small, round. Ductus bursae slender, slightly sclerotized just before ostium and before ductus seminalis; inception of ductus seminalis well before ostium. Signum with 17 to 19 branches on each side.

Alar expanse, 13–16 mm.

Type.—In the Academy of Natural Sciences of Philadelphia.

Type locality.—Pennsylvania?

Food plant.—Oak.

Distribution.—Eastern United States and Canada.

United States records

District of Columbia: 6 ♂♂, 5 ♀♀ (April, July, and August dates, 1900 and 1910, A. Busck); 2 ♂♂ (July 31, 1885, C. V. Riley).

Illinois: Putnam County, ♂ (10–VIII–1939, M. O. Glenn).

Maryland: Hyattsville, 2 ♂♂ (7–VII–1913, 21–VII–1913, A. Busck).

New Jersey: Anglesea, 2 ♂♂, ♀ (V–30–1905, W. D. Kearfott); Essex County, Park, ♀ ("20 May," W. D. Kearfott).

New York: Bellport, ♂ (1–VI–1902, H. G. Dyar); Ramapo, ♂ (27–V–1900, W. D. Kearfott).

Ohio: Cincinnati, 2 ♀♀ (14–VIII–1907; 29–V–1907, A. F. Braun).

Pennsylvania: Beaver County, 2 ♂♂, 2 ♀♀ (May 1900, Kemp coll.); New Brighton, ♂, 2 ♀♀ (14–19–VIII–1903, H. D. Merrick).

Virginia: Great Falls, ♀ (25–IX–1914, A. F. Kneale).

Canadian records

Ontario: Ottawa (July 13–24, 1906; April 13–16, 1935, C. H. Young).

Remarks.—Although this and the following species closely resemble each other they may be distinguished quite easily. The transverse dark markings of *quercicella* are broken and in the form of small spots and there is usually a dark spot on the hind margin of the fore wing at two-thirds. The transverse markings of *obsoletella* are more evenly strigose and the dark suffusion of the fore wing at two-thirds is usually in the form of a band across the wing.

The larva of *quercicella* has the three thoracic segments darkened; in *obsoletella* only the prothorax is darkened.

PSILOCORISIS OBSOLETELLA (Zeller)

PLATE 22, FIGURE 133; PLATE 40, FIGURE 220

Cryptolechia obsoletella ZELLER, Verh. zool.-bot. Ges. Wien, vol. 23, p. 242, 1873.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 137, 1878.—WALSINGHAM, Ins. Life, vol. 2, p. 151, 1889.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5221, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5849, 1903; Proc. Ent. Soc. Washington, vol. 5, p. 206, 1903.—MEYERICK, in Wytzman, Genera insectorum, fasc. 180, p. 197, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8471, 1939.

Psilocorsis obsoletella (Zeller) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 197, 1908.—BARNES and MCDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6426, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 236, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat., Memoir 101, p. 545, 1928.

Psilocorsis quercicella KEARFOTT, part (not Clemens) in Smith, Check list of the Lepidoptera of Boreal America, No. 6390, 1903.

This species is much like *quercicella*, but the fuscous shading before the tornus extends entirely across the wing in the form of a more or less conspicuous band. The fuscous markings of the fore wing are longer, narrower, and more numerous. The abdomen is light grayish fuscous above. All other characters practically as in *quercicella*.

First abdominal segment of male with well-developed hair pencil.

Male genitalia.—Harpe rather heavily clothed with hairs; sacculus narrow, ill defined, weakly sclerotized. Anellus a weakly sclerotized, more or less oval plate with a small crescent-shaped base; lateral fingerlike lobes slender, small. Aedeagus stout, sharply bent, acutely pointed; vesica armed with one long stout cornutus and a patch of small spiculate cornuti. Gnathos very broad, strongly spined laterally, weakly spined ventrally.

Female genitalia.—Genital plate membranous except for a narrow, sclerotized anterior band; ostium small, round. Ductus bursae membranous except for a narrow sclerotized band before ostium and a sclerotized, dilated portion well before the inception of ductus seminalis. Inception of ductus seminalis just before the sclerotized band which precedes the ostium. Branches of signum 19 to 20 on each side; the entire inner surface of the signum-bearing half of the bursa copulatrix strongly spiculate.

Alar expanse, 13–17 mm.

Type.—In the British Museum.

Type locality.—Ohio.

Food plant.—Oak; chestnut?

Distribution.—Eastern and southern United States.

United States records

- District of Columbia: 13 ♂♂, 9 ♀♀ (July and August dates, 1899-1900, A. Busck).
- Illinois: Decatur, 2 ♂♂ ("May 16-23"); Putnam County, ♂ (14-VIII-1939, M. O. Glenn).
- Maryland: Hyattsville, ♂, ♀ ("1907," A. Busck); Plummers Island, 6 ♂♂, 4 ♀♀ (May, June, July, September dates, A. Busck).
- Massachusetts: Marthas Vineyard, 3 ♂♂ (VII-15 to VII-29-1931, F. M. Jones).
- Missouri: St. Louis, ♂ (V-15-1904, H. McElhose); "central Missouri" ♀♀ ("4-14-84," "5-5-89").
- New Jersey: Anglesea, ♀ (V-30-05, W. D. Kearfott); Essex County Park, ♀♀ (26-IX-02, W. D. Kearfott).
- Ohio: Cincinnati, 3 ♂♂, 2 ♀♀ (V-29-06, V-21-07, VI-9-07, VIII-10-14, A. F. Braun).
- Pennsylvania: Nicholson, ♂ (VII-4-1904, A. E. Lister).
- Texas: Kerrville, 2 ♂♂, 2 ♀♀ (IV-11-1907, F. C. Pratt); ♂, "Texas" ("18-5," Belfrage).
- Virginia: Cape Henry, ♀ (8-9-27, A. Busck); Falls Church (♂, 2 ♀♀, 22-29-VII-1914, Carl Heinrich); ♂ (June 2, 1920, Kneale and Heinrich).

Remarks.—The distinguishing characters of this and *quercicella* have been discussed under the latter.

Although *obsoletella* and *quercicella* cover much of the same range, the former appears to be the more widely distributed of the two. Much more rearing must be done to establish the limits of both.

PSILOCORIS CRYPTOLECHIELLA (Chambers)

- Depressaria cryptolechiella* CHAMBERS, Can. Ent., vol. 4, p. 91, 1872.—BUSCK, Proc. Ent. Soc. Washington, vol. 5, p. 206, 1903.
- Hagno cryptolechiella* (Chambers) CHAMBERS, Can. Ent., vol. 4, p. 131, 1872.—BRAUN, Trans. Amer. Ent. Soc., vol. 49, p. 350, 1924.
- Cryptolechia cryptolechiella* (Chambers) CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 116, 1878.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 197, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8474, 1939.
- Psilocorsis cryptolechiella* (Chambers) KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6391, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 197, 1908.—BARNES and MCDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6432, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 236, 1923.
- Cryptolechia cryptolechiaella* CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 84, 137, 1878.
- Cryptolechia quercicella* WALSINGHAM (part) (not Clemens), Ins. Life, vol. 2, p. 151, 1889.—RILEY (part), in Smith, List of the Lepidoptera of Boreal America, No. 5223, 1891.—BUSCK (part), in Dyar, U. S. Nat. Mus. Bull. 52, No. 5851, 1903.

Alar expanse, 15 mm.

Type.—Lost.

Type locality.—Kentucky?

Food plant.—Holly?

Remarks.—This species is unknown to me, but I am retaining the name for the present in anticipation of the rediscovery of the species.

It appears to be nearest to, if not synonymous with, *obsoletella*. For the sake of completeness I give a copy of the original description:

“Third joint of the palpi black, with a narrow longitudinal white line on each side. Second joint pale yellow with a narrow longitudinal black line beneath. Antennae pale yellow, checkered above with black and with a narrow longitudinal black line on each side of the basal portion. Head, thorax and base of the anterior wings dull reddish-orange; anterior wings to the naked eye, pale golden, with the lustre of “watered” silk, produced by a multitude of transverse, narrow, wavy, dark brown lines, as seen under the lens; six small dark brown spots in a row around the apex, to the naked eye appearing like a narrow marginal line. Ciliae pale fuscous, with a silvery lustre and a somewhat darker hinder marginal line at their base. Hind wings yellowish-white with a silky lustre.”

PSILOCORISIS DUBITATELLA (Zeller)

Cryptolechia (Psilocorsis) dubitatella ZELLER, HOR. SOC. ENT. ROSS., vol. 13, p. 262, 1877.

Cryptolechia dubitatella (Zeller) MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 197, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8469, 1939.

Psilocorsis dubitatella (Zeller) BUSCK, Proc. Ent. Soc. Washington, vol. 5, p. 206, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6393, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 197, 1908.—BARNES and MCDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6429, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir. 68, p. 236, 1923.

Cryptolechia quercicella Walsingham [not Clemens], Ins. Life, vol. 2, p. 151, 1889.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5223, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5851, 1903.

Alar expanse, 16 mm. ($3\frac{3}{4}$ ''').

Type.—Zoological Museum, Berlin.

Type locality.—“North America.”

Food plant.—Unknown.

Remarks.—I do not know this species. Following is a copy of the original description:

“Capillis et thorace ochraceis, palpis linea longitudinali nigra signatis; alis ant. subelongatis, ochraceis, obsolete transverse strigulatis, puncto venae transversae obsolete fusco, nebula cinerea inferius addita, punctis marginalibus nigris superius majusculus, ciliis fusco-cinereis. ♀.”

There seems to be considerable difference of opinion regarding the proper placement of this species. Walsingham considers it a synonym of *quercicella* and Forbes suggests its synonymy with *obsoletella*. I

am inclined to believe that the latter view is correct, but we must wait for a more careful study of the type and the discovery of the larva to settle the matter.

PSILOCORISIS REFLEXELLA Clemens

PLATE 22, FIGURE 131; PLATE 40, FIGURE 222

Psilocorsis reflexella CLEMENS, Proc. Acad. Nat. Sci. Philadelphia, vol. 12, p. 213, 1860; in Stainton, Tineina of North America, p. 150, 1872.—BUSCK, Proc. Ent. Soc. Washington, vol. 5, p. 207, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6394, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 197, 1908.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 119, 1912.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6427, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 238, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 545, 1928.—PROCTER, Biological survey of the Mount Desert region, Part 6, The insect fauna, p. 274, 1938.

Psilocorsis reflexa CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 162, 1878.

Cryptolechia reflexella (Clemens) CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 137, 1878.—WALSINGHAM, Ins. Life, vol. 2, p. 151, 1889.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5224, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5852, 1903.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 197, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8467, 1939.

Cryptolechia cressonella CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 86, 1878.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8467, 1939 (cited as synonym of *C. reflexella* (Clemens)).

Head ferruginous-brown. Labial palpus light ochreous with the usual dark stripes; second segment with some fuscous shading exteriorly.

Thorax and fore wing ochreous strongly overlaid and mottled with reddish fuscous; inner and outer discal spots usually ill defined, blackish fuscous; terminal row of spots confluent forming a narrow, poorly defined blackish-fuscous line; cilia yellowish fuscous with a dark subbasal band. Hind wing and cilia yellowish fuscous, the cilia with a dark subbasal line. Legs whitish ochreous suffused with dull fuscous. Abdomen fuscous above and whitish ochreous beneath.

First abdominal segment simple.

Male genitalia.—Harpe moderately clothed with hair; sacculus narrow, weakly sclerotized. Anellus a broad, oval, cupped plate, strongly sclerotized basally; lateral lobes greatly exceeding central plate, slender, no thicker distally than basally. Aedeagus stout, sharply bent, pointed; vesica armed with one large, stout cornutus and a patch of strong, but smaller ones. Vinculum with a pointed dorsoanterior process.

Female genitalia.—Genital plate narrow, membranous except for a broad, sclerotized, anterior band. Ostium round. Ductus bursae membranous except for a large dilated, partially sclerotized portion immediately preceding the ostium; ductus seminalis spiculate on inner surface and entering ductus bursae just anterior to ostium. Branches of signum 22–24 on each side; signum-bearing half of bursa copulatrix spiculate.

Alar expanse, 18–25 mm.

Type.—In the Academy of Natural Sciences of Philadelphia.

Type locality.—"Pennsylvania."

Food plant.—Unknown.

Distribution.—Eastern United States.

United States records

District of Columbia: ♂, ♀ ("1906," A. Busck); ♀ (May 19, 1902, A. Busck); ♂ (Sept. 20/34, no collector); ♀ (6–15–06, Charles R. Ely).

Illinois: Putnam County, ♂ (13–VI–1936, M. O. Glenn).

Maine: Mount Desert (May 24).

Maryland: Plummers Island, ♂ (June 1903, A. Busck); 2 ♀♀ (1903, 1904, Barber and Schwarz).

Massachusetts: Boston, ♀ (Beutenmüller); Cohasset, ♂ (July 6, 1909, Owen Bryant).

New Hampshire: Hampton, ♂ (6–9–1904, S. A. Shaw).

New Jersey: Anglesea, 6 ♂♂, 2 ♀♀ (3–30–V–1905, W. D. Kearfott); Essex County Park, 2 ♂♂ ("May 20" and "6–19–99," W. D. Kearfott); Greenwood Lake, ♂ ("V–30," W. D. Kearfott).

New York: ♂ ("1906," Walsingham); ♂ (Beutenmüller).

Pennsylvania: Beaver County, ♂, ♀ (May, 1900, Kemp); New Brighton, 13 ♂♂, 7 ♀♀ (May and June, 1902–1906, H. D. Merrick); Pittsburgh, ♂, 2 ♀♀ (VII–12–06; VI–11–05, Henry Engle).

Virginia: Mountain Lake, ♂ (June 14–21, 1907, A. F. Braun).

Remarks.—In addition to the above I have before me a single male from Putnam Company, Ill. (13 June 1936, M. O. Glenn), which appears to belong here. The specimen is, however, heavily overlaid with fuscous scales and may be another species.

This is the largest species of this genus from North America and is usually readily recognized by its size. It is the only described species for which we have no definite host record.

PSILOCORIS FAGINELLA (Chambers)

PLATE 22, FIGURE 134; PLATE 40, FIGURES 217, 218

Hagno faginella CHAMBERS, Can. Ent., vol. 4, p. 131, 1872; vol. 6, p. 131, 232, 1874.

Cryptotechia faginella (Chambers) CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 84, 120, 137, 1878.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 197, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8472, 1939.

- Psilocosris faginella* (Chambers) BUSCK, Proc. Ent. Soc. Washington, vol. 5, p. 206, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6392, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 197, 1908.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 118, 1912.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6428, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 236, 1923.—PROCTER, Biological survey of the Mount Desert region, Part 6, The insect fauna, p. 274, 1938.
- Cryptotechia quercicella*, WALSINGHAM, part (not Clemens), Ins. Life, vol. 2, p. 511, 1889.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5223, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5851, 1903.
- Cryptotechia ferruginosa* ZELLER, Verh. zool.-bot. Ges. Wien, vol. 23, p. 243, 1873.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 137, 1878.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5219, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5847, 1903; Proc. Ent. Soc. Washington, vol. 5, p. 205, 1903.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 197, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8468, 1939. (New synonymy.)
- Psilocosris ferruginosa* (Zeller) KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6395, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 197, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6430, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 236, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat., Memoir 101, p. 545, 1928.

Labial palpus and head ochreous-yellow (typical dark stripes present on palpus). Thorax and fore wing brownish ochreous, the latter lightly irrorated with brown (some specimens lighter in color, with little or no brown irroration); inner and outer discal spots blackish fuscous, the former usually inconspicuous, the latter well defined; around termen a row of five or six small blackish-fuscous spots. Hind wing and cilia yellowish fuscous. Legs whitish ochreous, lightly suffused with brown. Abdomen light yellowish brown above, whitish ochreous beneath.

First abdominal segment simple.

Male genitalia.—Harpe moderately clothed with hairs; sacculus narrow, weakly sclerotized. Anellus an oval, deeply cupped plate; base strongly sclerotized; lateral lobes stout, exceeding the central plate. Aedeagus large, stout, sharply bent, pointed; vesica armed with one large cornutus and a long, narrow patch of strong slender ones. Vinculum with a prominent, broad, pointed dorsoanterior process.

Female genitalia.—Genital plate membranous except for a moderately broad, strongly sclerotized anterior band, which is slightly broader laterally than centrally. Ductus bursae dilated and strongly sclerotized at ostium. Inception of ductus seminalis at about middle of the sclerotized part of ductus bursae; inner surface of ductus seminalis finely spiculate. Signum with 19 to 21 branches on each side; signum-bearing half of bursa strongly spiculate.

Alar expanse, 18–23 mm.

Type.—In Museum of Comparative Zoology, Cambridge, Mass. (*faginella*); in British Museum (*ferruginosa*).

Type localities.—Kentucky (*faginella*); Ohio (*ferruginosa*).

Food plant.—*Fagus grandifolia* Ehrh.

Distribution.—Eastern United States.

United States records

Delaware: Lowes, ♂ (8–8–35, Donald McCreary).

Louisiana: East Baton Rouge Parish, 2 ♀♀ (24–VIII–1923, T. H. Jones and W. G. Bradley).

Maine: Augusta, 3 ♂♂, 2 ♀♀ (February 1931 [indoor record?]); Aurora, 3 ♂♂, 4 ♀♀ (13–16–VI–32; 6–4–31 [Gip. Moth Lab. No. 12164–S185]); Bar Harbor (June 2–12).

New Hampshire: Dublin, ♀ (A. Busck); Hampton, ♀ (VI–25–1907, S. A. Shaw).

Ohio: Cincinnati, ♀ (VIII–11–1917, A. F. Braun).

Vermont: One male; no further data.

Remarks.—I have placed *ferruginosa* as a synonym of *faginella*, since, aside from the coloration (*ferruginosa* is lighter than *faginella*) there are no differences between the two. Both have the same food plant and distribution.

PSILOCORISIS CARYAE, new species

PLATE 22, FIGURE 132; PLATE 40, FIGURE 219

Psilocorsis cryptolechiella BRIMLEY (not Chambers), The insects of North Carolina, p. 304, 1938.

Labial palpus with the second segment sordid whitish ochreous shaded with grayish fuscous exteriorly; a fuscous longitudinal line beneath, narrowly bordered laterally with whitish; third segment fuscous with a whitish tip, and a narrow whitish line on each side. Face, head, and basal segment of antenna above dark yellow-brown to light fuscous; underside of basal segment of antenna fuscous with two longitudinal whitish lines; remainder of antenna checkered with white and fuscous, less distinctly so and lighter toward the extremity. Thorax and base of fore wing deep brown. Fore wing light yellowish fuscous strongly overlaid with deep brown. Thorax and fore wing with a purplish luster; inner and outer discal spots and an indistinct row of spots around termen blackish fuscous; cilia light fuscous. Hind wing shining yellowish fuscous (with a brassy appearance), darker apically; cilia light fuscous with a darker sub-basal band. Legs whitish ochreous suffused with light fuscous. Abdomen yellowish fuscous above, whitish ochreous beneath.

First abdominal segment simple.

Male genitalia.—Harpe long and slender, cucullus pointed. Anellus a lightly sclerotized plate with slender digitate lateral processes, the latter not exceeding the posterior edge of the central plate. Aedeagus stout, sharply bent, sharply pointed; vesica armed with one large, sharply pointed cornutus and a narrow, elongate patch of smaller ones. Vinculum rounded with a well-developed, pointed dorsoanterior process.

Female genitalia.—Ostium large, oval. Genital plate membranous except for a narrow, sclerotized anterior band. Ductus bursae dilated and strongly sclerotized before ostium, otherwise slender and membranous; inception of ductus seminalis just before ostium. Signum with 17–21 branches on each side; signum-bearing half of bursa copulatrix strongly spiculate.

Alar expanse, 15–18 mm.

Type.—U.S.N.M. No. 52866.

Type locality.—Cuero, Tex. (September 13, 1910, M. M. High).

Food plants.—*Carya pecan* Aschers. and Graebn. and *Carya ovata* (Mill.) Koch.

Remarks.—Described from the ♂ type and 17 ♂ and 11 ♀ paratypes as follows: Cuero, Tex., 8 ♂ ♂ and 8 ♀ ♀ (June, July, and September dates, 1910, M. M. High); San Antonio, Tex., 3 ♂ ♂ (July 14–24, 1908, McMillan); Norfolk, Va., ♂ (September 13, 1910, M. M. High), all reared from pecan; Winfield, La., ♂ (June 16–23); Monticello, Fla., 3 ♀ ♀ (June 23, 1914, A. I. Fabis; April 8–9, 1915, John B. Gill) reared from hickory.

Paratypes in the U. S. National Museum, Canadian National, and H. H. Keifer collections.

With the exception of *fletcherella* this is the darkest species of the genus described from North America. It may be distinguished from *fletcherella* by its smaller size and the larger number of branches on each side of the signum. In female genitalia *caryae* more closely resembles *faginella* from which it may be distinguished by the more strongly sclerotized portion of the ductus bursae.

PSILOCORIS FLETCHERELLA Gibson

PLATE 40, FIGURE 221

Psilocorsis fletcherella GIBSON, Ottawa Nat., vol. 22, p. 226, 1909.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6431, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 236, 1923.

Cryptolechia fletcherella (Gibson) MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 197, 1922.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States (Part 2, Microlepidoptera), No. 8470, 1939.

Cryptolechia quercicella GIBSON (not Clemens), Can. Ent., vol. 40, p. 84, 1908.

Palpus, exclusive of the usual dark stripes, whitish ochreous. Head, thorax, and fore wing yellowish strongly overlaid with brown and

having a purplish tinge; inner and outer discal spots and a row of five or six terminal spots blackish fuscous; the first discal and the terminal row of spots sometimes ill defined. Hind wing and cilia light brown, the latter with a narrow yellowish basal line. Legs and under-side of abdomen whitish ochreous. Abdomen brown above.

Female genitalia.—Genital plate membranous except for a narrow, sclerotized anterior band. Ostium round. Ductus bursae dilated near ostium; membranous except for a narrow sclerotized ring before ostium and a small sclerotized plate before inception of ductus seminalis; ductus seminalis and area of ductus bursae immediately surrounding its inception finely spiculate. Branches of signum 15 to 16 on each side; signum-bearing half of bursa copulatrix strongly spiculate on inner surface.

Alar expanse, 19 mm.

Type.—In the United States National Museum.

Type locality.—Ottawa, Ontario, Canada.

Food plant.—*Populus tremuloides* Michx.

Distribution.—Eastern Canada and probably northeastern United States.

Canadian records

Ontario: Ottawa, 2 ♀♀ (10-VI-1909, A. Gibson); Merivale (2-VII-1935, T. N. Freeman).

Quebec: Meach Lake (13-VI-1906, July 1906, 30-VI-1937, C. H. Young); Wakefield (13-VII-1925, F. P. Ide).

Remarks.—I have not seen the specimens, nor do I know the sexes of the specimens from Merivale, Meach Lake, and Wakefield, but the identification is presumably correct.

10. Genus INGA Busck

PLATE 1, FIGURE 7; PLATE 5, FIGURE 37; PLATE 12, FIGURES 80, 80a; PLATE 14, FIGURE 89

Inga BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 200, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6483, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 243, 1923.—BRIMLEY, The insects of North Carolina, p. 304, 1938. (Genotype: *Anesychia sparsiciliella* Clemens, Proc. Ent. Soc. Philadelphia, vol. 2, p. 430, 1864.)

Antenna slender, strongly ciliate in male, smooth in female; basal segment without pecten. Labial palpus long, slender, recurved, reaching well above apex; terminal segment slightly longer than second, the latter thickened with closely appressed scales, roughened in front.

Fore wing elongate; length nearly 3 times the width; costa slightly arched; apex blunt; termen oblique, straight; 12 veins; 7 and 8 stalked, both to costa or apex, or with 7 to termen scarcely below apex.

Hind wing as broad as forewing; 8 veins; 3 and 4 connate or stalked; 6 and 7 somewhat divergent; 5 approximate to 4. Abdomen not depressed.

Male genitalia.—Harpe with sacculus very broad, deeply folded, heavily sclerotized and clothed with long coarse hairs. Clasper long, reaching to or beyond costa, usually dilated distally with apex armed with short, stout spines. Cucullus narrow, lightly sclerotized, clothed with fine hairs; apex rounded. Anellus broad, without lateral processes; lateral lobes weakly developed, with few hairs. Aedeagus long, slightly curved, apex pointed. Vinculum broad, rounded. Transtilla membranous with weak lateral hairy lobes. Gnathos long, bluntly pointed. Uncus well developed, elongated, narrowly pointed, moderately clothed with hairs.

Female genitalia.—Ductus bursae membranous or narrowly sclerotized just before ostium. Signum present or absent.

Remarks.—Meyrick⁴² has synonymized *Inga* with *Cryptolechia*, but the two are sufficiently distinct to justify their separation. The male genitalia of *Cryptolechia* show a tubular anellus, spined, broad gnathos and spoon-shaped uncus, together with minor differences. These characters, when compared with the description and figure of *Inga*, will serve to distinguish between the two.

As a means of separating the oecophorid genera, Busck, Meyrick, and others have used the direction of vein 7 of the fore wing (to termen, to apex, or to costa). For the most part this character serves for separating the genera into two groups, but in this genus we find all conditions existing. In *sparsiciliella*, *obscuromaculella*, *canariella*, and *concolorella* 7 is distinctly to costa but in *cretacea* and *ciliella* it goes to the termen scarcely below the apex. Normally veins 2 and 3 of the forewing are widely separated but in some specimens may be either connate or short-stalked.

In view of the fact that aberrations in venation occur here and that the genitalia indicate that the species are unmistakably congeneric, we may well associate them.

On the abdominal segments of the males of *concolorella* and *ciliella* and the females of *canariella* there are spines such as are commonly found in the Blastobasidae. The spines in *Inga*, however, differ from those found in the Blastobasidae by being dilated toward their extremities; those of the Blastobasidae (studied) are evenly tapered to a sharp point. The spines of *Inga* are, in most cases, readily deciduous, those of Blastobasidae more firmly attached.

Busck⁴³ erected this genus for *Anesychia sparsiciliella* Clemens. As already pointed out Meyrick considered the genus synonymous with

⁴² Meyrick, E., in Wytzman, *Genera insectorum*, fasc. 180, p. 195, 1922.

⁴³ Busck, A., *Proc. U. S. Nat. Mus.*, vol. 35, p. 200, 1908.

Cryptolechia. With this one exception *Inga* has been considered a valid genus with the genotype as the only species. From *Machimia* (*sensu* Meyrick) I am transferring *cretacea* (Zeller), *canariella* (Busck), *obscurumaculella* (Chambers), *concolorella* (Beutenmüller), *ciliella* (Busck), and *humata* (Meyrick) and from *Cryptolechia* (*sensu* Meyrick), *trigama* (Meyrick) to *Inga*, bringing to eight the total number of North American species referable to this genus.

KEY TO THE SPECIES OF INGA BASED PRIMARILY ON COLORATION

1. Fore wing yellow----- *canariella* (Busck) (p. 222)
Fore wing otherwise----- 2
2. Fore wing white or whitish----- 3
Fore wing otherwise----- 4
3. Costa of fore wing with a conspicuous black spot
sparsiciliella (Clemens) (p. 222)
Costa of fore wing without such spot----- *cretacea* (Zeller) (p. 225)
4. Antennal ciliations 5⁴⁴----- *humata* (Meyrick) (p. 220)
Antennal ciliations otherwise----- 5
5. Antennal ciliations ½----- *trigama* (Meyrick) (p. 224)
Antennal ciliations otherwise----- 6
6. Alar expanse less than 15 mm----- *obscurumaculella* (Chambers) (p. 226)
Alar expanse more than 15 mm----- 7
7. Labial palpus whitish ochreous; basal three-fifths of second segment blackish fuscous----- *ciliella* (Busck) (p. 227)
Labial palpus grayish fuscous----- *concolorella* (Beutenmüller) (p. 221)

KEY TO THE SPECIES OF INGA BASED PRIMARILY ON MALE GENITALIA

1. Abdomen spined----- 2
Abdomen not spined----- 3
2. Clasper curved, very thick, heavily spined (fig. 128) - *ciliella* (Busck) (p. 227)
Clasper straight, slender basally, abruptly dilated and finely spined apically (fig. 129)----- *concolorella* (Beutenmüller) (p. 221)
3. Clasper slender, bluntly pointed, extending little beyond middle of harpe (fig. 127)----- *canariella* (Busck) (p. 222)
Clasper slender or stout, dilated distally, and extending at least to costa (figs. 80, 126, 130)----- 4
4. Clasper strongly spined down to sacculus (fig. 130)
cretacea (Zeller) (p. 225)
Clasper with few or no spines as far down as sacculus (figs. 80, 126)----- 5
5. Clasper stout, hardly reaching costa (fig. 80) - *sparsiciliella* (Clemens) (p. 222)
Clasper slender, reaching beyond costa (fig. 126)
obscurumaculella (Chambers) (p. 226)

⁴⁴ The antennal ciliations of Meyrick (the relation of the length of the cilia to the width of the antennal shaft) are used here because both *humata* and *trigama* are known only from unique males and this character is the only one which can be used safely. None of the other species has antennal cilia as long as 5 or as short as ½.

KEY TO THE SPECIES OF INGA BASED PRIMARILY ON
FEMALE GENITALIA

- | | |
|--|---|
| 1. Signum present..... | 2 |
| Signum absent..... | 4 |
| 2. Signum minute ⁴⁵ ; a narrow sclerotized ring before ostium (fig. 206)..... | <i>obscurumaculella</i> (Chambers) (p. 226) |
| Signum well developed; ring before ostium broad or narrow..... | 3 |
| 3. Sclerotized ring before ostium broad (fig. 209)..... | <i>cilliella</i> (Busck) (p. 227) |
| Sclerotized ring before ostium narrow (fig. 210)..... | <i>cretacea</i> (Zeller) (p. 225) |
| 4. Abdomen strongly spined..... | <i>canariella</i> (Busck) (p. 222) |
| Abdomen not spined..... | 5 |
| 5. Sclerotized ring before ostium broad (fig. 208) | <i>concolorella</i> (Beutenmüller) (p. 221) |
| Sclerotized ring before ostium narrow (fig. 89) | <i>sparsicilliella</i> (Clemens) (p. 222) |

INGA HUMATA (Meyrick), new combination

Machimia humata MEYRICK, Exotic Microlepidoptera, vol. 1, p. 181, 1914; in Wytzman, Genera insectorum, fasc. 180, p. 82, 1922.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8387, 1939.

Cryptolechia humata (Meyrick) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6420, 1917.

Head whitish gray, somewhat sprinkled with light gray. Palpus ochreous whitish, second segment with the basal three-fifths gray externally. Antennal ciliations 5. Thorax gray irrorated with darker. Abdomen gray. Fore wing pale gray irrorated with dark fuscous; first and second discal spots and an outwardly curved row of spots from two-thirds of costa to two-thirds of inner margin, fuscous; cilia gray. Hind wing and cilia gray.

Alar expanse, 20 mm.

Type.—In the British Museum.

Type locality.—Palmerlee, Ariz.

Food plant.—Unknown.

Remarks.—I know this species from description only and am placing it here on the evidence presented in the description. The dark, lower portion of the second segment of the labial palpus and the pattern indicate that the species belongs in *Inga*. Until the type has been examined and a final disposition of the species has been made we can refer it to this genus.

⁴⁵ A single female of this species is available for study. The bursa of this specimen shows a minute, round signum, which may or may not be present on other specimens.

INGA CONCOLORELLA (Beutenmüller), new combination

PLATE 21, FIGURES 129, 129a; PLATE 39, FIGURE 208

- Cryptotechia concolorella* BEUTENMÜLLER, Ent. Amer., vol. 4, p. 30, 1888.—WALSINGHAM, Ins. Life, vol. 2, p. 152, 1889.—RILEY, in Smith, List of Lepidoptera of Boreal America, No. 5217, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5845, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6386, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 195, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6419, 1917.
- Machimia concolorella* (Beutenmüller) MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 82, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8386, 1939.

Head, palpus, thorax, abdomen, and fore wing grayish fuscous. Discal dots and an outwardly curved line of spots from two-thirds of costa to two-thirds of inner margin indistinct, fuscous. Legs grayish mottled with fuscous; the fore legs almost wholly overlaid by the latter color.

Male genitalia.—Cucullus broad, rounded; clasper slender basally, broadly dilated, obliquely pointed and reaching well beyond costa; distal surface clothed with fine spines. Anellus a broad sclerotized plate with a deep, median V-shaped excavation; from the posterodorsal edge a broad, flat process, broader distally than proximally; lateral, fleshy lobes moderately well developed, hairy. Aedeagus long, slender, slightly curved, bluntly pointed; dorsal third strongly sclerotized and armed with small teeth. Lateral lobes of transtilla stout, hairy.

Female genitalia.—Genital plate membranous. Ostium round, moderately large. Ductus bursae with a broad, sclerotized ring before ostium. Inception of ductus seminalis well before ostium. Bursa copulatrix sparsely and finely spiculate on inner surface.

Alar expanse, 20–22 mm.

Type.—In the United States National Museum.

Type locality.—Nevada.

Food plant.—Unknown.

Distribution.—Southwestern United States.

United States records

California: San Diego, 5 ♀♀ (June 16–July 23).

Nevada: ♂ (no date or collector).

Remarks.—With the type male I associate the five females from California. These agree well with the description and the type, although the latter is somewhat more suffused.

INGA CANARIELLA (Busck), new combination

PLATE 21, FIGURES 127, 127a; PLATE 39, FIGURE 207

Cryptolechia canariella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 195, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6422, 1917.

Machimia canariella (Busck) MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 82, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8382, 1939.

Head, palpus, legs, thorax, fore wing, and abdomen yellow. Antenna, palpus and legs mottled with reddish yellow; base of costa of fore wing reddish yellow. Hind wing and cilia whitish yellow; cilia with a darker subbasal line.

Male genitalia.—Harpe slender, long; portion beyond clasper longer than that before; cucullus bluntly pointed; clasper slender, straight, not extending much beyond middle of harpe. Anellus large, triangular, broader distally than basally; lateral lobes near distal end minute. Aedeagus long, slender, gently curved; vesica armed with a small patch of weak spiculate cornuti and one bladeliike distal one. Transstilla with small, hairy, papillate lateral lobes.

Female genitalia.—Genital plate membranous; ostium large oval, anterior edge narrowly sclerotized. Ductus bursae membranous; inception of ductus seminalis well before ostium. Bursa copulatrix large; inner surface finely spiculate.

Alar expanse, 21–24 mm.

Type.—In the United States National Museum.

Type locality.—Huachuca Mountains, Arizona.

Food plant.—Unknown.

Distribution.—Known only from the type locality.

United States records

Arizona: Huachuca Mountains, 2 ♂♂, 2 ♀♀ (no date or collector); Palmerlee, Cochise County, ♂ (no date or collector).

INGA SPARSICILIELLA (Clemens)

PLATE 1, FIGURE 7; PLATE 5, FIGURE 37; PLATE 12, FIGURES 80, 80a; PLATE 14, FIGURE 89

Anesychia sparsiciliella CLEMENS, Proc. Ent. Soc. Philadelphia, vol. 2, p. 430, 1864; in Stainton, The Tinelna of North America, p. 255, 1872.—CHAMBERS, Can. Ent., vol. 12, p. 226, 1880.—BUSCK, Proc. Ent. Soc. Washington, vol. 5, p. 218, 1903.

Anesychia sparsicella CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 129, 1878.

Cryptolechia sparsiciliella (Clemens) BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5844, 1903.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 197, 1922.

Inga sparsiciliella (Clemens) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 200, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6483, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 243, 1923; in LEONARD, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 546, 1928.—BRIMLEY, The insects of North Carolina, p. 304, 1938.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8466, 1939.

Machimia sparsiciliella (Clemens) MEYRICK, Exotic Microlepidoptera, vol. 3, p. 471, 1928.

Cryptolechia contrariella WALKER, List of the specimens of lepidopterous insects in the collection of the British Museum, vol. 29, p. 771, 1864.—WALSINGHAM, Proc. Zool. Soc. London, 1880, p. 85.—KEARFOTT, in SMITH, Check list of the Lepidoptera of Boreal America, No. 6385, 1903.

Inga contrariella (Walker) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8466, 1939 (cited as synonym of *I. sparsiciliella* (Clemens)).

Inga atropicta (Zeller) McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8466, 1939 (cited as synonym of *I. sparsiciliella* (Clemens)).

Cryptolechia inscitella WALKER, List of the specimens of lepidopterous insects in the collection of the British Museum, vol. 29, p. 772, 1864.

Cryptolechia atropicta ZELLER, Verh. zool.-bot. Ges. Wien, vol. 25, p. 343, 1875.—RILEY, in SMITH, List of the Lepidoptera of Boreal America, No. 5216, 1891.

Ground color of labial palpus, basal fourth of antenna, head, thorax, and fore wing white. Basal half of labial palpus outwardly blackish fuscous. Outer three-fourths of antenna brownish fuscous. Base of costa, and extreme edge to beyond middle, inner angle, discal spot at basal third and a conspicuous large costal spot reaching middle of wing, black or blackish fuscous. From the middle outer edge of the large costal spot a broken, outwardly curved, narrow, blackish-fuscous line to vein 6, then the line is inwardly curved to inner margin at outer third; cilia with some brownish scales mixed. Hind wing and cilia brownish fuscous. Legs brownish fuscous.

Male genitalia.—Portion of harpe beyond clasper as long as that before; clasper dilated distally, nearly attaining costa and clothed with short stout spines in distal half. Anellus broad with a deep V-shaped median excavation; lateral lobes weak; a well developed, pointed, dorsoanterior process. Aedeagus long, slender; vesica with an elongate, narrow, weakly sclerotized bar.

Female genitalia.—Genital plate membranous; ostium round; ductus bursae membranous except for a narrow sclerotized band just before ostium. Inception of ductus seminalis well before ostium. Bursa copulatrix large, oval, with smooth or very finely spiculate inner surface.

Alar expanse, 14–19 mm.

Types.—In the Academy of Natural Sciences of Philadelphia (*sparsiciliella*); in British Museum (*contrariella*, *inscitella*, *atropicta*).

Type localities.—"Virginia" (*sparsiciliella*); ? (*contrariella*, *in-scitella*); "North America" (*atropicta*).

Food plant.—Unknown.

Distribution.—New York south to Florida and west to Texas.

United States records

District of Columbia: 2 ♀♀ (no data).

Florida: Altamont, ♂ (21-IX-1924, F. R. Cole); St. Petersburg, 3 ♂♂, ♀ (April); Paradise Key, 2 ♂♂ (3-III-1919, E. A. Schwarz and H. S. Barber).

Georgia: Spring Creek, ♂ (18-V-1916, J. C. Bradley).

Maryland: ♀ (no data).

Mississippi: Ocean Springs, ♀ (29-VI-1921).

New York: ♀ (William Beutenmüller).

North Carolina: Southern Pines, 2 ♀♀ (July 8-15; Aug. 1-7).

Pennsylvania: York, ♀ (W. D. Kearfott).

Texas: Kerrville, ♂, ♀ (May, 1906, F. C. Pratt); Harris County, ♀ (no data); Victoria, ♂ (6-10-18, J. D. Mitchell).

Virginia: Fortress Monroe, ♂ (VII-19-03, W. D. Kearfott).

Remarks.—The white ground color and the contrasting black markings immediately distinguish this from all other species of the genus.

The species is widespread but apparently not common in any one locality. The specimen from Victoria, Tex., is the only reared example I have seen, but its host is not recorded on the label.

INGA TRIGAMA (Meyrick), new combination

Cryptolechia trigama MEYRICK, Exotic Microlepidoptera, vol. 3, p. 476, 1928.—

McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8475, 1939.

Head and thorax pale grayish. Palpus whitish with the basal two-thirds of the second segment and basal, median and subapical annuli of terminal segment dark fuscous. Fore wing light gray with some scattered black scales. On costa a black spot at base and before middle, some black scaling beneath and confluent with the latter; inner and outer discal spots black; two strongly angulated series of small black dots crossing wing outwardly; cilia pale gray, with dark basal line. Hind wing and cilia light gray.

Alar expanse, 20 mm.

Type.—In the British Museum.

Type locality.—Fort Davis, Tex., 5,000 feet.

Food plant.—Unknown.

Remarks.—This species is known to me only from the description. I place it here with some hesitation, but its proper assignment can be made only after an examination of the type. On pattern it appears to be near *sparsiciliella*.

INGA CRETACEA (Zeller), new combination

PLATE 21, FIGURES 130, 130a; PLATE 39, FIGURE 210

Cryptolechia cretacea ZELLER, Verh. zool.-bot. Ges. Wien, vol. 23, p. 243, 1873.—WALSINGHAM, Trans. Amer. Ent. Soc., vol. 10, p. 176, 1882.—RILEY, in Smith, List of Lepidoptera of Boreal America, No. 5218, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5846, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6387, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 195, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6417, 1917.

Machimia cretacea (Zeller) MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 83, 1922.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8388, 1939.

Labial palpus, head, and fore wing white to sordid whitish more or less sprinkled with small brown scales. Basal two-fifths of second segment of labial palpus brown outwardly. Eyes narrowly edged with brown in front. Antenna brown. Base of costa, first and second discal spots, and an outwardly curved subterminal line of spots brown. Hind wing and cilia brownish. Legs whitish strongly overlaid with brown. Abdomen whitish somewhat suffused dorsally with light brown and with more or less brown scaling ventrally.

Male genitalia.—Cucullus rounded, narrow; clasper gently curved, slightly dilated distally, heavily clothed with stout spines (the latter extending inwardly down to sacculus) and extending well beyond costa. Anellus a broad, strongly sclerotized plate with a deep V-shaped median excavation; from posterodorsal margin a broad, spatulate process; lateral lobes weakly developed, moderately hairy. Aedeagus long, slightly curved, pointed; vesica armed with a long, strongly sclerotized bar. Transtilla with long, digitate, hairy, lateral lobes.

Female genitalia.—Genital plate membranous. Ostium large, round. Ductus bursae with a narrow sclerotized plate ventrally just before ostium. Inception of ductus seminalis well before ostium. Bursa copulatrix oval, with few minute spicules on inner surface; signum well developed.

Alar expanse, 14–16 mm.

Type.—In the Museum of Comparative Zoology, Cambridge, Mass.

Type locality.—Texas.

Food plant.—Unknown.

Distribution.—Southern United States.

United States records

Arizona: Palmerlee, 4 ♂♂ (no data or collector).

Kansas: Onaga, ♂ (Crevecoeur, collector).

North Carolina: Southern Pines, 15 ♂♂, 10 ♀♀ (July 15 to August 15).

Texas: Brownsville, ♂ (no data or collector); Kerrville, 5 ♂♂, ♀ (April to August dates, F. C. Pratt); San Benito, ♂ and ♀ (March 16-23; Sept. 8-15); Victoria, ♀ ("3-20," E. A. Schwarz).

Remarks.—This species and *sparsiciliella* are the only two described species of this genus with white or whitish ground color. The black markings of *sparsiciliella* will immediately distinguish it from *cretacea*.

INGA OBSCUROMACULELLA (Chambers), new combination

PLATE 21, FIGURES 126, 126a; PLATE 39, FIGURE 206

Cryptolechia obscuromaculella CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 86, 1878.—RILEY, in Smith, List of Lepidoptera of Boreal America, No. 5220, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5848, 1903.—KEARFOTT, in Smith, Check List of the Lepidoptera of Boreal America, No. 6388, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 195, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6418, 1917.

Machimia obscuromaculella (Chambers) MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 82, 1922.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8385, 1939.

Labial palpus, face, and head whitish ochreous to ochreous. Basal three-fifths of second segment of palpus and front around eyes fuscous. Antenna whitish ochreous annulated with fuscous. Thorax and fore wing ochreous strongly irrorated with fuscous; first and second discal spots fuscous; an indistinct, outwardly curved subterminal row of small fuscous spots. Hind wing grayish fuscous. Legs fuscous.

Male genitalia.—Harpe moderately narrow; cucullus bluntly pointed; clasper slender, slightly dilated and clothed with fine spines distally, reaching slightly beyond costa. Anellus broad with a deep V-shaped, median excavation, and a large spatulate process from the dorsoposterior margin; the latter broader distally than proximally; lateral lobes small. Aedeagus long, slender, pointed; vesica armed with a large patch of fine cornuti and a long, strongly sclerotized, irregularly shaped band. Lateral lobes of transtilla moderately large, hairy.

Female genitalia.—Genital plate membranous. Ostium moderately large. Ductus bursae membranous with a narrow sclerotized ring before ostium. Inception of ductus seminalis well before ostium. Bursa copulatrix large, oval with a minute, round signum.

Alar expanse, 14-15 mm.

Type.—In the United States National Museum.

Type locality.—Basque County, Tex.

Food Plant.—Unknown.

Distribution.—This species is known only from Texas.

United States records

Texas: Kerrville, ♂ (IV-12-07, F. C. Pratt); San Antonio, ♀ (June 1899, O. C. Poling).

INGA CILIELLA (Busck), new combination

PLATE 21, FIGURES 128, 128a; PLATE 39, FIGURE 209

Cryptolechia ciliella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 196, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6423, 1917.

Machimia ciliella (Busck) MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 82, 1922; Exotic Microlepidoptera, vol. 3, p. 471, 1928.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8384, 1939.

Labial palpus, head, face, thorax, and fore wing light ochreous more or less suffused with fuscous scaling. Basal three-fifths of labial palpus blackish fuscous. Antenna blackish fuscous narrowly annulated with brown. Base of costa, first and second discal spots, a poorly defined spot near middle of inner margin, and a more or less well defined undulating, outwardly curved row of spots blackish fuscous; cilia concolorous with fore wing. Hind wing and cilia dark fuscous; cilia with a light basal line. Legs light ochreous strongly overlaid with fuscous, the fore legs more so than the others. Abdomen light ochreous suffused and irrorated with fuscous.

Male genitalia.—Harpe very short; cucullus small, bluntly pointed; clasper large, stout, reaching beyond costa, strongly spined. Anellus large, laterally produced, recurved, forming a semitubular articulation for the aedeagus; dorsoanterior spatulate process well developed; lateral lobes small, hairy, fleshy. Aedeagus slender, long, nearly straight; dorsodistal two-fifths scobinate; vesica armed with a long sclerotized band. Lateral lobes of transtilla well developed, fleshy, hairy.

Female genitalia.—Genital plate membranous. Ostium large round. Ductus bursae with a broad sclerotized band before ostium; ductus seminalis enlarged with its inception well before ostium. Bursa copulatrix with a well developed signum; inner surface finely spiculate.

Alar expanse, 16-23 mm.

Type.—In the United States National Museum.

Type locality.—Baboquivari Mountains, Pima County, Ariz.

Food plant.—Unknown.

Distribution.—Southwestern United States.

United States records

Arizona: Baboquivari Mountains, 9 ♂♂, 3 ♀♀ (July 1903, August 1923, October, November 1924, O. C. Poling; July, August 1916 [no collector]); Palmerlee 3 ♂♂ (no date or collector): Yavapai County, ♂, 3 ♀♀ (no date or collector).

New Mexico: Sapello Cañon, ♂ (7-27-02, Oslar).

Remarks.—Some specimens of this species are rather heavily infuscated and at first may be mistaken for *concolorella* but the genitalia will immediately distinguish the two.

The specimens from the Baboquivari Mountains are consistently lighter than specimens from the other localities.

11. Genus *MARTYRINGA* Busck

PLATE 1, FIGURE 10; PLATE 5, FIGURE 39; PLATE 11, FIGURES 72, 72a; PLATE 14, FIGURE 90; PLATE 17, FIGURE 107

Martyringa BUSCK, Journ. New York Ent. Soc., vol. 10, p. 96, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, p. 489, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, p. 107, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 190, 1908.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 120, 1913.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 160, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 234, 1923.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 54, 1922.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 134, 1929.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 96, 1938. (Genotype: *Oegoconia latipennis* Walsingham, Trans. Amer. Ent. Soc., vol. 10, p. 190, 1882.)

Antenna stout (thickened in the male); basal segment without pecten. Labial palpus long, recurved, reaching beyond vertex; second segment thickened and roughened beneath, slightly longer than third.

Fore wing slightly more than three times as long as wide; termen convex; apex rounded; inner margin straight; 11 veins; 1c strong at margin, weaker basally; 2 and 3 coincident; 4 stalked with 2+3; 5 connate or approximate to 4 and parallel to 6; 8 and 9 out of 7; 7 to termen just below apex.

Hind wing as broad as fore wing, costa slightly arched; termen oblique, straight; 7 veins; 3 and 4 coincident; 5 connate with 3+4; 6 and 7 slightly divergent.

Male genitalia.—Clasper absent. Gnathos not spined. Uncus well developed. Anellus membranous, not forming ring around aedeagus.

Female genitalia.—Genital plate sclerotized; ductus bursae strongly sclerotized posterior to inception of ductus seminalis; signum absent.

Remarks.—This genus is closely related to the Asiatic genus *Anchonoma* Meyrick (= *Santuzza* Heinrich). A marked difference, however, exists in the male genitalia. The anellus of *Anchonoma* is

moderately sclerotized basally, and terminates in two long, strongly sclerotized processes, the whole closely attached to the aedeagus. In *Martyringa* the anellus is membranous and the two sclerotized processes of the aedeagus, although closely resembling those of the anellus of *Anchonomas*, cannot be homologized with them. Only one species of *Martyringa* (*latipennis*) is at present recognized.

By the weakness of 1c of the fore wing the genus approaches the Gelechiidae, but on genitalic characters it clearly remains oecophorid.

MARTYRINGA LATIPENNIS (Walsingham)

PLATE 1, FIGURE 10; PLATE 5, FIGURE 39; PLATE 11, FIGURES 72-72a; PLATE 14, FIGURE 90; PLATE 17, FIGURE 107

Oegoconia latipennis WALSINGHAM, Trans. Amer. Ent. Soc., vol. 10, p. 190, 1882.—RILEY, in Smith, List of Lepidoptera of Boreal America, No. 5578, 1891.

Martyringa latipennis (Walsingham) BUSCK, Journ. New York Ent. Soc., vol. 10, p. 96, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, No. 5476, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6000, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 190, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6412, 1917.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 55, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 234, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat., Memoir 101, p. 544, 1928.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 134, 1929.—BRIMLEY, The insects of North Carolina, p. 302, 1938.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 96, 1938.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8380, 1939.

Labial palpus, antenna, head, thorax and legs, and ground color of fore wing pale ochreous. Second segment of labial palpus shaded with fuscous on basal two-thirds outwardly and irrorated basally inwardly; third segment with an indistinct fuscous, subbasal annulus; antenna narrowly annulated with fuscous basally and shaded with fuscous apically; basal segment fuscous above except at extreme tip. Thorax and base of tegula strongly overlaid with fuscous. Ground color of fore wing largely obscured by the fuscous shading; at basal third two large blackish-fuscous spots followed by a broad, pale ochreous dash; at the end of cell a large blackish-fuscous spot; from costa, at beginning of cilia, a transverse, pale ochreous fascia to vein 6, then outwardly angled and curved to inner margin slightly before tornus; termen pale ochreous; cilia grayish fuscous. Hind wing pale cinereous, shaded with fuscous toward apex; terminal edge pale ochreous; cilia grayish fuscous. Legs shaded and banded with fuscous except at joints. Abdomen ochreous, lightly suffused with pale fuscous above; below lighter, sparsely irrorated with fuscous.

Male genitalia.—Harpe elongate, without clasper, sparsely clothed with minute hairs. Anellus membranous. Vinculum produced anteriorly as a spatulate process. Transtilla a weakly sclerotized band. Gnathos bluntly rounded, roughly spoon-shaped. Uncus elongated,

recurved ventrally and terminating in a sharp point; aedeagus long, slender, heavier at the distal end than at the proximal end, terminating in two stout, sharp-pointed processes.

Female genitalia.—Genital plate heavily sclerotized, with a shallow cleft on the posterior margin; posterior part of ductus bursae flattened and broadened; ostium only a narrow horizontal slit; bursa copulatrix small, membranous.

Alar expanse, 15–21 mm.

Type.—In the British Museum.

Type locality.—Not stated.

Food plant.—Unknown.

Distribution.—Eastern United States.

United States records

Connecticut: East River, ♂ (July 7, 1908, Charles R. Ely).

Maryland: Cabin John, ♂ (August 1902, A. Busck); Plummers Island, 37 ♂♂, 5 ♂♂ (July and August dates, 1902–1924, A. Busck; July, 1924, L. J. Bottimer).

New York: Ithaca (*teste* Forbes).

North Carolina: Tryon, 2 ♂♂, ♀ (3–16–VII–1904, Fiske).

Pennsylvania: New Brighton, 5 ♂♂, 2 ♀♀ (July dates, 1903–1907, H. D. Merrick); Nicholson, 10 ♂♂ (July, August 1904, A. E. Lister).

Remarks.—This species is probably more widespread than indicated by present records. According to Mr. Busck the adults fly in the early morning hours after midnight and are, therefore, collected infrequently. Mr. Busck also states that the larva probably will be found in rotten wood.

12. Genus PLEUROTA Hübner

PLATE 1, FIGURE 6; PLATE 5, FIGURE 34; PLATE 12, FIGURES 76, 76a; PLATE 14, FIGURE 87

Pleurota HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 406, 1826.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 191, 1908.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 134, 1912.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 160, 1917.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 105, 1922; Revised handbook of British Lepidoptera, p. 674, 1928.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 180, 1929.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 169, 1938. (Genotype: *Phalaena Tinea bicostella* Clerck, Icones insectorum rariorum cum nominibus eorum trivialibus, locisque e C. Linnaei syst. nat. allegatis, pl. 3, fig. 15, 1761.)

Eupleuris HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 406, 1826.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 105, 1922. (Genotype: *Tinea honorella* Hübner, Sammlung europäischer Schmetterlinge, vol. 8, fig. 254, 1796.)

Hotoscolia ZELLER, Isis von Oken, vol. 3, p. 190, 1839.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 105, 1922. (Genotype: *Tinea forficella* Hübner, Sammlung europäischer Schmetterlinge, vol. 8, fig. 343, 1796.)

Protasis HERRICH-SCHÄFFER, Systematisches Bearbeitung der Schmetterlinge von Europa, vol. 5, p. 40, 1853.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 105, 1922. (Genotype: *Protasis punctella* Costa, Fauna del regno di napoli, vol. 2, pl. 4, fig. 2, 1836.)

Head with loosely appressed scales; tongue well developed; antenna finely to strongly ciliated, basal segment with pecten; labial palpus long, porrect; second segment densely clothed with long spreading scales, especially beneath; third segment short, acute. Abdomen strongly spined.

Fore wing elongate, pointed or falcate; termen very oblique; 12 veins; 7 and 8 stalked, 7 to termen; 2-5 approximated, 11 from before middle.

Hind wing ovate, as broad as fore wing; 8 veins; 3 and 4 connate, 6 and 7 subparallel.

Male genitalia.—Harpe without clasper. Anellus with lateral processes well developed. Gnathos well developed, pointed. Uncus well developed.

Female genitalia.—Ductus bursae sclerotized for at least part of its length; inception of ductus seminalis at anterior third of ductus bursae. Signum of bursa copulatrix present.

Remarks.—At present only one recognized American species; *P. albastrigulella* (Kearfott).

Thema Walker (List of the specimens of lepidopterous insects in the collection of the British Museum, vol. 29, p. 802, 1864; genotype: *Thema brevivitella* Walker) and *Phryganeutis* Meyrick (Proc. Linn. Soc. New South Wales, vol. 9, p. 742, 1884; genotype: *Phryganeutis cinerea* Meyrick) have been synonymized with *Pleurota* Hübner, but it does not seem likely that these Australian genera are congeneric with *Pleurota*.

Pleurota can be distinguished from any other North American oecophorid genera by the porrect labial palpus.

PLEUROTA ALBASTRIGULELLA (Kearfott)

PLATE 20, FIGURES 123, 123a; PLATE 39, FIGURE 212

Dorata albastrigulella KEARFOTT, Can. Ent., vol. 39, p. 8, 1907.

Pleurota albastrigulella (Kearfott) BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6413, 1917.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 170, 1938.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8389, 1939.

Pleurota albastrigulella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 191, 1908.

Pleurota albistrigulella MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 107, 1922.

Labial palpus, antenna, head, thorax, and fore wing fuscous overlaid, strigulated, or otherwise marked with white. Second segment of labial palpus white beneath at base; from basal third irrorated and mixed with white scales; third segment white exteriorly. Antenna white beneath. Head and thorax almost entirely overlaid with white. Edge of costa of fore wing white from base to apical third; central portion and apex of wing strongly dusted and overlaid with white; at basal third, in cell, a blackish-fuscous spot followed by a similar one at the end of cell; on vein 1c an elongate, blackish-fuscous spot, slightly nearer the inner and outer discal spot; vein 7 marked with a more or less distinct longitudinal, blackish-fuscous streak; around termen a poorly defined series of blackish-fuscous spots; cilia white with a light fuscous median band. Hind wing grayish fuscous, darker apically; cilia pale fuscous with an indistinct, darker, subbasal band. Legs fuscous marked with silvery white; hind tibia and tarsus ochreous-white, the latter overlaid with fuscous exteriorly except at joints. Abdomen shining grayish fuscous.

Male genitalia.—Harpe slender, rather abruptly narrowed beyond middle; cucullus narrowly rounded. Anellus with a narrow, strongly sclerotized portion and long, slender, bluntly pointed lateral processes. Aedeagus slender, curved, somewhat dilated at each end; vesica armed with a few weakly sclerotized, short cornuti and with a small weakly sclerotized folded area. Vinculum narrowly rounded. Gnathos long, beaked, pointed, with a scobinate posterior surface. Uncus stout, pointed.

Female genitalia.—Genital plate membranous. Ostium large, oval, transverse. Ductus bursae depressed and sclerotized in posterior third; inception of ductus seminalis at anterior third. Bursa copulatrix large, oval, elongate; signa consisting of two slender, thornlike processes from posterior surface of bursa, and a transverse, lunate plate slightly posterior to middle of bursa; at right angles to the long axis of the plate, one third from each end of inner surface, two flattened, pointed processes.

Alar expanse, 15–20 mm.

Type.—In the United States National Museum.

Type locality.—Placer County, Calif.

Food plant.—Unknown.

Distribution.—Southwestern United States.

United States records

Arizona: Pinal Mountains, alt. 5,000 feet, ♀ (May 15, 1925, O. C. Poling).

California: Camp Baldy, San Bernardino Mountains, ♂, ♀ (June 24–30, July 16–23); Gavilan Hills, Riverside, ♂ (2–V–1935, C. M. Dammers); Havilah, 2 ♂♂ (June 1–7); Los Angeles, ♂ (“IV–22,” O. Buchholz); San Diego, ♂, ♀ (8–12–V–1907, W. S. Wright), ♂ (“9–V–23,” no collector), 2 ♂♂ (no date, Ricksecker); Shingle Springs, El Dorado County, 6 ♂♂ (16–V–1931, 7–V–1934, H. H. Keifer).

13. Genus *CARCINA* Hübner

PLATE 1, FIGURE 9; PLATE 5, FIGURE 36; PLATE 11, FIGURES 71, 71a;
PLATE 14, FIGURE 88

Carcina HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 410, 1826.—REBEL, in Staudinger and Rebel, Catalog der Lepidopteren des palaearctischen Faunengebietes, vol. 2, p. 175, 1901.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 126, 1912.—BUSCK, Can. Ent., vol. 53, p. 277, 1921.—BLACKMORE, Report of the Provincial (British Columbia) Museum of Natural History for the year 1920, pp. 23, 31, 1921.—MEYRICK, in Wytsman, Genera Insectorum, fasc., 180, p. 159, 1922.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 40, 1929.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 251, 1939. (Genotype: *Pyralis quercana* Fabricius, Systema entomologiae, p. 652, 1775.)

Phibalocera STEPHENS, Illustrations of British entomology, Haustellata, vol. 4, p. 192, 1834. (Genotype: *Pyralis quercana* Fabricius, Systema entomologiae, p. 652, 1775.)

Head with appressed scales; tongue developed; antenna longer than fore wing, thick, simple; basal segment with pecten. Labial palpus long, recurved; second segment thickened with appressed scales; terminal segment shorter than second.

Fore wing broad, termen oblique, straight, 12 veins; 2 from well before angle, 3 and 4 stalked, 5 and 6 parallel, 7 and 8 stalked, 7 to termen, 11 from before middle.

Hind wing nearly as wide as fore wing; 8 veins; 3 and 4 stalked; 6 and 7 divergent toward apex.

Male genitalia.—Cucullus divided; clasper absent. Anellus with lateral processes. Vesica armed. Gnathos and uncus well developed, the former unspined.

Female genitalia.—Ductus bursae membranous. Inception of ductus seminalis adjacent to ostium. Signum present.

Larva.—Characters essentially as in *Agonopterix*: ninth abdominal segment with setae I and II well separated; seta VI not on same pinaculum with IV and V, remote from VII. Setal group VII bisetose on first and seventh, unisetose on eighth and ninth abdominal segments. Ocelli normal. Submentum without pit.

Pupa.—Smooth except for a fringe of hair on dorso- and latero-caudal margins of seventh abdominal segment. Prothoracic femora and labial palpi not exposed. Cremaster present but greatly reduced.

Remarks.—This genus may be distinguished from the other genera of North American oecophorids by the antenna which exceeds the length of the fore wing.

The presence of a short (vestigial) cremaster in the pupa will distinguish *Carcina* from *Machimia*.

CARCINA QUERCANA (Fabricius)

- Pyralis quercana* FABRICIUS, Systema entomologiae, p. 652, 1775; Entomologia systematica, vol. 3, p. 271, 1793.
- Phalaena quercana* (Fabricius) DONOVAN, The natural history of British insects, vol. 3, p. 93, pl. 106, fig. 3, 1794.
- Tortrix quercana* (Fabricius) HAWORTH, Lepidoptera Britannica, 1811.
- Carcina quercana* (Fabricius) HEINEMANN, Die Schmetterlinge Deutschlands und der Schweiz, vol. 2, p. 362, 1870.—RÖSSLER, Jahrb. Nassau. Vereins Naturk., vol. 33, p. 282, 1881.—SNELLEN, Die Vlinders van Nederland, vol. 2, p. 609, 1882.—STEUDEL and HOFFMANN, Württemberg. Vereins vaterl. Naturk., vol. 38, p. 206, 1882.—JOURDHEUILLE, Mém. Soc. Acad. l'Aube, vol. 47, p. 188, 1883.—BAU, Handbuch für Schmetterlings-Sammler, p. 358, 1886.—SORHAGEN, Die Kleinschmetterlinge der Mark Brandenburg, p. 216, 1886.—FAILLA-TEDALDI, Nat. Siciliano, vol. 8, p. 186, 1889.—REBEL, Verh. zool.-bot. Ges. Wien, vol. 42, p. 530, 1893.—MEYRICK, A handbook of British Lepidoptera, p. 613, 1895.—REUTTI, Verh. Naturw. Vereins Karlsruhe, vol. 12, p. 237, 1898.—SEEBOLD, Deutsche Ent. Zeitschr., Iris, vol. 11, p. 317, 1898.—CARADJA, Deutsche Ent. Zeitschr., Iris, vol. 12, p. 207, 1899.—STANGE, Die Tineinen der umgegend von Friedland in Mecklenberg, p. 34, 1899.—REBEL, in Staudinger and Rebel, Catalog der Lepidoptern des palaearctischen Faunengebietes, vol. 2, No. 3323, 1901.—CARADJA, Bull. Soc. Sci. Bucarest, vol. 10, p. 155, 1901.—SORHAGEN, Allgemeine Zeitschr. Ent., vol. 7, p. 77, 1902.—DISQUÉ, Deutsche Ent. Zeitschr., Iris, vol. 14, p. 213, 1902.—SCHÜTZE, Deutsche Ent. Zeitschr., Iris, vol. 15, p. 23, 1902.—SPEISER, Königsberg. Physikal.-Oekonom. Ges. Beitr. Naturk. Preussens, No. 9, p. 148, 1903.—REBEL, Ann. Naturh. Hofmus., vol. 18, p. 336, 1903.—MENDES, Broteria, vol. 3, p. 248, 1904.—CROMBRUGGHE, Mém. Soc. Ent. Belgique, vol. 2, p. 51, 1906.—REBEL, Verh. zool.-bot. Ges. Wien, vol. 58, p. (80), 1908.—SPULER, Die Schmetterlinge Europas, vol. 2, p. 343, pl. 89, fig. 35, 1910.—GRIEBEL, Lepid. Fauna Rheinpfalz., vol. 2, p. 55, 1910.—PIQUENARD, Bull. Soc. Sci. Méd. Ouest. (Rennes), vol. 19, p. 79, 1910.—GIANELLI, Ann. Accad. Agr. Torino, vol. 53, p. 96, 1911.—REBEL, Ann. Naturh. Hofmus., vol. 25, p. 417, 1911.—HOLL, Bull. Soc. Hist. Nat. Afrique du Nord, vol. 3, p. 26, 1911.—HAUDER, Ent. Zeitschr., vol. 25, p. 204, 1913.—SKALA, Verh. naturf. Ver. Brünn, vol. 51, p. 316, 1913.—REBEL, Wien. Ent. Ver. Jahrb., vol. 23, p. 202, 1913.—VERBRODT and MÜLLER-RUTZ, Die Schmetterlinge der Schweiz, vol. 2, p. 476, 1914.—GALVAGNI, Wien. Ent. Ver. Jahrb., vol. 25, p. 35, 1915.—SCHAWERDA, Wien. Ent. Ver. Jahrb., vol. 26, p. 46, 1916.—REBEL, Ann. Naturh. Hofmus., vol. 30, p. 166, 1916; Sitzungsb. Akad. Wiss. Wien, vol. 126, p. 808, 1917.—MARTINI, Deutsche Ent. Zeitschr., Iris, vol. 30, p. 155, 1917.—MITTELBERGER, Wien. Ent. Ver. Jahrb., vol. 28, p. 66, 1918.—TURATI, Soc. Italiana Sci. Nat. Mus. Civico, Pavia, vol. 58, p. 116, 1919.—STRAND, Archiv für Naturg., vol. 85A, pt. 4, p. 9, 1919.—BLACKMORE, Report of the Provincial (British Columbia) Museum of Natural History for the year 1920, pp. 23, 31, pl. 2, 1921.—BUSCK, Can. Ent., vol. 53, p. 276, 1921.—BLACKMORE, Report of the Provincial (British Columbia) Museum of Natural History for the year 1921, p. 28, 1922.—ZIMMERMAN, Verh. zool.-bot. Ges. Wien, vol. 71, p. (43), 1922.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 159, 1922.—CHRÉTIEN, in Oberthür, Études de Lépidoptérologie comparée, fasc. 19, p. 368, 1922.—GALVAGNI, Wien. Ent. Ver. Jahrb., vol. 30, p. 105, 1924.—LEONARDI, Elenco delle specie di Insetti dannosi e

loro parassiti ricordati in Italia fino all' anno 1911, pt. 2, p. 281, 1927.—ZERNY, Deutsche Ent. Zeitschr., Iris, vol. 41, p. 144, 1927.—LARSEN, Ent. Meddel., vol. 17, p. 80, 1927.—MEYRICK, A revised handbook of British Lepidoptera, p. 675, 1928.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 40, 1929.—AMSEL, Deutsche Ent. Zeitschr., Iris, vol. 44, p. 121, 1930.—DRENOWSKI, Mem. Bulg. Akad. Wiss., vol. 26, No. 6, p. 75, 1930.—VERBRODT, Deutsche Ent. Zeitschr., Iris, vol. 45, p. 129, 1931.—ESCHERICH, Die Forstinsekten Mitteleuropas, vol. 3, p. 202, fig. 162, pl. 1, fig. 22, 1931.—REBEL and ZERNY, Denkschr. Akad. Wiss. Wien, math.-nat. Kl., vol. 103, p. 151, 1931.—HERING, Die Tierwelt Mitteleuropas (Die Schmetterlinge), p. 154, 1932.—ECKSTEIN, Kleinschmet. Deutschlands, p. 123, pl. 6, fig. 223, 1933.—STERNECK, Prodrum der Schmetterlingsfauna Böhmens, vol. 2, p. 109, 1933.—MORLEY and RAIT-SMITH, Trans. Ent. Soc. London, vol. 81, p. 176, 1933.—ZERNY, Deutsche Ent. Zeitschr., Iris, vol. 48, p. 25, 1934.—OSTHELDER, Mitt. Münch. Ent. Ges., vol. 24, p. 82, 1935.—PIERCE and METCALFE, The genitalia of the tineid families of the Lepidoptera of the British Islands, p. 32, pl. 18, 1935.—RAPP, Beiträge zur Fauna Thüringens, vol. 2, p. 140, 1936.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8392, 1939.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 92, p. 251, 1939.

Phibalocera quercana (Fabricius) STEPHENS, A systematic catalog of British insects, pt. 2, p. 192, No. 7153, 1829; Illustrations of British entomology, Haustellata, vol. 4, p. 193, 1834.—WOOD, Index entomologicus, p. 169, fig. 1160, 1845.—STANTON, Insecta Britannica, p. 81, 1854; A manual of British butterflies and moths, vol. 2, p. 319, 1859; The natural history of the Tineina, vol. 13, pp. 296, 297, pl. 7, fig. 1, 1873.

Phalaenae Tortrix fagana SCHIFFERMÜLLER, Systematisches Verzeichniss der Schmetterlinge der Wiener Gegend, p. 128, pl. 16, fig. 6, 1776.

Tortrix fagana (Schifferrmüller) HÜBNER, Sammlung europäischer Schmetterlinge, vol. 7, pl. 24, fig. 153, 1830.

Carcina fagana (Fabricius) HERRICH-SCHÄFFER, Systematisches Bearbeitung der Schmetterlinge von Europa, vol. 5, p. 131, 1853.

Tinea cancella HÜBNER, Sammlung europäischer Schmetterlinge, p. 69, fig. 453, 1796.

Carcina cancella HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 410, 1826.

Lampros faganella TREITSCHKE, in Ochseneimer, Die Schmetterlinge von Europa, vol. 9, pt. 2, p. 67, 1833.

Labial palpus pale yellow; second segment irrorated with pink on apical third. Antenna pale yellow below, dull pink above. Face shining pale yellow. Head and thorax very pale, dull brownish ochreous. Fore wing dull pink overlaid and suffused with pale, dull brownish ochreous and sparsely irrorated in apical third with black; on basal third of costa a narrow, yellow patch fading to white on extreme costal edge; from middle to apical third of costa a quadrate yellow patch; edge of costa to apex and termen to tornus and the cilia dark yellow; cilia at tornus dull pink; from basal third to about middle of inner margin a subtriangular yellow patch extending well into cell; in this patch, which is ochreous in some specimens, some reddish-ochreous scales. Hind wing pale straw-yellow suffused with

pink at apex; cilia pale yellow. Legs creamy white; fore pair strongly overlaid exteriorly with dark pink. Abdomen light yellowish.

Male genitalia.—Harpe ample, hairy, without clasper; sacculus deeply folded; cucullus deeply cleft, lower point (extension of sacculus?) with tuft of strong, curved bristles. Lateral processes of anellus long. Vesica armed with 4 to 7 strong cornuti. Gnathos without spines. Uncus elongate, hooked, lateral edges infolded.

Female genitalia.—Genital plate dilated laterally; ostium slitlike; ductus bursae membranous; inception of ductus seminalis just before ostium; bursa copulatrix with small signum.

Alar expanse, 17–21 mm.

Type.—Lost?

Type locality.—Europe.

Food plants.—*Quercus*; *Cotoneaster pyracantha* L.; apple.

Distribution.—Europe, Asia Minor, and southern Vancouver Island, British Columbia, Canada.

Canadian records

British Columbia: Victoria, 14 ♂♂, 10 ♀♀ (July and August dates, 1920–1922, E. H. Blackmore; 19–VII–1922, W. R. Carter; 7–8–VIII–1929, J. F. G. Clarke).

Remarks.—The species is well established on southern Vancouver Island, British Columbia, and probably will be found in Washington State, across the Straits of Juan de Fuca, where oak is abundant.

There is considerable variation in this species, which probably accounts for some of the synonymy, but all figures of this species I have seen are readily recognizable.

14. MATHILDANA, new genus

PLATE 1, FIGURE 2; PLATE 7, FIGURE 50; PLATE 11, FIGURES 74, 74a, 74b; PLATE 19, FIGURE 118

Genotype.—*Dasycera newmanella* Clemens, Proc. Ent. Soc. Philadelphia, vol. 2, p. 428, 1864.

Head smooth, tongue developed; antenna thickened with scales; ciliated in male; basal segment without pecten. Labial palpus long, slender; second segment thickened with appressed scales; third segment shorter than second, slender, acute.

Fore wing narrow, costa straight or gently arched; apex narrowly rounded; 12 veins; 2 about as near to 3 as 4 is to 5; 7 and 8 stalked, both to costa; 11 from about middle of cell; cell not much longer than one-half the length of wing.

Hind wing about as wide as fore wing; costa gently convex; 8 veins; 3 and 4 connate; 5 nearer to 6 than to 4.

Male genitalia.—Harpe without clasper. Anellus with lateral processes. Vesica armed. Gnathos and uncus well developed.

Female genitalia.—Genital plate partly sclerotized. Ductus bursae with blind sac from ventral surface. Signum present.

Remarks.—The species *newmanella* has been placed in several different genera by various authors, but I have found it impossible to include our North American specimens in any of the established genera.

Walsingham⁴⁶ has discussed the confusion arising from the description of two species with the name *sulphurella* by Fabricius, and suppressed the genus *Oecophora* as a result. He was erroneous in this, as brought out by Meyrick,⁴⁷ who resurrected *Oecophora* and separated it from *Dasycera*. *Dasycera* Stephens (1829) is synonymous with *Dasycerus* Haworth (1828), the latter being preoccupied by *Dasycerus* Brongniart (1800). *Esperia* is therefore the proper generic name for the European species, as pointed out by Fletcher.⁴⁸ This name is not available for our American species since the two, *newmanella* and *sulphurella*, are not congeneric.

In *Esperia* the costa of the fore wing is concave, the cell reaches to outer two-thirds, vein 2 is remote from 3; 3, 4, and 5 are about equidistant at their bases. In the hind wing vein 5 is much nearer to 4 than to 6. In the male genitalia the clasper is present and the vesica is without armature. (I have not seen a female of *Esperia*.)

The genus *Mathildana* differs from *Esperia* by the straight or convex costa of fore wing, the short cell, which does not extend much past the center of the wing, and the approximation of vein 2 to 3. In the hind wing vein 5 is nearer to 6 than to 4. In the male the clasper is absent, and the vesica is strongly armed.

MATHILDANA NEWMANELLA (Clemens), new combination

Dasycera newmanella CLEMENS, Proc. Ent. Soc. Philadelphia, vol. 2, p. 423, 1864; in Stainton, *Tineina* of North America, p. 252, 1872.—ZELLER, Verh. zool.-bot. Ges. Wien, vol. 23, p. 289, 1873.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 3, p. 145, 1877.—BEUTENMÜLLER, in Smith, Catalogue of the insects of New Jersey, p. 357, 1890.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5545, 1891.—DIETZ, in Smith, Catalogue of the insects of New Jersey, p. 476, 1900.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5932, 1903.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 22, 1922.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 18, 1938.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8353, 1939.

⁴⁶ Walsingham, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 141, 1912.

⁴⁷ Meyrick, in Wytsman, Genera insectorum, fasc. 180, p. 20-21, 1922.

⁴⁸ Fletcher, Mem. Dept. Agr. India (Ent. ser.), vol. 11, p. 85, 1929.

Oecophora newmanella (Clemens) KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6478, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 203, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6499, 1917.—BARNES and BUSCK, Contr. Lepid. North America, vol. 4, pl. 38, fig. 6, 1920.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 249, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat., Memoir 101, p. 546, 1928.—BRIMLEY, The insects of North Carolina, p. 304, 1938.

Labial palpus orange-yellow; third segment with brownish suffusion. Tongue yellow. Face, tegula, collar, and basal segment of antenna brassy; remainder of antenna shining purplish black except for about eight terminal segments, which are silvery white. Head, thorax, and fore wing dusky black with a pronounced purple luster; from base of wing, along fold, an orange-yellow dash extending to basal fifth; in cell, a similarly colored, longitudinal dash reaching slightly past middle of wing (in some specimens the orange dashes are weak or absent, this is especially true of the southern examples); cilia fuscous, lighter apically. Hind wing dark fuscous; cilia lighter. Legs shining brassy. Abdomen fuscous above with a faint purple sheen; brassy below.

Male genitalia.—Harpe narrow; divided beyond sacculus; sacculus broad; cucullus sharply pointed. Anellus a small plate; lateral processes long, flattened, dilated distally. Aedeagus moderately short, stout; vesica armed with numerous long, straight cornuti. Vinculum narrowly rounded. Gnathos broad, thick, slightly excavated posteriorly and terminating in a long, sharply pointed process. Uncus long, pointed.

Female genitalia.—Genital plate narrow; sclerotized posteriorly. Ostium rather broad, oval, opening in membranous anterior part of genital plate. Ductus bursae narrowly sclerotized adjacent to ostium, with short blind sac from ventral surface anterior to sclerotized part; inception of ductus seminalis well before ostium. Bursa copulatrix large, asymmetrical; signum a lightly sclerotized elongate, weakly spined plate.

Alar expanse, 14–19 mm.

Type.—In the Academy of Natural Sciences of Philadelphia.

Type locality.—"Virginia."

Food plant.—Unknown.

Distribution.—Eastern United States and eastern Canada.

United States records

District of Columbia: Washington, ♂ (no date or collector).

Maryland: ♂ (May 30, 1916, A. Busck); ♀ (May 30, 1906, H. S. Barber).

New Hampshire: Hampton, 2 ♂♂ (10–11–VI–1911, S. A. Shaw).

New Jersey: Greenwood Lake, ♀ (June 10, 1900, Wm. Beutenmüller).

New York: Numerous localities (*vide* Forbes).

- North Carolina: Black Mountains, 6 ♂♂, 4 ♀♀ (May 3-27, Wm. Beutenmüller); Mount Graybeard, ♂ ("V-26," Wm. Beutenmüller).
 Ohio: Cincinnati, 4 ♂♂ (28-V-1904, A. F. Braun); ♀ ("5-23-03," no collector); Cuyahoga County, ♀ (9-VI-1898, W. D. Kearfott).
 Pennsylvania: New Brighton, 2 ♂♂ (10-VI-1907, 10-21-1907, H. D. Merrick).
 Vermont: 2 ♂♂ (no date or collector).
 Virginia: Mountain Lake, 2 ♂♂ (June 14, 1907, A. F. Braun); Virginia shore, opposite Plummers Island, Md., ♂ (May 28, 1914, R. C. Shannon); Woodstock, ♀ (June 1, 1903; no collector).

Canadian records

- Ontario: Bala (July 19, 1932, G. S. Walley); Fishers Glen (June 12, 1931, W. J. Brown); Georgian Bay (July 13, 1932, G. S. Walley); Leamington (June 8, 1929, G. S. Walley); Orillia (June 26, July 2, 1926, C. H. Curran); Ottawa, ♂ (19-VI-1905, C. H. Young); Point Pelee (July 22, 1927, F. P. Ide).
 Quebec: Knowlton (June 24, 1929, G. S. Walley); Laval County (July 13, 1907); Mount St. Hilaire (July 1, 1909); Oka (June 12, 1911); St. Johns (June 19, 1911, G. Chagnon).

Remarks.—The specimens from North Carolina have little or no orange color in the center of the wing but otherwise agree with the specimens from more northern localities.

15. CAROLANA, new genus

PLATE 1, FIGURE 3; PLATE 7, FIGURE 49; PLATE 10, FIGURES 69, 69a, 69b;
 PLATE 16, FIGURE 96; PLATE 17, FIGURE 108

Genotype.—*Borkhausenia ascriptella* Busck, Can. Ent., vol. 40, p. 194, 1908.

Head with closely appressed scales; tongue well developed; antenna strongly ciliated in male, simple in female; basal segment with strong pecten; labial palpus long, slender, smooth; third segment nearly as long as second. Abdomen armed with peculiar, short, stout, truncated setae. Thorax smoothly scaled.

Fore wing elongate, costa gently arched; apex pointed; 12 veins; 2 distant from 3; 3, 4, and 5 equidistant; 7 and 8 long stalked, both to costa; 10 distant from 9; 11 from basal fourth of cell.

Hind wing narrower than fore wing; apex pointed; 3 and 4 stalked from angle of cell; 6 and 7 subparallel; cell shorter than one half the length of wing.

Male genitalia.—Clasper absent. Anellus without lateral processes. Vesica armed. Uncus and gnathos present. Socii absent.

Female genitalia.—Genital plate membranous. Ductus bursae partly sclerotized. Signum present.

Remarks.—This genus may be distinguished from *Borkhausenia* by the following characters: In *Carolana* vein 2 of the fore wing is distant from 3, 10 is distant from 9, 11 from basal fourth, and there is no internal cell. In the hind wing 3 and 4 are stalked and the cell

is shorter than one-half the length of the wing. The clasper is absent in the male genitalia, and the ductus bursae of the female is partly sclerotized. In *Borkhausenia* veins 2 to 5 of the fore wing are equidistant, 10 is near 9, 11 is from about middle of cell, and the internal cell is present. In the hind wing 3 and 4 are approximate and the cell is about half as long as the wing. In the male genitalia the clasper is present and in the female genitalia the ductus bursae is membranous.

The genotype is the only species I have seen referable to this genus.

CAROLANA ASCRIPTELLA (Busck), new combination

Borkhausenia ascriptella BUSCK, Can. Ent., vol. 40, p. 194, 1908; Proc. U. S. Nat. Mus., vol. 35, p. 204, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6505, 1917.—BARNES and BUSCK, Contr. Lepid. North America, vol. 4, p. 235, 1920.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 40, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 249, 1923; in LEONARD, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 546, 1928.—PROCTER, Biological survey of the Mount Desert Region: The insect fauna, p. 272, 1938.—GAEDE, in BRYK, Lepidopterorum catalogus, pt. 88, p. 51, 1938.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8369, 1939.

Labial palpus, antenna, face, head, thorax, and fore wing straw colored, shining. Second segment of labial palpus shaded with blackish fuscous exteriorly on basal half. Antenna indistinctly and narrowly annulated with fuscous. Fore wing irrorated with blackish fuscous; base of costa, a large spot at basal third, in cell, and one at end of cell, blackish fuscous; cilia straw colored, more ochreous basally. Hind wing pale light fuscous; cilia ochreous basally fading to straw color outwardly. Legs straw colored, strongly overlaid with blackish fuscous exteriorly except at joints and on hind tibia and tarsus. Abdomen shining whitish-ochreous.

Male genitalia.—Harpe narrow; cucullus rounded. Anellus deeply incised on posterior edge. Aedeagus large, stout, sharply pointed, sharply curved basally; vesica armed with a single, long, sharply pointed, strong cornutus. Vinculum narrowly rounded. Gnathos very broad, shovel-shaped and very closely approximated to the slender, pointed uncus.

Female genitalia.—Genital plate membranous. Ostium broad, anterior edge concave. Ductus bursae slender, twisted, sclerotized in posterior two-thirds, the sclerotized portion bearing numerous small teeth on inner surface; ductus seminalis entering well before ostium. Bursa copulatrix large, oval; signum a weakly sclerotized, toothed plate.

Alar expanse, 9–12 mm.

Type.—In the United States National Museum.

Type locality.—Oak Station, Allegheny County, Pa.

Food plant.—Unknown.

Distribution.—Eastern United States from Maryland northward to Maine.

United States records

Connecticut: East River, ♂ (July 8, 1909, Charles R. Ely).

District of Columbia: Anacostia, ♂, ♀ (7–VI–1910, P. R. Myers).

Maryland: Plummers Island, 4 ♂♂, 2 ♀♀ (June 1903, A. Busck).

New Hampshire: 2 ♂♂ (A. Busck).

New Jersey: Essex County Park, ♂, ♀ (June 24–30, W. D. Kearfott); Montclair, 2 ♂♂, 3 ♀♀ (June, July dates, 1913, 1920, W. D. Kearfott).

New York: Ithaca (*teste* Forbes).

Pennsylvania: New Brighton, 3 ♂♂ (June, July, 1907 and 1911, H. D. Merrick); Oak Station, Allegheny County, 14 ♂♂, 6 ♀♀ (June, July dates, 1911, Fred Marloff).

Remarks.—This species has been recorded⁴⁹ from Mexico and Costa Rica but the specimens I have seen, determined as this species, are referable to other genera.

16. Genus DECANTHA Busck

PLATE 3, FIGURE 19; PLATE 7, FIGURE 55; PLATE 10, FIGURES 66, 66a;
PLATE 14, FIGURE 91

Decantha BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 202, 1908; vol. 47, p. 31, 1915.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 422, 1915.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 161, 1917.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 24, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 248, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 546, 1928.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 64, 1929.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 23, 1938. (Genotype: *Oecophora borkhausenii* Zeller, Isis von Oken, vol. 3, p. 192, 1839.)

Head smooth; tongue developed. Antenna ciliated in male; basal segment with pecten. Labial palpus long, recurved; second segment roughened in front and thickened with appressed scales; terminal segment shorter than second, acute.

Fore wing elongate, pointed, 11 veins; 2 from toward angle, 3 from angle, 7 and 8 coincident, to costa; 11 from middle.

Hind wing narrower than fore wing, 8 veins; 3 and 4 remote, 4 from angle; 5 to 7 parallel.

Male genitalia.—Harpe without clasper. Anellus with elongate, strap-like, lateral processes. Gnathos not spined. Vesica with strong cornuti. Uncus pointed.

⁴⁹ Walsingham, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 143, 1912.

Female genitalia.—Ductus bursae lightly sclerotized posteriorly. Signum present.

Remarks.—This genus is similar to *Fabiola* in having veins 7 and 8 of the fore wing coincident. It may be distinguished, however, by the presence of pecten on the basal segment of the antenna, the presence of strong cornuti on the vesica of the male, and the presence of a signum in the female.

There is a single North American species belonging to this genus.

DECANTHA BOREASELLA (Chambers)

PLATE 20, FIGURES 125, 125a; PLATE 39, FIGURE 211

Oecophora boreasella CHAMBERS, Can. Ent., vol. 5, p. 189, 1873; Cincinnati Quart. Journ. Sci., vol. 2, p. 114, 292, 1875; U. S. Geol. Geogr. Surv. Terr. Bull. 3, p. 129, 141, 1877.—RILEY, in Smith, List of Lepidoptera of Boreal America, No. 5550, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5921, 1903.

Borkhausenia boreasella (Chambers) KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6468, 1903 (as a synonym of *Borkhausenia borkhauseni* [Zeller]).

Decantha boreasella (Chambers) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 202, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6497, 1917.—MEYRICK, in Wytzman, Genera Insectorum, fasc. 180, p. 24, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 248, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 546, 1928.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 23, 1938.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8358, 1939 (as a synonym of *Decantha borkhauseni* [Chambers]).

Borkhausenia borkhauseni (Zeller) DYAR, Proc. U. S. Nat. Mus., vol. 27, p. 934, 1904.

Labial palpus white overlaid and irrorated with black. Antenna checkered black and white. Head black, with a reddish luster and mixed with white posterodorsally. Thorax and fore wing shining golden; base of tegula and collar narrowly black; base of wing black, outer margin of the black basal patch concave and edged with white; the color of the basal patch is narrowly continued along the costal edge to apical fourth; at basal third a triangular area (broadest at costa) of black crosses the wing to the inner corner of a quadrate black spot on the inner margin; from middle of costa, to apical fourth, a rectangular black area extending past the middle of wing, and joined by its inner corner to the outer corner of the spot on the inner margin; the outer corner of the rectangular costal spot extends to tornus where it broadens and fades to reddish brown; all spots are edged outwardly with white and the spot on the inner margin is edged inwardly with white; at apex a black spot; cilia golden

ochreous. Hind wing dark fuscous; cilia shining yellowish fuscous. Legs black annulated with white at joints. Abdomen fuscous.

Male genitalia.—Harpe broad, short, cucullus rounded; sacculus rather strongly, though narrowly, sclerotized and produced as a pointed process slightly beyond cucullus. Anellus consisting of two long, flattened, truncated, lateral processes arising from a small basal plate. Aedeagus relatively long, stout, nearly straight, bluntly pointed; vesica armed with one long cornutus with lateral serrations and a smaller, stout, hooked distal one. Vinculum bluntly pointed. Gnathos truncate. Uncus long, pointed.

Female genitalia.—Genital plate lightly sclerotized posteriorly; ostium long, narrow, opening in anterior membranous part of genital plate. Ductus bursae strongly sclerotized in posterior two-thirds, posterior third somewhat narrower than anterior part; at middle, from inner surface several long slender spines; inception of ductus seminalis at posterior two-thirds. Bursa copulatrix small; signum a poorly developed, elongate plate.

Alar expanse, 10–15 mm.

Type.—In the Museum of Comparative Zoology, Cambridge, Mass.

Type locality.—Not stated.

Food plant.—Unknown.

Distribution.—Far-western United States and Canada and North-eastern United States.

United States records

Arizona: Huachuca Mountains, ♀ (no date); Pinal Mountains, ♂ (July 1900, Kunze).

California: Burney Falls, Shasta County, ♀ (20–VII–1871, Walsingham); Camp Baldy, San Bernardino Mountains, ♀ (June 24–30).

District of Columbia: ♂ (A. Busek).

Massachusetts: Cohasset, ♂ (July 6, 1907, Owen Bryant).

Canadian records

British Columbia: Kaslo, 2 ♂ ♂ (29–VI–1903; 25–VII–1903, H. G. Dyar); Seton Lake, Lillooet, ♂ (9–VI–1926, J. McDunnough).

Remarks.—In Chambers' description he gives the dark areas of the fore wing, head, palpi, etc., as "reddish-brown." In the fresh specimens before me these parts are distinctly black, but worn specimens are brownish. In view of this I feel that his description was written from a faded specimen.

This is the species that has been listed as a synonym of the European *borkhausenii* with which it is definitely congeneric; but a comparison of the figures will adequately show the differences.

17. Genus *FABIOLA* Busck

PLATE 3, FIGURE 25; PLATE 6, FIGURE 41; PLATE 8, FIGURES 61, 61a; PLATE 16, FIGURE 95

Fabiola BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 202, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 161, 1917.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 23, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 248, 1923; in LEONARD, Cornell Univ. Agr. Exp. Stat., Memoir 101, p. 546, 1928.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 96, 1929.—GAEDE, in BRYK, Lepidopterorum catalogus, pt. 88, p. 22, 1938.—BRIMLEY, The insects of North Carolina, p. 304, 1938. (Genotype: *Oecophora shalериella* Chambers, Cincinnati Quart. Journ. Sci., vol. 2, p. 114, 1875.)

Head with smooth, appressed scales and spreading side tufts; tongue developed; antenna strongly ciliated in male; basal segment without pecten. Labial palpus long, slender, curved, smooth; terminal segment as long as second.

Fore wing elongate; 11 veins, 2 from well before angle, 7 and 8 coincident, to costa.

Hind wing narrow, ovate-lanceolate, 8 veins; 3 and 4 connate or approximate; 6 and 7 parallel.

Male genitalia.—Harpe without clasper. Anellus with lateral processes. Tegumen broad. Gnathos not spined. Socii absent. Uncus present.

Female genitalia.—Genital plate strongly sclerotized, protruding; ductus bursae membranous; signum absent.

Remarks.—A derivative of *Schiffermülleria*, differing from it in having veins 7 and 8 of the fore wing coincident, and a slender extension of the sacculus.

This genus contains two described North American species.

FABIOLA SHALERIELLA (Chambers)

Oecophora shalериella CHAMBERS, Cincinnati Quart. Journ. Sci., vol. 2, p. 114, 1875.

Fabiola shalериella (Chambers), MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 23, 1922.—FORBES, in LEONARD, Cornell Univ. Agr. Exp. Stat., Memoir 101, p. 546, 1928.—BRAUN, Trans. Amer. Ent. Soc., vol. 61, p. 46, 1935.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8356, 1939.

Oecophora shallериella RILEY, in SMITH, List of Lepidoptera of Boreal America, No. 5557, 1891.—BUSCK, in DYAR, U. S. Nat. Mus. Bull. 52, No. 5928, 1903.

Borkhausenia shallериella, KEARFOTT, in SMITH, Check list of the Lepidoptera of Boreal America, No. 6474, 1903.

Fabiola shallериella BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 202, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6498, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 248, 1923.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 96, 1929.—GAEDE, in BRYK, Lepidopterorum catalogus, pt. 88, p. 22, 1938.

Labial palpus shining white; second segment narrowly edged with fuscous anteriorly and at apex; third segment wholly overlaid with fuscous. Antenna shining greenish fuscous narrowly and faintly annulated with silvery white. Face shining white. Head and thorax iridescent greenish fuscous, this color continued to base of fore wing and narrowly around its edges; at basal fourth of fore wing, from inner margin, a conspicuous, transverse, white fascia, which does not reach costa and is narrowly edged inwardly and outwardly with black; in costal half of the white fascia numerous metallic blue scales; between this fascia and the base of wing a large golden-ochreous spot, lighter centrally; slightly before apex, on costa, a white spot; from this spot a short, transverse, black-edged fascia extends almost to inner margin; between this fascia and that at basal fourth the ground color is golden-ochreous, this color also between the outer metallic fascia and apex; from costa, in the area between the two fasciae, an elongate greenish-fuscous shade streaked with white and extending nearly to middle of wing; on middle inner margin an elongate, irregular velvety black spot containing three small spots of metallic blue scales. Between this black spot and the fuscous costal shade a pale, yellowish longitudinal streak; extreme apex white preceded by fuscous; cilia shining fuscous except at tornus; there creamy white. Hind wing blackish fuscous except for a whitish baso-costal area; cilia shining fuscous. Legs silvery white shaded with fuscous. Abdomen greenish fuscous above, silvery white beneath.

Male genitalia.—Harpe broad, sparsely hairy; costa convex; cucullus sharply pointed. Anellus with long, curved, pointed lateral processes; lateral process with double row of minute setae for most of length. Aedeagus slender, slightly curved. Vinculum broadly rounded. Gnathos long, rugose toward distal end, which is truncated. Uncus long, sharply pointed. Tegumen produced laterally into a point.

Female genitalia.—Genital plate strongly sclerotized, convex, broader anteriorly than posteriorly. Ostium longitudinal, nearly spindle-shaped. Ductus bursae slender; ductus seminalis at posterior third of ductus bursae. Bursa copulatrix oval.

Alar expanse, 10–15 mm.

Type.—In the Museum of Comparative Zoology, Cambridge, Mass.

Type locality.—Camp Bee Spring, Ky.

Food plant.—Unknown.

Distribution.—Eastern United States and Canada.

United States records

Connecticut: Stamford, ♂ (June 10, 1930, B. T. R. Lab., coll.).

Kentucky: Camp Bee Spring.

Maryland: Plummers Island, ♂, ♀ (31-V-1908, A. Busck).

New York: Bear Mountain, 2 ♂♂, ♀ (13-VI-1925, F. M. Schott).

Pennsylvania: New Brighton, ♂ (24-VI-1907, H. D. Merrick); Oak Station, Allegheny County, 11 ♂♂, 3 ♀♀ (11-18-VI-1911, Fred Marloff); Ohio Pyle, ♂, 3 ♀♀, (10-VI-1906, Henry Engel); Pittsburgh, 2 ♂♂ (6-10-VI-1906, Henry Engel); York, 3 ♂♂ 2 ♀♀ (11-VI-1901 and 10-VI-1902, W. D. Kearfott).

Virginia: Great Falls, 31 ♂♂, 2 ♀♀ (May dates, 1919-1922, A. Busck).

Canadian records

Ontario: Severn (June 17, 1925, C. H. Curran).

Remarks.—This and the following species are the only two, described from North America, referable to the genus *Fabiola*.

FABIOLA TECTA Braun

PLATE 20, FIGURES 119, 119a

Fabiola tecta BRAUN, Trans. Amer. Ent. Soc., vol. 61, p. 45, 1935.—BRIMLEY, Insects of North Carolina, p. 304, 1938.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8357, 1939.

Similar to *shaleriella* but smaller, with the golden-ochreous areas of the fore wing replaced by yellow, the median black area extending almost across the wing and containing three longitudinal metallic-blue streaks, and with the fuscous areas and cilia of both wings more blackish.

Male genitalia.—Similar to *shaleriella* but with the harpe broader, cucullus more acutely pointed and with the lobes of the tegumen shorter and more bluntly pointed.

Alar expanse, 9-10 mm.

Type.—In Dr. A. F. Braun collection, Cincinnati, Ohio.

Type locality.—Near Natural Bridge, McCreary County, Ky.

Food plant.—Unknown.

Distribution.—Known only from Kentucky.

United States records

Kentucky: Cumberland Valley, Letcher County, 2 ♂♂ (1-VII-1935, A. F. Braun).

Remarks.—The two males listed above were sent to me by Dr. Braun. I have seen no other specimens.

This species is amply distinct from *shaleriella* in markings and genitalia.

18. Genus SCHIFFERMÜLLERIA Hübner

PLATE 2, FIGURE 18; PLATE 7, FIGURE 56; PLATE 13, FIGURES 82, 82a; PLATE 16, FIGURE 98

Schiffermülleria HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 421, 1826.—STEPHENS, Illustrations of British entomology, Haustellata, vol. 4, p. 423, 1835.—WALSINGHAM and DURANT, Ent. Monthly Mag., vol. 45, p. 156, 1909.—

WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 421-422, 1912.—MEYRICK, in WYTSMAN, Genera Insectorum, fasc. 180, p. 26-27, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 246-248, 1923. (Genotype: *Phalaena Tinea schaefferella* Linnaeus, Systema naturae, ed. 10, p. 541, 1758.)

Chrysis MILLIÈRE, Ann. Soc. Ent. France, ser. 3, vol. 2, p. 61, 1854. (Genotype: *Panalia grandis* Desvignes, Entomologist, vol. 1, p. 342, 1842.)

Head smooth, side tufts slightly raised; tongue developed; antenna ciliated; basal segment without pecten. Labial palpus long, recurved, smooth or slightly roughened; terminal segment shorter or as long as second segment.

Fore wing elongate, apex pointed; 12 veins; 2 from well before angle; 3 and 4 approximate; 7 and 8 stalked, both to costa, 11 from before middle.

Hind wing narrower than fore wing, costa gently arched, 8 veins; 3 and 4 connate, 5 nearer to 4 than to 6; 6 and 7 subparallel.

Male genitalia.—Harpe ample. Anellus with lateral extensions. Gnathos a broad, unspined band. Socii absent. Uncus well developed.

Female genitalia.—Genital plate strongly sclerotized; ductus bursae wholly membranous or slightly sclerotized for part of its length; signum present or absent.⁵⁰

Remarks.—Busck⁵¹ recognized five species in this genus (but placed them under the name *Epicallima*). Of these I have synonymized one, *dimidiella*, with *quadrifaculella* and have placed *coloradella* in the Ethmiidae. The genus *Ethmia*, as it now stands, is not a homogeneous assemblage of species and will accommodate *coloradella*. The proper generic placement of this species must await a revision of the Ethmiidae, and for that reason no further treatment of *coloradella* is given in this paper. In 1912⁵² Busck added *lucidella*; Meyrick described *antidectis* in 1914⁵³ and *rostrigera* in 1918.⁵⁴ The first, *lucidella*, belongs in *Schiffermülleria*, *antidectis* is referable to *Triclonella* in the family Cosmopterygidae, and *rostrigera* is a synonym of *coloradella* (new synonymy). In 1923⁵⁵ Braun added *amplicincta* which is a synonym of *edithella*. I have retained the generic name *Epicallima* for *argenticinctella* (Clemens) and have associated the European *formosella* (Schiffermüller) with it. The latter has become established in the United States in recent years. This leaves three North American species referable to the genus *Schiffermülleria*.

⁵⁰ There is only a single female each of *edithella* and *lucidella* available for study. The bursa copulatrix of *edithella* is missing, and that of *lucidella*, although partly obscured, appears to lack a signum.

⁵¹ Busck, A., Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908 (*argenticinctella*, *edithella*, *coloradella*, *dimidiella*, and *quadrifaculella*.)

⁵² Busck, A., Ent. News, vol. 3, p. 170, 1912.

⁵³ Meyrick, E., Exotic Microlepidoptera, vol. 1, p. 218, 1914.

⁵⁴ Ibid., vol. 2, p. 237, 1918.

⁵⁵ Braun, A. F., Trans. Amer. Ent. Soc., vol. 49, p. 117, 1923.

KEY TO THE SPECIES OF SCHIFFERMÜLLERIA BASED ON COLORATION

1. Ground color of fore wing dark brown to black with conspicuous white or whitish markings; no metallic scaling.

quadrimaculella (Chambers) (p. 248)

 Ground color and markings otherwise..... 2
2. Median longitudinal streak of fore wing reaching apex; deep golden-yellow..... lucidella (Busck) (p. 251)
- Median longitudinal streak of fore wing ending well before apex;
 light golden-yellow..... edithella (Busck) (p. 250)

KEY TO THE SPECIES OF SCHIFFERMÜLLERIA BASED ON MALE GENITALIA

1. Lateral processes of anellus extending well beyond base of harpe..... 2
- Lateral processes of anellus short, not extending beyond base of harpe (fig. 122)..... quadrimaculella (Chambers) (p. 248)
2. Costa of harpe slightly convex (fig. 121)..... lucidella (Busck) (p. 251)
- Costa of harpe deeply concave (fig. 120)..... edithella (Busck) (p. 250)

KEY TO THE SPECIES OF SCHIFFERMÜLLERIA BASED ON FEMALE GENITALIA

1. Anterior edge of genital plate straight or slightly concave; ostium deeply V-shaped (fig. 213)..... quadrimaculella (Chambers) (p. 248)
- Anterior edge of genital plate not straight or concave; ostium not deeply V-shaped..... 2
2. Anterior edge of genital plate strongly convex (fig. 214)

edithella (Busck) (p. 250)

 Anterior edge of genital plate broadly forked (fig. 215)

lucidella (Busck) (p. 251)

SCHIFFERMÜLLERIA QUADRIMACULELLA (Chambers)

PLATE 20, FIGURES 122, 122a; PLATE 39, FIGURE 213

- Oecophora quadrimaculella* CHAMBERS, Cincinnati Quart. Journ. Sci., vol. 2, p. 292, 1877; U. S. Geol. Geogr. Surv. Terr. Bull. 3, p. 129, 1877; p. 159, 1878.—RILEY, in Smith, List of Lepidoptera of Boreal America, No. 5556, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5927, 1903.
- Borkhausenia quadrimaculella* (Chambers) KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6473, 1903.
- Epicallima quadrimaculella* (Chambers) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 202, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6495, 1917.—BRAUN, Proc. Acad. Nat. Sci. Philadelphia, vol. 73, p. 12, 1921.
- Schiffermuelleria quadrimaculella* (Chambers) MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 27, 1922.
- Schiffermuelleria quadrimaculella* McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8365, 1939.
- Oecophora dimidiella* WALSINGHAM, Ins. Life, vol. 1, p. 148, 1888.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5554, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5925, 1903.—ANDERSON, Catalogue of British Columbia Lepidoptera, No. 1098, 1904. (New synonymy.)

Borkhausenia dimidiella (Walsingham) KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6471, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 767, 1904.

Epicallima dimidiella (Walsingham) BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 202, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6493, 1917.—TREHERNE, Sci. Agr., vol. 1, p. 116-118, 1921.—BRAUN, Proc. Acad. Nat. Sci. Philadelphia, vol. 73, p. 12, 1921.—ESSIG, Insects of Western North America, p. 719, 1926.

Schiffermuelleria dimidiella (Walsingham) MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 27, 1922.

Schiffermülleria dimidiella (Walsingham) FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 247, 1923.—BRAUN, Trans. Amer. Ent. Soc., vol. 51, p. 197, 1925.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8364, 1939.

Palpus black; second segment with a white longitudinal streak inwardly; apex of third segment white. Head and basal segment of antenna white to yellowish; antenna black with white spot above on each segment. Thorax, fore wing and cilia, and abdomen dark brown to black. Fore wing with four white or yellowish spots, two on costa and two on inner margin. Hind wing fuscous; cilia concolorous. Legs dark brown to black with whitish to yellowish inwardly; tarsi annulated with white or yellowish.

Male genitalia.—Costa straight; cucullus pointed; sacculus broad, lightly sclerotized. Anellus with short, slender, lateral processes. Vinculum rounded. Aedeagus slender, weak. Gnathos truncated. Uncus bluntly pointed.

Female genitalia.—Genital plate rectangular, moderately sclerotized; ostium V-shaped. Bursa copulatrix oval, signum a single, strongly sclerotized curved thorn.

Alar expanse, 11-20 mm.

Types.—In Museum of Comparative Zoology, Cambridge, Mass. (?) (*quadrifaculella*); in British Museum (*dimidiella*).

Type localities.—Clear Creek, Colo. (*quadrifaculella*); Sonoma County, Calif. (*dimidiella*).

Distribution.—North-central and Western United States and Canada.

United States records

Arizona: Redington, 2 ♂♂, ♀ (no date or collector); Santa Catalina Mountains, ♀ (no date or collector).

California: Camp Baldy, San Bernardino Mountains, ♀ (July 16-23); Monache Meadows, Tulare County, 8,000 feet, ♀ (July 8-14); Sonoma County, ♀ (19-V-1871, Walsingham); Tuolumne Meadows, Tuolumne County, ♀ (July 16-23).

Colorado: Custer County, ♀ (Wm. Beutenmüller); Florissant, ♂ (July 8, 1907, S. A. Rohwer); Peaceful Valley, ♀ (July 5, W. P. and T. D. A. Cockerell); Silverton, 2 ♀♀ (July 24-31); ♂, labeled only "Colorado," Wm. Beutenmüller).

Minnesota: Duluth, ♂ (no date or collector).

Montana: ♂ (J. Brunner); Two Medicine Lake (15-VII-20); Going-to-the-Sun (18-21-VII-20 (*teste* Braun).

Oregon: Ashland, ♂ (7-XI-1917, A. J. Wagner; [rf. *Pinus ponderosa*]).

Utah: Bear Lake (29-VI-1924) (*teste* Braun).

Washington: Metaline Falls, ♂, ♀ (12-VI-31, W. D. Bedard [from pine slabs]); Pullman, 4 ♂♂ (14-V-1930, F. G. Hinman), 2 ♂♂ (11-V-1930, 19-VI-1930, J. F. G. Clarke), ♀ (19-VI-1930, T. M. Clarke); Tieton, ♂ (12-V-1931, Fred P. Dean).

Canadian records

Alberta: Bilby, 27 ♂♂, 8 ♀♀ (June 18 to July 4, 1924, Owen Bryant).

British Columbia: Kaslo, ♂ (50-IV-1905, J. W. Cockle); Victoria, 3 ♂♂, ♀ (June dates, W. R. Carter); Wellington, ♀ (June 22, 1904, G. W. Taylor).

Remarks.—I have two specimens before me that were determined by Walsingham as his *dimidiella*. These do not differ in any detail from *quadrinaculella*. I therefore believe the synonymy is correct.

The life history of this species is imperfectly known, but the larva appears to feed on the refuse that collects in the cracks of bark.

SCHIFFERMÜLLERIA EDITHELLA (Busck)

PLATE 20, FIGURES 120, 120a; PLATE 39, FIGURE 214

Epicallima edithella BUSCK, Journ. New York Ent. Soc., vol. 15, p. 138, 1907; Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6491, 1917.

Schiffermulleria edithella (Busck) MEYRICK, in WYTSMAN, Genera Insectorum, fasc. 180, p. 26, 1922.

Schiffermulleria edithella (Busck) FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 247, 1923.—BRAUN, Trans. Amer. Ent. Soc., vol. 61, p. 46, 1935.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8362, 1939.

Epicallima amplicincta BRAUN, Trans. Amer. Ent. Soc., vol. 49, p. 117, 1923. (New synonymy.)

Palpus yellowish white, with fuscous scaling outwardly on third segment and tip of second. Face whitish. Head, antenna, thorax, and abdomen dark brown to black. Tip of antenna silvery white. Fore and hind wings dark brown, the fore wing with median longitudinal light golden streak ending well before apex; base and a transverse band at basal third golden, margined with brown; between the base and the band a metallic, blue-tinged fascia; on costal edge of longitudinal golden streak two bluish metallic dashes separated by a costal lobe of the golden color. Cilia of fore and hind wings dark brown. Fore and middle legs yellowish; fore pair fuscous outwardly; middle tibia fuscous outwardly on distal half; hind legs grayish exteriorly, yellowish inwardly.

Male genitalia.—Costa of harpe deeply concave; cucullus truncate; sacculus broad but not strongly sclerotized; costa and sacculus clothed with strong hairs. Lateral extensions of anellus long, curved, pointed.

Vinculum rounded. Aedeagus slender, slightly dilated basally. Uncus pointed.

Female genitalia.—Genital plate broad, strongly sclerotized; anterior edge convex. Ostium margined posteriorly with broad, finely scobinate prominences. [Ductus bursa and bursa copulatrix missing in only specimen available for study.]

Alar expanse, 9–11 mm.

Types.—In United States National Museum (*edithella*); in collection of Dr. A. F. Braun, Cincinnati, Ohio (*amplicincta*).

Type localities.—Center Harbor, N. H. (*edithella*); Cincinnati, Ohio (*amplicincta*).

Food plant.—Unknown (probably lichens).

Distribution.—Eastern United States.

United States records

Kentucky: Powell River, ♀ (June 26, A. F. Braun).

New Hampshire: Center Harbor, ♂ (July 22, 1902, H. G. Dyar).

Ohio: Cincinnati, 2 ♂♂ (June 5, June 13, 1918, A. F. Braun).

Pennsylvania: Delaware Water Gap, ♀ (no date or collector).

Virginia: Great Falls, ♂ (June 13, 1919, A. Busck).

Remarks.—Through the courtesy of Dr. Braun I was able to obtain a paratype of her species. There is no doubt about the synonymy.

Although the species is rare in collections it is probably common.

SCHIFFERMÜLLERIA LUCIDELLA (Busck)

PLATE 20, FIGURES 121, 121a; PLATE 39, FIGURE 215

Epicallima lucidella BUSCK, Ent. News, vol. 23, p. 170, 1912.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6495, 1917.—BRAUN, Trans. Amer. Ent. Soc., vol. 49, p. 118, 1923.

Schiffermuelleria lucidella (Busck) MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 26, 1922.

Schiffermülleria lucidella (Busck) FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 247, 1923.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8359, 1939.

Much like the foregoing species, but with the median longitudinal streak much darker and wider and extending to apex of wing.

Male genitalia.—Costa of harpe slightly convex, with a sharp, tooth-like projection near apex; cucullus bluntly pointed; saccus broad, lightly sclerotized. Lateral extensions of anellus very long, slender, sharply pointed. Vinculum rounded. Aedeagus slender, dilated basally.

Female genitalia.—Genital plate strongly sclerotized, broad, concave posteriorly and broadly forked anteriorly. Ostium small, round. Alar expanse, 10–12 mm.

Type.—In the United States National Museum.

Type locality.—Oak Station, Allegheny County, Pa.

Food plant.—Unknown (probably lichens).

Distribution.—Known from the type locality only.

United States records

Pennsylvania: Oak Station, Allegheny County, 28 ♂♂, 4 ♀♀ (June 4 to 23, 1911, 1912, Fred Marloff).

19. Genus CHAMBERSIA Riley

PLATE 1, FIGURE 4; PLATE 6, FIGURE 46; PLATE 12, FIGURES 79, 79a; PLATE 19, FIGURE 115

Chambersia RILEY, in Smith, List of the Lepidoptera of Boreal America, p. 115, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, p. 526, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, p. 115, 1903.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 162, 1917.—BARNES and BUSCK, Contr. Lepid. North America, vol 4, p. 235, 1920.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 49, 1938 (as synonym of *Borkhausenia*). (Genotype: *Blepharocera haydenella* Chambers, U. S. Geol. Geogr. Surv. Terr. Bull. 3, p. 145, 1877.)

Blepharocera Chambers, U. S. Geol. Geogr. Surv. Terr. Bull. 3, p. 144, 1877 (preoccupied). (Genotype: *Blepharocera haydenella* Chambers, U. S. Geol. Geogr. Surv. Terr. Bull. 3, p. 145, 1877.)

Labial palpus long, slender; second segment roughened in front with appressed scales; third segment shorter than second, acute. Tongue developed. Antenna long, ciliated in male, serrate in female; basal segment with pecten. Thorax smooth.

Fore wing rather narrow, broadest at apical third; costa straight, apex bluntly pointed, termen oblique; 12 veins; 2 remote from 3; 3, 4, and 5 equidistant; 7 and 8 stalked, both to costa; 10 remote from 9; 11 from well before middle of cell; internal cell absent.

Hind wing narrower than fore wing; costa gently arched; apex pointed; 8 veins; 2 remote from 3; 3 and 4 connate; 5 strongly curved; 6 and 7 strongly divergent apically.

Male genitalia.—Clasper absent. Anellus with lateral processes. Vesica unarmed. Gnathos and uncus well developed.

Female genitalia.—Genital plate partly membranous. Ductus bursae membranous. Ductus seminalis from about middle of ductus bursae. Signum present.

Remarks.—I am resurrecting *Chambersia* for *haydenella*, which I am removing from *Borkhausenia*. This genus differs from *Borkhausenia* in having vein 2 of the fore wing remote from 3; 10 remote from 9 and the internal cell absent. The hind wing is narrower than the fore wing and veins 3 and 4 are connate. The male genitalia lack a clasper and the signum is present in the female.

CHAMBERSIA HAYDENELLA (Chambers)

PLATE 1, FIGURE 3

Blepharocera haydenella CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 3, p. 144, 1877; Bull. 4, p. 132, 1878.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 33, 1929.

Chambersia haydenella (Chambers) RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5547, 1891.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5931, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6477, 1903.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6503, 1917.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 44, 1929.

Borkhausenia haydenella (Chambers) BARNES and BUSCK, Contr. Lepid. North America, vol. 4, p. 235, 1920.—BRAUN, Proc. Acad. Nat. Sci. Philadelphia, vol. 73, p. 12, 1921.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 40, 1922.—MCDUNNOUGH, Can. Ent., vol. 59, p. 271, 1927.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 59, 1933.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8370, 1939.

Labial palpus ochreous-white; second segment suffused with light fuscous outwardly and mottled inwardly; third segment suffused with fuscous outwardly. Antenna light fuscous; basal segment ochreous-white above. Head, thorax, and ground color of fore wing grayish-fuscous, strongly irrorated with white; a spot at base of costa, a large spot at the center of the wing and another at the end of the cell, fuscous; at apex a large fuscous spot connected with a similar, but smaller spot at tornus, by a narrow fuscous band around termen (all the dark markings are more or less indistinct and fused with the ground color); cilia grayish fuscous. Hind wing fuscous; cilia grayish fuscous. Legs ochreous-white strongly suffused with light grayish fuscous. Abdomen shining grayish fuscous; silvery beneath.

Male genitalia.—Harpe short, broad; costa strongly convex; cucullus rounded; sacculus moderately broad, lightly sclerotized. Anellus a small sclerotized plate with strong, curved, pointed, lateral processes; the lateral processes are very broad basally. Aedeagus slender, slightly curved, weak; vesica unarmed. Vinculum rounded. Gnathos broad, with a short, sharp point and median posterior protuberance. Uncus pointed.

Female genitalia.—Genital plate broad, membranous anteriorly and in middle. Ostium large, broadly oval. Ductus bursae short; inception of ductus seminalis slightly posterior to middle. Bursa copulatrix oval; signum a small, weakly sclerotized, toothed plate.

Alar expanse, 12–17 mm.

Type.—In the Museum of Comparative Zoology, Cambridge, Mass.

Type locality.—"Colorado."

Food plant.—Unknown.

Distribution.—From Colorado northward to Alberta and westward to Vancouver Island, British Columbia.

United States records

Colorado: Silverton, 3 ♂♂ (July 24-31).

Montana: (*teste* Braun).

Canadian records

Alberta: Waterton Lakes, 2 ♂♂, ♀ (11-14-VII-1923, J. McDunnough).

British Columbia: Kaslo, ♂ (7-VI-1908, J. W. Cockle); Mount McLean, Lillooet, alt. 4,000-5,000 feet, ♂, ♀ (26-VIII-1923, J. McDunnough); Salmon Arm, ♂ (2-VI-1922, W. R. Buckell); Seton Lake, Lillooet, ♂ (9-VI-1926, J. McDunnough).

Remarks.—Various authors have placed this species in one or another genus, but, as pointed out in the generic discussion, it is unique and cannot be confused with any other described from North America. It probably will be found in other western States and Provinces.

20. Genus EPICALLIMA Dyar

PLATE 2, FIGURE 14; PLATE 6, FIGURE 47; PLATE 12, FIGURE 81, 81a; PLATE 16, FIGURE 99

Epicallima DYAR, U. S. Nat. Mus. Bull. 52, p. 525, 1903.—KEARFOTT, in Smith, List of the Lepidoptera of Boreal America, p. 115, 1903.—MEYBICK, Journ. Bombay Nat. Hist. Soc., vol. 17, p. 408-409, 1906.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.—KEARFOTT, in Smith, Catalogue of the insects of New Jersey, p. 562, 1910.—BUSCK, Ent. News, vol. 23, p. 170, 1912; Proc. Ent. Soc. Washington, vol. 14, p. 44, 1912; Proc. U. S. Nat. Mus., vol. 47, p. 33, 1914.—BARNES and MCDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 161, 1917. (Genotype: *Callima argenticinctella* Clemens.)

Callima CLEMENS, Proc. Acad. Nat. Sci., Philadelphia, vol. 12, pp. 166-167, 1860; in Stainton, Tineina of North America, p. 122-123, 1872. (Genotype: *Callima argenticinctella* Clemens.)

Head smooth, side tufts somewhat raised, tongue developed; antenna finely ciliated in male, simple in female; basal segment without pecten. Labial palpus long, slender, greatly exceeding vertex; second segment much longer than third, slightly roughened.

Fore wing elongate, apex pointed, termen oblique, 12 veins; 2, 3, and 4 approximate at base, from angle of cell; 7 and 8 stalked, both to costa; 11 from before middle of cell.

Hind wing narrower than fore wing; costa excavated; 8 veins; 3 and 4 connate or short stalked; 5 about equidistant from 4 and 6.

Male genitalia.—Harpe long and slender, with pointed extension of sacculus arising near cucullus. Anellus with lateral projections, fused or separate. Vesica armed. Gnathos and uncus well developed.

Female genitalia.—Ductus bursae partly sclerotized and armed on the inner surface with toothlike spines. Signum present.

Remarks.—Dyar⁵⁶ proposed the name *Epicallima* to replace *Callima* Clemens (1860) which he considered preoccupied by *Kallima*

⁵⁶ Dyar, U. S. Nat. Mus. Bull. 52, p. 525, 1903.

Westwood (1849). This has been generally accepted since the initial letter of each is identical. If the two names (*Callima* and *Kallima*) are ever considered separate terms then *Callima* will supersede *Epicallima*.

KEY TO THE SPECIES OF EPICALLIMA BASED ON COLORATION

Base of fore wing brown..... argenticinctella (Clemens) (p. 225)
 Base of fore wing not brown..... formosella (Schifferrmüller) (p. 257)

KEY TO THE SPECIES OF EPICALLIMA BASED ON MALE GENITALIA

Lateral projections of anellus divergent, not reaching gnathos (fig.

81)..... argenticinctella (Clemens) (p. 255)

Lateral projections of anellus fused and reaching gnathos (fig. 124)

formosella (Schifferrmüller) (p. 257)

KEY TO THE SPECIES OF EPICALLIMA BASED ON FEMALE GENITALIA

Signum a small toothed plate (fig. 99)..... argenticinctella (Clemens) (p. 255)

Signa two large toothed plates (fig. 216)-- formosella (Schifferrmüller) (p. 257)

EPICALLIMA ARGENTICINCTELLA (Clemens)

Callima argenticinctella CLEMENS, Proc. Acad. Nat. Sci. Philadelphia, vol. 12, p. 167, 1860; in Stainton, The Tineina of North America, p. 123, 1872.—CHAMBERS, U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 134, 1878.—BUSCK, Proc. Ent. Soc. Washington, vol. 5, p. 201, 1903.

Oecophora argenticinctella (Clemens) CHAMBERS, Cincinnati Quart. Journ. Sci., vol. 2, p. 114, 1875; U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 158, 1878.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5549, 1891.

Epicallima argenticinctella (Clemens) BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5920, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6467, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 201, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6490, 1917.—RHOADS, New York State Coll. For. Techn. Publ. 17, p. 204, 1924.

Epicallima argenticinctella (Clemens) BLACKMAN and STAGE, New York State Coll. For. Techn. Publ. 10, p. 108, 1918.

Schifferrmülleria argenticinctella (Clemens) MEYRICK, in Wytsman, Genera Insectorum, fasc. 180, p. 26, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 247, 1923; in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 546, 1928.—PROCTER, Biological survey of the Mount Desert region: Part 6, The insect fauna, p. 273, 1938.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8361, 1939.

Labial palpus with second segment blackish fuscous; terminal segment and antenna black and white. Head pale to golden-yellow. Thorax yellowish brown. Fore wing pale to golden-yellow and brown; base of inner margin with narrow silver bar; from inner

margin an inwardly oblique, narrow, antemedian silvery line, which does not reach costa; from costa a postmedian outwardly oblique silvery bar reaching about one-half distance across wing; opposite it from inner margin a semicircular silver bar, the outer half of which is composed of lead colored scales; all the above silvery bars narrowly edged with black; cilia golden-yellow except a few before tornus which are fuscous. Hind wing and cilia fuscous. Fore and middle pair of legs chiefly black and white; hind pair lighter. Abdomen fuscous.

Male genitalia.—Harpe elongate, slender; cucullus bluntly pointed; sacculus broad with a terminal curved projection extending beyond cucullus. Anellus a more or less rectangular sclerotized plate with widely separated lateral processes; the processes about twice the length of the central plate. Aedeagus stout, slightly narrower at the middle than at the extremities; distal end terminating in a sharp, thorn-like point; vesica armed with one long straight cornutus. Gnathos drawn out into a blunt point medially.

Female genitalia.—Genital plate broad, moderately sclerotized. Ostium large, oval. Ductus bursae strongly sclerotized in posterior half and armed with 12–18 strong teeth inwardly. Signum a small, strongly sclerotized toothed plate.

Alar expanse, 10–13 mm.

Type.—In the Academy of Natural Sciences of Philadelphia.

Type locality.—"Pennsylvania."

Food plants.—Dead wood and bark of hickory, larch, elder, elm.

Distribution.—Eastern United States.

United States records

Illinois: Decatur, 3 ♂♂ (June 16–23).

Iowa: Sioux City, ♂ ("9–18," C. N. Ainslie).

Kentucky: ♀ (no data).

Maryland: Cabin John, ♂ (August 1902, A. Busck); Plummers Island, 2 ♂♂ (July 1903, A. Busck); ♀ ('07, Barber and Schwarz); ♀ (July 17, L. J. Bottimer).

New Hampshire: Central Harbor, ♀ (July 30, 1902, H. G. Dyar); ♂ (no locality; A. Busck).

New Jersey: 3 ♂♂ (no locality; A. Busck and Wm. Beutenmüller); Essex County, 6 ♂♂, 2 ♀♀ (July, W. D. Kearfott); Montclair, ♂ (8–6–99, W. D. Kearfott).

New York: Woodhaven, Long Island, ♀ (6–VI–21, G. P. Engelhardt); ♂ (no locality, Wm. Beutenmüller).

Ohio: Cincinnati, 3 ♂♂, ♀ (VII–2–5–1907, VIII–3–07, VI–16–08, A. F. Braun).

Pennsylvania: Arendtsville, ♂, ♀ (6–VII–1921, S. W. Frost); Harrisburg, ♀ (30–VII–1914, W. S. Fisher); New Brighton, ♂, 2 ♀♀ (16–VII–1907 and 28–VII–1907, H. D. Merrick); Oak Station, Allegheny County, 7 ♂♂, ♀ (June and July 1906 to 1908, Fred Marloff); Pittsburgh, ♀ (24–VI–06, Henry Engel).

Remarks.—This species undoubtedly will be found through much more of eastern North America than is indicated by present records, and its range may also extend west of the Rocky Mountains.

EPICALLIMA FORMOSELLA (Schifferrmüller)

PLATE 20, FIGURES 124, 124a; PLATE 39, FIGURE 216

Phalaena tineae formosella SCHIFFERMÜLLER, Systematisches Verzeichniss der Schmetterlinge der Wiener Gegend, p. 140, 1776.

Alucita formosella (Schifferrmüller) FABRICIUS, Mantissa insectorum, vol. 2, p. 255, 1787.

Tinea formosella (Schifferrmüller) HÜBNER, Sammlung europäischer Schmetterlinge, fig. 248, [1793–1827].

Oecophora formosella (Schifferrmüller) TREITSCHKE, Die Schmetterlinge von Europa, vol. 9, p. 170, 1833.—FREY, Die Tineen und Pterophoren der Schweiz, p. 158, 1856.—HEINEMANN, Die Schmetterlinge Deutschlands und der Schweiz, p. 382, 1870.

Lamprus formosella (Schifferrmüller) HERRICH-SCHÄFFER, Systematische Bearbeitung der Schmetterlinge von Europa, vol. 5, p. 141, 1855.

Acampsia formosella (Schifferrmüller) MEYRICK, A handbook of British Lepidoptera, p. 635, 1895.

Borkhausenia formosella (Schifferrmüller) REBEL, in Staudinger and Rebel, Catalog der Lepidopteren des palaearktischen Faunen-gebietes, vol. 2, p. 178, No. 3387, 1901.

Schifferrmülleria formosella (Schifferrmüller) MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 27, 1922; A revised handbook of British Lepidoptera, p. 667, 1928.—FORBES, in Leonard, Cornell Univ. Agr. Exp. Stat. Memoir 101, p. 546, 1928.

Rhinosia flammella DUPONCHEL, Histoire naturelle des lépidoptères ou papillons de France, Supplement, vol. 4, p. 253, pl. 72, fig. 4, 1842.

Much like *argenticinctella*, but with second segment of palpus ochreous and head brown. Basal third of fore wing ochreous followed by a brown median area, the latter in turn followed by a lighter color; on middle of inner margin a large ochreous spot bounded by a crescentic white line inwardly and followed by a narrow extension of the median brown shade; from middle of costa to end of cell a moderately broad white band narrowing toward end of cell.

Male genitalia.—Cucullus broadly rounded; sacculus well defined, moderately sclerotized; clasper absent. Anellus strongly sclerotized; lateral extensions reaching gnathos, fused for much of their length, pointed. Vinculum bluntly pointed. Aedeagus long, slender, straight; vesica armed with a single slender cornutus. Gnathos and uncus pointed.

Female genitalia.—Genital plate broad, somewhat rectangular, moderately sclerotized. Ductus bursae long, slender, sclerotized except for a dilated, membranous section near middle and the extreme anterior membranous part before the bursa copulatrix. Inception of ductus

seminalis between the two sclerotized portions of the ductus bursae; at anterior end of posterior sclerotized portion numerous small but strong teeth. Bursa copulatrix moderately large, oval; signa two large, sclerotized, finely toothed plates.

Alar expanse, 10-13 mm.

Type.—Lost (?) (*formosella*); Paris Museum (?) (*flammella*).

Type localities.—Europe (*formosella*, *flammella*).

Food plants.—Under bark of apple and red maple.

Distribution.—Eastern United States.

United States records

New Jersey: North Bergen. 3 ♂ ♂, 3 ♀ ♀ (11-X-1940, George Rau); Ramsey, ♂ (2-VIII-35, Dr. A. B. Klots).

New York: Flatbush, Long Island, ♀ (20-VII, G. P. Engelhardt); Woodhaven, Long Island, ♂ (9-VII-1930, G. P. Engelhardt).

Remarks.—This species has been introduced into the United States within recent years. So far as I am able to ascertain it is to be found only in New Jersey and New York. The habit of this and the preceding species of feeding under bark of various trees is very conducive to the spread of the insects. For this reason we should expect it to become rather widespread in this country.

The specimens from North Bergen, N. J., were reared from larvae found in association with the mealybug, *Pseudococcus comstocki* (Kuw.). It was assumed that the larvae were predacious on the mealybugs, but no conclusive evidence in support of this assumption has been obtained.

I have compared our American specimens carefully with a long series from Europe and there is no doubt about their specific identity.

21. Genus HOFMANNOPHILA Spuler

PLATE 2, FIGURE 12; PLATE 6; FIGURE 43; PLATE 12, FIGURES 78, 78a, 78b; PLATE 16, FIGURE 101

Hofmannophila SPULER, in Hofmann, Die Schmetterlinge Europas, vol. 2, p. 340, 1910.

Borkhausenia Auctorum, in part.

Head smooth, side tufts loosely appressed; tongue developed. Antenna ciliated; basal segment with pecten. Labial palpus long, recurved; second segment slightly roughened in front; third segment as long as second, acute.

Fore wing oblong-ovate with costa slightly convex; apex rounded; termen oblique; 12 veins; 2 from near angle; 2, 3, 4, and 5 approximate at bases; 5 and 6 parallel; 7 and 8 stalked, both to costa; 11 from well before middle of cell.

Hind wing as broad as fore wing, pointed; costa slightly convex before middle; 8 veins; 3 and 4 comate; 5 curved; 6 and 7 subparallel.

Male genitalia.—Harpe with clasper. Gnathos and uncus well developed.

Female genitalia.—Anterior apophyses branched. Ductus bursae partly sclerotized. Signum present.

Larva.—Ninth segment with seta I approximate to II (much closer to II than to III); seta VI not on the same pinaculum with IV and V, approximate to VII. Setal group VII essentially as in *Agonopterix*: bisetose on first and seventh, unisetose on eighth and ninth abdominal segments. Ocelli reduced (ocellus 1 more or less completely fused with 2 and ocellus 3 with 4). Submentum without pit.

Pupa.—Pubescent. Prothoracic femora and labial palpi not exposed. Cremaster absent.

Remarks.—*Hofmannophila* may be distinguished, in the larva, from other oecophorid genera (except *Endrosis*) by the approximation of seta I with II and VI with VII on the ninth abdominal segment; and from *Endrosis* by the absence of a submental pit and the presence of only two setae in group VII on the second abdominal segment.

Lepesme⁵⁷ has pointed out the differences between *Hofmannophila* and *Borkhausenia*. Although he has used *B. stipella* (Linnaeus) (a congener of *minutella* Linnaeus) for his comparisons with *pseudopretella*, the differences show adequately why *Hofmannophila* should be removed from *Borkhausenia* (Genotype: *Phalaena Tinea minutella* Linnaeus).

HOFMANNOPHILA PSEUDOPRETELLA (Stainton)

Oecophora pseudopretella STAINTON, Catalogue of the British Tineidae and Pterophoridae, p. 14, 1849; Insecta Britannica Tineina, p. 162, 1854; A manual of British butterflies and moths, vol. 2, p. 358, 469, 1859.—TENGSTROM, in Förhandlingar, Pro fauna et flora Fennica, p. 346, No. 1052, 1869.—HEINEMANN, Die Schmetterlinge Deutschlands und der Schweiz, vol. 2, p. 377, 1870.—WOCKE, in Staudinger and Wocke, Catalog der Lepidopteren des europaischen Faunengebiets, vol. 2, p. 307, No. 2265, 1871.—WOLLASTON, Ann. Mag. Nat. Hist., ser. 5, vol. 3, p. 436, 1879.—SORHAGEN, Die Kleinschmetterlinge der Mark Brandenburg, p. 333, 1886.—WALSINGHAM, Ins. Life, vol. 1, p. 149, 1888.—RILEY, in Smith, List of the Lepidoptera of Boreal America, No. 5555, 1890.—DISQUÉ, Ent. Zeit. (Stettin), vol. 56, p. 244, 1895.—REUTTI, Verh. Naturw. Ver. Karlsruhe, vol. 12, p. 238, 1898.—SEEBOLD, Deutsche Ent. Zeitschr., Iris, vol. 11, p. 316, 1898.—CROMBRUGGHE, Ann. Soc. Ent. Belg., vol. 42, p. 36, 1898.—DISQUÉ, Deutsche Ent. Zeitschr., Iris, vol. 14, p. 214, 1902.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, No. 5926, 1903.—ANDERSON, Catalogue of British Columbia Lepidoptera, No. 1099, 1904.—BLAIR, Entomologist, vol. 58, p. 10, 1925.

Acompsia pseudopretella (Stainton) MEYRICK, A handbook of British Lepidoptera, p. 634, 637, 1895.—LONGSTAFF, Ent. Monthly Mag., vol. 38, p. 23, 1902.

⁵⁷ Lepesme, P., Bull. Soc. Ent. France, vol. 42, p. 284, 1937.

- Gelechia pseudospirella* (Stainton) HERRICH-SCHÄFFER, Systematische Bearbeitung der Schmetterlinge von Europa, vol. 5, p. 162, 181, fig. 627, 1855.
- Lamprus pseudospirella* (Stainton) RÜSSLER, Jahrb. nassau. Ver. Naturk., vol. 34, p. 281, 1881.
- Lampros pseudospirella* (Stainton) SNELLEN, Die Vlinders van Nederland, vol. 2, p. 725, 1882.
- Borkhausenia pseudospirella* (Stainton) REBEL, in Staudinger and Rebel, Catalog der Lepidopteren des palaeartischen Faunengebietes, vol. 2, No. 3358, 1901.—MALLOCH, Ent. Monthly Mag., vol. 37, p. 186, 1901.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, No. 6472, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 766, 1904.—DYAR, Proc. U. S. Nat. Mus., vol. 27, p. 934, 1904.—CROMBRUGGHE, Mem. Soc. Ent. Belg., vol. 14, p. 54, 1906.—SICH, Entomologist, vol. 40, p. 42, 261, 1907.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 204, 1908.—SICH, Ent. Rec. vol. 20, p. 92, 1908.—MÜLLER-RUTZ, Mitt. Schweiz. Ent. Ges., vol. 11, p. 348, 1909.—PIQUENARD, Bull. Soc. Sci. Med. Ouest., vol. 19, p. 79, 1910.—KRULIKOWSKI, Rev. Russe Ent., vol. 9, p. 321, 1910.—GRIEBEL, Die Lepidopteren Fauna der bayerischen Rheinpfalz, vol. 2, p. 54, 1910.—SICH, Entomologist, vol. 43, p. 150, 1910.—SKALA, Int. Ent. Zeitschr., vol. 5, p. 303, 1912; Verh. Nat. Ver. Brünn, vol. 51, p. 317, 1913.—HAMFELT, Arkiv für Zoöl., vol. 10, No. 25, p. 9, 1917.—MARTINI, Deutsche Ent. Zeitschr., Iris, vol. 14, p. 214, 1917.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6504, 1917.—MITTERBERGER, Jahresh. Wien. Ent. Ver., vol. 28, p. 67, 1918.—HAWKSHAW, Entomologist, vol. 52, p. 82, 1919.—STRAND, Archiv für Naturg., vol. 85 A, pt. 4, p. 9, 1920.—CARADJA, Deutsche Ent. Zeitschr., Iris, vol. 34, p. 140, 1920.—MEYRICK, in Wytsman, Genera insectorum, fasc. 180, p. 41, 1922.—HAUDER, Jahresh. Oberösterreich. Musealver., vol. 80, p. 285, 1924.—CARADJA, Deutsche Ent. Zeitschr., Iris, vol. 40, p. 43, 1926.—ESSIG, Insects of western North America, p. 719, 1926.—WATERS, Ent. Monthly Mag., vol. 64, p. 177, 1928.—MEYRICK, A revised handbook of British Lepidoptera, p. 669, 1928.—HAYWARD, Entomologist, vol. 62, p. 50, 1929.—FORD, Entomologist, vol. 62, p. 261, 1929.—DALTRY, Entomologist, vol. 63, p. 115, 1930.—SCHÜTZE, Deutsche Ent. Zeitschr., Iris, vol. 44, p. 31, 1930.—NICHOLSON, Ent. Rec., vol. 43, p. 88, 1931.—FORD, Entomologist, vol. 64, p. 259, 1931.—CHRYSAL, Ent. Monthly Mag., vol. 68, p. 9, pl. 2, figs. 1-5, 1932.—ADKIN, Ent. Monthly Mag., vol. 68, p. 40, 1932.—FRYER, Ent. Monthly Mag., vol. 68, p. 137, 1932.—AUSTEN and HUGHES, Brit. Mus. Econ. Ser. No. 14, p. 34, figs. 19, 20, 1932.—ECKSTEIN, Die Kleinschmetterlinge Deutschlands, p. 124, pl. 10, figs. 1, 2, 1933.—MORLEY and RAIT-SMITH, Trans. Ent. Soc. London, vol. 81, p. 178, 1933.—PIERCE and METCALFE, The genitalia of the tineid families of the Lepidoptera of the British Islands, p. 30, pl. 16, 1935.—RAPP, Die Natur der mitteldeutschen Landschaft Thüringen; Beiträge zur Fauna Thüringens, vol. 2, p. 142, 1936.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8376, 1939.
- Borkhausenia pseudospirella* AUSTEN, Ent. Rec., vol. 45, p. 16, 1933.
- Hofmannophila pseudospirella* SPULER, in Hofmann, Die Schmetterlinge Europas, ed. 3, vol. 2, p. 340, fig. 111; pl. 89, fig. 42, 1910.—VORBRÖDT and MÜLLER-RUTZ, Schmetterlinge der Schweiz, vol. 2, p. 464, 1914.—LINCK and WEBER, Schweiz. Ent. Anz., vol. 1, p. 59, 1922.—PETERSEN, Lepidopteren Fauna von Estland (Esti), p. 510, 1924.—GRÖNLEIN, Norsk. Ent. Tidsskr., vol. 2, p. 46, 1924.—HELLÉN, Notulae Ent., vol. 6, p. 31, 1926.—LARSEN, Ent. Meddel., ser. 2, vol. 11 (whole ser. 17), p. 79, 1927.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.),

vol. 11, p. 110, 1929.—VORTRODT, Deutsche Ent. Zeitschr., Iris, vol. 45, p. 128, 1931.—HERING, in Brohmer, Ehrmann, und Ulmer, Die Tierwelt Mitteleuropas (Ergänzb. 1), p. 151, 1932.—LEPESME, Bull. Soc. Ent. France, vol. 42, p. 283, fig. 1, pl. 1, figs. 1-4, 1937.

Labial palpus, head, thorax, and ground color of fore wing pale ochreous. Second segment of labial palpus dark fuscous exteriorly on basal half; third segment strongly overlaid with fuscous except posterior edge at middle. Antenna fuscous narrowly and faintly annulated with ochreous. Collar iridescent blackish fuscous; remainder of thorax, tegula, and fore wing irrorated and suffused with fuscous; in fold, from base, along vein 1c of fore wing, a series of two or three short, longitudinal, blackish-fuscous dashes; in cell, at basal third, an elongate blackish-fuscous discal spot; at the end of cell another conspicuous, large, similarly colored spot; extreme base of costa blackish fuscous; from apical third of costa, around termen to inner margin, a series of short, blackish-fuscous dashes; cilia pale ochreous-fuscous. Hind wing shining light yellowish fuscous; cilia yellowish fuscous. Legs pale ochreous strongly overlaid with blackish fuscous except on hind tibia. Abdomen pale ochreous, suffused with fuscous. Legs and underside of abdomen iridescent.

Male genitalia.—Harpe ample, strongly sclerotized except for an area between sacculus and costa; near base, at each end of the articulation with the transtilla, a profusely hairy, fleshy swelling; cucullus pointed; sacculus narrow; clasper very stout, extending past middle of harpe; distal end deeply excavated. Anellus an elongate plate with broadly V-shaped posterior edge and with long, papillate laterobasal lobes. Aedeagus stout, terminating in a short point; basal portion bandlike, coiled; vesica armed with a single, long, curved cornutus. Vinculum broadly rounded. Transtilla a narrow sclerotized band. Gnathos beaked, pointed; posterior surface excavated, scobinate. Uncus long, stout, pointed.

Female genitalia.—Ovipositor short; anterior apophyses branched. Genital plate sclerotized posteriorly, membranous anteriorly. Ostium rather broad oval, preceded by a short, sclerotized portion of the ductus bursae. Ductus bursae convoluted; sclerotized in posterior two-thirds except for a short membranous portion anterior to the sclerotized ring at ostium; sclerotized portion of ductus bursae armed with small teeth on inner surface; inception of ductus seminalis at posterior edge of the long sclerotized part of ductus bursae. Bursa copulatrix small, round with a moderately small, oval, sclerotized, toothed signum.

Alar expanse, 15-26 mm.

Type.—In the British Museum (?).

Type locality.—?

Hosts.—Furs, skins, museum specimens, including moths; seeds of many kinds, dried plants, live and dead lepidopterous pupae, figs, dates, stored cereals, upholstering, carpets, book bindings, corks of wine bottles, etc.

Remarks.—The above list of hosts will give some idea of the wide variety of substances attacked by this species.

Distribution.—Universal. In North America it is found in the Pacific Coast states, Nevada, southern British Columbia eastward to Manitoba and Pennsylvania.

United States records

California: Alameda County, 2 ♂♂, 2 ♀♀ (20-II-1908, 19-22-IX-1908, G. R. Pilate); Berkeley, 2 ♀♀ (May, June); Carmel, ♀ (June, A. H. Vachell); Eureka, 5 ♂♂, 3 ♀♀ (5-6-VI, H. S. Barber); Los Angeles, 2 ♀♀ (no date, Coquillett); Mills College, ♂ (7-VI-1908, G. R. Pilate); Mount Hermon, Santa Cruz County, ♂ (5-IX-1931, H. H. Keifer); Plumas County, ♀ ("July 24-31"); Santa Clara, ♀ (no date or collector).

Nevada: Glenbrook, 2 ♀♀ (August 25, 1915, H. G. Dyar).

Oregon: Albany, ♀ (12-VII-1940, S. M. Dohanian [rf. filbert nut]); Portland ♂, 2 ♀♀ (13-VII-1918, E. J. Newcomber [Quaintance No. 14101]); ♂ (4-VII-1931, J. F. G. Clarke); Shedd, ♂, ♀ (June 1939, J. E. Davis); Tualatin, ♀ (15-VII-1919, L. R. Rockwood).

Pennsylvania: Norristown, 2 ♀♀ (17-V-1939, G. K. Schumaker [rf. *Thuja plicata* seed]).

Washington: Bellingham, 3 ♂♂, 2 ♀♀ (May to September dates, 1922-1931, J. F. G. Clarke); Blaine, ♂ (12-VI-1934, no collector); Chehalis, ♀ (no date, T. Kincaid); Friday Harbor, 3 ♂♂ (12-14-VII-1924, T. Kincaid); Pullman, ♀ (15-VI-1930, J. F. G. Clarke); Seattle (2 ♂♂, 19-VIII-1930, J. F. G. Clarke; ♀, September, 1898, C. V. Piper); Seaview, 4 ♂♂, 2 ♀♀ (23-V-1918; 16-VII-1918, H. K. Plank [Quaintance Nos. 15541, 15582]); Snoqualmie Pass, Kittitas County, ♀ (12-VIII-1930, J. F. G. Clarke).

Canadian records

British Columbia: Duncan, ♀ (June 1908, Hanham); Goldstream, ♀ (6-IX-1920, E. H. Blackmore); Kaslo, ♂ (8-VIII-1903, H. G. Dyar); Maillardville, ♂ (9-VI-1920, no collector); Malakatla (August 22, 1904, Rev. G. H. Keene); Maple Bay (13-VII-1933, J. McDunnough); Sandon, ♀ (13-VIII-1903, Currie); Sooke, ♂ (10-III-1922, no collector); Vancouver (12-IV-1903; 27-VII-1905, no collector); Victoria, 3 ♂♂ (30-V-1921, 5-VII-1921); ♀ (1-IX-1921, W. R. Carter); ♂ (6-VII-1920); 2 ♀♀ (14-VIII-1920, E. H. Blackmore); 2 ♀♀ (1-IX-1903, 5-IX-1903, H. G. Dyar); Wellington, (2 ♂♂, ♀, 15-VII-1902, G. W. Taylor; 2 ♀♀, June 1900, no collector).

Manitoba: Aweme, 3 ♀♀ (31-V-1904, 16-V-1905, N. Criddle).

22. Genus ENDROSIS Hübner

PLATE 1, FIGURE 5; PLATE 7, FIGURE 51; PLATE 8, FIGURES 60, 60a; PLATE 19, FIGURE 116

Endrosis HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 401, 1825.—CLEMENS, Proc. Acad. Nat. Sci. Philadelphia, 1860 p. 165; *in* Stainton, *Tineina* of North America, p. 119, 1872.—CHAMBERS, Cincinnati Quart.

Journ. Sci., vol. 2, p. 244, 1875; U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 140, 1878.—RILEY, in Smith, List of the Lepidoptera of Boreal America, p. 107, 1891.—DYAR, Journ. New York Ent. Soc., vol. 3, p. 19, 1895.—DIETZ, in Smith, Catalogue of the insects of New Jersey, p. 477, 1900.—BUSCK, in Dyar, U. S. Nat. Mus. Bull. 52, p. 543, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, p. 118, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 767, 1904.—ANDERSON, Catalogue of British Columbia Lepidoptera, p. 55, 1904.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 203, 1908.—FORBES, Ann. Ent. Soc. Amer., vol. 3, p. 132, pl. 20, fig. 143, 1910.—KEARFOTT, in Smith, Catalogue of the insects of New Jersey, p. 562, 1910.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, p. 126, 1912.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 162, 1917.—MEYRICK, in Wytzman, Genera insectorum, fasc. 180, p. 33, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 250, 1923.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 77, 1929.—PIERCE and METCALFE, The genitalia of the tineid families of the Lepidoptera of the British Islands, p. 29, 1935.—GAEDE, in Bryk, Lepidopterorum catalogus, pt. 88, p. 43, 1938.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), p. 77, 1939. (Genotype: *Phalacnae Tineae lactella* Schiffermüller, Systematisches Verzeichniss der Schmetterlinge der Wiener Gegend, p. 139, 1776.)

Head smooth. Tongue developed. Basal segment of antenna with pecten. Labial palpus long, curved, smooth; second segment slightly thickened with appressed scales; terminal segment nearly as long as second.

Fore wing with 2 from before angle; 4 and 5 approximated at base; 7 and 8 stalked, both to costa; 11 from before middle.

Hind wing narrower than fore wing, ovate-lanceolate; 7 veins; veins 3 and 4 stalked; 5 absent; 6 and 7 subparallel.

Male genitalia.—Harpe with clasper. Anellus with elongated, lateral processes. Vinculum spatulate. Gnathos and uncus present, pointed.

Female genitalia.—Ovipositor very long, always extended. Anterior apophyses branched. Ductus bursae enlarged in posterior half; strongly sclerotized. Signum a few minute dots.

Abdomen spined.

Larva.—Ninth segment with setae I and II approximate; seta VI not on same pinaculum with IV and V, approximate to VII. Setal group VII trisetose on first, bisetose on seventh and unisetose on eighth and ninth abdominal segments. Ocelli reduced (ocelli 1, 2, 5, and 6 absent). Submentum with a large sclerotized pit.

Pupa.—Smooth. Prothoracic femora exposed. Labial palpi exposed and large. Cremaster absent.

Remarks.—*Endrosia* may be distinguished from one group of American oecophorid genera by the presence of pecten on the basal segment of the antenna, and from those genera with pecten by the absence of vein 5 of the hind wing. In the larval and pupal stages

it appears nearest to *Hofmannophila*, from which it is distinguished chiefly by the large pit in the submentum of the larva and the exposed labial palpi of the pupa.

ENDROSIS LACTELLA (Schiffermüller)

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- Endrosis lactella* (Schiffermüller) DONISTHORPE, Ent. Rec., vol. 29, p. 33, 1917.—MEYRICK, Natural history of Juan Fernandez and Easter Island, vol. 3, p. 268, 1920; in Wytsman, General insectorum, fasc. 180, p. 33, 1922; A revised handbook of British Lepidoptera, p. 668, 1928.—FORD, Entomologist, vol. 62, p. 261, 1929.—MEYRICK, Anal. Mus. Buenos Aires, vol. 36, p. 390, 1931.—FORD, Entomologist, vol. 64, p. 259, 1931.—TURNER, Proc. Linn. Soc. New South Wales, vol. 57, p. 279, 1932.—AUSTEN and HUGHES, Brit. Mus. Econ. Ser., No. 14, p. 33, fig. 18, 1932.—FRYER, Ent. Monthly Mag., vol. 68, p. 137, 1932.—CURTIS, Ent. Monthly Mag., vol. 68, p. 166, 167, 1932.—AUSTEN, Ent. Rec., vol. 45, p. 16, 1933.—MORLEY and RAIT-SMITH, Trans. Ent. Soc. London, vol. 81, p. 178, 1933.—PIERCE and METCALFE, The genitalia of the tineid families of the Lepidoptera of the British Islands, p. 29, pl. 16, 1935.
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p. 117, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 27, p. 767, 1904.—DYAR, Proc. U. S. Nat. Mus., vol. 27, p. 934, 1904.—ANDERSON, Catalogue of British Columbia Lepidoptera, p. 55, 1904.—REBEL, Ann. Hofmus. Wien, vol. 19, p. 357, 1904.—CROMBRUGGHE, Mem. Soc. Ent. Belg., vol. 14, p. 39, 1906.—GATNAR, Jahrb. Wien. Ent. Ver., vol. 16, p. 49, 1906.—REBEL, Jahrb. Wien. Ent. Ver., vol. 16, p. 72, 1906.—VERITY, Bull. Soc. Ent. Ital., vol. 38, p. 50, 1906.—HORMUZAKI, Verh. zool.-bot. Ges. Wien, vol. 57, p. 86, 1907.—SPARRE SCHNEIDER, Tromsø Mus. Aarsh., vol. 28, p. 147, 1907.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 203, 1908.—KRULIKOWSKI, Deutsche Ent. Zeitschr., Iris, vol. 21, p. 265, 1909.—SPULER, in Hofmann, Die Schmetterlinge Europa, ed. 3, vol. 2, p. 349, fig. 118, pl. 88, fig. 66, 1910.—PIQUENARD, Bull. Soc. Sci. Med. Ouest., vol. 19, p. 97, 1910.—KEARFOTT, in Smith, Catalogue of the insects of New Jersey, p. 562, 1910.—REBEL, Ann. Hofmus. Wien, vol. 25, p. 414, 1911.—TURATI, Bull. Soc. Ent. Ital., vol. 43, p. 231, 1911.—SKALA, Int. Ent. Zeitschr., vol. 5, p. 303, 1912.—VORBRODT und MÜLLER-RUTZ, Die Schmetterlinge der Schweiz, vol. 2, p. 472, 1912.—SKALA, Verh. Nat. Ver. Brünn, vol. 51, p. 310, 1913.—REBEL, Ann. Hofmus. Wien, vol. 27, p. 331, 1913.—SPARRE SCHNEIDER, Tromsø Mus. Aarsh., vol. 35, p. 200, 1914.—GALVAGNI, Jahrb. Wien. Ent. Ver., vol. 25, p. 30, 1915.—SCHAWERDA, Jahrb. Wien. Ent. Ver., vol. 26, p. 44, 1916.—HAMFELT, Arkiv für Zool., vol. 10, No. 25, p. 9, 1917.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, No. 6502, 1917.—PHILPOTT, Trans. Proc. New Zealand Inst., vol. 49, p. 229, 1917.—MARTINI, Deutsche Ent. Zeitschr., Iris, vol. 30, p. 144, 1917.—MITTERBERGER, Jahrb. Wien. Ent. Ver., vol. 28, p. 61, 1918.—TURATI, Atti Mus. Civ. Milano, vol. 58, p. 160, 1919.—HAWKSHAW, Entomologist, vol. 52, p. 82, 1919.—CARADJA, Deutsche Ent. Zeitschr., Iris, vol. 34, p. 121, 1920.—ANDRES, Zeitschr. Angew. Ent., vol. 6, p. 406, 1920.—SHELDON, Entomologist, vol. 55, p. 78, 1922.—ZIMMERMAN, Verh. zool.-bot. Ges. Wien, vol. 71, p. 43, 1922.—BARCA, Norsk. Ent. Tidsskr., vol. 1, p. 229, 1923.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 250, 1923.—GRÖNLIEN, Norsk Ent. Tidsskr., vol. 2, p. 46, 1924.—PETERSEN, Lepidopteren Fauna von Estland (Esti), p. 501, 1924.—GALVAGNI, Jahrb. Wien. Ent. Ver., vol. 30, p. 105, 1924.—PREISSECKER, Jahrb. Wien. Ent. Ver., vol. 30, p. 186, 1924.—ALFKEN, Anz. Schädlinisk, vol. 1, p. 95, 1925.—STEPHAN, Deutsche Ent. Zeitschr., Iris, vol. 39, p. 122, 1925.—REBEL, Deutsche Ent. Zeitschr., Iris, vol. 40, p. 146, 1926.—LARSEN, Ent. Meddel., ser. 2, vol. 11 (whole ser. 17), p. 82, 1927.—ZERNY, Eos, vol. 3, p. 479, 1927.—LEONARDI, Elenco delle specie di insetti dannosi e loro parassiti ricordati in Italia fino all'anno 1911 (Part 2), p. 278, 1927.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 77, 1929.—REBEL, Deutsche Ent. Zeitschr., Iris, vol. 43, p. 79, 1929.—HAYWARD, Entomologist, vol. 62, p. 50, 1929.—WOLFF, Ent. Meddel., ser. 2, vol. 10 (whole ser. 16), p. 352, 1929.—UFFELN, Kleinschmetterlinge Westfalen, p. 75, 1930.—GRAVES, Ent. Rec., vol. 42, p. 97, 1930.—DRENOWSKI, Mem. Bulg. Akad. Wiss., vol. 26, No. 6, p. 75, 1930.—AMSEL, Deutsche Ent. Zeitschr., Iris, vol. 44, p. 122, 1930.—VORBRODT, Deutsche Ent. Zeitschr., Iris, vol. 45, p. 131, 1931.—REBEL and ZERNY, Denkschr. Akad. Wiss. Wien, math. nat. Kl., vol. 103, p. 149, 1931.—TURNER, Entomologist, vol. 64, p. 191, 1931.—NICHOLSON, Ent. Rec., vol. 43, p. 88, 1931.—HERING, in Brohmer, Ehrmann and Ulmer, Die Tierwelt Mitteleuropas (Ergänzbd. 1) p. 138, 1932.—ECKSTEIN, Die Kleinschmetterlinge Deutschlands, p. 126, pl. 5, fig. 204, 1933.—RAPP, Die Natur der mitteleuropäischen Landschaft Thüringen; Beiträge zur Fauna Thüringens, vol. 2, p. 127, 1936.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8368, 1939.

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- Anacamptis sarcitella* STEPHENS, Illustrations of British entomology, Haustellata, vol. 4, p. 210, 1834.—WOOD, Index entomologicus, p. 175, pl. 39, fig. 1207, 1854.
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- Tinea betulinella* HÜBNER, Sammlung Europäischer Schmetterlinge, vol. 5 (Tineen), pl. 67, fig. 448, 1801.
- Endrosis betulinella* HÜBNER, Verzeichniss bekannter Schmetterlinge, p. 401, 1825.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 33, 1922 (as synonym of *lactella*).
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- Lita betulinella* DUPONCHEL, Histoire naturelle des lépidoptères ou papillons de France, vol. 11, p. 298, pl. 297, fig. 8, 9, 1838.
- Endrosis fenestrella* SCOPOLI, Entomologica Carniolica, p. 252, 1763.—STAINTON, Insecta Britannica Tineina, p. 164, pl. 5, fig. 8, 1854; A manual of British butterflies and moths, vol. 2, p. 359, 469, 1859.—CLEMENS, in Stainton, The Tineina of North America, p. 119, 1872.—CHAMBERS, Cincinnati Quart. Journ. Sci., vol. 2, p. 244, 1875; U. S. Geol. Geogr. Surv. Terr. Bull. 4, p. 140, 1878.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 33, 1922.—BLAIR, Entomologist, vol. 58, p. 10, 1925 (as synonym of *lactella*).
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Labial palpus, head, thorax, and extreme base of fore wing white. Basal half of second segment of labial palpus blackish fuscous exteriorly and anteriorly; third segment with narrow subbasal and broad subterminal annuli, dull black. Antenna, anterior part of thorax and base of tegula blackish fuscous. Ground color of fore wing sordid white strongly suffused and mottled with fuscous; at basal third two indistinct discal spots followed by a similar one at

end of cell, all blackish fuscous; costa, an elongate blotch on costa, joined to outer discal spot, and apex blackish fuscous; cilia pale yellowish fuscous irrorated with fuscous. Hind wing shining silvery fuscous, darker apically; cilia pale yellowish fuscous. Legs pale ochreous-white overlaid with blackish fuscous except at joints, and hind tibia and tarsus. Abdomen pale ochreous narrowly edged with silvery white on posterior margin of segments.

Male genitalia.—Harpe broad basally, gradually tapering to the pointed cucullus; clasper stout, flattened, pointed; sacculus broad, strongly sclerotized. Anellus an oval plate with strong, slightly curved, flattened, pointed lateral processes. Aedeagus long, stout, nearly straight; vesica armed with three large, toothlike cornuti and a long one with a deep lateral excavation near its distal end. Vinculum long, spatulate. Gnathos long, beaked, excavated and armed with small teeth on its posterior surface. Uncus strong, slightly curved, sharply pointed.

Female genitalia.—Ovipositor very long, segmented; anterior pair of apophyses branched. Ductus bursae strongly sclerotized and dilated in posterior half; membranous anteriorly; inception of ductus seminalis at junction of ductus bursae and bursa copulatrix. Bursa copulatrix large, oval; signum a few, small sclerotized points.

Alar expanse, 11–20 mm.

Types.—Vienna Museum (?) (*betulinella*, *lactella*); in the British Museum (?) (*fenestrella*, *sarcitella*, *subditella*); in the Academy of Natural Sciences, Philadelphia (*kennicottella*); in the Zoological Museum, Berlin (*antarctica*).

Type localities.—Vienna (*lactella*); England (*sarcitella*); North Westfield, Illinois (*kennicottella*); Carniola, Austria (*fenestrella*); Africa (*antarctica*); New Zealand (*subditella*); Europe (*betulinella*).

Hosts.—Stored cereals, fruits and other products; also reared from birds' nests and refuse, dried skins, dried flesh, and wool.

Distribution.—This species is generally distributed throughout most of the world. In North America it is found from coast to coast as far north as Alaska.

United States and Alaska records

Alaska: ♂ (August 1904, C. V. Piper).

California: Eureka, 5 ♀ ♀ (6–7–VI, H. S. Barber); Los Angeles, 3 ♀ ♀ (April, Coquillett); Mills College, 2 ♂ ♂, 2 ♀ ♀ (25–III–1908; 28–IX–1908, G. R. Pilate); Nevada County, 3 ♀ ♀ ("September"; no collector); Palo Alto, ♂ (October 1914); Pasadena, ♂ (7–10–24; no collector); Placer County, ♂, 4 ♀ ♀ (September; no collector); San Diego, ♂ (30–VI–1907, W. S. Wright); San Francisco, 16 ♂ ♂, ♀ (March; no collector); Saticoy, ♂ (January, 1926; no collector); Shasta Retreat, Siskiyou County, 5 ♂ ♂, 13 ♀ ♀ (June to September dates; no collector).

Nevada: Glenbrook, 2 ♂♂ (25-26-VIII-1915, H. G. Dyar).

New York: Two specimens apparently introduced.

Oregon: Allendale, 2 ♂♂, ♀ (7-6-1918, H. K. Plank); Corvallis, 3 ♀♀ (November and January; no collector).

Washington: Bellingham, 2 ♂♂, 2 ♀♀ (May, July, September 1922, 1923, J. F. G. Clarke); Friday Harbor, ♀ (June 8, 1924, T. C. Kincaid); Olympia, ♀ (5-13-1894; no collector); Pullman, ♀ (2-VI-1894, C. V. Piper); 2 ♀♀ (30-VI-1930; 28-VII-1932, J. F. G. Clarke); Seaview, ♂, ♀ (16-VII-1918; 6-IV-1919, H. K. Plank); Seattle, ♂ (19-VIII-1930, J. F. G. Clarke).

Canadian records

British Columbia: Ainsworth, ♀ (13-VII-1903, H. G. Dyar); Comox (22-VI-1933, J. McDunnough); Kaslo 5 ♀♀ (June and July dates, 1903, H. G. Dyar); Mount Cheam (August 15, 1901, J. Fletcher); Vancouver (April to September, G. R. Hopping); Victoria, ♂, 8 ♀♀ (May to September dates, 1917 to 1920, E. H. Blackmore); ♂, 2 ♀♀ (May to September 1922, W. R. Carter); ♀ (12-VIII-1909, A. J. Croker).

Remarks.—This widely distributed household insect is the only species referable to this genus.

In Europe and on the Pacific coast it does considerable damage, feeding on stored cereals, fruits, and other products.

GENERA AND SPECIES ERRONEOUSLY REFERRED TO THE OECOPHORIDAE

Family COSMOPTERYGIDAE

ANONCIA, new genus

PLATE 3, FIGURE 20; PLATE 7, FIGURE 52; PLATE 13, FIGURES 85, 85a; PLATE 19,
FIGURE 114

Genotype.—*Hypatopa conia* Walsingham, Proc. U. S. Nat. Mus., vol. 33, p. 211, 1907.

Head smooth, side tufts slightly spreading. Antenna ciliated in male, simple in female, with pecten on basal segment. Labial palpus moderately long, curved, upturned; second segment roughened and thickened with scales; terminal segment stout, pointed, shorter than second.

Fore wing elongate, ovate, 12 veins; 1b furcate, 1c absent, 2 from near angle; 7 and 8 stalked, both to costa, 11 from before middle.

Hind wing narrower than fore wing, 8 veins; 3 and 4 connate or stalked, 6 and 7 parallel at base, divergent distally.

Male genitalia.—Asymmetrical; harpe roughly triangular, clasper absent; right harpe with basal process. Anellus with long, lateral processes. Elements of gnathos fused, naked, strongly sclerotized. Uncus and socii absent.

Female genitalia.—Ductus bursae membranous or only slightly sclerotized. Bursa copulatrix without signum.

The following species belong to this genus:

- episcia* (Walsingham), Proc. U. S. Nat. Mus., vol. 33, p. 211, 1907. (New combination.)
conia (Walsingham), *ibidem*, vol. 33, p. 212, 1907. (New combination.)
fasciata (Walsingham), *ibidem*, vol. 33, p. 213, 1907. (New combination.)
orites (Walsingham), *ibidem*, vol. 33, p. 213, 1907. (New combination.)
diveni (Heinrich), Journ. Agr. Res., vol. 20, p. 814, 1921. (New combination.)
sphacelina (Keifer), Monthly Bull. Dept. Agr. California, vol. 24, p. 214, 1935. (New combination.)
marinensis (Keifer), *ibidem*, vol. 24, p. 215, 1935. (New combination.)

Genus TRICLONELLA Busck

PLATE 1, FIGURE 1; PLATE 7, FIGURE 57; PLATE 13, FIGURES 84, 84a; PLATE 19, FIGURE 112

Triclonella BUSCK, Journ. New York Ent. Soc., vol. 8, p. 236, 1900; *in* Dyar, U. S. Nat. Mus. Bull. 52, p. 525, 1903.—KEARFOTT, *in* Smith, Check list of the Lepidoptera of Boreal America, p. 114, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 203, 1908.—WALSINGHAM, Biol. Centr.-Amer., Lepidoptera-Heterocera, vol. 4, pp. 136-137, 1912; p. 422, 1915.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, pp. 161-162, 1917.—MEYERICK, *in* Wytzman, Genera Insectorum, fasc. 180, p. 22-23, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 249, 1923.—FLETCHER, Mem. Dept. Agr. India (Ent. Ser.), vol. 11, p. 230, 1929.—GAEDE, *in* Bryk, Lepidopterorum catalogus, pt. 88, p. 21, 1938.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), p. 77, 1939. (Genotype: *Triclonella pergandecella* BUSCK, Journ. New York Ent. Soc., vol. 8, p. 237, pl. 9, fig. 2, 1900.)

Labial palpus long, smooth, recurved; second segment slightly thickened with appressed scales; terminal segment shorter than second, slender, acute. Antenna ciliated in male, simple in female, with pecten on basal segment. Tongue developed.

Fore wing elongate ovate; 12 veins, 1b furcate, 1c absent, 2 from well before angle, 3 and 4 separate, 7 and 8 stalked, both to costa, 11 from before middle.

Hind wing narrower than fore wing, 8 veins; 3 and 4 connate or stalked; 5 connate with or stalked from 4; 6 and 7 parallel basally, diverging distally.

Male genitalia.—Harpe roughly triangular, without clasper. Gnathos bifid. Uncus absent.

Female genitalia.—Ductus bursae membranous or sclerotized for at least some of its length; signum absent.

Triclonella, like the foregoing genus, is referable to the Cosmopterygidae. In the fore wing 1c, a vein always possessed by Oecophoridae, is absent, and the socii and uncus of the male genitalia are likewise missing. This is evidenced by the fact that the two elongate, lateral processes from the tegumen, which might be confused with

the uncus, are *in front of* the anal opening. These lateral processes cannot, therefore, be in any way homologized with the uncus.

Three American species are referable to this genus. They are:

pergandeella Busck, Journ. New York Ent. Soc., vol. 8, p. 237, pl. 9, fig. 2, 1900.

determinatella (Zeller), Verh. zool.-bot. Ges. Wien, vol. 23, p. 289, 1873.

antidectis (Meyrick), Exotic Microlepidoptera, vol. 1, p. 218, 1914. (New combination.)

ANTEQUERA, new genus

PLATE 4, FIGURES 27, 28; PLATE 9, FIGURES 63, 63a, 63b; PLATE 18, FIGURE 111

Genotype.—*Semioscopis accertella* Busck, Journ. Ent. Zool., Claremont, vol. 5, p. 100, 1913.

Head roughened with slender scales; antenna strongly ciliate in male, simple in female; basal segment without pecten. Labial palpus moderately long, slightly upturned; second segment roughened with coarse scales, longer than third. Thorax smooth.

Fore wing elongate; costa nearly straight; 12 veins; 1b furcate; 2-5 closely approximate at base, from or near angle of cell; 6 approximate to the stalk of 7 and 8; 7 to costa; termen convex, oblique.

Hind wing as broad as fore wing; 8 veins; 3 and 4 connate; 5 nearer to 4 than to 6; 6 and 7 parallel.

Male genitalia.—Slightly asymmetrical; anellus strongly developed; uncus and transtilla absent; socii vestigial; harpe weak.

Female genitalia.—Genital plate membranous; signum present.

ANTEQUERA ACERTELLA (Busck), new combination

Semioscopis accertella BUSCK, Journ. Ent. Zool., Claremont, vol. 5, p. 100, 1913.—

MEYRICK, in WYTSMAN, Genera Insectorum, fasc. 180, p. 186, 1922.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), No. 8462, 1939.

Male genitalia.—Harpe slender, weak, hairy, without clasper; cucullus rounded; sacculus poorly defined. Anellus strongly developed into two lateral processes each forming a half of a cylinder in which the aedeagus rests. Aedeagus long, slender; vesica armed with numerous strong cornuti. Vinculum produced, rounded, broad. Socii indicated only by a few hairs. Gnathos divided into two long, pointed processes.

Female genitalia.—Genital plate membranous. Ostium with a broad ventroanterior plate. Ductus bursae strongly sclerotized in posterior half; inception of ductus seminalis about middle of ductus bursae. Bursa copulatrix moderately large; signa two small sclerotized, scoabinate plates.

Alar expanse, 17-19 mm.

Type.—In the United States National Museum.

Type locality.—San Diego, Calif.

Remarks.—I am tentatively placing this genus in the family Cosmopterygidae. It appears to be related to the genus *Macrobathra* Meyrick.

The only species I have seen that is referable to this genus is the genotype.

Family ETHMIIDAE

Genus EUMEYRICKIA Busck

PLATE 1, FIGURE 8; PLATE 7, FIGURE 57A; PLATE 12, FIGURES 75, 75a; PLATE 17, FIGURE 104

Eumeyrickia BUSCK, Journ. New York Ent. Soc., vol. 10, p. 94, 1902; in Dyar, U. S. Nat. Mus. Bull. 52, p. 525, 1903.—KEARFOTT, in Smith, Check list of the Lepidoptera of Boreal America, p. 113, 1903.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 191–192, 1908.—KEARFOTT, in Smith, Catalogue of the insects of New Jersey, p. 561, 1910.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 160, 1917.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, p. 234, 1923.—BRIMLEY, The insects of North Carolina, p. 303, 1938.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), p. 78, 1939. (Genotype: *Chactochilus trimaculellus* Fitch, Report on the noxious, beneficial, and other insects of the State of New York, vol. 2, p. 233, 1856.)

?*Eido* CHAMBERS, Can. Ent., vol. 5, p. 72, 1873.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 192, 1908. (Genotype: *Eido albatpella* Chambers.)

Atheropla MEYRICK, Proc. Linn. Ent. Soc. New South Wales, vol. 9, pp. 758–759, 1884. (Genotype: *Atheropla melichlora* Meyrick.)

The genus *Eumeyrickia* is clearly ethmiid and is here transferred to that family. Vein 5 of the hind wing is closer to 6 than to 4, a good ethmiid character, which is supported by genitalic characters. In the male genitalia, as in other Ethmiidae, the harpe is distinctly segmented. This character is not found in the Oecophoridae.

Meyrick has synonymized *Eumeyrickia* with the Australian genus *Atheropla*, which synonymy seems unlikely. In his description of the genus⁵⁸ Meyrick states that veins 5–7 of the hind wing are nearly parallel. If this is true of his *Atheropla* (partially described from imperfect material), then *Eumeyrickia* immediately becomes separable on the character of vein 5, which is divergent from 6. In view of these facts I believe it advisable to retain *Eumeyrickia* for our American species.

The genotype is the only known North American species referable to this genus.

⁵⁸ Meyrick, in Wytzman, Genera insectorum, fasc. 180, p. 109, 1922.

Family BLASTOBASIDAE

Genus GERDANA Busck

PLATE 3, FIGURE 21; PLATE 6, FIGURE 42; PLATE 8, FIGURES 58, 58a; PLATE 19, FIGURE 117

Gerdana BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 193, 1908.—BARNES and McDUNNOUGH, Check list of the Lepidoptera of Boreal America, p. 160, 1917.—MEYRICK, in WYTSMAN, Genera insectorum, fasc. 180, p. 191, 1922.—FORBES, Cornell Univ. Agr. Exp. Stat. Memoir 68, pp. 234-235, 1923.—McDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), p. 79, 1939. (Genotype: *Gerdana caritella* Busck.)

Labial palpus short, reaching nearly to vertex; second segment somewhat roughened beneath; third segment slightly shorter than third. Tongue well developed. Antenna simple, with pecten on basal segment. Abdomen strongly spined.

Fore wing elongate-ovate, apex blunt; 12 veins; 1b furcate; 1c not preserved at margin; 2 from near angle; 3-5 approximate; 7-8 stalked; 7 to termen just below apex, 8 to costa; stalk of 7 and 8 approximate to or connate with 9; 11 from middle.

Hind wing as broad as fore wing with costa excised from middle; apex pointed, termen straight, oblique; 8 veins; 6 and 7 parallel but divergent toward tip; 3 and 4 connate or stalked; 5 nearest 4.

Male genitalia.—Symmetrical; harpe elongate, divided; clasper short, curved; anellus tubular; transtilla a narrow band; vinculum short, spatulate; aedeagus long, stout, straight. Gnathos a hook. Uncus fleshy, slightly hairy.

Female genitalia.—Bursa copulatrix without signum. Ductus bursae membranous. Ostium small, with sclerotized plate ventrally.

Remarks.—I recognize only one species in this genus. The species is not oecophorid, partaking of both gelechiid and blastobasid characters. Likewise it does not clearly belong to either of these families but suggests both when certain characters are considered. The abdominal segments are heavily spinose, a good blastobasid character, but the costa of the fore wing is not thickened nor are veins 10 and 11 unusually distant as in that family. Vein 1c of the fore wing is not preserved at the margin as in Oecophoridae and the gnathos is distinctly gelechiid. On the spinose character of the abdomen, the absence of vein 1c of the fore wing and the larval habit of living in refuse I transfer this genus to the Blastobasidae.

I have before me a series of 15 specimens reared from "witches'-broom." These were reared from larvae collected at Canaan, Maine, by Dr. A. E. Brower. Another series, reared from a long-eared owl's nest by W. L. Jellison, was collected in Beaverhead County, Mont.

In addition, I have had for determination the following: 1 male from Summerland, British Columbia (21-VII-1933, A. N. Gartrell); 4 females from Ottawa (8-VIII-1924, G. S. Walley; 16-VII-1906, C. H. Young) and Blackburn, Ontario (7-VII-1939, E. G. Lester); and 1 female from Putnam County, Ill. (14-IX-1939, M. O. Glenn).

Family HELIODINIDAE

Genus EUCLEMENSIA Grote

PLATE 3, FIGURE 23; PLATE 7, FIGURE 54; PLATE 12, FIGURES 77, 77a; PLATE 15, FIGURE 93

Euclemensia GROTE, Can. Ent., vol. 10, p. 69, 1878.—BUSCK, Proc. U. S. Nat. Mus., vol. 35, p. 202, 1908.—MEYRICK, in Wytzman, Genera insectorum, fasc. 165, p. 20, 1914.—FORBES, Cornell Univ. Agr. Exp. Stat., Memoir 68, p. 357, 1923.—MCDUNNOUGH, Check list of the Lepidoptera of Canada and the United States of America (Part 2, Microlepidoptera), p. 87, 1939. (Genotype: *Hamadryas bassettella* Clemens, Proc. Ent. Soc. Philadelphia, vol. 2, p. 423, 1864.)

Hamadryas Clemens, Proc. Ent. Soc. Philadelphia, vol. 2, p. 422, 1864 (preoccupied). (Genotype: *Hamadryas bassettella* Clemens.)

Head with smoothly appressed scales; antenna slightly rough-scaled, without pecten on basal segment. Labial palpus exceeding base of antenna; third segment slightly shorter than second. Tongue developed.

Fore wing narrow, elongate, costa very slightly concave at middle; 12 veins; 7 and 8 stalked, both to costa.

Hind wing nearly as broad as fore wing, 8 veins; 6 and 7 subparallel; 3 and 4 separate.

Male genitalia.—Harpe symmetrical, simple. Anellus with well-developed lateral processes; central plate absent. Gnathos bifid. Uncus absent.

Female genitalia.—Bursa copulatrix double, partly sclerotized; inception of ductus seminalis on bursa; two ducts. Ostium opening in median portion of genital plate.

Remarks.—Although this genus does not belong in the Heliodinidae, where both Meyrick and Forbes placed it, I am leaving it there until the family is revised and the genera are reallocated.

EXPLANATION OF PLATES

The illustrations for this paper were made by the author; the plates were composed by Mrs. Eleanor A. Carlin, Bureau of Entomology and Plant Quarantine. No attempt was made to adhere to a definite scale in making the drawings. Most of the male genitalia were drawn to one scale but the female genitalia were drawn to a convenient size.

Explanation of symbols applied to heads

P=Palpus.

pt=Pecten.

E=Eye.

Explanation of symbols applied to genitalia

MALE

Cl=Clasper of harpe.	An=Anellus.
Tr=Transtilla.	lbAn=Lobe of anellus.
Lbtr=Lobe of transtilla.	lpAn=Lateral process of anellus.
Hp=Harpe.	extSc=Extension of sacculus.
Sc=Sacculus.	V=Vinculum.
Un=Uncus.	Ae=Aedeagus.
Gn=Gnathos.	Vs=Vesica.
Tg=Tegumen.	Cu=Cornuti.
Si=Socii.	ODM=Outer dorsal margin of sacculus.
th=Terminal hook of aedeagus.	

FEMALE

Gp=Genital plate.	Db=Ductus bursae.
O=Ostium.	Ds=Ductus seminalis.
Bc=Bursa copulatrix.	Op=Ovipositor.
S=Signum.	SpOp=Spines of ovipositor.

PLATE 1

1. *Triclonella pergandecla* (Busck): Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
2. *Mathildana newmanella* (Clemens): Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
3. *Carolana ascriptella* (Busck): Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
4. *Chambersia haydenella* (Chambers): Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
5. *Endrosis lactella* (Schifferrmüller): Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
6. *Pleurota bicostella* (Clerck): Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
7. *Inga sparsiciliella* (Clemens): Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
8. *Eumeyrickia trimaculella* (Fitch): Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
9. *Carcina quercana* (Fabricius): Lateral aspect of head showing eye, labial palpus, and basal segment of antenna with pecten.
10. *Martyringa latipennis* (Walsingham): Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.

PLATE 2

11. *Depressaria heracliana* (Linnaeus): Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.

12. *Hofmannophila pseudospretella* (Stainton) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
13. *Agonopterix ocellana* (Fabricius) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
14. *Epicallima argenticinctella* (Clemens) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
15. *Semioscopis steinkellneriana* (Schifferrmüller) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
16. *Apachea barbricella* (Busck) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
17. *Martyrhilda canella* (Busck) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
18. *Schifferrmülleria schacfferella* (Linnaeus) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.

PLATE 3

19. *Decantha borkhausenii* (Zeller) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
20. *Anoneia conia* (Walsingham) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
21. *Gerdana caritella* Busck : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
22. *Occophora bractella* (Linnaeus) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
23. *Euclomensia bassettella* (Clemens) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
24. *Psilocorsis quercicella* Clemens : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
25. *Fabiola shaleriella* (Chambers) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
26. *Machimia tentoriferella* Clemens : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.

PLATE 4

27. *Antequera acertella* (Busck) : Wings.
28. *Antequera acertella* (Busck) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.
29. *Bibarramba allenella* (Walsingham) : Wings.
30. *Bibarramba allenella* (Walsingham) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna with pecten.
31. *Himmacia huachucella* (Busck) : Wings.
32. *Himmacia huachucella* (Busck) : Lateral aspect of head, showing eye, labial palpus, and basal segment of antenna without pecten.

PLATE 5

Wing Venation

33. *Machimia tentoriferella* Clemens.
34. *Pleurota bicostella* (Clerck).
35. *Semioscopis steinkellneriana* (Schifferrmüller).
36. *Carcina quercana* (Fabricius).
37. *Inga sparsiciliella* (Clemens).
38. *Psilocorsis quercicella* Clemens.
39. *Martyringa latipennis* (Walsingham).

PLATE 6

Wing Venation

40. *Apachca barberella* (Busck).
41. *Fabiola shaleriella* (Chambers).
42. *Gerdana caritella* Busck.
43. *Hofmannophila pseudospretella* (Stalnton).
44. *Martyrhilda canella* (Busck).
45. *Agonopterix ocellana* (Fabricius).
46. *Chambersia haydenella* (Chambers).
47. *Epicallima argenticinctella* (Clemens).
48. *Depressaria heracliiana* (Linnaeus).

PLATE 7

Wing Venation

49. *Carolana ascriptella* (Busck).
50. *Mathildana newmanella* (Clemens).
51. *Endrosis lactella* (Schiffermüller).
52. *Anoncia conia* (Walsingham).
53. *Oecophora bractella* (Linnaeus).
54. *Euclementia bassettella* (Clemens).
55. *Decantha borkhausenii* (Zeller).
56. *Schiffermülleria schaefferella* (Linnaeus).
57. *Triclonella pergandeella* Busck.
- 57A. *Eumeyrickia trimaculella* (Fitch).

PLATE 8

- 58-58a. *Gerdana caritella* Busck; 58, Ventral aspect of male genitalia; 58a, aedeagus, lateral view.
- 59-59a. *Psilocorsis quercicella* Clemens: 59, Ventral aspect of male genitalia; 59a, aedeagus, lateral view.
- 60-60a. *Endrosis lactella* (Schiffermüller): 60, Ventral aspect of male genitalia; 60a, aedeagus, lateral view.
- 61-61a. *Fabiola shaleriella* (Chambers): 61, Ventral aspect of male genitalia; 61a, aedeagus, lateral view.
- 62-62a. *Agonopterix ocellana* (Fabricius): 62, Ventral aspect of male genitalia; 62a, aedeagus, lateral view.

PLATE 9

- 63-63b. *Antequera accertella* (Busck): 63, Ventral aspect of male genitalia with aedeagus removed; 63a, lateral aspect of male genitalia with aedeagus removed; 63b, aedeagus, lateral view.
- 64-64a. *Himmacia huachucella* (Busck): 64, Ventral aspect of male genitalia with aedeagus removed; 64a, aedeagus, lateral view.
- 65-65a. *Bibarrambula allenella* (Walsingham): 65, Ventral aspect of male genitalia with aedeagus removed; 65a, aedeagus, lateral view.

PLATE 10

- 66-66a. *Decantha borkhausenii* (Zeller): Ventral aspect of male genitalia; 66a, aedeagus, lateral view.
- 67-67a. *Martyrhilda canella* (Busck): 67, Ventral aspect of male genitalia; 67a, aedeagus, lateral view.

- 68-68a. *Depressaria heracliiana* (Linnaeus): 68, Ventral aspect of male genitalia; 68a, aedeagus, lateral view.
 69-69b. *Carolana ascriptella* (Busck): 69, Ventral aspect of male genitalia; 69a, aedeagus, lateral view; 69b, gnathos and uncus, lateral view.
 70-70a. *Machimia tentoriferella* Clemens; 70, Ventral aspect of male genitalia; 70a, aedeagus, lateral view.

PLATE 11

- 71-71a. *Carcina quercana* (Fabricius): 71, Ventral aspect of male genitalia; 71a, aedeagus, lateral view.
 72-72a. *Martyringa latipennis* (Walsingham): 72, Ventral aspect of male genitalia; 72a, aedeagus, lateral view.
 73-73a. *Semioscopis steinkellneriana* (Schiffermüller): 73, Ventral aspect of male genitalia; 73a, aedeagus, lateral view.
 74-74b. *Mathildana newmanella* (Clemens): 74, Ventral aspect of right harpe and anellus; 74a, aedeagus, lateral view; 74b, gnathos and uncus, lateral view.

PLATE 12

- 75-75a. *Eumeyrickia trimaculella* (Fitch): 75, Ventral aspect of male genitalia; 75a, aedeagus, lateral view.
 76-76a. *Pleurota bicostella* (Clerck): 76, Ventral aspect of male genitalia; 76a, aedeagus, lateral view.
 77-77a. *Euclementia bassettella* (Clemens): 77, Ventral aspect of male genitalia; 77a, aedeagus, lateral view.
 78-78b. *Hofmannophila pseudospretella* (Stainton): 78, Ventral aspect of male genitalia; 78a, aedeagus, lateral view; 78b, gnathos and uncus, lateral view.
 79-79a. *Chambersia haydenella* (Chambers): 79, Ventral aspect of male genitalia; 79a, aedeagus, lateral view.
 80-80a. *Inga sparsiciliella* (Clemens): 80, Ventral aspect of male genitalia; 80a, aedeagus, lateral view.
 81-81a. *Epicaltima argenticinctella* (Clemens): 81, Ventral aspect of male genitalia; 81a, aedeagus, lateral view.

PLATE 13

- 82-82a. *Schiffermülleria schaefferella* (Linnaeus): 82, Ventral aspect of male genitalia; 82a, aedeagus, lateral view.
 83-83a. *Oecophora bractella* (Linnaeus): 83, Ventral aspect of male genitalia; 83a, aedeagus, lateral view.
 84-84a. *Triclonella pergandeella* Busck: 84, Ventral aspect of male genitalia; 84a, aedeagus, lateral view.
 85-85a. *Anoncia conia* (Walsingham): 85, Ventral aspect of male genitalia; 85a, aedeagus, lateral view.
 86-86b. *Apachea barberella* (Busck): 86, Ventral aspect of male genitalia; 86a, aedeagus, lateral view; 86b, dorsal view of tegumen to show absence of uncus.

PLATE 14

87. *Pleurota bicostella* (Clerck): Ventral aspect of female genitalia.
 88. *Carcina quercana* (Fabricius): Ventral aspect of female genitalia.
 89. *Inga sparsiciliella* (Clemens): Ventral aspect of female genitalia.

90. *Martyringa latipennis* (Walsingham): Ventral aspect of female genitalia.
 91. *Decantha borkhausenii* (Zeller): Ventral aspect of female genitalia.
 92. *Machimia tentoriferella* Clemens: Ventral aspect of female genitalia.

PLATE 15

93. *Euclementia bassettella* (Clemens): Ventral aspect of female genitalia.
 94. *Apachea barberella* (Busck): Ventral aspect of female genitalia.

PLATE 16

95. *Fabiola shaleriella* (Chambers): Ventral aspect of female genitalia.
 96. *Carolana ascriptella* (Busck): Ventral aspect of female genitalia.
 97. *Semioscopis steinkellneriana* (Schifferrmüller): Ventral aspect of female genitalia.
 98. *Schifferrmülleria schaefferella* (Linnaeus): Ventral aspect of female genitalia.
 99. *Epicallima argenticinetella* (Clemens): Ventral aspect of female genitalia.
 100. *Martyrhilda canella* (Busck): Ventral aspect of female genitalia.
 101. *Hofmannophila pseudospirella* (Stainton): Ventral aspect of female genitalia.

PLATE 17

102. *Depressaria heracliana* (Linnaeus): Ventral aspect of female genitalia.
 103. *Agonopterix ocellana* (Fabricius): Ventral aspect of female genitalia.
 104. *Eumeyrickia trimaculella* (Fitch): Ventral aspect of female genitalia.
 105. *Psilocorsis quercicella* Clemens: Ventral aspect of female genitalia.
 106. *Borkhausenia minutella* (Linnaeus): Abdominal spines (setae).
 107. *Martyringa latipennis* (Walsingham): Abdominal spines (setae).
 108. *Carolana ascriptella* (Busck): Truncated abdominal spines (setae).

PLATE 18

109. *Bibarrambra allenella* (Walsingham): Ventral aspect of female genitalia.
 110. *Himmacia huachucella* (Busck): Ventral aspect of female genitalia.
 111. *Antequera acertella* (Busck): Ventral aspect of female genitalia.

PLATE 19

112. *Triclonella pergandcella* (Busck): Ventral aspect of female genitalia.
 113. *Oecophora bractella* (Linnaeus): Ventral aspect of female genitalia.
 114. *Anoncia conia* (Walsingham): Ventral aspect of female genitalia.
 115. *Chambersia haydenella* (Chambers): Ventral aspect of female genitalia.
 116. *Endrosis lactella* (Schifferrmüller): Ventral aspect of female genitalia.
 117. *Gerdana caritella* Busck: Ventral aspect of female genitalia.
 118. *Mathildana newmanella* (Clemens): Ventral aspect of female genitalia.

PLATE 20

- 119-119a. *Fabiola tecta* Braun: 119, Ventral aspect of male genitalia with left harpe and tegumen removed; 119a, aedeagus, lateral view.
 120-120a. *Schifferrmülleria edithella* (Busck): 120, Ventral aspect of male genitalia with left harpe and tegumen removed; 120a, aedeagus, lateral view.
 121-121a. *Schifferrmülleria lucidella* (Busck): 121, Ventral aspect of male genitalia with left harpe and tegumen removed; 121a, aedeagus, lateral view.

- 122-122a. *Schiffmülleria quadrimaculella* (Chambers): 122, Ventral aspect of male genitalia with left harpe and tegumen removed; 122a, aedeagus, lateral view.
- 123-123a. *Pleurota albastrigulella* (Kearfott): 123, Ventral aspect of male genitalia with left harpe and tegumen removed; 123a, aedeagus, lateral view.
- 124-124a. *Epicallima formosella* (Schiffmüller): 124, Ventral aspect of male genitalia with left harpe and tegumen removed; 124a, aedeagus, lateral view.
- 125-125a. *Decantha borcasella* (Chambers): 125, Ventral aspect of male genitalia with left harpe and tegumen removed; 125a, aedeagus, lateral view.

PLATE 21

- 126-126a. *Inga obscuromaculella* (Chambers): 126, Ventral aspect of male genitalia with left harpe and tegumen removed; 126a, aedeagus, lateral view.
- 127-127a. *Inga canariella* (Busck): 127, Ventral aspect of male genitalia with left harpe and tegumen removed; 127a, aedeagus, lateral view.
- 128-128a. *Inga ciliella* (Busck): 128, Ventral aspect of male genitalia with left harpe and tegumen removed; 128a, aedeagus, lateral view.
- 129-129a. *Inga concolorella* (Beutenmüller): 129, Ventral aspect of male genitalia with left harpe and tegumen removed; 129a, aedeagus, lateral view.
- 130-130a. *Inga cretacea* (Zeller): 130, Ventral aspect of male genitalia with left harpe and tegumen removed; 130a, aedeagus, lateral view.

PLATE 22

131. *Psilocorsis reflexella* Clemens: Aedeagus, lateral view.
132. *Psilocorsis caryae*, new species: Aedeagus, lateral view.
133. *Psilocorsis obsoletella* (Zeller): Aedeagus, lateral view.
134. *Psilocorsis faginella* (Chambers): Aedeagus, lateral view.
- 135-135a. *Semioscopis aurorella* Dyar; Ventral aspect of male genitalia with left harpe and tegumen removed; 135a, aedeagus, lateral view.
136. *Semioscopis medunnaoughi*, new species: Aedeagus, lateral view.
- 137-137a. *Semioscopis inornata* (Walsingham): Ventral aspect of male genitalia with left harpe and tegumen removed; 137a, aedeagus, lateral view.

PLATE 23

- 138-138a. *Semioscopis megamicrella* Dyar: 138, Ventral aspect of male genitalia with left harpe and tegumen removed; 138a, aedeagus, lateral view.
- 139-139a. *Semioscopis braunae*, new species: 139, Ventral aspect of male genitalia with left harpe and tegumen removed; 139a, aedeagus, lateral view.
- 140-140a. *Semioscopis packardella* (Clemens): Ventral aspect of male genitalia with left harpe and tegumen removed; 140a, aedeagus, lateral view.
141. *Semioscopis merricella* Dyar: Aedeagus, lateral view.

PLATE 24

- 142-142a. *Martyrhilda gracilis* (Walsingham): 142, Ventral aspect of right harpe and anellus of male genitalia; 142a, aedeagus, lateral view.

- 143-143a. *Martyrhilda umbraticostella* (Walsingham): 143, Ventral aspect of male genitalia with left harpe removed; 143a, aedeagus, lateral view.
144. *Martyrhilda thoracenigraeella* (Chambers): Aedeagus, lateral view.
- 145-145a. *Martyrhilda sordidella*, new species: 145, Ventral aspect of male genitalia with left harpe and tegumen removed; 145a, aedeagus, lateral view.
- 146-146a. *Martyrhilda thoracefasciella* (Chambers): 146, Ventral aspect of right harpe and anellus of male genitalia; 146a, aedeagus, lateral view.
- 147-147a. *Martyrhilda sphaeralceae*, new species: 147, Ventral aspect of right harpe and anellus of male genitalia; 147a, aedeagus, lateral view.
- 148-148a. *Martyrhilda hildaella*, new species: 148, Ventral aspect of male genitalia with left harpe and tegumen removed; 148a, aedeagus, lateral view.
- 149-149a. *Martyrhilda sciadop* (Meyrick): 149, Ventral aspect of male genitalia with left harpe removed; 149a, aedeagus, lateral view.

PLATE 25

- 150-150a. *Martyrhilda nivalis* (Braun): 150, Ventral aspect of male genitalia with left harpe removed; 150a, aedeagus, lateral view.
151. *Martyrhilda klamathiana* (Walsingham): Lateral view of aedeagus.
- 152-152a. *Agonopterix fulva* (Walsingham): 152, Ventral aspect of male genitalia with left harpe removed; 152a, aedeagus, lateral view.
- 153-153a. *Agonopterix gelidella* (Busck): 153, Ventral aspect of male genitalia with left harpe removed; 153a, aedeagus, lateral view.
154. *Agonopterix arcuella*, new species: Clasper and sacculus of right harpe of male genitalia.
155. *Agonopterix lythrella* (Walsingham): Clasper and sacculus of right harpe of male genitalia.
- 156-156a. *Agonopterix hyperella* Ely: 156, Ventral aspect of right harpe and anellus of male genitalia; 156a, aedeagus, lateral view.

PLATE 26

- 157-157a. *Agonopterix curvilincella* (Beutenmüller): 157, Ventral aspect of right harpe and anellus of male genitalia; 157a, aedeagus, lateral view.
- 158-158a. *Agonopterix muricolorella* (Busck): 158, Ventral aspect of right harpe and anellus of male genitalia; 158a, aedeagus, lateral view.
- 159-159a. *Agonopterix clemensella* (Chambers): 159, Ventral aspect of right harpe and anellus of male genitalia; 159a, aedeagus, lateral view.
- 160-160a. *Agonopterix atrodorsella* (Clemens): 160, Ventral aspect of right harpe and anellus of male genitalia; 160a, aedeagus, lateral view.
- 161-161a. *Agonopterix nubiferella* (Walsingham): 161, Ventral aspect of right harpe and anellus of male genitalia; 161a, aedeagus, lateral view.

PLATE 27

- 162-162a. *Agonopterix pteleae* Barnes and Busck: 162, Ventral aspect of right harpe and anellus of male genitalia; 162a, aedeagus, lateral view.
- 163-163a. *Agonopterix eupatoriella* (Chambers): 163, Ventral aspect of right harpe and anellus of male genitalia; 163a, aedeagus, lateral view.
- 164-164a. *Agonopterix pulvipennella* (Clemens): 164, Ventral aspect of right harpe and anellus of male genitalia; 164a, aedeagus, lateral view.

PLATE 28

- 200B. *Depressaria togata* Walsingham; Male genitalia (drawn by Herbert harpe and anellus of male genitalia; 165a, aedeagus, lateral view.
166–166a. *Agonopterix rosaciliella* (Busck): 166, Ventral aspect of right harpe and anellus of male genitalia; 166a, aedeagus, lateral view.
167–167a. *Agonopterix fuseiterminella*, new species: 167, Ventral aspect of right harpe and anellus of male genitalia; 167a, aedeagus, lateral view.
168–168a. *Agonopterix novi-mundi* (Walsingham): 168, Ventral aspect of right harpe and anellus of male genitalia; 168a, aedeagus, lateral aspect.

PLATE 29

- 169–169a. *Agonopterix robiniella* (Packard): 169, Ventral aspect of right harpe and anellus of male genitalia; 169a, aedeagus, lateral view.
170–170a. *Agonopterix nigrinotella* (Busck): 170, Ventral aspect of right harpe and anellus of male genitalia; 170a, aedeagus, lateral view.
171–171a. *Agonopterix argillacea* (Walsingham): 171, Ventral aspect of right harpe and anellus of male genitalia; 171a, aedeagus, lateral view.

PLATE 30

- 172–172a. *Agonopterix senicionella* (Busck): 172, Ventral aspect of right harpe and anellus of male genitalia; 172a, aedeagus, lateral view.
173–173a. *Agonopterix flavicomella* (Engel): 173, Ventral aspect of right harpe and anellus of male genitalia; 173a, aedeagus, lateral view.
174–174a. *Agonopterix costimacula*, new species: 174, Ventral aspect of right harpe and anellus of male genitalia; 174a, aedeagus, lateral view.
175–175a. *Agonopterix antennariella*, new species: 175, Ventral aspect of right harpe and anellus of male genitalia; 175a, aedeagus, lateral view.

PLATE 31

- 176–176a. *Agonopterix oregonensis*, new species: 176, Ventral aspect of right harpe and anellus of male genitalia; 176a, aedeagus, lateral view.
177–177a. *Agonopterix psoralisella* (Walsingham): 177, Ventral aspect of right harpe and anellus of male genitalia; 177a, aedeagus, lateral view.
178–178a. *Agonopterix clarkei* Keifer: 178, Ventral aspect of right harpe and anellus of male genitalia; 178a, aedeagus, lateral view.
179–179a. *Agonopterix dimorphella*, new species: 179, Ventral aspect of male genitalia with left harpe and tegumen removed; 179a, aedeagus, lateral view.
180–180a. *Agonopterix cajonensis*, new species: 180, Ventral aspect of male genitalia with left harpe and tegumen removed; 180a, aedeagus, lateral view.

PLATE 32

- 181–181a. *Agonopterix sabulella* (Walsingham): 181, Ventral aspect of right harpe and anellus of male genitalia; 181a, aedeagus, lateral view.
182–182a. *Agonopterix pallidella* (Busck): 182, Ventral aspect of right harpe and anellus of male genitalia; 182a, aedeagus, lateral view.
183–183a. *Agonopterix pergandcella* (Busck): 183, Ventral aspect of right harpe and anellus of male genitalia; 183a, aedeagus, lateral view.

- 184-184a. *Agonopterix costosa* (Haworth): 184, Ventral aspect of right harpe and anellus of male genitalia; 184a, aedeagus, lateral view.
185-185a. *Agonopterix nebulosa* (Zeller): 185, Ventral aspect of right harpe and anellus of male genitalia; 185a, aedeagus, lateral view.

PLATE 33

186. *Agonopterix arnicella* (Walsingham): Ventral aspect of right harpe and anellus of male genitalia.
187-187a. *Agonopterix amissella* (Busck): 187, Ventral aspect of right harpe and anellus of male genitalia; 187a, aedeagus, lateral view.
188-188a. *Agonopterix latipalpella* Barnes and Busck: 188, Ventral aspect of right harpe and anellus of male genitalia; 188a, aedeagus, lateral view.
189-189a. *Agonopterix sanguinella* (Busck): 189, Ventral aspect of right harpe and anellus of male genitalia; 189a, aedeagus, lateral view.
190-190a. *Agonopterix posticella* (Walsingham): 190, Ventral aspect of right harpe and anellus of male genitalia; 190a, aedeagus, lateral view.

PLATE 34

- 191-191b. *Depressaria maculatella* Busck: 191, Ventral aspect of right harpe and anellus of male genitalia; 191a, aedeagus, lateral view; 191b, transtilla, ventral view.
192-192b. *Depressaria grotella* Robinson: 192, Ventral aspect of right harpe and anellus of male genitalia; 192a, aedeagus, lateral view; 192b, transtilla, ventral view.
193-193b. *Depressaria betulella* Busck: 193, Ventral aspect of right harpe and anellus of male genitalia; 193a, aedeagus, lateral view; 193b, transtilla, ventral view.

PLATE 35

- 194-194a. *Depressaria atrostrigella*, new species: 194, Ventral aspect of right harpe, anellus, vinculum, and transtilla of male genitalia; 194a, aedeagus, lateral view.
195-195a. *Depressaria alienella* Busck: 195, Ventral aspect of right harpe, anellus and transtilla of male genitalia; 195a, aedeagus, lateral view.
196-196a. *Depressaria artemisiella* McDunnough: 196, Ventral aspect of right harpe, anellus, and transtilla of male genitalia; 196a, aedeagus, lateral view.
197-197a. *Depressaria artemisiae dracunculi* Clarke: 197, Ventral aspect of right harpe, anellus and transtilla of male genitalia; 197a, aedeagus, lateral view.

PLATE 36

- 198-198a. *Depressaria angustati*, new species: 198, Ventral aspect of right harpe, anellus and transtilla of male genitalia; 198a, aedeagus, lateral view.
199-199a. *Depressaria multifidae* Clarke: 199, Ventral aspect of right harpe, anellus and transtilla of male genitalia; 199a, aedeagus, lateral view.
200-200a. *Depressaria whitmani*, new species: 200, Ventral aspect of right harpe, anellus and transtilla of male genitalia; 200a, aedeagus, lateral view.

PLATE 37

- 200B. *Depressaria togata* Walsingham: Male genitalia (drawn by Herbert Stringer).
 201-201a. *Depressaria yakimae*, new species: 201, Ventral aspect of male genitalia with left harpe and tegumen removed; 201a, aedeagus, lateral view.
 202-202a. *Depressaria leptotacniae* Clarke: 202, Ventral aspect of male genitalia with left harpe and tegumen removed; 202a, aedeagus, lateral view.

PLATE 38

- 203-203a. *Depressaria juliella* Busck: 203, Ventral aspect of right harpe and anellus of male genitalia; 203a, aedeagus, lateral view.
 204-204a. *Depressaria eleanorae*, new species: 204, Ventral aspect of right harpe and anellus of male genitalia; 204a, aedeagus, lateral view.
 205-205a. *Depressaria cinereocostella* Clemens: 205, Ventral aspect of right harpe, anellus and transtilla of male genitalia; 205a, aedeagus, lateral view.

PLATE 39

206. *Inga obscuromaculella* (Chambers): Ventral aspect of female genitalia without ovipositor.
 207. *Inga canariella* (Busck): Ventral aspect of female genitalia without ovipositor.
 208. *Inga concolorella* (Beutenmüller): Ventral aspect of female genitalia without ovipositor.
 209. *Inga ciliella* (Busck): Ventral aspect of female genitalia without ovipositor.
 210. *Inga cretacea* (Zeller): Ventral aspect of female genitalia without ovipositor.
 211. *Decantha boreasella* (Chambers): Ventral aspect of female genitalia without ovipositor.
 212. *Pleurota albastrigulella* (Kearfott): Bursa copulatrix and signa of female genitalia.
 213. *Schiffermülleria quadrimaculella* (Chambers): Ventral view of genital plate of female genitalia.
 214. *Schiffermülleria edithella* (Busck): Ventral view of genital plate of female genitalia.
 215. *Schiffermülleria lucidella* (Busck): Ventral aspect of genital plate of female genitalia.
 216. *Epicallima formosella* (Schiffermüller): Ventral aspect of female genitalia without ovipositor.

PLATE 40

217. *Psilocorsis faginella* (Chambers): Ventral aspect of genital plate, ostium, and posterior portion of ductus bursae of female genitalia.
 218. *Psilocorsis faginella* (Chambers): Signum of bursa copulatrix.
 219. *Psilocorsis caryae*, new species: Ventral aspect of genital plate, ostium, and posterior portion of ductus bursae of female genitalia.
 220. *Psilocorsis obsoletella* (Zeller): Ventral aspect of genital plate, ostium, and posterior portion of ductus bursae of female genitalia.
 221. *Psilocorsis fletcherella* Gibson: Signum of bursa copulatrix.
 222. *Psilocorsis reflexella* Clemens: Signum of bursa copulatrix.
 223. *Semioscopis aurorella* Dyar: Ventral aspect of female genitalia without ovipositor.

224. *Semioscopis braunae*, new species: Ventral aspect of female genitalia without ovipositor.
225. *Semioscopis inornata* (Walsingham): Ventral aspect of ovipositor, showing hooked macrosetae, genital plate, ostium, and posterior portion of ductus bursae of female genitalia.
226. *Semioscopis megamicrella* Dyar: Ventral aspect of genital plate, ostium, and posterior portion of ductus bursae of female genitalia.
227. *Semioscopis merricella* Dyar: Bursa copulatrix of female genitalia.
- 228-228a. *Semioscopis packardella* (Clemens): 228, Ventral aspect of genital plate, ostium, and posterior portion of ductus bursae of female genitalia; 228a, bursa copulatrix.
229. *Agonopterix dimorphella*, new species: Ventral aspect of female genitalia without ovipositor.
- 230-230a. *Agonopterix clarki* Keifer: 230, Ventral aspect of ovipositor lobes of female genitalia showing spines (setae) of the ovipositor; 230a, ventral view of genital plate and ostium.
231. *Martyrhilda nivalis* (Braun): Ventral aspect of female genitalia without ovipositor.

PLATE 41

232. *Martyrhilda umbraticostella* (Walsingham): Ventral aspect of female genitalia without ovipositor.
233. *Martyrhilda gracilis* (Walsingham): Ventral aspect of female genitalia without ovipositor.
234. *Martyrhilda klamathiana* (Walsingham): Ventral aspect of female genitalia without ovipositor.
235. *Martyrhilda thoracefasciella* (Chambers): Ventral aspect of female genitalia without ovipositor.
236. *Martyrhilda sciadopa* (Meyrick): Ventral aspect of female genitalia without ovipositor.
237. *Martyrhilda sphaeralcae*, new species: Ventral aspect of female genitalia without ovipositor.
238. *Martyrhilda sordidella*, new species: Ventral aspect of female genitalia without ovipositor.
239. *Martyrhilda thoracenigraecella* (Chambers): Ventral aspect of female genitalia without ovipositor.

PLATE 42

240. *Agonopterix hyperella* Ely: Ventral aspect of female genitalia without ovipositor.
241. *Agonopterix oregonensis*, new species: Ventral aspect of female genitalia without ovipositor.
242. *Agonopterix clemensella* (Chambers): Ventral aspect of female genitalia without ovipositor.
243. *Agonopterix muricolorella* (Busck): Ventral aspect of female genitalia without ovipositor.
- 244-244a. *Agonopterix cajonensis*, new species: 244, Ventral aspect of genital plate, ostium and posterior portion of ductus bursae; 244a, bursa copulatrix.
245. *Agonopterix curvilineella* (Beutenmüller): Ventral aspect of female genitalia without ovipositor.
246. *Agonopterix arcuella*, new species: Ventral aspect of female genitalia without ovipositor.

- 247-247a. *Agonopterix gelidella* (Busck): 247, Ventral aspect of genital plate, ostium and posterior portion of ductus bursae; 247a, bursa copulatrix.
248. *Agonopterix fulva* (Walsingham): Ventral aspect of female genitalia without ovipositor.

PLATE 43

249. *Agonopterix eupatoriella* (Chambers): Ventral aspect of female genitalia without ovipositor.
250. *Agonopterix scabellata* (Zeller): Ventral aspect of female genitalia without ovipositor.
251. *Agonopterix pteleae* Barnes and Busck: Ventral aspect of female genitalia without ovipositor.
252. *Agonopterix atrodorsella* (Clemens): Ventral aspect of female genitalia without ovipositor.
253. *Agonopterix pulvipennella* (Clemens): Ventral aspect of female genitalia without ovipositor.

PLATE 44

254. *Agonopterix walsinghamella* (Busck): Ventral aspect of female genitalia without ovipositor.
255. *Agonopterix argillacea* (Walsingham): Ventral aspect of female genitalia without ovipositor.
256. *Agonopterix pallidella* (Busck): Ventral aspect of female genitalia without ovipositor.
257. *Agonopterix rosaciliella* (Busck): Ventral aspect of female genitalia without ovipositor.
258. *Agonopterix fusciterminella*, new species: Ventral aspect of female genitalia without ovipositor.
259. *Agonopterix robinella* (Packard): Ventral aspect of genital plate of female genitalia.
- 259A. *Agonopterix thelmae*, new species: Ventral aspect of genital plate of female genitalia.
260. *Agonopterix lecontella* (Clemens): Ventral aspect of bursa copulatrix of female genitalia.

PLATE 45

261. *Agonopterix costimacula*, new species: Ventral aspect of female genitalia without ovipositor.
262. *Agonopterix canadensis* (Busck): Ventral aspect of female genitalia without ovipositor.
263. *Agonopterix scnicionella* (Busck): Ventral aspect of female genitalia without ovipositor.
264. *Agonopterix antennariella*, new species: Ventral aspect of female genitalia without ovipositor.
265. *Agonopterix nigrinotella* (Busck): Ventral aspect of female genitalia without ovipositor.
266. *Agonopterix nebulosa* (Zeller): Ventral aspect of female genitalia without ovipositor.
267. *Agonopterix flavicomella* (Engel): Ventral aspect of female genitalia without ovipositor.

PLATE 46

268. *Agonopterix latipalpella* Barnes and Busck: Ventral aspect of female genitalia without ovipositor.
269. *Agonopterix amissella* (Busck): Ventral aspect of female genitalia without ovipositor.
270. *Agonopterix sabulella* (Walsingham): Ventral aspect of female genitalia without ovipositor.
271. *Agonopterix psoralicella* (Walsingham): Ventral aspect of female genitalia without ovipositor.
272. *Agonopterix amyrisella* (Busck): Ventral aspect of female genitalia without ovipositor.
273. *Agonopterix costosa* (Haworth): Ventral aspect of female genitalia without ovipositor.
274. *Agonopterix posticella* (Walsingham): Ventral aspect of female genitalia without ovipositor.

PLATE 47

275. *Depressaria maculatella* Busck: Ventral aspect of female genitalia without ovipositor.
- 276-276a. *Depressaria betulella* Busck: 276, Ventral aspect of genital plate and part of ductus bursae of female genitalia; 276a, signum.
- 277-277a. *Depressaria grotella* Robinson: 277, Ventral aspect of genital plate of female genitalia; 277a, signum.
278. *Depressaria artemisiella* McDunnough: Ventral aspect of female genitalia without ovipositor.
279. *Depressaria cleanorae*, new species: Ventral aspect of female genitalia without ovipositor.
280. *Depressaria juliella* Busck: Ventral aspect of female genitalia without ovipositor.

PLATE 48

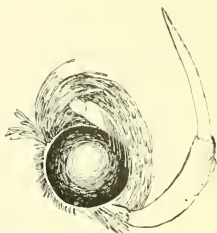
281. *Depressaria cinereocostella* Clemens: Ventral aspect of female genitalia without ovipositor.
282. *Depressaria alienella* Busck: Ventral aspect of female genitalia without ovipositor.
283. *Depressaria artemisiae dracunculi* Clarke: Ventral aspect of female genitalia without ovipositor.
284. *Depressaria palousella*, new species: Ventral aspect of female genitalia without ovipositor.
285. *Depressaria yakimae*, new species: Ventral aspect of female genitalia without ovipositor.
286. *Depressaria whitmani*, new species: Ventral aspect of female genitalia without ovipositor.
287. *Depressaria angustati*, new species: Ventral aspect of genital plate and part of ductus bursae of female genitalia.
288. *Depressaria multifidae* Clarke: Ventral aspect of genital plate and part of ductus bursae of female genitalia.
289. *Depressaria leptotaeniae* Clarke: Ventral aspect of genital plate and part of ductus bursae of female genitalia.



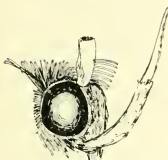
1. *TRICLONELLA*



2. *MATHILDANA*



3. *CAROLANA*



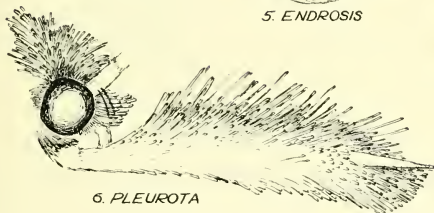
4. *CHAMBERSIA*



5. *ENDROSIS*



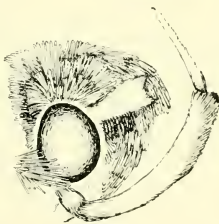
7. *INGA*



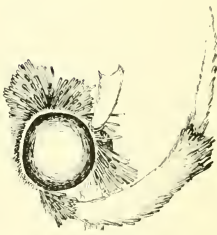
6. *PLEUROTA*



8. *EUMEYRICKIA*



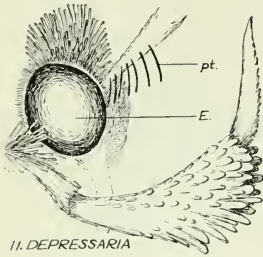
9. *CARCINA*



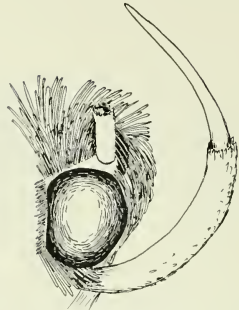
10. *MARTYRINGA*

NORTH AMERICAN OECOPHORIDAE, COSMOPTERYRIDAE, AND ETHMIIDAE.

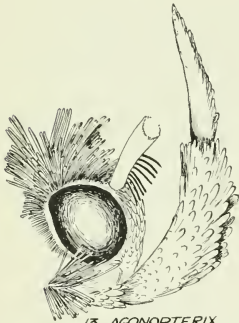
FOR EXPLANATION OF PLATE SEE PAGE 274.



11. *DEPRESSARIA*



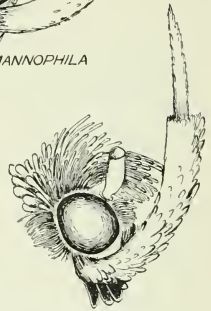
12. *HOFMANNOPHILA*



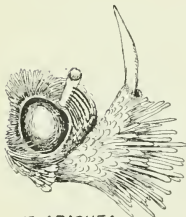
13. *AGONOPTERIX*



14. *EPICALLIMA*



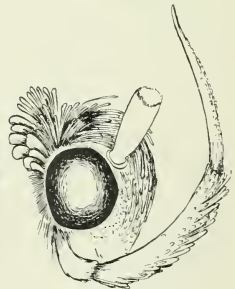
15. *SEMIOSCOPIIS*



16. *APACHEA*



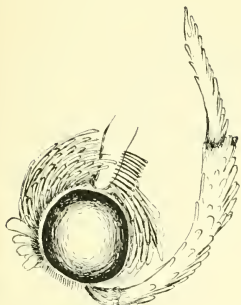
17. *MARTYRHILDA*



18. *SCHIFFERMÜLLERIA*

NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGES 274-275



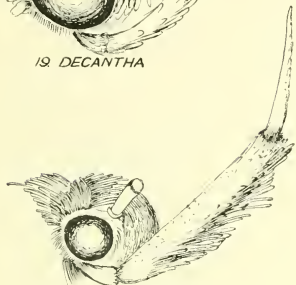
19. *DECANTHA*



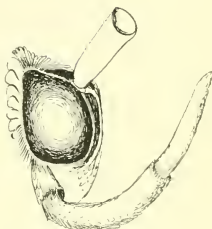
20. *ANONCIA*



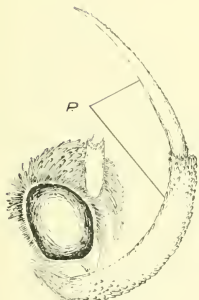
21. *GERDANA*



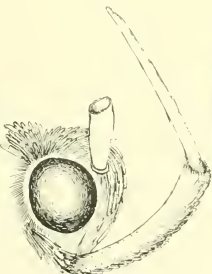
22. *OECOPHORA*



23. *EUCLEMENSIA*



24. *PSILOCORSIS*



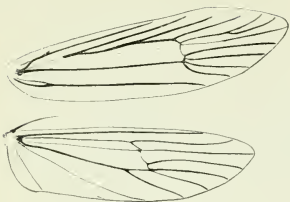
25. *FABIOLA*



26. *MACHIMIA*

NORTH AMERICAN OECOPHORIDAE, COSMOPTERYGIDAE, BLASTOBASIDAE,
AND HELIODINIDAE.

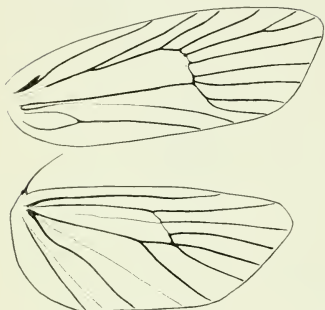
FOR EXPLANATION OF PLATE SEE PAGE 275.



27. ANTEQUERA



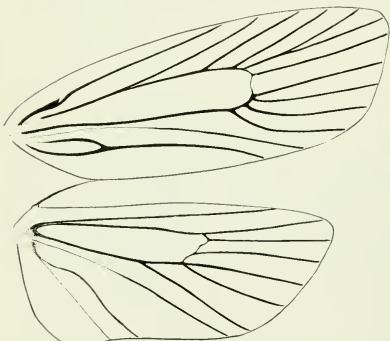
28. ANTEQUERA



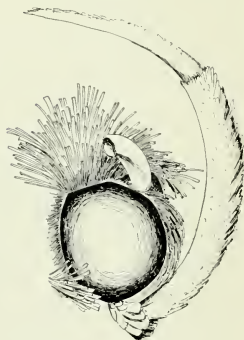
29. BIBARRAMBLA



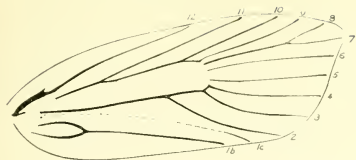
30. BIBARRAMBLA



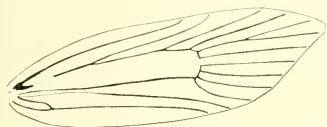
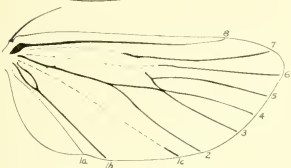
31. HIMMACIA



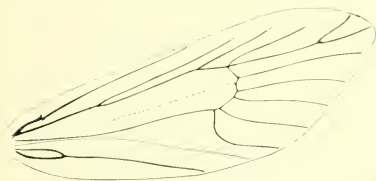
32. HIMMACIA



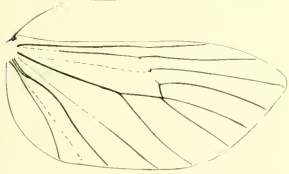
33. *MACHIMIA*



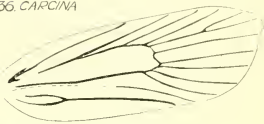
34. *PLEUROTA*



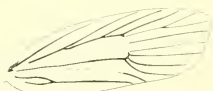
35. *SEMIOSCOPIIS*



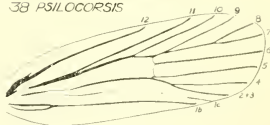
36. *CARCINA*



37. *INGA*



38. *PSILOCORISIS*

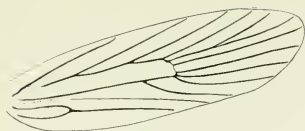


39. *MARTYRINGA*

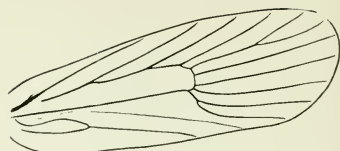
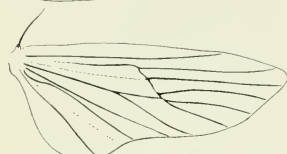


NORTH AMERICAN OECOPHORIDAE.

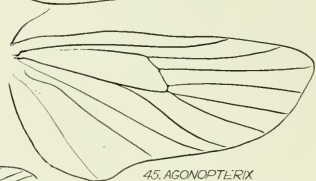
FOR EXPLANATION OF PLATE SEE PAGE 275.



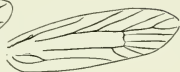
40 APACHEA



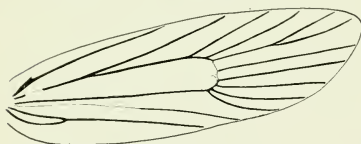
45. AGONOPTERIX



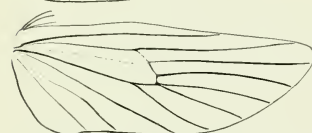
41 FABIOLA



42 GERDANA



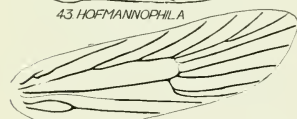
43 HOFMANNOPHILA



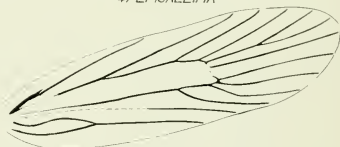
46 CHAMBERSIA



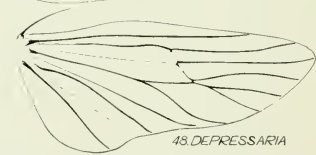
47 EPICALLIMA



44 MARTYRHILDA

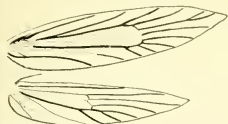


48. DEPRESSARIA

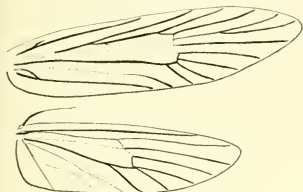


NORTH AMERICAN OECOPHORIDAE AND BLASTOBASIDAE.

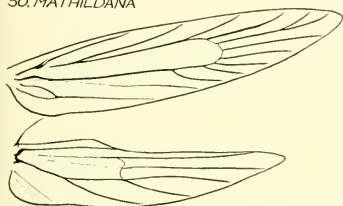
FOR EXPLANATION OF PLATE SEE PAGE 276.



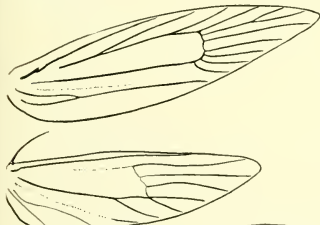
49. *CAROLANA*



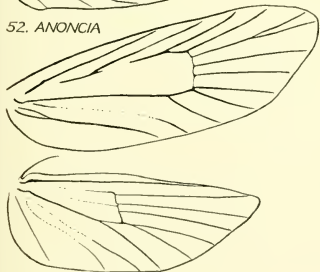
50. *MATHILDANA*



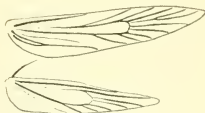
51. *ENDROSIS*



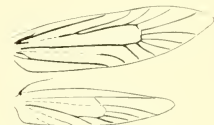
52. *ANONCIA*



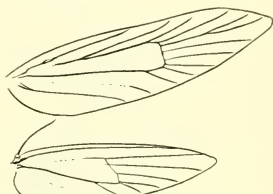
53. *OECOPHORA*



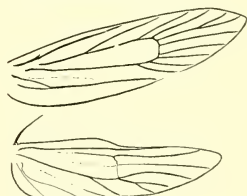
54. *EUCLEMENSIA*



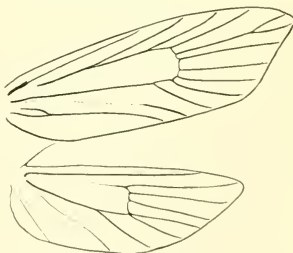
55. *DECANTHA*



56. *SCHIFFERMÜLLERIA*



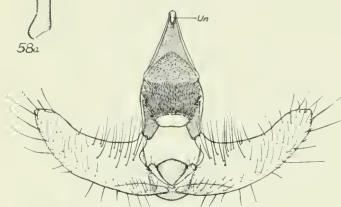
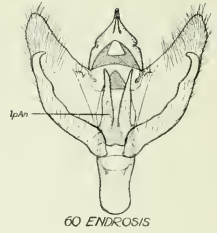
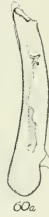
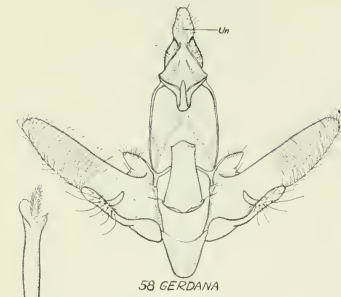
57. *TRIGONELLA*



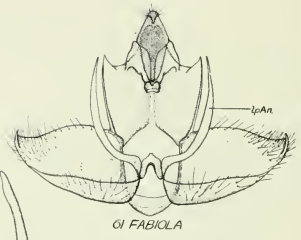
57A. *EUMEYRICKIA*

NORTH AMERICAN OECOPHORIDAE, COSMOPTERYRIDAE, ETHMIIDAE, AND HELIODINIDAE.

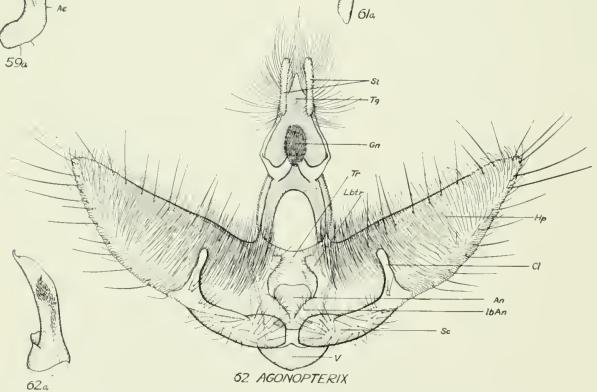
FOR EXPLANATION OF PLATE SEE PAGES 276.



59 PSILOCORISIS



61 FABIOLA



62 AGONOPTERIX



63. ANTEQUERA



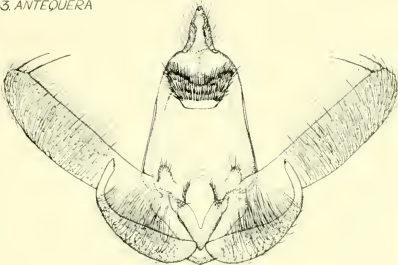
63a



63b



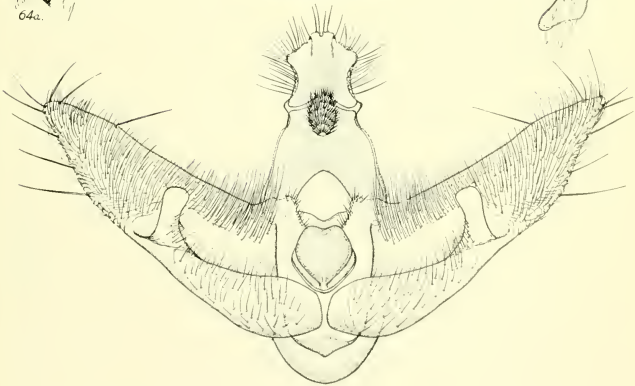
64a



64. HIMMACIA



65a



65. BIBARRAMBLA

NORTH AMERICAN OECOPHORIDAE AND COSMOPTERYGIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 276.



66. *DECANTHA*



67a



67. *MARTYRHILDA*



66a



68. *DEPRESSARIA*



68a



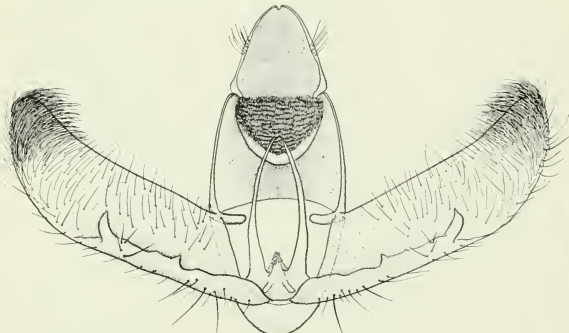
69a



69b



69. *CAROLANA*



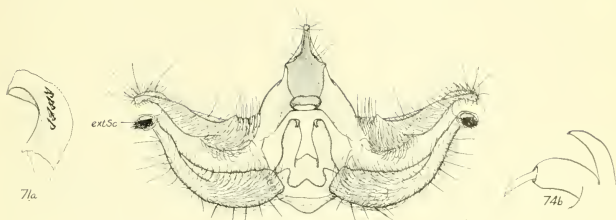
70. *MACHIMIA*



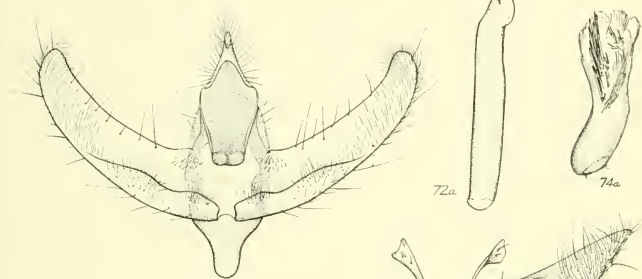
70a

NORTH AMERICAN OECOPHORIDAE.

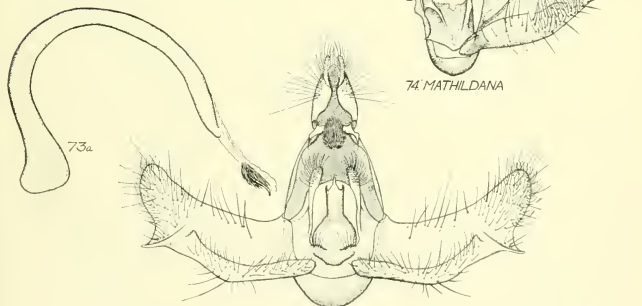
FOR EXPLANATION OF PLATE SEE PAGES 276-277.



71. *CARCINA*



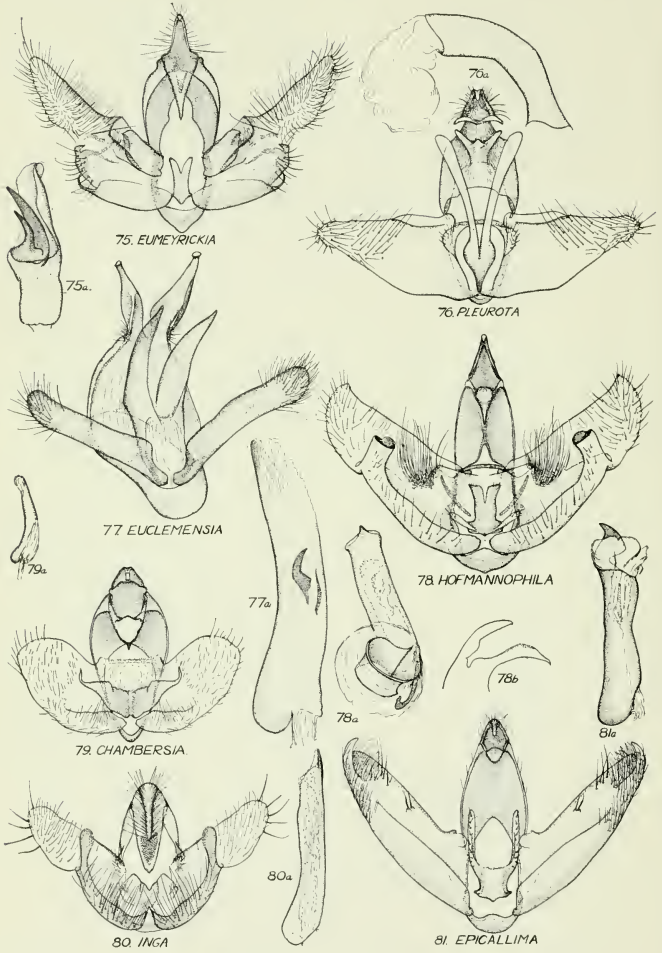
72. *MARTYRINGA*



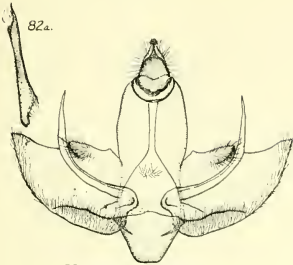
73. *SEMIOSCOPI*

NORTH AMERICAN OECOPHORIDAE.

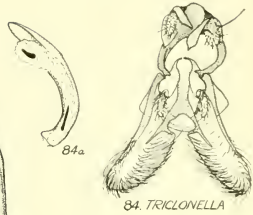
FOR EXPLANATION OF PLATE SEE PAGE 277.



NORTH AMERICAN OECOPHORIDAE, ETHMIIDAE, AND HELIODINIDAE.
 FOR EXPLANATION OF PLATE SEE PAGE 277.



82. SCHIFFERMULLERIA



84. TRICLONELLA



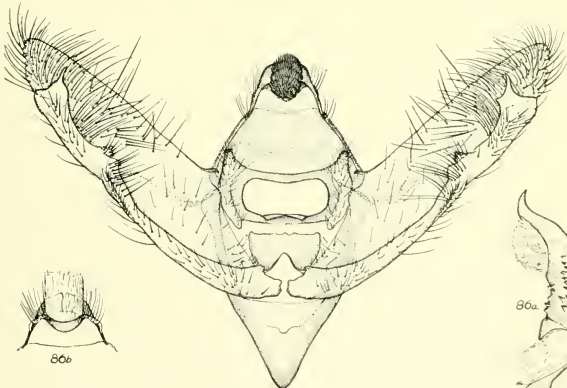
83. OECOPHORA



83a.



85. ANOXIA



86. APACHEA



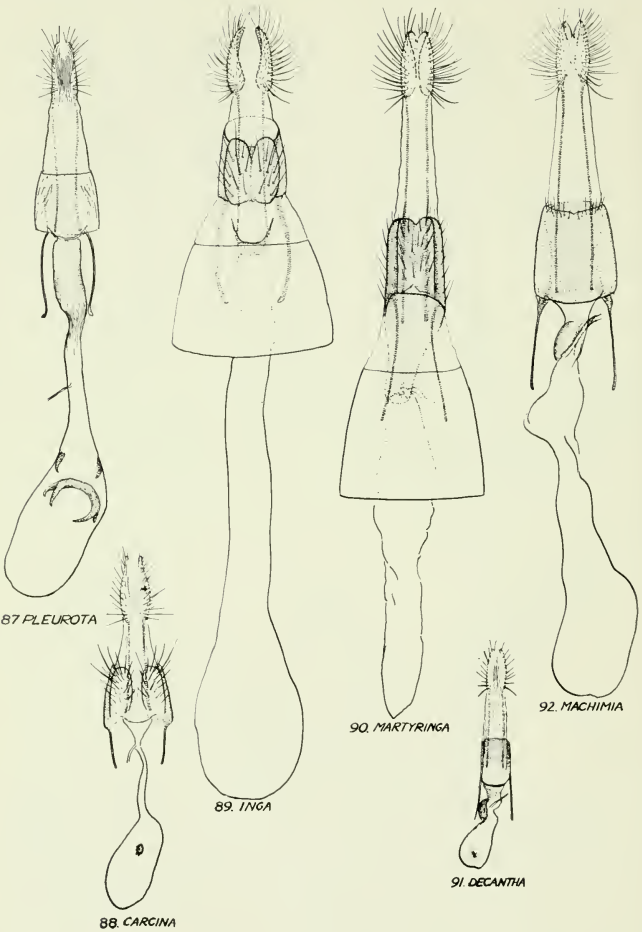
86b



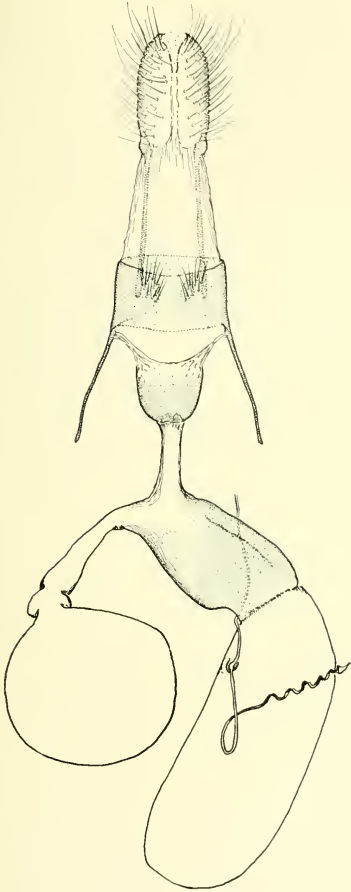
86a.

NORTH AMERICAN OECOPHORIDAE AND COSMOPTERYGIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 277.



NORTH AMERICAN OECOPHORIDAE.
FOR EXPLANATION OF PLATE SEE PAGES 277-278.



93. *EUCLEMENSIA*



94. *APACHEA*

NORTH AMERICAN OECOPHORIDAE AND HELIODINIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 278.



95 *FABIOLA*



96 *CAROLANA*



97 *SEMIOSCOPIS*



98 *SCHIFFERMÜLLERIA*



100 *MARTYRHILDA*



101 *HOFMANNOPHILA*



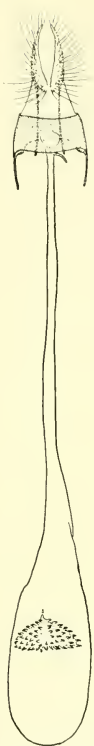
99 *EPICALLIMA*

NORTH AMERICAN OECOPHORIDAE.

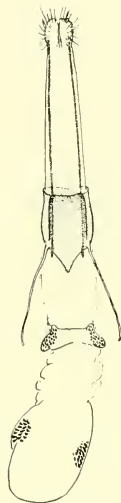
FOR EXPLANATION OF PLATE SEE PAGE 278.



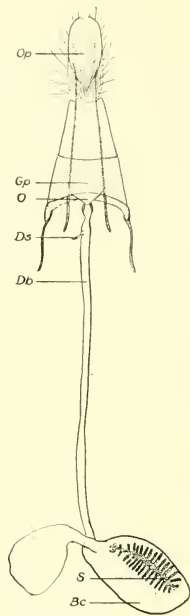
102. *DEPRESSARIA*



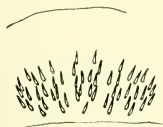
103. *AGONOPTERIX*



104. *EUMEYRICKIA*



105. *PSILOCORIS*



106. *BORKHAUSENIA* ♂



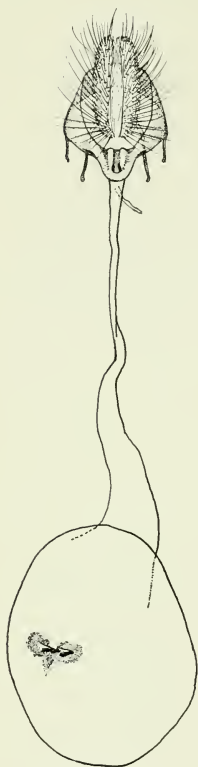
107. *MARTYRINGA* ♀



108. *CAROLANA* ♂

NORTH AMERICAN OECOPHORIDAE AND ETHMIIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 275.



109. *BIBARRAMBLA*

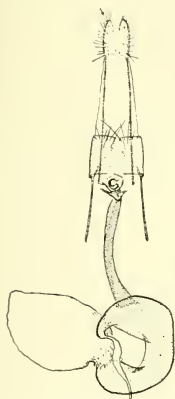


110. *HIMMACIA*



111. *ANTEQUERA*

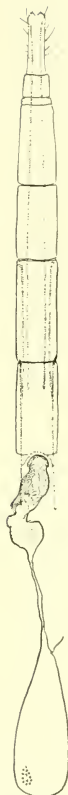
NORTH AMERICAN OECOPHORIDAE AND COSMOPTERYGIDAE
FOR EXPLANATION OF PLATE SEE PAGE 278.



112. *TRICLONELLA*



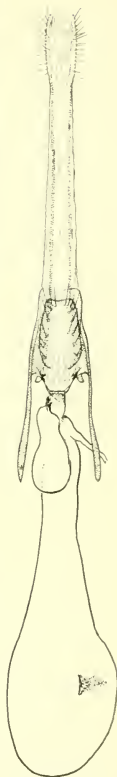
113. *OECOPHORA*



116. *ENDROSIS*



117. *GERDANA*



118. *MATHILDANA*



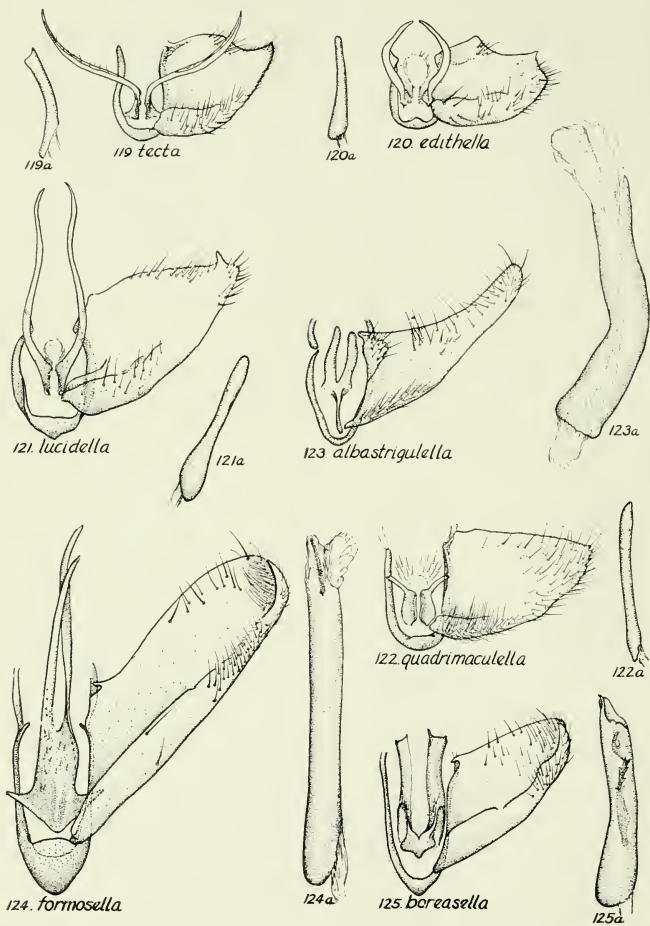
114. *ANONCIA*



115. *CHAMBERSIA*

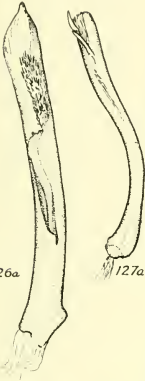
NORTH AMERICAN OECOPHORIDAE, COSMOPTERYGIDAE, AND BLASTOBASIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 278.



NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGES 276-279.

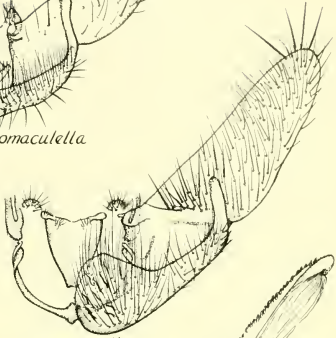


126a

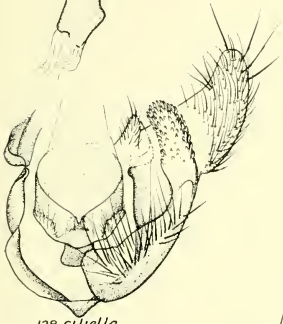
127a



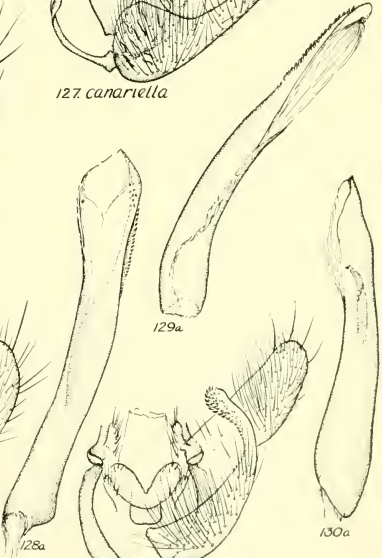
126 *obscuromaculella*



127 *canariella*



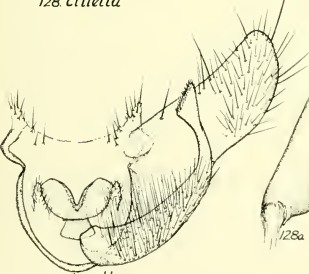
128 *ciliella*



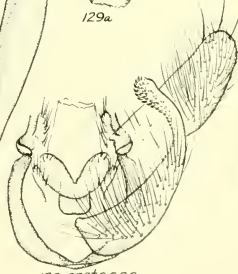
129a

128a

130a



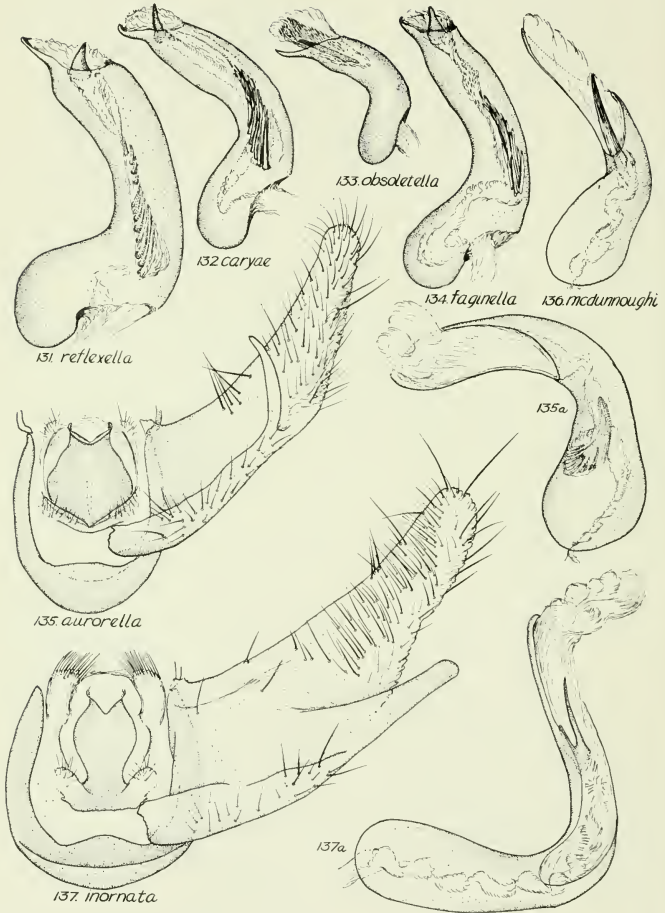
129 *concolorella*



130 *cretacea*

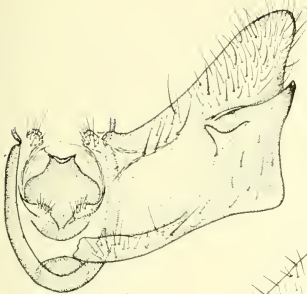
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 279.



NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 279.



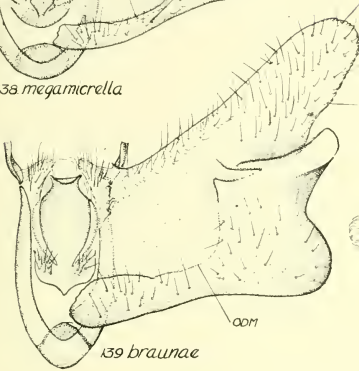
138 *megamicrella*



138a

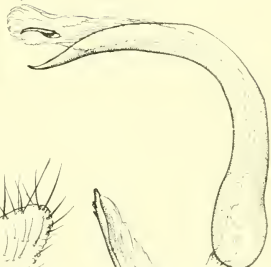


139a

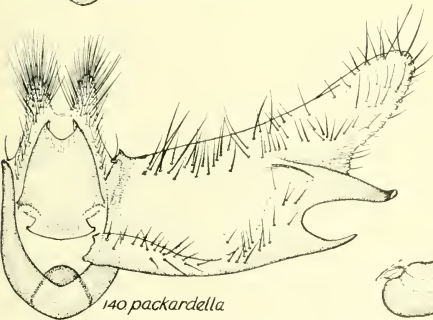


139 *braunae*

oom



141 *merricella*

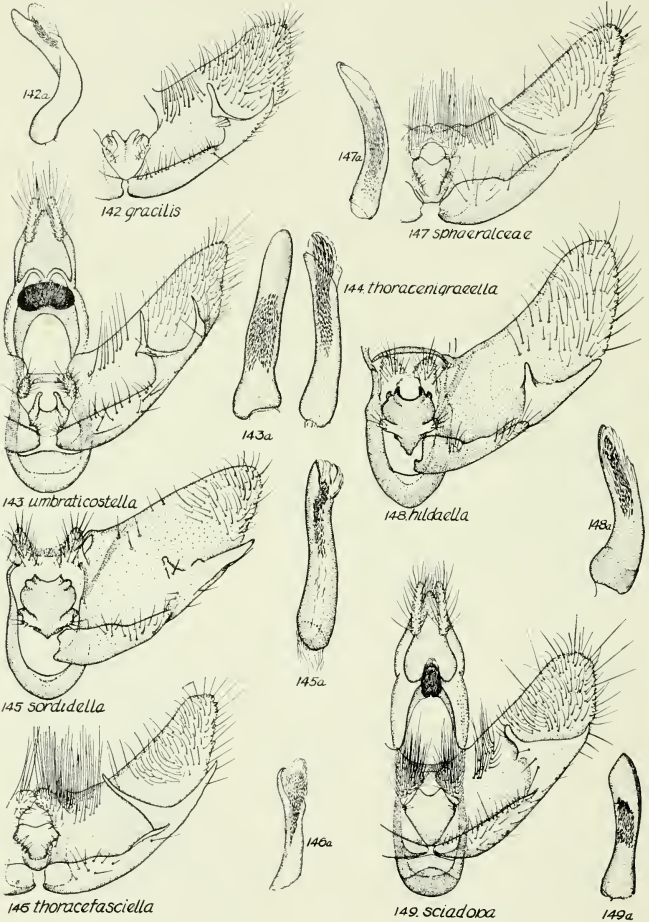


140 *packardella*

140a

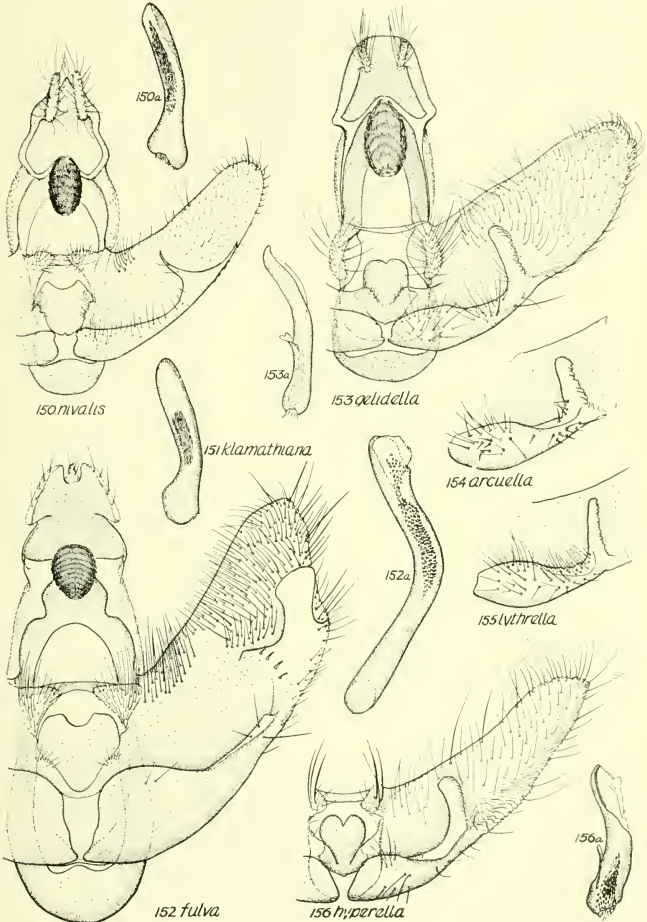
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 279.



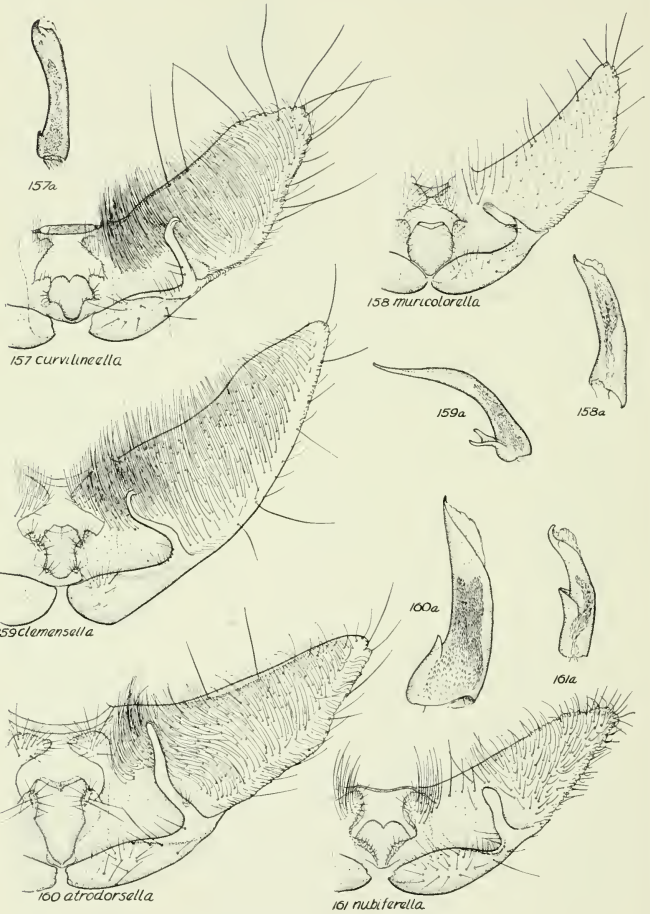
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGES 279-280.



NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 280.

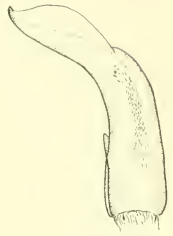


NORTH AMERICAN OECOPHORIDAE.

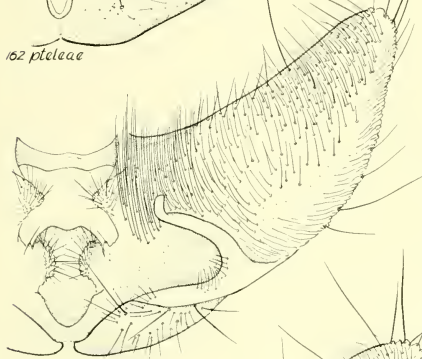
FOR EXPLANATION OF PLATE SEE PAGE 280.



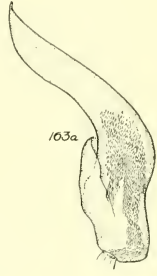
162 *pteleae*



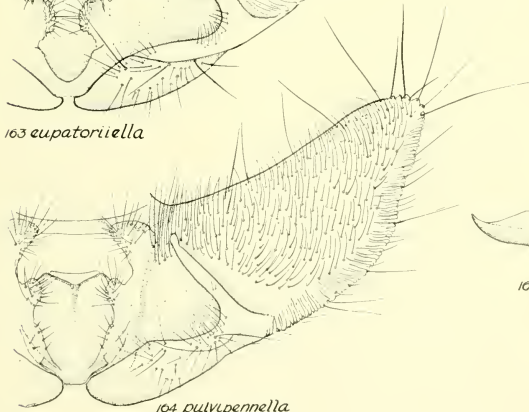
162a



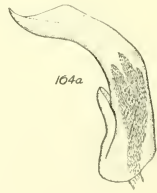
163 *eupatoriella*



163a



164 *putvipennella*



164a

NORTH AMERICAN OECOPHORIDAE

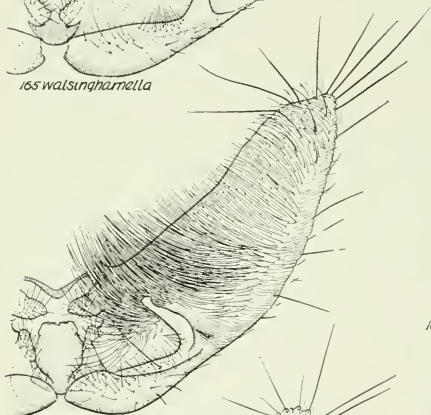
FOR EXPLANATION OF PLATE SEE PAGE 280.



165 *walsinghamella*



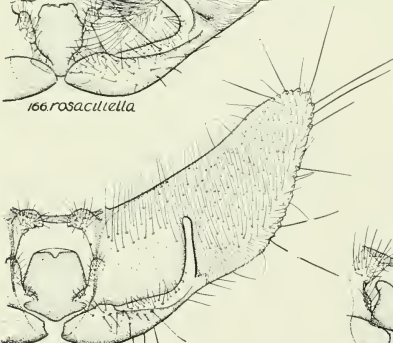
165a



166 *rosaciliella*



166a



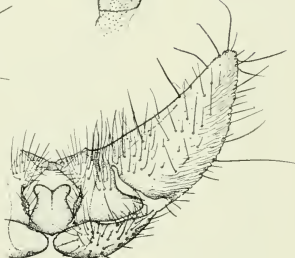
167 *fusciterminella*



167a



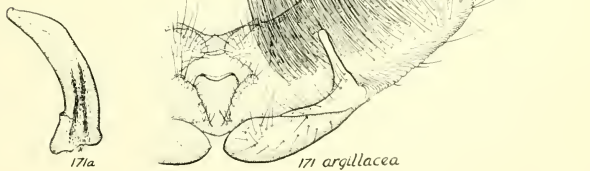
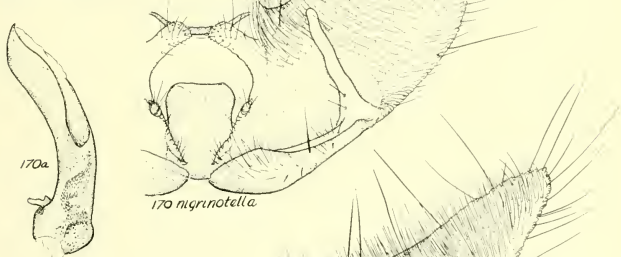
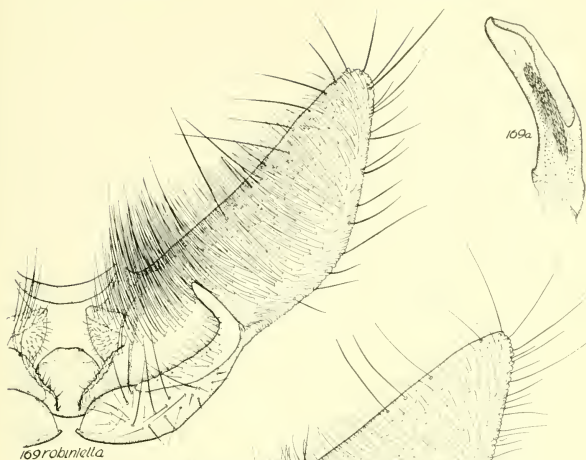
168a



168 *novt-mundal*

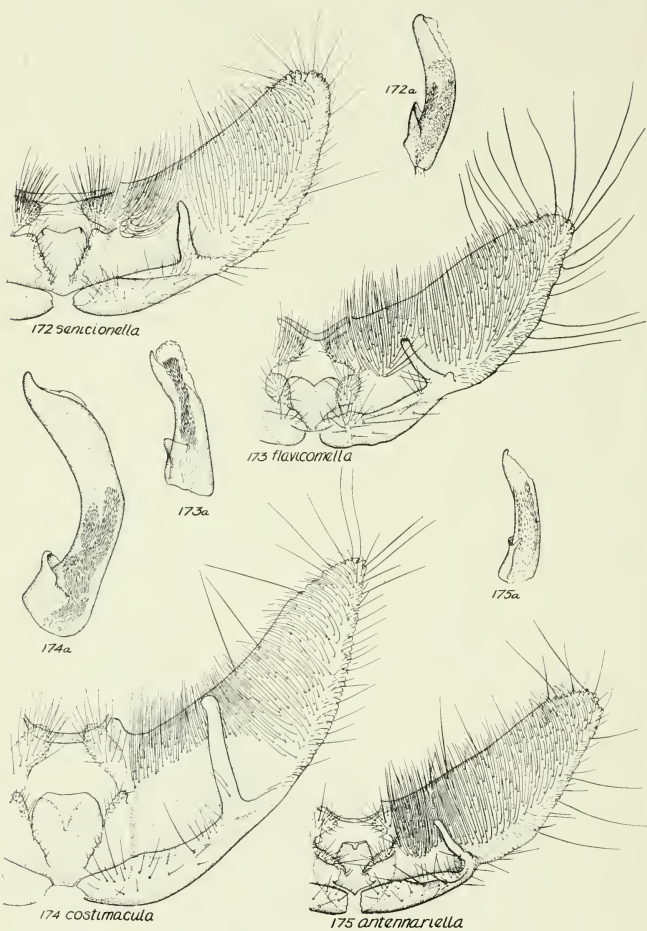
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 281.



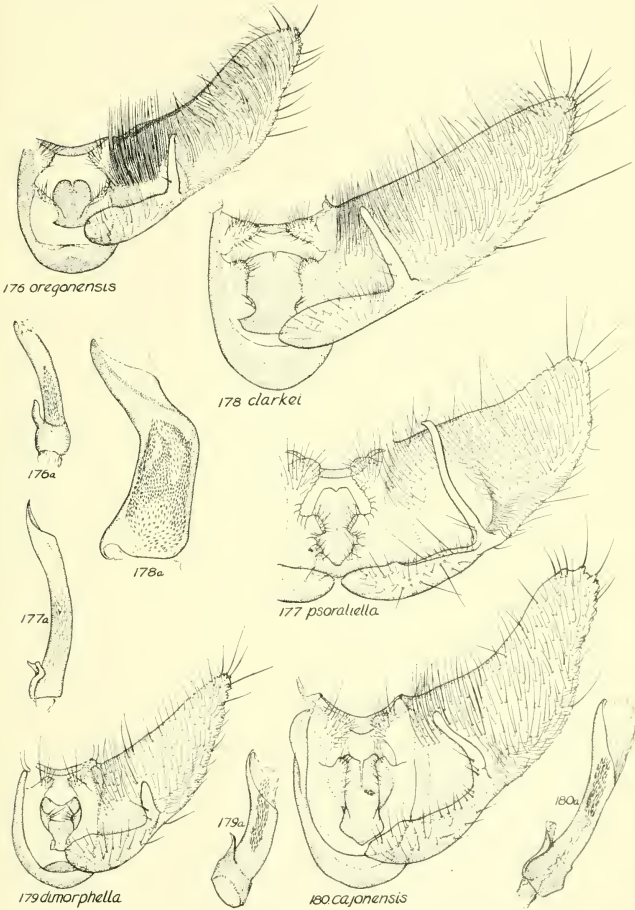
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 281.



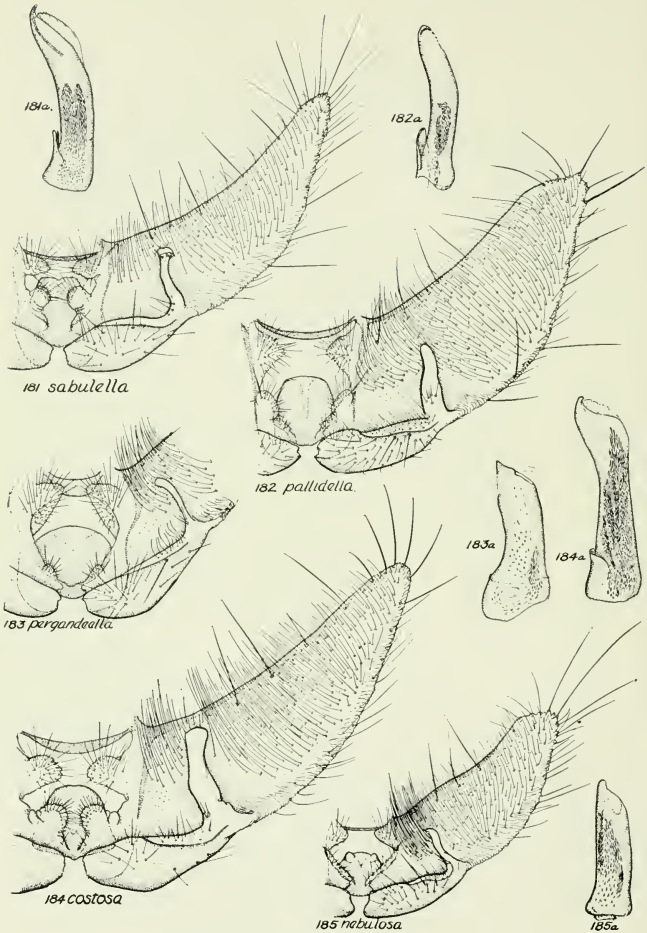
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 281.



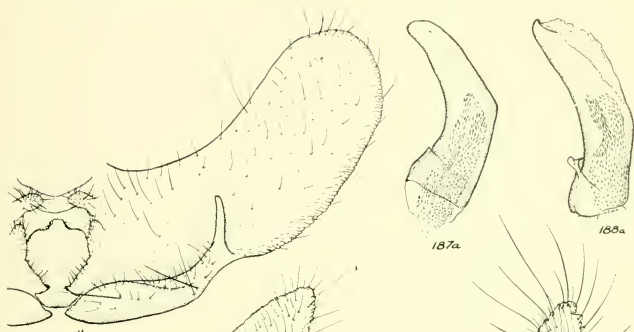
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 281.



NORTH AMERICAN OECOPHORIDAE.

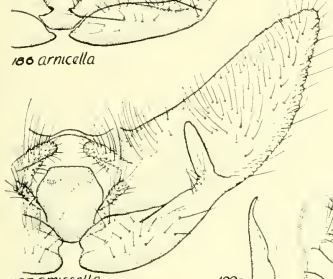
FOR EXPLANATION OF PLATE SEE PAGES 281-282.



186 *arnicella*

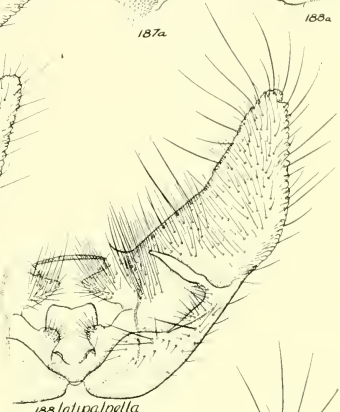
187a

188a



187 *amissella*

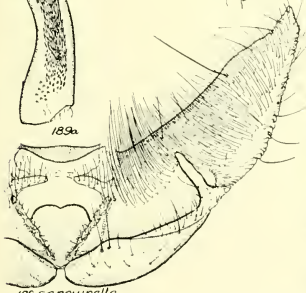
189a



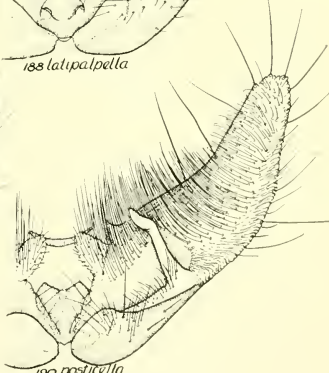
188 *latipalpa*



189a



185 *sanguinella*



190 *posticella*

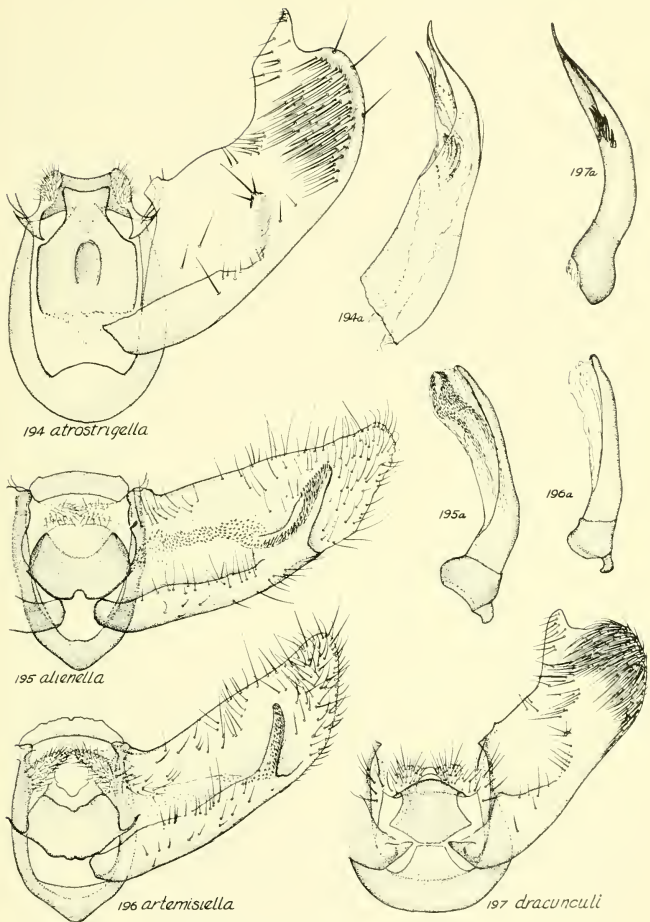
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 282



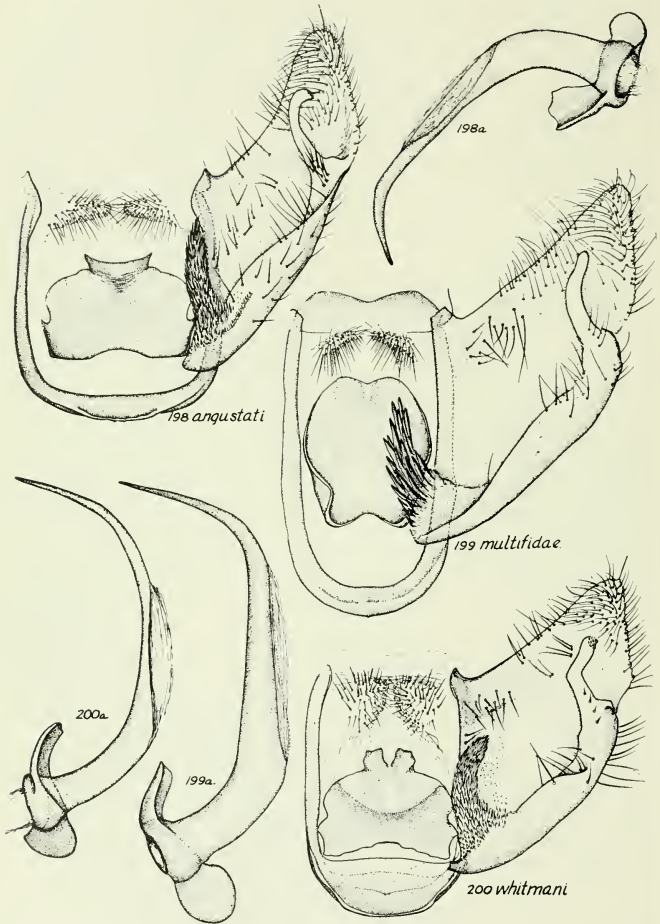
NORTH AMERICAN OECOPHORIDAE

FOR EXPLANATION OF PLATE SEE PAGE 282.



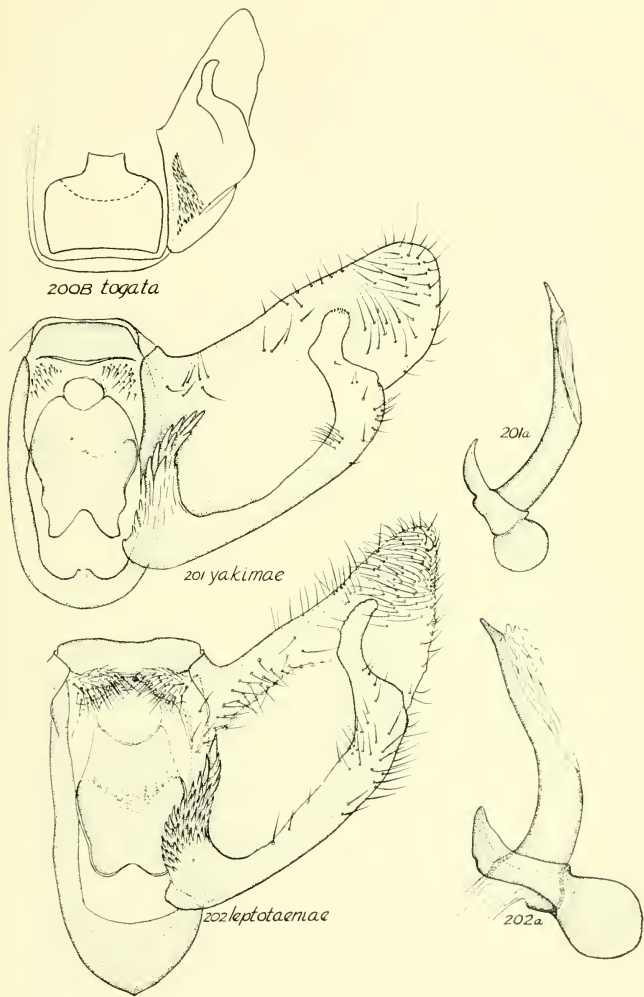
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FOR EXPLANATION OF PLATE SEE PAGE 282.



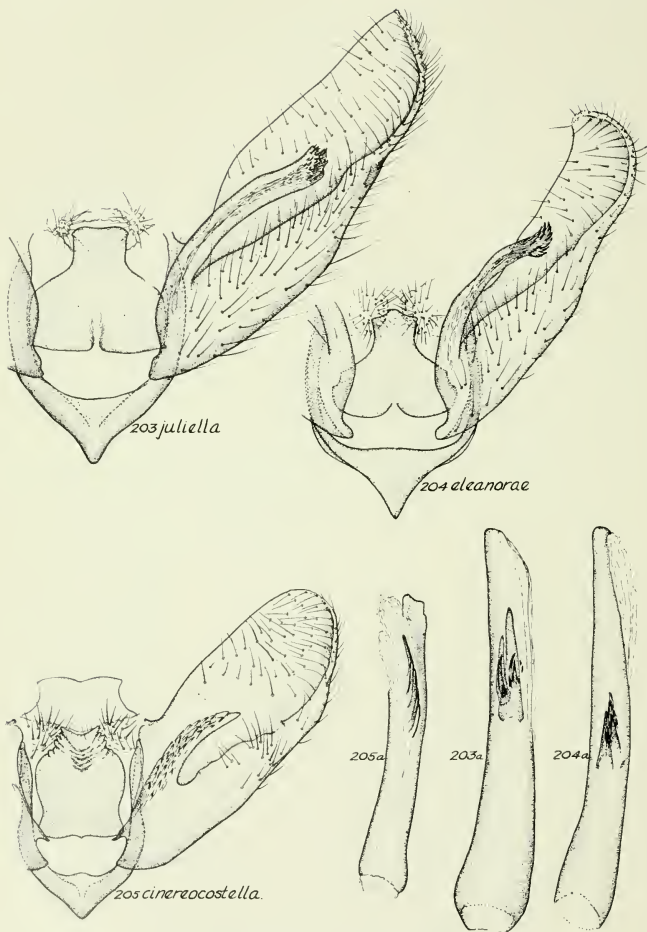
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FOR EXPLANATION OF PLATE SEE PAGE 282.



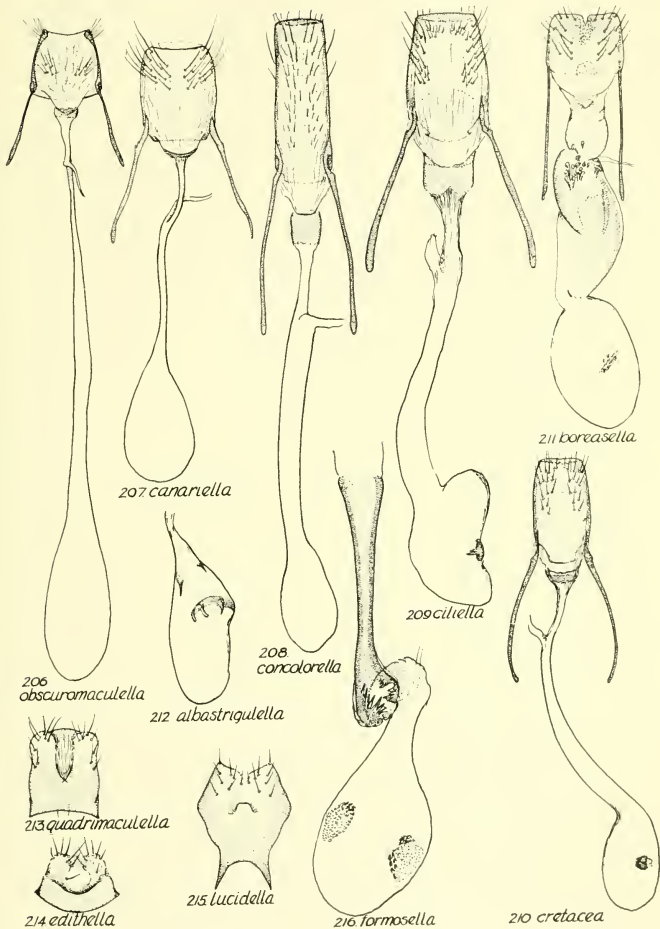
NORTH AMERICAN OECOPHORIDAE

FOR EXPLANATION OF PLATE SEE PAGE 283.



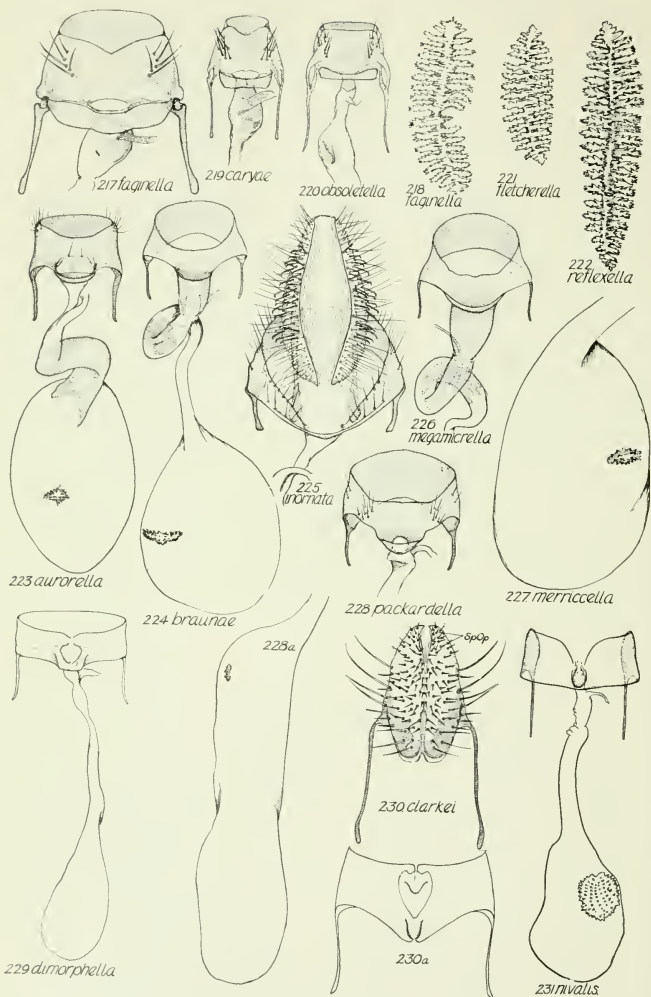
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 283.



NORTH AMERICAN OECOPHORIDAE

FOR EXPLANATION OF PLATE SEE PAGE 283.



NORTH AMERICAN OECOPHORIDAE.

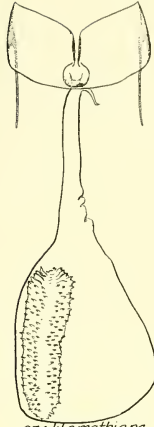
FOR EXPLANATION OF PLATE SEE PAGES 287-284.



232 *umbraticostella*



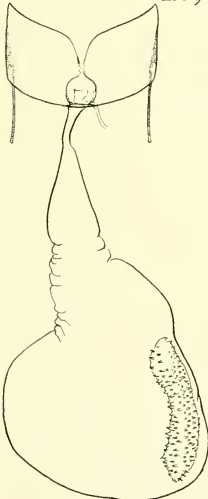
233 *gracilis*



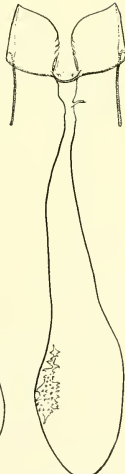
234 *klamathiana*



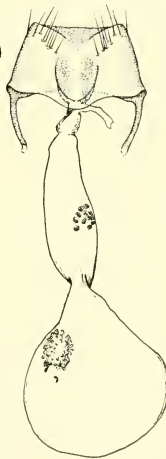
235 *thoracetaciella*



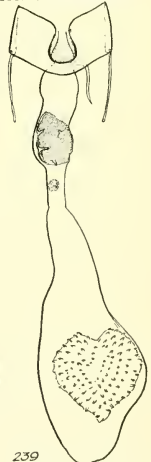
236 *scia.dopa*



237 *sphaeralceae*



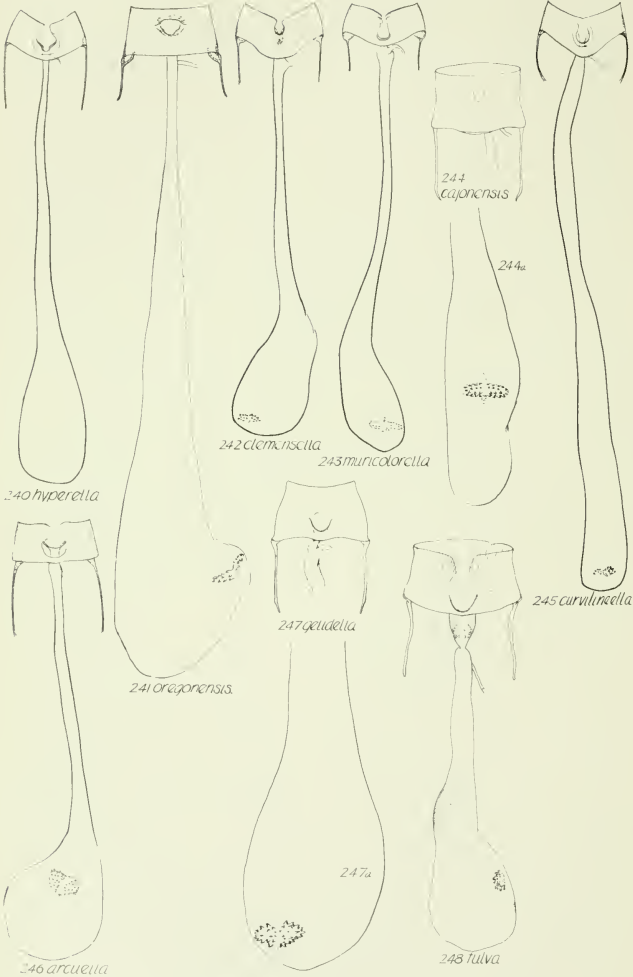
238 *sordidella*



239 *thoracigracella*

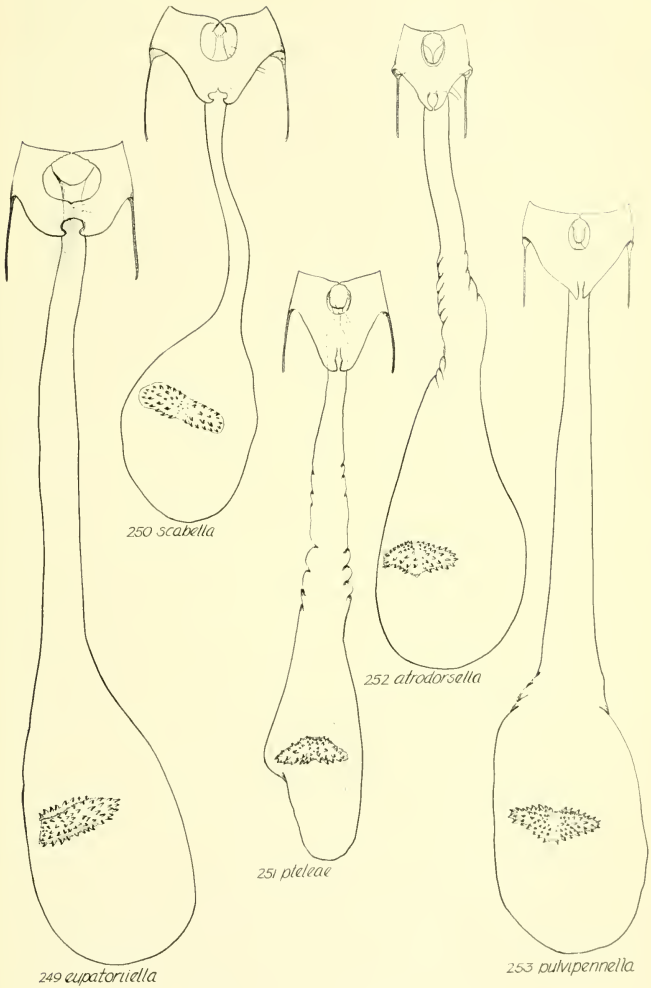
NORTH AMERICAN OECOPHORIDAE

FOR EXPLANATION OF PLATE SEE PAGE 281.



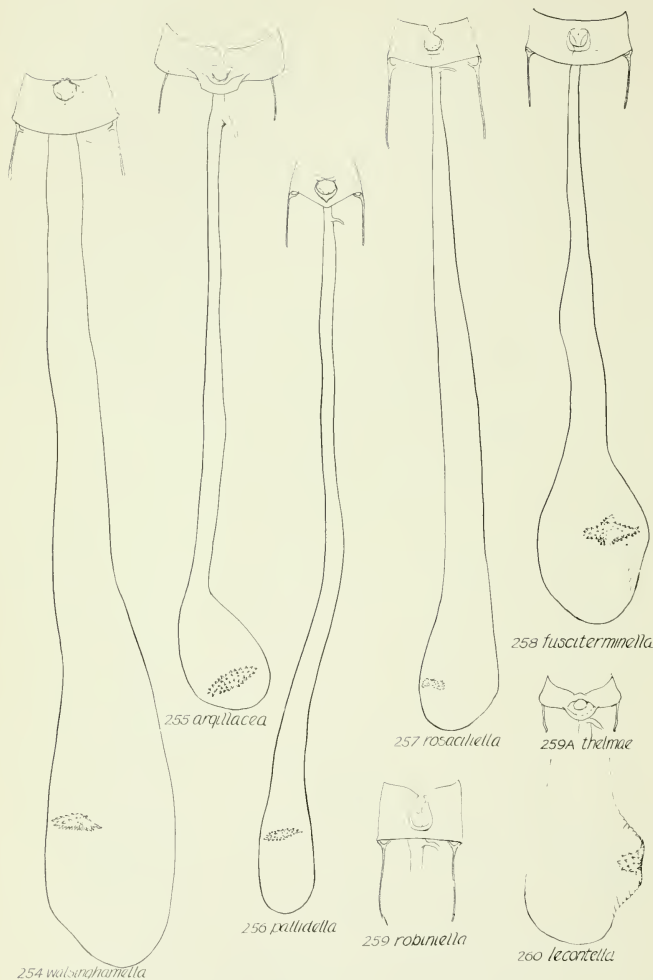
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGES 284-285.



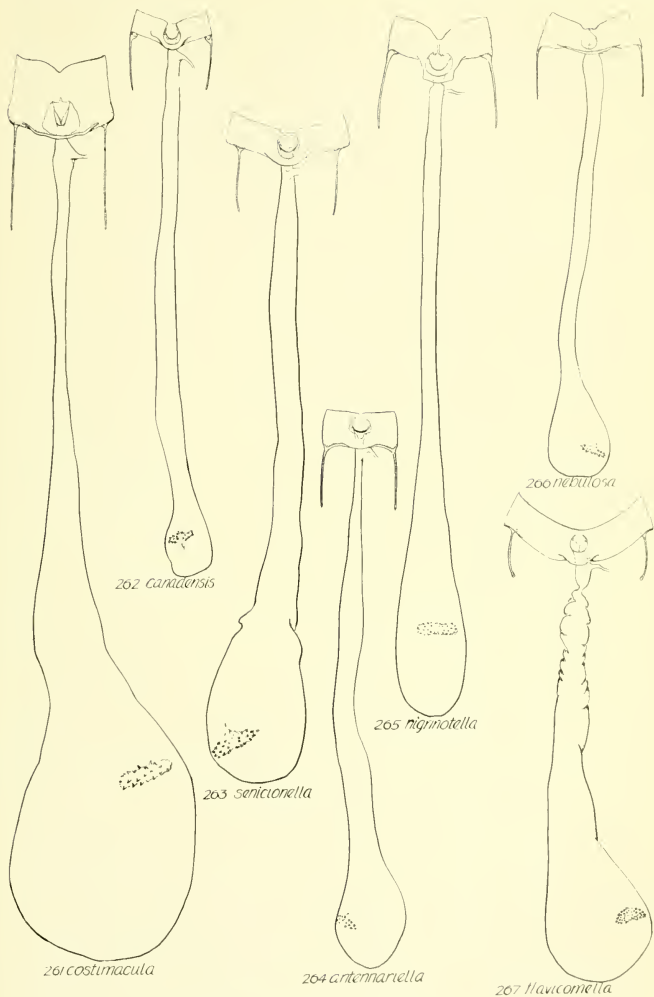
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FOR EXPLANATION OF PLATE SEE PAGE 285.



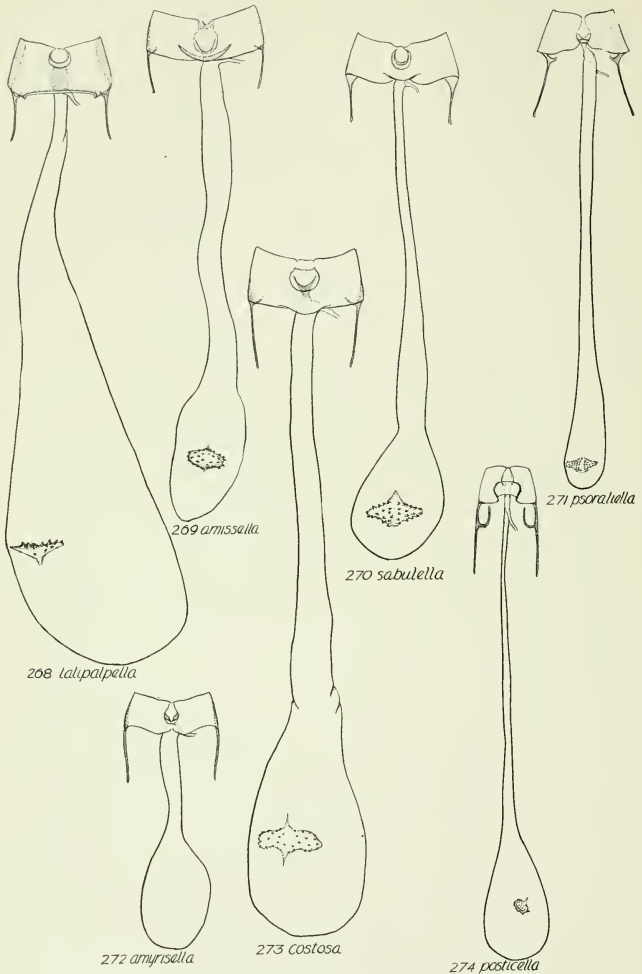
NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 285.



NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGE 285



NORTH AMERICAN OECOPHORIDAE.

FOR EXPLANATION OF PLATE SEE PAGES 285



275 *maculatella*



278 *artemisiella*



279 *elleanorae*



280 *julietta*



276 *betulella*



277 *grotella*



276a



277a

NORTH AMERICAN OECOPHORIDAE

FOR EXPLANATION OF PLATE SEE PAGE 286



281 *cinereocostella*



283 *dracunculi*



282 *alienella*



284 *palouseella*



285 *yakimae*



287 *arivistati*



289 *leptotaeniae*



286 *whitmani*



288 *multifidae*

NORTH AMERICAN OECOPHORIDAE

FOR EXPLANATION OF PLATE SEE PAGE 286