

# INSECTS OF HAWAII

*A Manual of the Insects of the Hawaiian Islands,  
including an Enumeration of the Species and Notes on  
their Origin, Distribution, Hosts, Parasites, etc.*

by **ELWOOD C. ZIMMERMAN**

Commonwealth Scientific & Industrial  
Research Organization  
Canberra, Australia

Honorary Associate, British Museum (Natural History)  
Formerly Curator of Entomology,  
Bernice P. Bishop Museum, Honolulu

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PART II  
GELECHIOIDEA

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Superfamily **GELECHIOIDEA** (Stainton)

*Gelechidae* Stainton, 1854: 75.

*Gelechioidea*: Mosher, 1916: 23, 33, 98. Forbes, 1923: 37, 229.

The Gelechioidea is the largest of the superfamilies of the Microlepidoptera, *sensu stricto*. In Hawaii there are more gelechioids than all other Microlepidoptera combined.

In Hawaii, all Lepidoptera which have at least the base of the proboscis clothed with imbricated squamae belong either to the Gelechioidea or to the Pyralidae. The Pyralidae are distinguishable because they have tympana in the bases of their abdomens, whereas tympana are absent in the Gelechioidea. Many Pyralidae (Scopariinae, Nymphulinae, Pyralinae, Crambinae, Phycitinae) have chaetosemata (setose, postantennal sensory organs), but chaetosemata are absent in the Gelechioidea. Although there are exceptions, most Pyralidae have hindwings broader than their forewings, all three branches of vein 1 are fully developed, and veins 7 and 8 are partly, mostly, or entirely fused. These hindwing characters are variable in the gelechioids, but few species have a combination similar to that of the pyralids. Most gelechioids are small, narrow-winged moths, and most (but not all) have conspicuously upcurved, sickle-shaped labial palpi which are notably long and slender on many species.

KEY TO THE FAMILIES OF GELECHIOIDEA IN HAWAII

1. Face strongly retreating ventrocaudad, subhorizontal; antennae appearing to be inserted in front of eyes and held stretched out in front of head when at rest; distal segment of labial palpus compressed, very thin, rather bladelike, concave externally; wing venation as in figure 621; forewings with veins 2, 3, and 4 arising from posterior margin of cell instead of 3 and 4 arising from apex of cell; hindwing with anterior margin of cell submedial; female frenulum with only two setae; a small, yellow, leaf eater of palms. . . . . **Agonoxenidae.**  
Without such a combination of characters. . . . . 2
- 2(1). Anterior margin of cell in hindwing submedial; labial palpi drooping or porrect; frenulum of female with only two setae; a small leaf miner in *Lonicera*; as in figures 628, 629. . . . . **Cycnodiidae.**  
Not so; labial palpi usually strongly curved dorsad. . . . . 3
- 3(2). Forewing with vein 11 short, only about as long as or shorter than vein 10 and arising distad of middle of wing, venation as in figures 608, 609; frenulum of female with only two setae. . . . . **Scythrididae.**

Forewing with vein 11 normally long, usually arising distinctly basad of middle of wing and usually obviously longer than vein 10; frenulum of female with three setae. . . . . **Gelechiidae.**

Family **SCYTHRIDIDAE** (Staudinger and Rebel)

*Butalidae* Heinemann and Wocke, 1876:436.

*Scythridinae* Rebel, in Staudinger and Rebel, 1901:179, as a subfamily of Elachistidae.

*Scythrididae*: Spuler, 1910 (1901–1910):432.

*Scythridae*: *auctorum*. Included in the Hypsilophidae by Hampson, 1918:387.

*Butalidae* is based upon *Butalis* Treitschke, 1833, which is a homonym of *Butalis* Boie, 1826, Aves, and it is thus not available for use in family-group name combinations in Lepidoptera. Treitschke's name was replaced by *Copida* Sodoffsky, 1837, which is now considered a synonym of *Scythris* Hübner, 1825 (1816–1826):414.

The name *Scythrididae* has not appeared in Hawaiian literature heretofore, but here I have transferred the peculiar Hawaiian genus *Mapsidius* from the Yponomeutidae, where it obviously does not belong, to this family. The *Scythrididae* is a poorly known group almost everywhere.

The Hawaiian moths assigned here lack ocelli, have the proboscis squamose, have eleven veins in the forewings with vein 7 stalked with 8 and have vein 11 arising distad of the middle of the cell. The hindwings have "pectens" of long hair on the anal areas.

Some workers have suggested that *Prays* is also a member of the *Scythrididae*, but that can hardly be true because *Prays* does not have a squamose proboscis and is different in other primary characters.

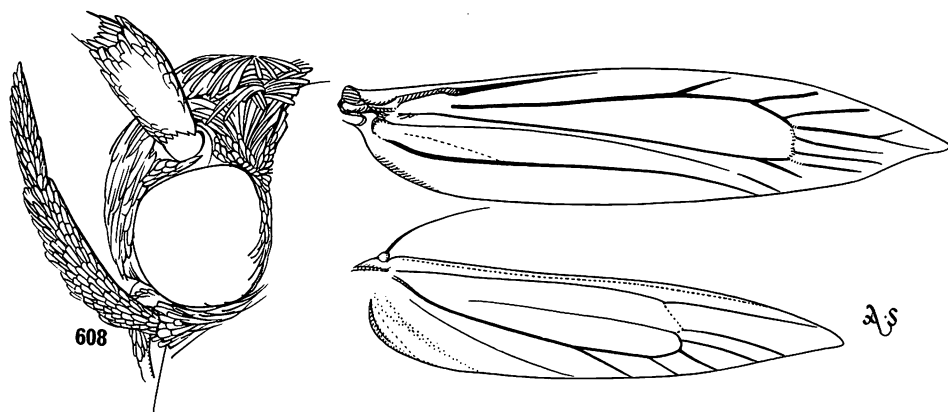


Figure 608—Head and wing venation of *Mapsidius auspicata* Walsingham, holotype (BM slide 4174); Lanai, 2,000 feet. The forking of vein 1b in the forewing is variable in the various *Mapsidius* species—it is strong in some and weak in others. This is the type-species of *Mapsidius*.

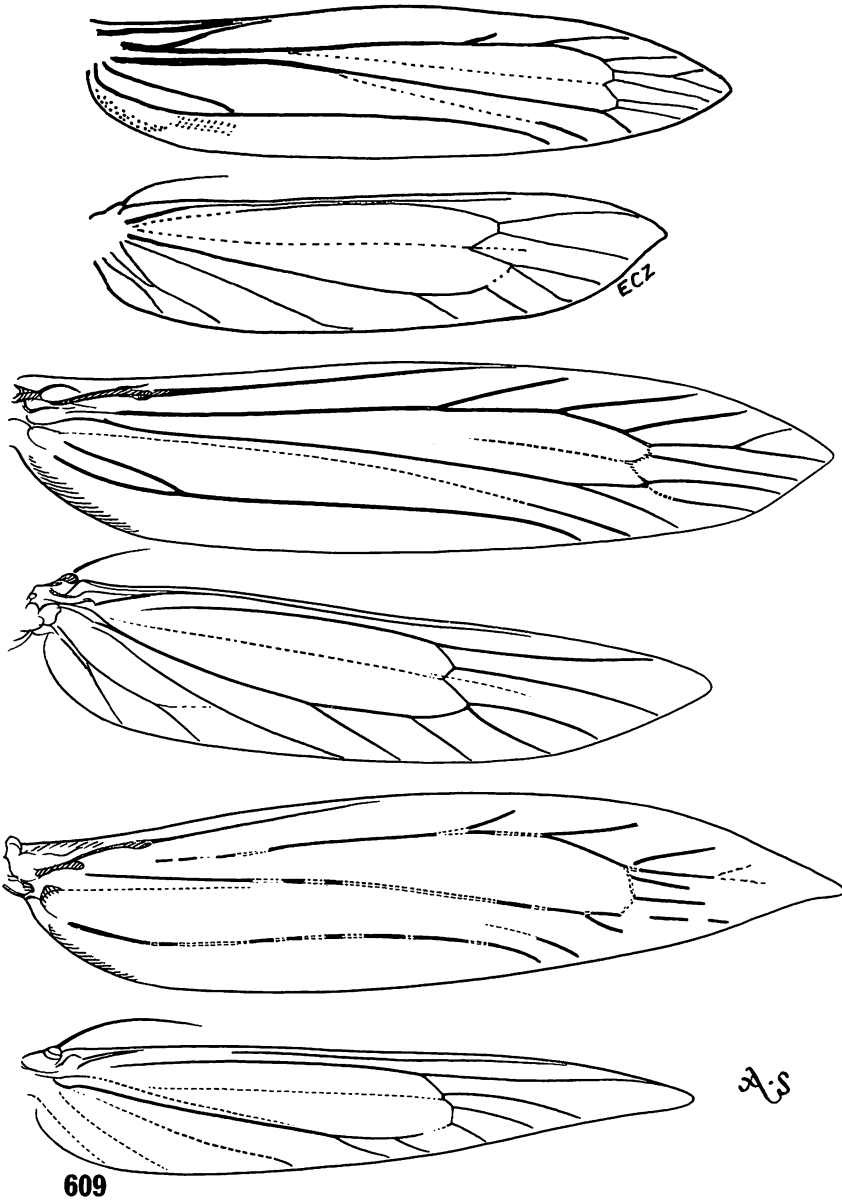


Figure 609—Wing venations of *Mapsidius*. Top, *iridescens* Walsingham (slide Z-70-14); Kamuela, Kauai. Middle, *quadridentata* Walsingham (Busck slide 61); Maui. Bottom, *chenopodii* Swezey (slide Z-XII-21-65); Maui. Note particularly the differences in the forking of the base of vein 1 in the forewings, the origins of veins 4 and 5, and the different wing shapes. Not to same scale.

The scythridids are a confusing group, and the determination of their true taxonomic position is difficult. They appear to combine characters of the yponomeutoids and the gelechioids. Some authors place them in the Yponomeutidae, some in the Gelechiidae, some in the "Elachistidae", and some workers give them full family status.

The larvae are exceptional and appear out of place in either the yponomeutoids or the gelechioids because most of the pinacula bear more than the normal single seta (I have examined larvae of European *Scythris* and the Hawaiian *Mapsidius*). The placement of seta L2 on abdominal segments one to eight is unusual, because it is situated far below seta L1 and on the level of L3. The separation of L1 and L2 is yponomeutoid and certainly not gelechioid (on which group L2 is normally closely approximated to L1 if not on the same pinaculum). The very low placement of L2 in front of L3 is an extreme of the tendency for the separation of L1 and L2 in many yponomeutoids. One must not be confused by the fact that there are two setae on the L1 pinaculum on *Mapsidius* and *Scythris*, because it may appear that the double L1 is L1 and L2, whereas the L2 pinaculum is placed far distant from

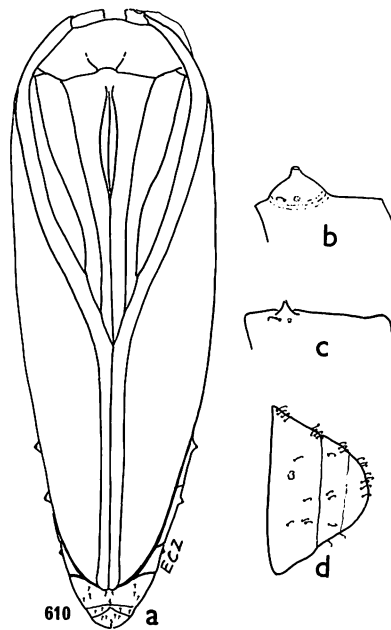


Figure 610—Details of the pupae of *Mapsidius* species. *a*, ventral aspect of a cast skin of *auspicata* Walsingham; length 6 mm. *d*, left lateral aspect of cauda of same. *c*, lateral aspect of the spiracle of the right side of the second abdominal segment as seen from the left side (the spiracles are progressively smaller on each segment caudad of this). *b*, lateral aspect of the spiracle of the right side of the second abdominal segment of *chenopodii* Swezey, as seen from the left side. Note the great differences in the sizes of the spiracles when compared with the lengths of their respective tergites. Except for these differences, the pupae of these species are basically very similar. The pupae are smoothly compact, solidly fused with no possible movement of the abdomen, and with nonprotuberant appendages.

L1 and is in front of the L3 pinaculum. The L2 pinaculum may have two or three setae (perhaps even more in some species?), and the L3 pinaculum bears several setae. On the *Mapsidius chenopodii* larvae that I have seen, the D pinaculum bear three setae, the SD1 pinaculum has two setae, and the SV pinaculum bears a cluster of several setae.

Mosher (1916:100, fig. 89) studied the pupae of two supposed *Scythris*, and she placed the Scythrididae in the Gelechioidea while noting its similarities to the Yponomeutoidea. She illustrates a supposed pupa of *Scythris eboracensis* Zeller in which she shows the antennae touching at their extreme apices. The European *Scythris* I have studied have the pupal antennae separated throughout as they are in most yponomeutoids and obviously different from the arrangement in most, but not all, the gelechioids where the antennae normally lie at least in partial contact on the abdomen. I have seen pupal skins of *Mapsidius auspicata* Walsingham and *Mapsidius chenopodii* Swezey (figure 610). They are solid, smoothly compact pupae whose appendages are tightly fused with the body and are not protuberant. No movement of the abdomen appears possible. The antennae are contiguous for their entire lengths on the abdomen, as figured, and thus they differ from the American and European species discussed above. The labial palpi are exposed on *Scythris* and *Mapsidius* as they are in the yponomeutoids, but some gelechioids also have them exposed. Mosher says that the abdominal spiracles are produced and tubular in some American species assigned to *Scythris*. On the European *Scythris* pupae I have examined they are only moderately produced. On *Mapsidius* they are distinctly produced as illustrated in figure 610, *b*, *c*. Tubular, produced spiracles are found in the Yponomeutidae.

The larvae and pupae appear to be yponomeutoid, and the moths more nearly resemble yponomeutoids than gelechioids if the squamose proboscis is ignored. However, the densely squamose proboscis is a most confusing gelechioid character. The female has a two-spined frenulum as do the yponomeutoids. Although the gelechioids usually have three spines in the frenulum, some of them have only two spines. The strange genitalia are unlike anything I have seen in either the yponomeutoids or the gelechioids. The wing venation is distinctive, and the placement of vein 11 (R1) distad of the middle of the cell is particularly noteworthy.

It would appear that the Scythrididae is a divergent group in which characters of both the yponomeutoids and gelechioids are strangely combined. For convenience, I shall treat the family tentatively as a member of the gelechioids so that it is associated with all other Hawaiian Microlepidoptera which have squamose proboscides.

#### Genus **MAPSIDIUS** Walsingham

*Mapsidius* Walsingham, 1907*b*:650. Type-species: *Mapsidius auspicata* Walsingham, 1907*b*:650, by original designation.

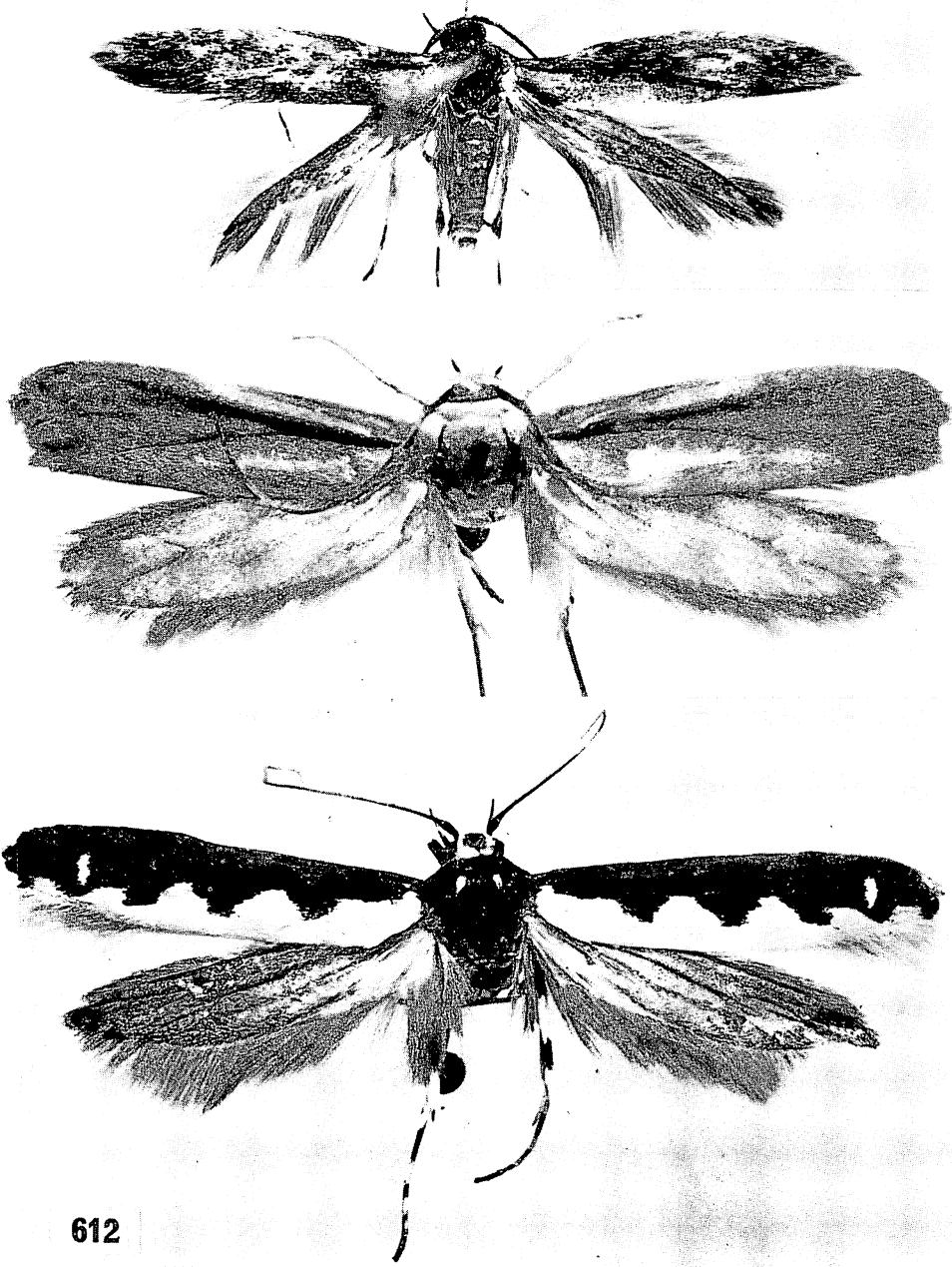
*Mapsidius* is known only from the Hawaiian Islands and is one of the most unusual genera of the endemic Lepidoptera. I do not have any information concerning its relationships except that it appears allied to *Scythris*. The fore-



611

Figure 611—*Mapsidius*. Top, *auspicata* Walsingham, allotype male (BM slide 4174); Lanai, 2,000 feet; forewing 6.5 mm. Middle, *charpentieri* Swezey, holotype; Mohiakea, Waianac Mts., Oahu. Bottom, a cocoon of *charpentieri*; length 2.5 mm.





612

Figure 612—*Mepsidius*. Top, *chenopodii* Swezey, holotype; Saddle Road, Hawaii; forewing 6 mm. Middle, *iridescens* Walsingham, holotype female (BM slide 3954); Kauai, 3,000 to 4,000 feet; forewing 12.5 mm. Bottom, *quadridentata* Walsingham, holotype female (BM slide 3953); Lanai, 2,000 feet; forewing 12.5 mm.

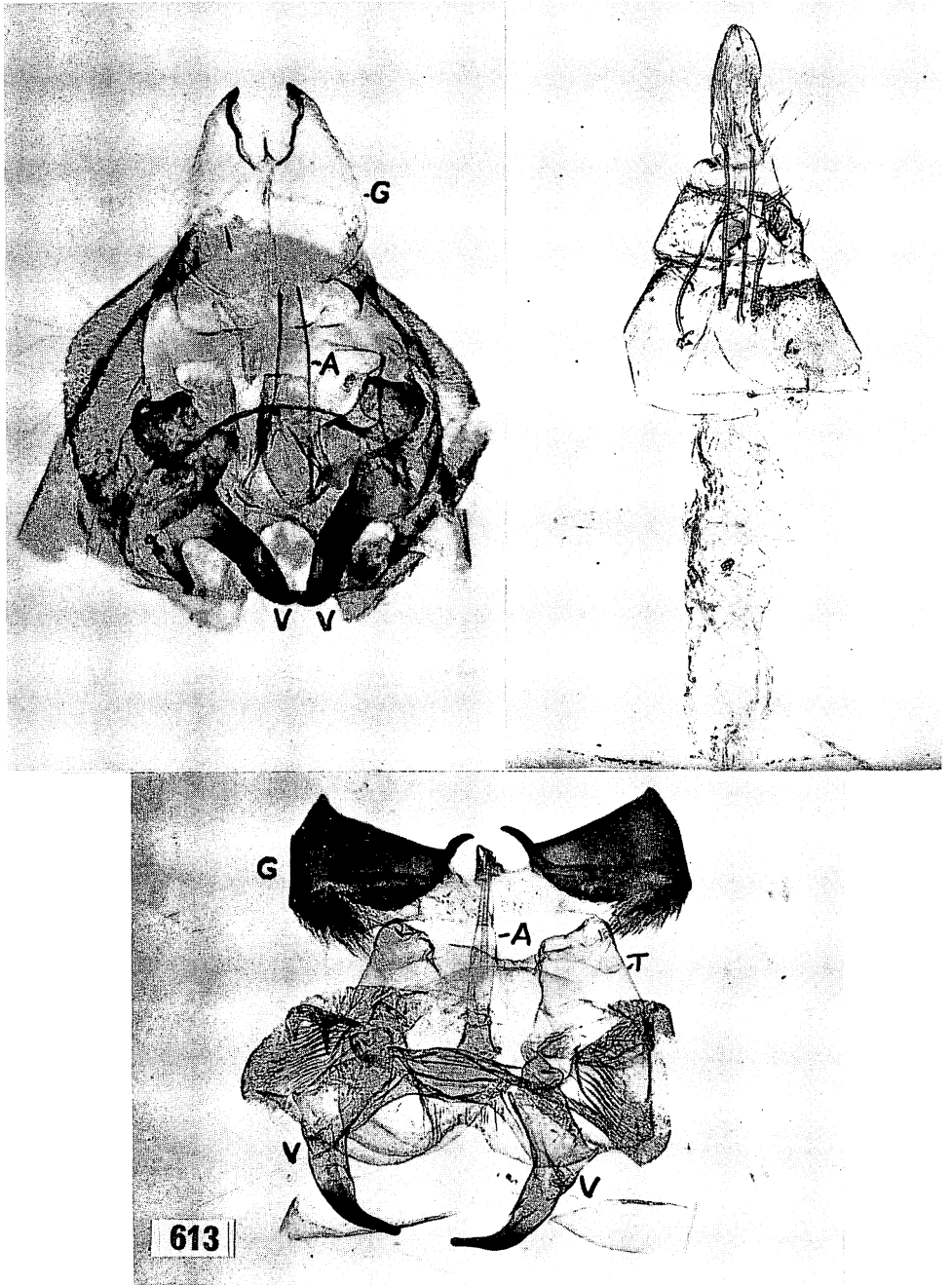


Figure 613—*Mapsidius*, genitalia. Top left, male genitalia of *auspicata* Walsingham, holotype (BM slide 4174), aedeagus in situ; Lanai, 2,000 feet. Note the fused gnathus at top. Top right, female genitalia of *quadridentata* Walsingham, holotype (BM slide 3953); Lanai, 2,000 feet. Bottom, genitalia of a male paratype of *charpentieri* Swezey (Busck slide 63), aedeagus in situ; Waianae Mts., Oahu. Note the heavily sclerotized arms of the divided gnathus. Compare figure 614. A, aedeagus; G, gnathus; T, tegumen; V, valva.

wings have only 11 veins (evidently 3 and 4 are fused), and veins 7 and 8 are stalked when fully developed. The wing shape and venation are subject to rather unusual specific variation. The male genitalia are heavy and peculiar—bearing no resemblance to the genitalia of any other genus in Hawaii. The pilifers are well developed, and the vestiture that they bear crosses over the base of the rostrum so as to make them appear to resemble maxillary palpi.

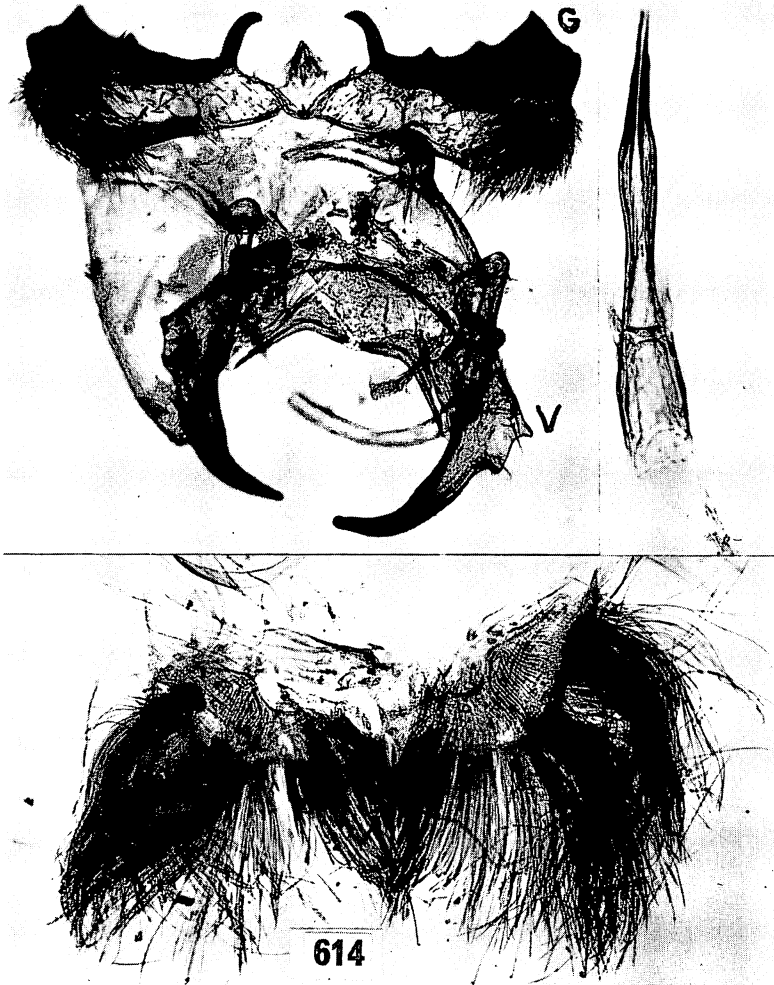


Figure 614—Male genitalia and apex of abdomen of, supposedly, *Mapsidius charpentieri* Swezey (slide Z-XII-19-62-15); Halecauau, Oahu; aedeagus at top right. Compare figure 613 and note the differences in the contours of the arms of the gnathus and the valvae. It would appear that two forms are involved. If not, the variation is unusually great. G, gnathus; V, valva.

There is specific variability in the development of the maxillary palpi. Walsingham, in his original description, said that the proboscis is "naked". This statement is a serious error, because the rostrum is densely and conspicuously squamose. Walsingham also said in his original description that the basal antennal segment lacks a pecten. This is true for his species *auspicata* and *iridescens* and *chenopodii* Swezey, but Walsingham's *quadridentata* has a conspicuous pecten as does Swezey's *charpentierii*.

Five species have been described in *Mapsidius*, but there are many undescribed species in the islands. Four of the five known species have *Charpentiera* (Amaranthaceae) as hostplant. The fifth known species feeds upon *Chenopodium* (Chenopodiaceae). "The caterpillars of these moths feed within webs on the new apical foliage; later, when the leaves are fully expanded they are some-

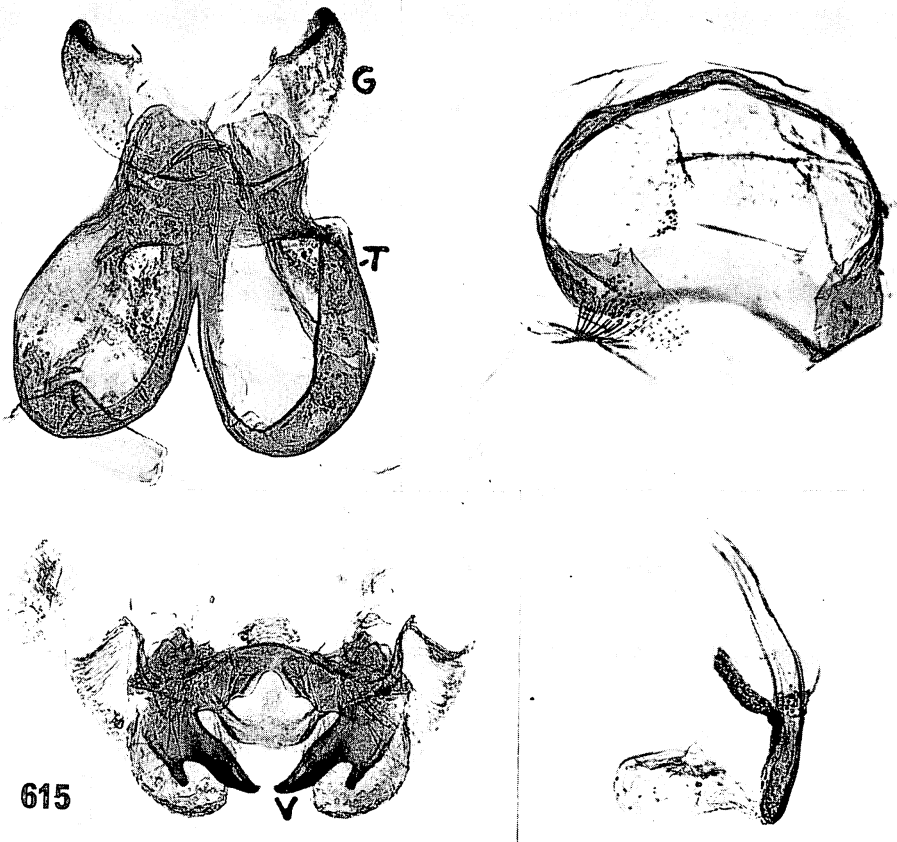


Figure 615—*Mapsidius chenopodii* Swezey, dismembered male genitalia (slide Z-XII-21-65); Saddle Road Hawaii; ex *Chenopodium*. Top left, tegumen and arms of the gnathus. Top right, caudal abdominal segment. Bottom left, valvae and associated parts. Bottom right, aedeagus. G, gnathus; T, tegumen; V, valva.

times very ragged from the work of these larvae. The white, densely spun cocoons are made on the leaves.” (Swezey, 1954:45.)

Some of the moths have striking and beautiful color patterns. It is strange that so few specimens have been captured. Dr. Perkins collected three species, but he found only one specimen each of two of the species and only two specimens of the third during all of his extensive Hawaiian explorations over a period of several years. Much remains to be recorded about these unusual moths.

I have examined the larvae of *Mapsidius chenopodii* Swezey, and they have much in common with the larvae of true *Scythris*. Some details of the larva of *Mapsidius chenopodii* are as follows: Head with the frons reaching only about half the distance to the vertical triangle; each mandible has four sharp apical teeth. The three prespiracular L setae of the prothorax are in a subhorizontal line. On abdominal segments one to eight the D1 and D2 pinacula are in line

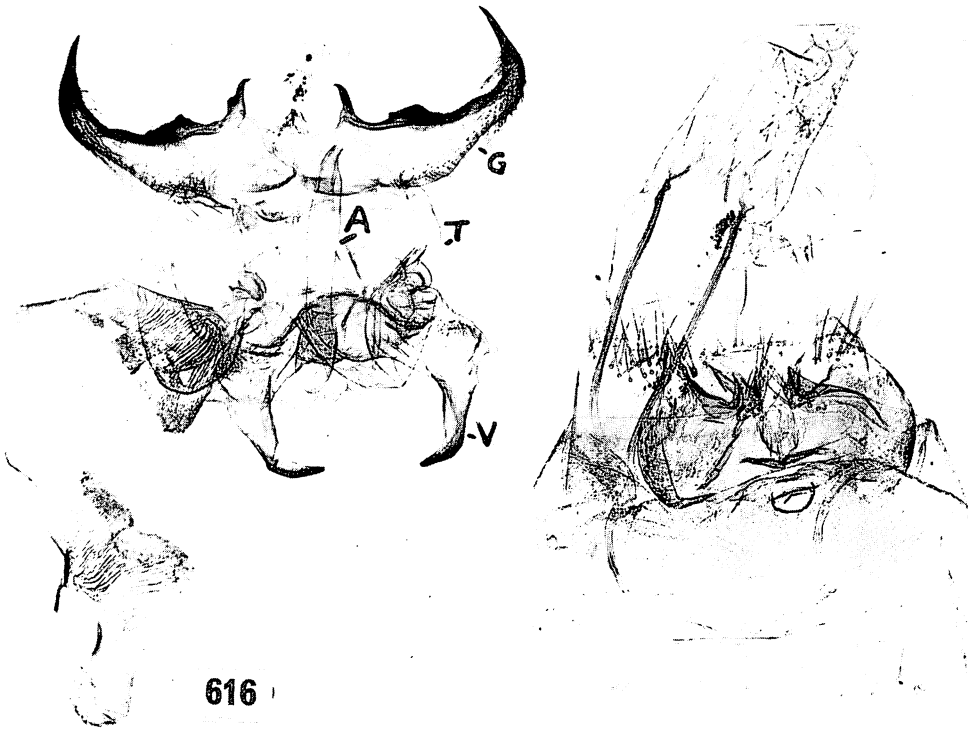


Figure 616—*Mapsidius quadridentata* Walsingham, male and female genitalia (male, Busck slide 61; female, Busck slide 62); Maui. A, aedeagus; G, gnathus; T, tegumen; V, valva.

and each contains about four setae; seta SD1 is single, directly above the spiracle and longer than the D setae; the L1 pinaculum has two setae (one of which is short and may easily be overlooked); the L2 pinaculum has two setae and is far below L1; the L3 pinaculum has about six setae; the SV and V setal groups on abdominal segments one and two have four or five setae; the SV groups on abdominal segments three to six have about 10 to 12 setae but only two setae on segments seven, eight, and nine; the V setal groups on segments three to nine are single but sometimes have a second very small seta on segment seven. The spiracles are very small. Ventral proleg crochets are arranged in biordinal circles.

The multiple setae on the abdominal pinacula are a diagnostic character for *Mapsidius* in the Hawaiian microlepidopterous fauna.

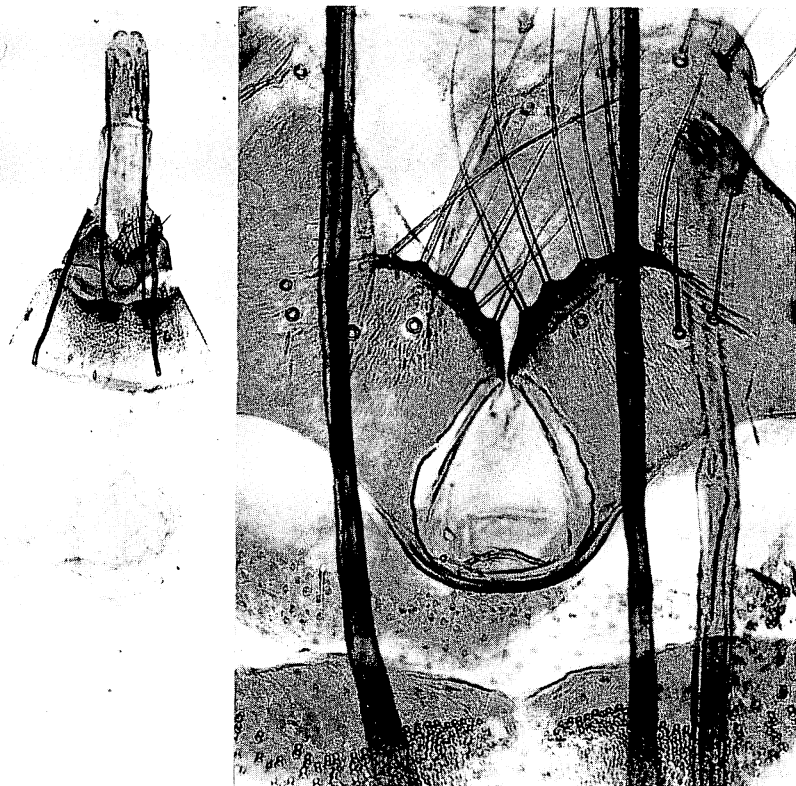
**617**

Figure 617—*Mapsidius auspicata* Walsingham, female genitalia (slide Z-XII-24-65); Kamokuiki Valley, Oahu; ex *Charpentiera*.

## KEY TO THE SPECIES OF MAPSIDIUS

1. Forewings immaculate, iridescent greyish; figure 612;  
Kauai . . . . . **iridescens** Walsingham.  
Not as above forewings variously maculate . . . . . 2
- 2(1). Forewings very boldly marked with the posterior part  
of the wing white and the anterior part black with  
the black extended into the white area as four or  
five subtriangular, toothlike projections, as in figure  
612; Lanai and Maui . . . **quadridentata** Walsingham.  
Without such a color pattern . . . . . 3
- 3(2). Forewings basically fuscous with a scattering of white  
scales which do not form distinct maculae; figure  
612; Hawaii . . . . . **chenopodii** Swezey.  
Forewings basically white scaled with fuscous to black  
scaling, some of which form distinct maculae . . . . . 4
- 4(3). Forewing pattern as in figure 611; expanse about 15  
mm.; antennal pecten absent; on various islands . . .  
. . . . . **auspicata** Walsingham.  
Forewing pattern as in figure 611, the maculae more  
discrete and more sharply angled than on *auspicata*;  
expanse about 20 to 25 mm.; antennal pecten  
conspicuous; Oahu . . . . . **charpentierii** Swezey.

**Mapsidius auspicata** Walsingham (figs. 608, head, wing venation; 610, pupa; 611, moth; 613, male genitalia; 617, female genitalia; col. pl. 4:6).  
*Mapsidius auspicata* Walsingham, 1907b:650, pl. 25, fig. 5.

Endemic. Kauai (female holotype locality: Kaholuamano, 4,000 feet),  
Oahu, Lanai (male allotype locality: 2,000 feet), Hawaii.

Hostplant: *Charpentiera*.

Parasites: *Horogenes blackburni* (Cameron), *Pristomerus hawaiiensis* Perkins.

"Larva in dense white silken tunnel on leaves. . . ." (Swezey, 1910e:141.)

See also notes under *charpentierii* below.

There have been several species mixed under this name, and the recorded  
distribution is suspect. The basal antennal segment does not have a pecten.

**Mapsidius charpentierii** Swezey (figs. 611, moth, cocoon; 613, 614, male  
genitalia; 618, female genitalia).

*Mapsidius charpentierii* Swezey, 1932:201, pl. 13, fig. 5; 1954:45, fig. 14.

Endemic. Oahu (type locality: Mohiakea Valley, Waianae Mountains).

Hostplant: *Charpentiera obovata*.

Similar to *auspicata* Walsm., but of larger size, and the black marks on the forewings (as shown by the  
figure) are more distinct and angulated. The cocoon is different, also. It is elongate spindle-shaped, densely  
made of white silk, placed on underside of leaf and beneath a thin lacework of silk which has several large  
circular meshes. This is similar to the way the cocoon of *M. quadridentata* is constructed, whereas the cocoon  
of *auspicata* is broad spindle-shaped beneath a closely-woven layer of white silk.

Pupa 10 mm., dark brown, lighter on the wing sheaths, which extend as far as the apex of 6th abdominal segment. Apical margin of abdominal segments with a raised rim. Spiracles of abdominal segments raised. Cremaster obtuse. (Swezey, 1932:201.)

The basal antennal segment bears a squamose pecten.

The holotype is now in the Bishop Museum.

**Mapsidius chenopodii** Swezey (figs. 609, wing venation; 610, pupa; 612, moth; 615, male genitalia; 619, female genitalia).

*Mapsidius chenopodii* Swezey, 1947b:103.

Endemic. Hawaii (type locality: near Pohakuloa).

Hostplant: *Chenopodium oahuense*.

Parasites: *Bracon* species [misidentified as *terryi* (Bridwell)], *Horogenes* ("Olesicampe") *blackburni* (Cameron).

The larvae (described briefly before the key immediately above) have on occasion been found to be numerous on the foliage of the hostplant. It will be noted that all the other described species of *Mapsidius* have been found to feed upon *Charpentiera* (Amaranthaceae).

The basal antennal segment of the moth lacks a pecten.

The holotype is now in Bishop Museum.

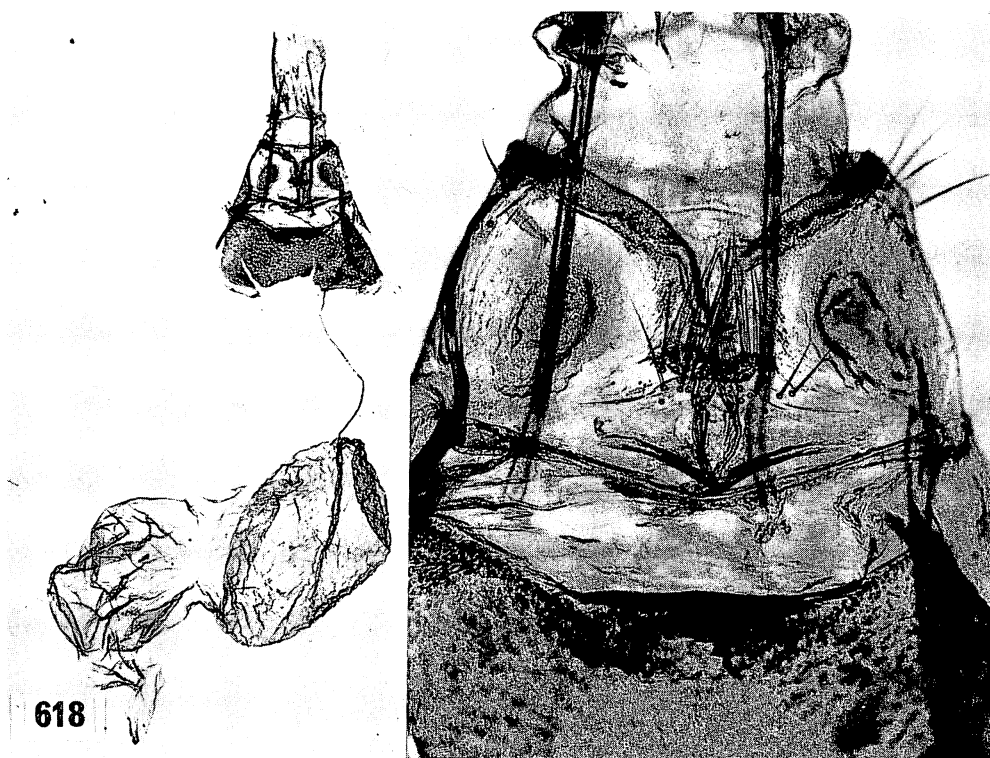


Figure 618—*Mapsidius charpentieri* Swezey, female genitalia (slide Z-XII-19-62-14); Kamokuiki Valley, Oahu; ex *Charpentiera*.



**Mapsidius iridescens** Walsingham (figs. 609, wing venation; 612, moth; 620, male, female genitalia).

*Mapsidius iridescens* Walsingham, 1907*b*:651, pl. 25, fig. 7.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: *Charpentiera* leaves.

Parasite: *Frontina archippivora* Williston (Diptera).

This species is distinctive because of the immaculate, somewhat iridescent coloration of the forewings. The peculiar maxillary palpi are much reduced. It was described from one female collected in May, 1894, by Dr. Perkins. A male, determined as this species by Dr. Swezey, which I have compared with the type (and whose genitalia I have illustrated), has a different appearance from the type. Perhaps this is because of its having been faded by the tropical sun while it was in the Sugar Planters' collection in Honolulu. It has a strange, narrow, thinly scaled, shiny band along part of the posterior margins of the forewings to beyond their middles, and the scaling at the bases of the wings

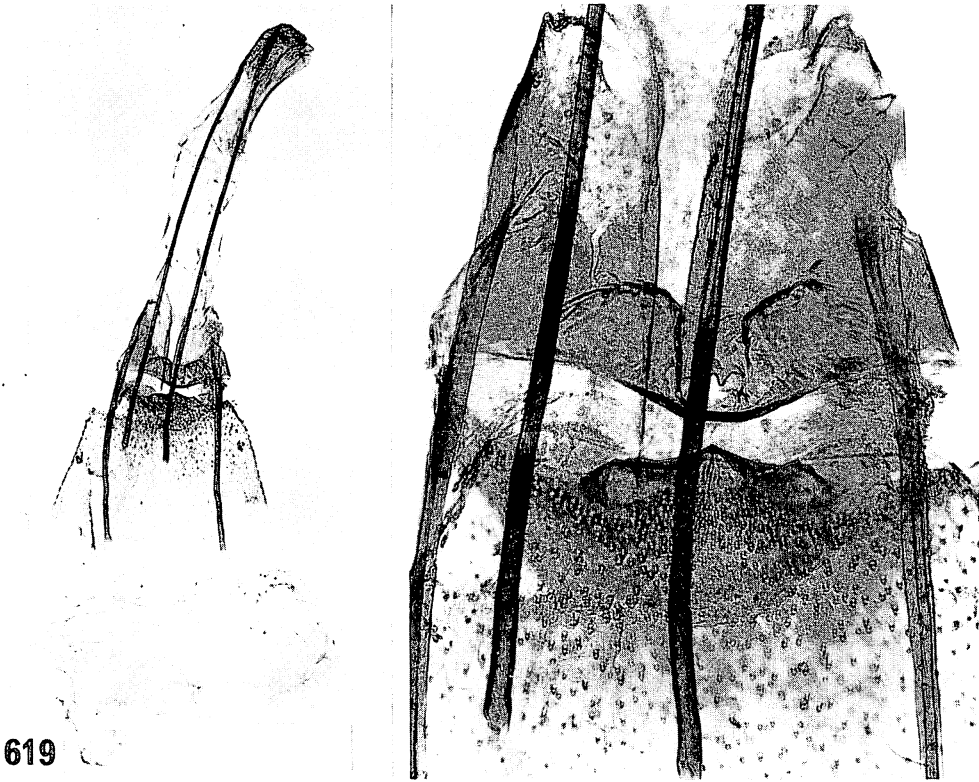


Figure 619—*Mapsidius chenopodii* Swezey, female genitalia (slide Z-XII-22-65); Saddle Road, Hawaii; cx *Chenopodium*.



Figure 620—Genitalia of *Mapsidius iridescens* Walsingham. Top, female genitalia of the holotype (BM slide 3954); Kauai, 3,000 to 4,000 feet. Bottom, male genitalia from a specimen reared from *Charpentiera*; Kauai (Busck slide 75).

is different. If these characters are not sexual, then two species have been mixed under this name. The basal antennal segment lacks a pecten.

**Mapsidius quadridentata** Walsingham (figs. 609, wing venation; 612, moth; 613, female genitalia; 616, male, female genitalia).

*Mapsidius quadridentata* Walsingham, 1907b:651, pl. 25, fig. 6. Swezey, 1954:45, fig. 13.

Endemic. Lanai (type locality: 2,000 feet), Maui.

Hostplant: *Charpentiera*.

As the illustration displays, the forewings of this species are the most boldly maculate of any of the described species of the genus.

The Maui record, and that of the hostplant, are by Dr. Swezey who reared a specimen taken at Wailuku in 1922 [*Proc. Hawaiian Ent. Soc.* 5(3):343, 1924]. In his *Forest Entomology in Hawaii*, 1954:45, he also listed the species from Iao Valley, Maui.

The basal antennal segment has a squamose pecten.

#### Family **AGONOXENIDAE** Meyrick

*Agonoxenidae* Meyrick, 1926a:245. T.B. Fletcher, 1929:ii. Brues and Melander, 1932, 1945:225. Brues, Melander and Carpenter, 1954:245. Bradley, 1966:453, revision.

Meyrick erected this family to receive *Agonoxena* and *Haemolytis*.

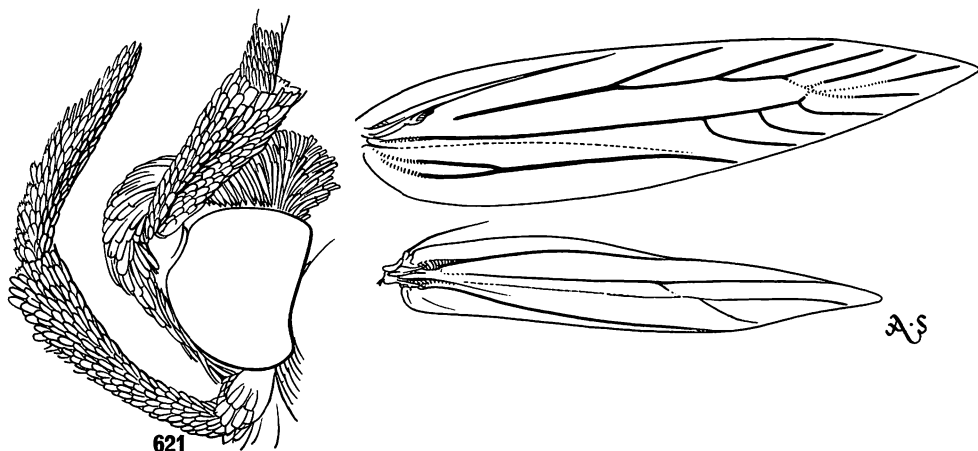


Figure 621—Head and wing venation of *Agonoxena argaula* Meyrick (BM slide 2318); Ellis Islands. There is individual variation in the origins of veins 6, 7, and 8 in the forewing and veins 5 and 6 in the hindwing. The female frenulum contains only two setae.

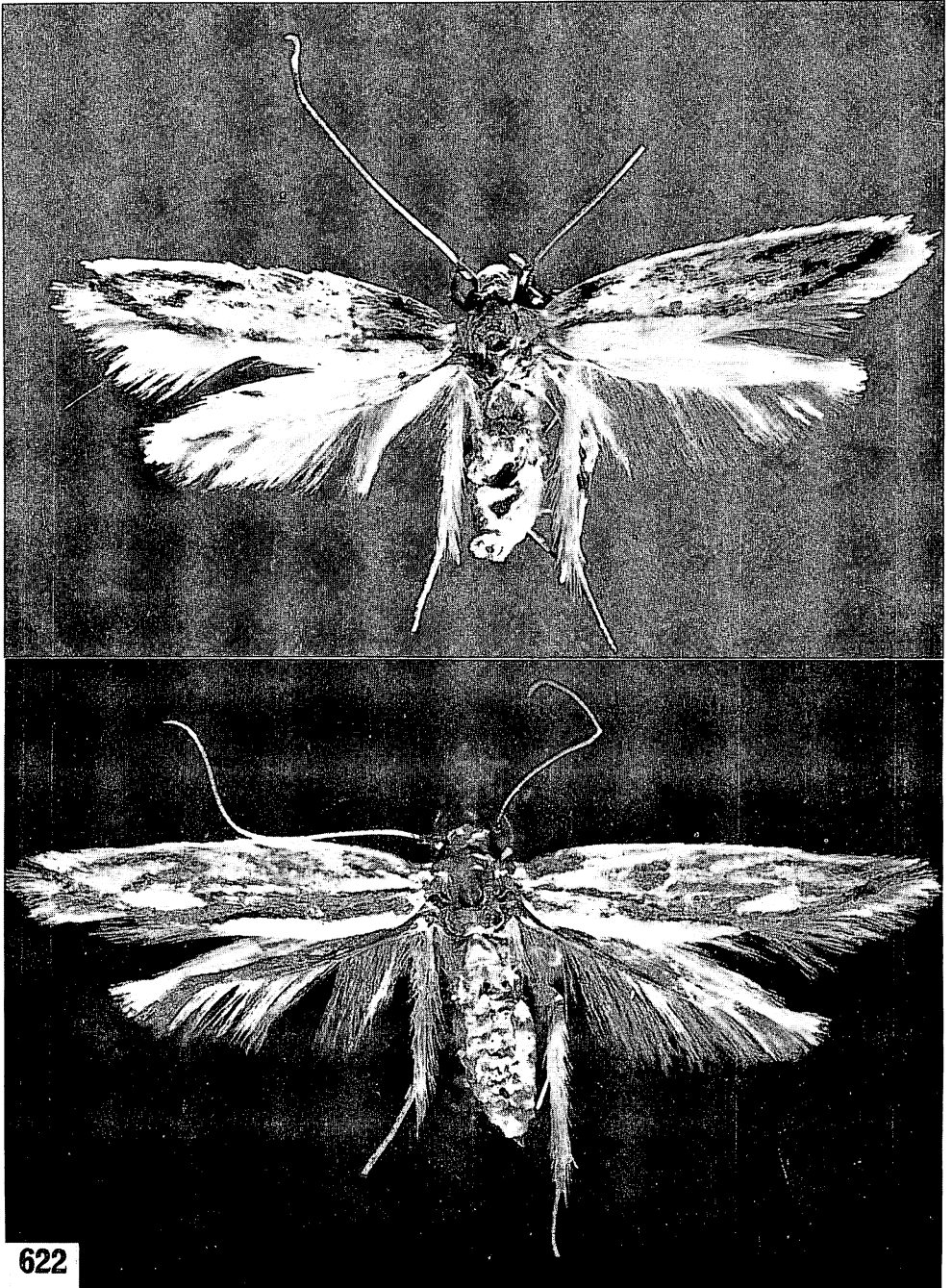
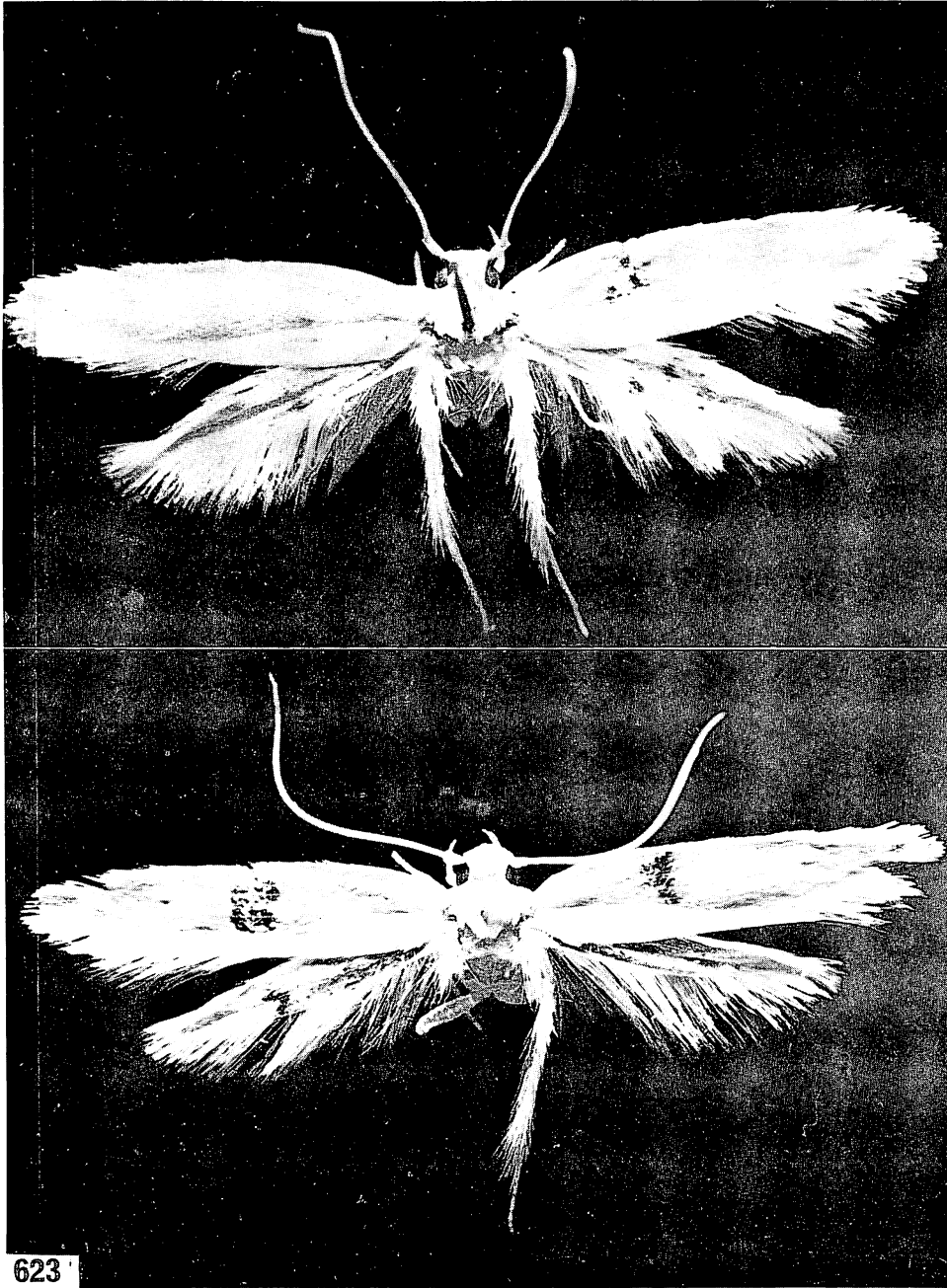


Figure 622—*Agonoxena argaula* Meyrick, color forms. Honolulu specimens. Expanse about 12 to 16 mm.



623

Figure 623—*Agonoxena argaula* Meyrick, color forms. Honolulu specimens. Expanse about 12 to 16 mm.

The phylogenetic position of the family evidently puzzled Meyrick, who, basing his classification mainly on wing venation and external characters, suggested that it might be connected with the Cosmopterigidae. Previously (Meyrick, 1921, p. 471), he had placed *Agonoxena* in the family Coleophoridae, but had expressed the opinion that it was an aberrant form of doubtful reference.

In the present study, a wider range of characters than used hitherto has been considered and has included genitalic and pupal structure and larval chaetotaxy. These combined have provided evidence which supports Meyrick's hypothesis that the family belongs in the Gelechioid complex, but which indicates a closer affinity with the Oecophoridae than with the Cosmopterigidae.

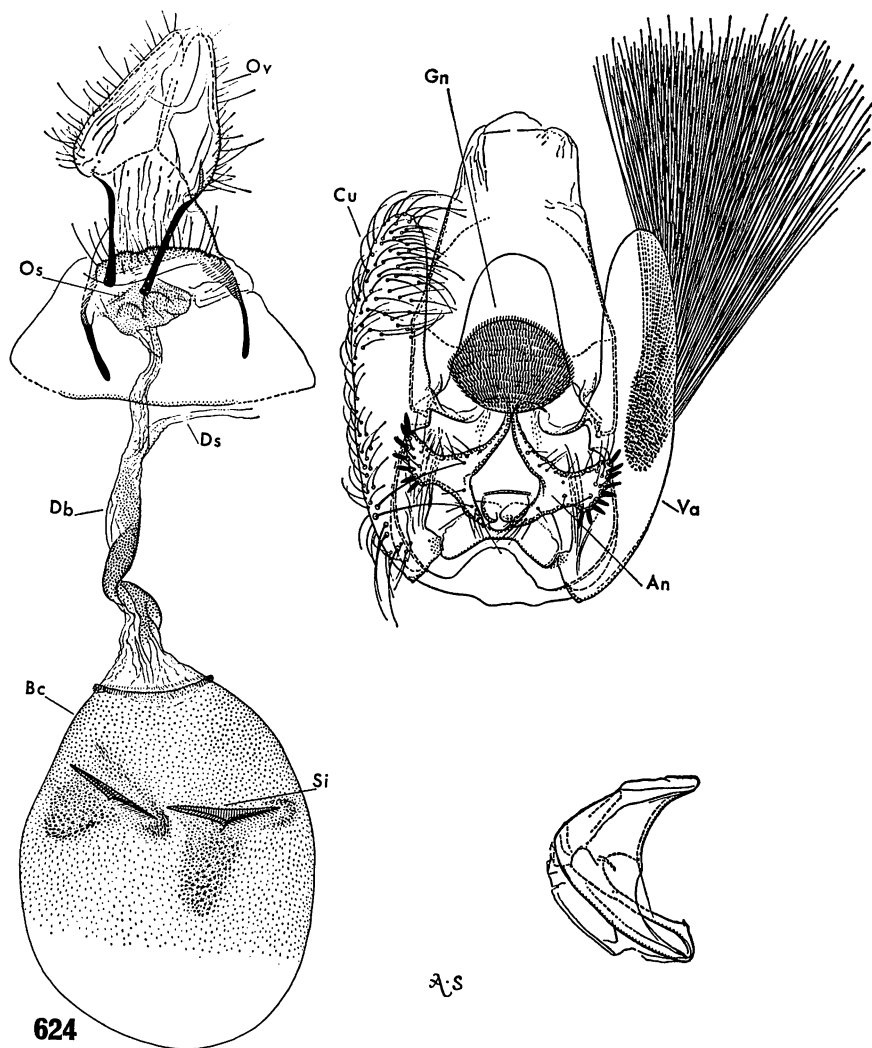


Figure 624—*Agonoxena argaula* Meyrick, female and male genitalia (rearranged from Bradley, 1966). Aedeagus at bottom right. *An*, anellus; *Bc*, bursa copulatrix; *Cu*, cuculus; *Db*, ductus bursae; *Ds*, ductus seminalis; *Gn*, gnathus; *Os*, ostium; *Ov* ovipositor; *Si*, signum; *Va*, valva.

The adults of the . . . described species representing this family are broadly similar in both superficial and internal structure and form a homogeneous and distinctive group. The forewing coloration and pattern, flattened head and explanate labial palpi are characteristic and diagnostic characters of members of this family. (Bradley, 1966:453-454.)

Brues and Melander, 1932:225, 1945:225 (and repeated on p. 233 of the 1954 edition) erroneously say that the "frenulum of female [is] simple", but it is composed of two bristles.

Genus **AGONOXENA** Meyrick

*Agonoxena* Meyrick, 1921a:471. Type-species: *Agonoxena argaula* Meyrick; monotypic.

*Haemolytis* Meyrick, 1926a:245. Type-species: *Haemolytis miniana* Meyrick; monotypic. Synonymy by Bradley, 1966:454.

Bradley, 1966:453, revision.

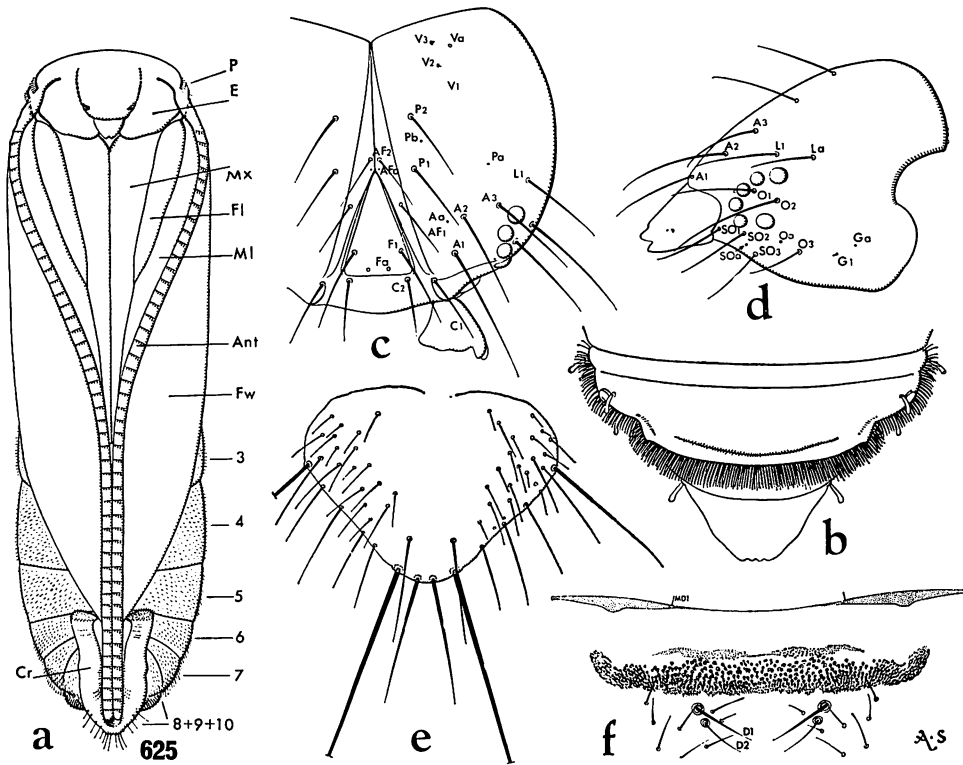


Figure 625—*Agonoxena argaula* Meyrick, details of the larva and pupa (rearranged from Bradley, 1966). *a*, ventral aspect of pupa (*Ant*, antenna; *Cr*, cremaster; *E*, eye; *Fl*, front leg; *Fw*, forewing; *Ml*, middle leg; *Mx*, maxilla; *P*, antennal pecten; 3 to 10, abdominal segments). *b*, dorsal aspect of the caudal end of the pupa. *c* and *d*, frontal and lateral aspects of the larval head. *e*, dorsal aspect of the caudal (10th) tergite of the larva. *f*, dorsal aspect of the mesonotum of the larva. The mesothoracic spiracles are of the transverse type. (Note: In the original paper the maxilla is wrongly labeled labial palpus.)

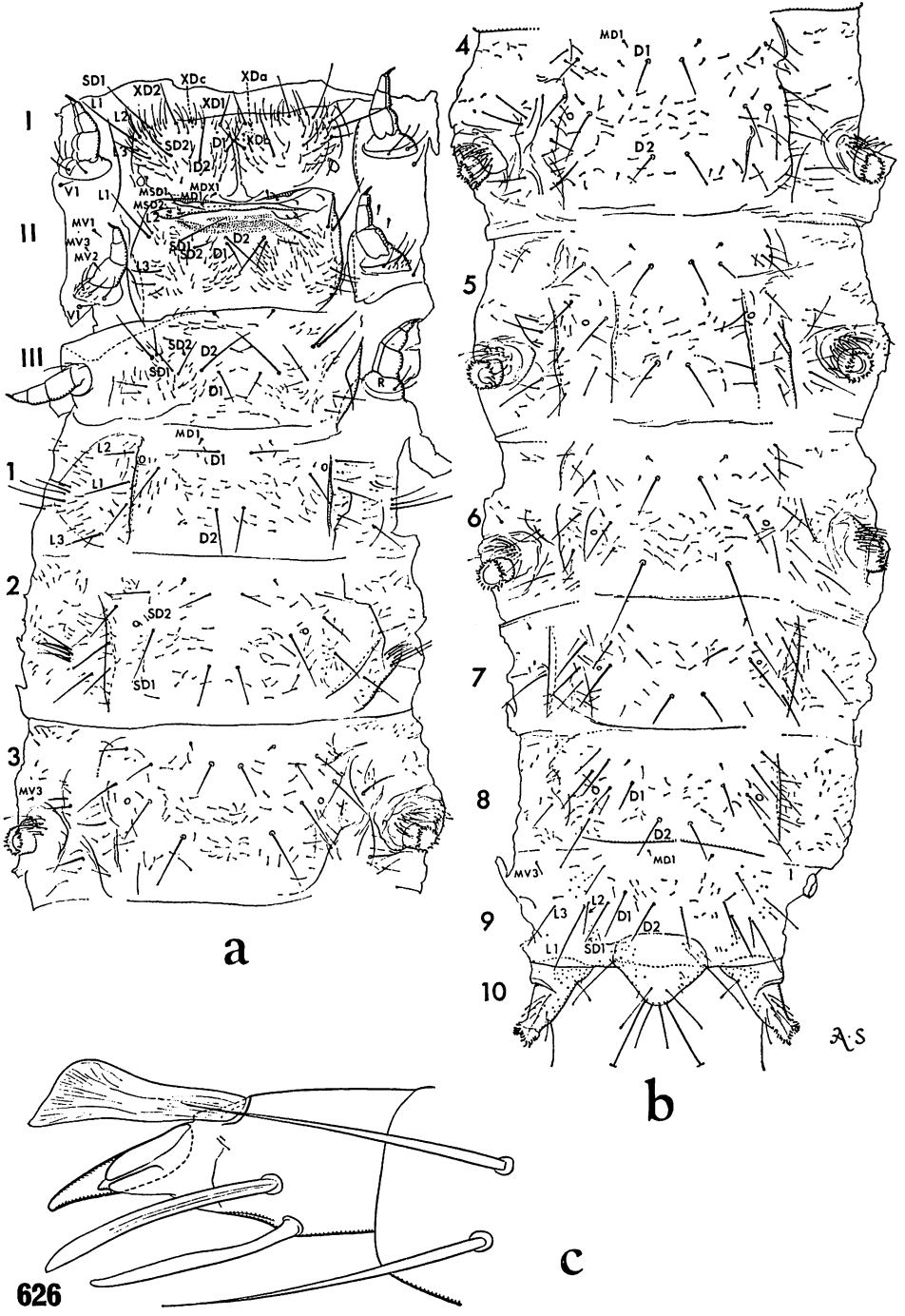


Figure 626—*Agonoxema argaula* Meyrick, details of the larva. a, b, the split skin of the thorax (I, II, III) and abdomen (1 to 10), in dorsal aspect. c, tarsus of a thoracic leg. Note the long anal prolegs. (After Bradley, 1966.)



As now constituted, this genus contains four described species. It is a Pacific genus with species occurring from Java to Australia and Melanesia. The representative in Hawaii is a widespread immigrant of economic importance. It is a moth of depressed form about 7 mm. in length when the wings are in repose. It is cream color beneath and mostly yellow above with white streaks on the forewings of the females. The underside has a definite flattened appearance, and the face is subhorizontal. The labial palpi diverge against the trochanters when at rest. The maxillary palpi are small and the proboscis is squamose basad. The wings diverge caudad. The depressed form of the moth is a reflection of its habit of insinuating itself between the folded leaflets of its palm hosts. Meyrick said that ocelli were present in this group, but that was a mistake—the ocelli are absent in *Agonoxena*.

**Agonoxena argaula** Meyrick (figs. 621, head, wing venation; 622, 223, moths; 624, male and female genitalia; 625, 626, larva, pupa; 627, larval damage).

*Agonoxena argaula* Meyrick, 1921a:472; 1927c:84. Swezey, 1942:215; 1954:57. Bradley, 1966:453, redescription, larva, pupa, adult, many figures. See *Proc. Hawaiian Ent. Soc.* after 1949 for numerous references by various authors in Hawaii.

The coconut flat moth.

Kauai, Oahu, Hawaii.

Immigrant. Described from Fiji and known also from Guam, the New Hebrides, Tonga, Samoa, Ellice, Wallis, Futuna, and Palmyra islands. First recorded in Hawaii by Van Zwaluwenburg in 1949 [*Proc. Hawaiian Ent. Soc.* 13(3):334, 1949] from specimens collected at Kahala, Honolulu by him and Pemberton in June, 1948. It was first found on Kauai in 1952 and on Hawaii in 1953. Artificially spread by commerce.

Hostplants: *Chrysalidocarpus lutescens* (areca palm), *Cocos nucifera* (coconut), *Hyophorbe amaricaulis* (bottle palm), *Kentia*, *Pritchardia* ("loulou").

Parasites: *Apanteles agonoxenae* Fullaway, *Brachymeria agonoxenae* Fullaway (as much as 85% parasitism of pupae), *Brachymeria polynesiensis* (Cameron), *Eupelmus cushmani* (Crawford), *Gelis tenellus* (Say), *Trathala flavo-orbitalis* (Cameron). (Are *Eupelmus* and *Gelis* hyperparasites?) For an account of parasitism, with particular reference to Fiji, together with lists of parasites and a discussion of predation, see Hinckley, 1963. See Van Zwaluwenburg, 1949:447, for parasites in Hawaii.

This, the largest known species of the genus, is a pest of coconut and some other palms. The attacks of the larvae give the leaves an unsightly appearance. "Feeding is confined to the epidermis on the underside of the leaves. The feeding scar of the young larva is long and narrow, spreading into wide, irregular blotches as the caterpillar grows. Feeding areas turn brown and are conspicuous. The caterpillar is yellowish green and feeds beneath a web; it does not tie up the leaf as *Omiodes* [*Hedylepta*] does. Pupation takes place beneath a close, elongate, white web on either side of the upper or lower leaf surface." [Van Zwaluwenburg, *Proc. Hawaiian Ent. Soc.* 13(3):334, 1949.] During a

heavy attack, several thousand larvae may infest a single palm tree. Where the dead tissue has fallen out of the elongate feeding scars, the leaves may be perforated by myriads of slitlike holes.



627

Figure 627—Characteristic linear feeding scars made on a coconut leaflet by the larvae of *Agonoxena argaula* Meyrick. (Photograph supplied by C. J. Davis.)

The slender *Agonoxena* caterpillar feeds beneath a slight web on the underside of the leaflet; it eats the lower epidermis and green parenchyma, leaving the upper epidermis as a narrow, dry, dead patch. As the larva grows it moves about, producing several of these dead spots in the course of its life, so that there may be hundreds of narrow dead areas on each leaf of badly infested trees. In appearance these spots differ distinctly from the work of the coconut leafroller, so the presence of either *Agonoxena* or [*Hedylepta*] *blackburni* can be distinguished readily. (Swezey, 1954:57.)

Tothill, Taylor, and Paine (1930:13, 30, 63, 156, 180, 250, 260), who studied the moth in Fiji during their extensive research on the *Levuana* coconut moth, illustrated the feeding scars of the larvae on their plate 23, figures D and F.

The pale yellowish to greenish larvae are, when mature, about 16 to 18 mm. long, and they have been described in detail by Bradley (1966:462). His figures are reproduced here, and they should suffice to enable the identification of the larva in Hawaii. Attention is called particularly to the numerous secondary setae. Bradley's paper may be consulted when more detailed information is required.

[The cocoon] consists of two main sections: an inner flimsy fusiform case, containing the pupa and cast larval skin, slightly wider than the pupa and almost twice as long, and an outer, comparatively thick, protective mantle which is spread over the inner case. The inner case is smooth-lined and has the lateral walls strengthened with a series of closely spaced vertical struts exteriorly. The outer mantle forms a closely addressed tent-like covering, the peripheral margin adhering to the leaf surface and the intervening space between the margin and the inner case being partly filled with numerous minute struts formed from agglutinated silken threads fixed to the leaf surface and supporting the underside of the mantle. (Bradley, 1966:470.)

Bradley (1966:468) noted that the pupa is pale brown, slightly depressed, has the abdomen setose laterad, and the cremaster is an "elaborate . . . device in the form of a pair of strongly developed arm-like processes projecting cephalad from ventral surface of terminal segments, apices of arms pad-like and clad ventrally with short wiry hairs which engage in the silken cocoon and thus anchor the pupa; structure of cremaster . . . recalling that of the cremaster found in certain species of Ethmiidae."

There is much variation in the color and color pattern of the moths (see the illustrations). The male genital valvae bear great tufts of long hair.

Family **CYCNODIIDAE** Busck

*Elachistidae* Stainton, 1854:224. Spuler, 1898a:33. Busck, 1909:92. Braun, 1948:1, revision of North American species (7 genera, 57 species).

*Elachistinae*: Walsingham, 1890:148.

*Cynodioides* Busck, 1909:92. Forbes, 1923:36, 218.

*Cynodiidae* Busck, 1914a:53, pl. 2. Forbes, 1923:218.

*Cynodiidae*: Brues, Melander, and Carpenter, 1954:258.

*Cynodiadae*: Hampson, 1918:387.

*Aphelosetidae* Hampson, 1918:387. Hampson does not claim credit for this name, but I have been unable to find an earlier usage.

*Aphelosetidae*: Brues, Melander, and Carpenter, 1954:258.

Because of confusion in the identity of the type-species, true *Elachista* does not belong to the family that has been known as the Elachistidae, and Cynodiidae replaces it. J. D. Bradley (1970:231) has said that "if the designations of type-species in Boisduval, 1836 are rejected, the earliest valid type-species designation for the genus *Elachista* appears to be *Tischeria com-*

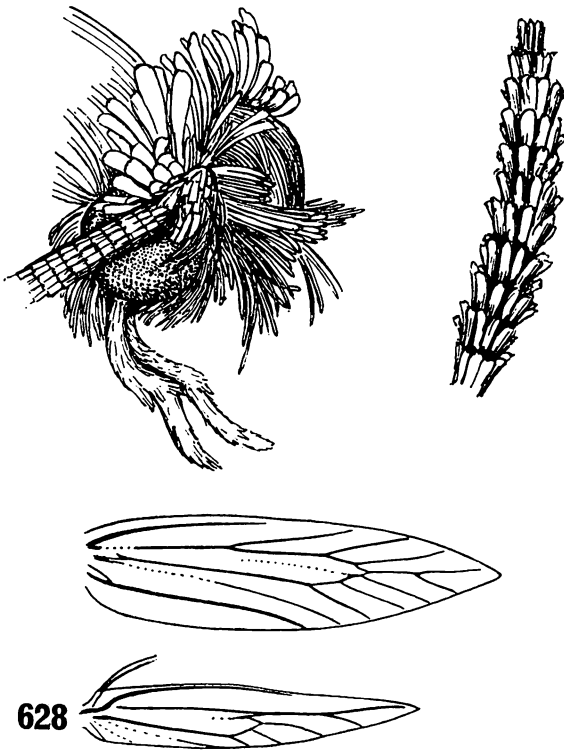


Figure 628—*Swezeyula loniceræ* Zimmerman and Bradley; head, in lateral aspect with scales erected, and apical part of antenna to show the rough scaling and the wing venation.

*planella* (Treitschke) by Duponchel in 1838. If this type-species designation is upheld then the genus *Elachista* Treitschke, 1833 becomes a senior objective synonym of *Tischeria* Zeller, 1839 and would be replaced by *Aphelosetia* Stephens, 1834. The family name Elachistidae would then replace Tischeriidae, and the name [Cynodiidae (Busck, 1909)] would be available for Elachistidae sensu auctt.”

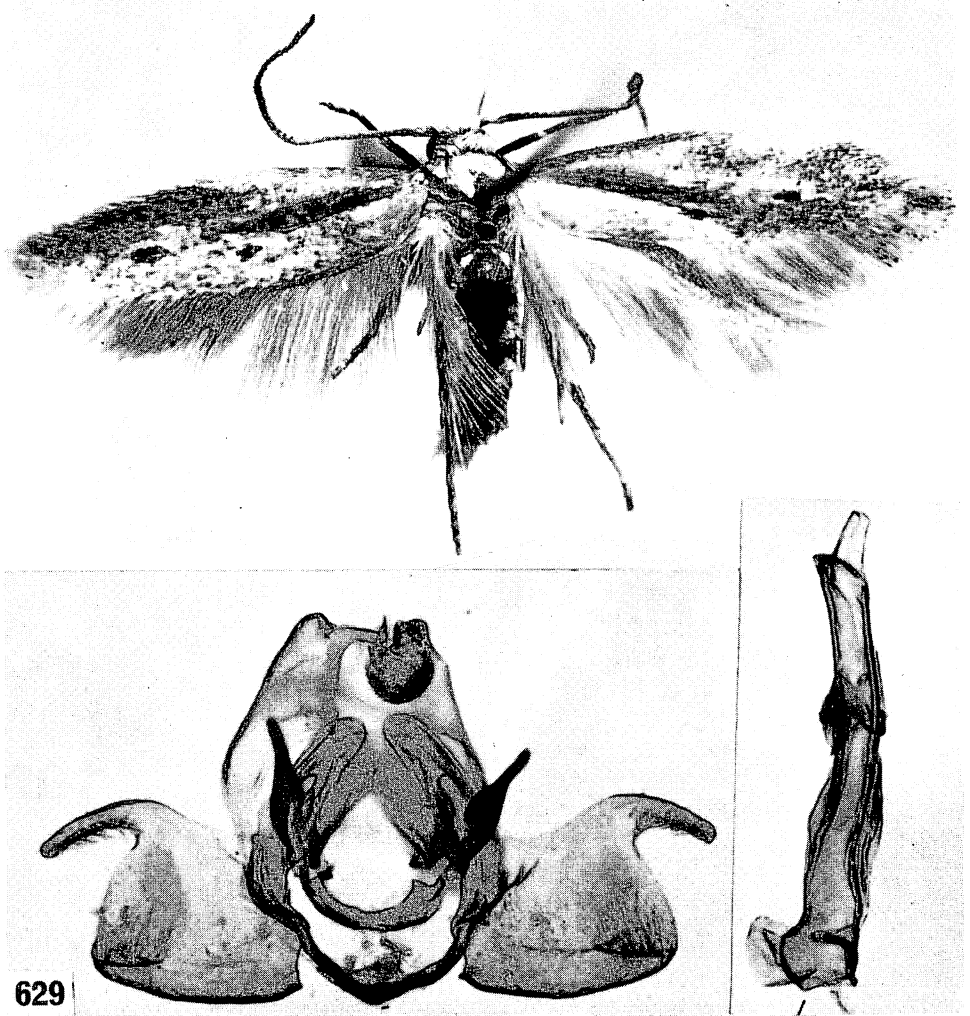


Figure 629—*Swezeyula loniceræ* Zimmerman and Bradley. Top, a paratype from Honolulu, expanse 8 to 9 mm.; forewings greyish with two small dark maculae. Bottom, male genitalia from another paratype from Honolulu.

In *Fauna Hawaiiensis*, Walsingham described two new species which he erroneously placed in *Elachista*. These species were never recognized by subsequent workers in Hawaii. During this study it was found that one of them (*longisquamella*) is the same as "*Petrochroa*" *nigrella* Swezey, which I now place in *Hyposmocoma* in the Cosmopteriginae. The other (*spilota*) belongs to *Philodoria* in the Gracillariidae. Thus, there are no representatives of the Cynodiidae (Elachistidae) in the endemic Hawaiian fauna. A foreign species has, however, become established in Hawaii.

Braun, in her revision of the American species (1948:1) said:

The relationships of the family are somewhat obscure. The presence of an additional branch of radius of the hind wing in some of the genera suggests primitive affinities; however, the retention of such a character in some members of a group is not inconsistent with a high degree of specialization of the group as a whole. Neither pupal characters or genitalia bear out the assumption of a primitive position for the family. Pupal characters indicate Gelechioid affinities with relationship closer to the Oecophoridae, a view supported by certain features of the genitalia. Meyrick (1927, *Revised Handbook of the British Lep.*, p. 600) derives the family from Hyponomeutoid stock; this view is supported by imaginal structure. I would derive the family from primitive Hyponomeutoid stock, in which there is a tendency for preservation of additional branches of the radial sector of the hind wing (Braun, 1933. *Trans. Amer. Ent. Soc.*, LIX, p. 245), with development proceeding along Gelechioid lines, but along the Oecophorid rather than the Gelechiid branch, with considerable affinity to the Scythridae.

It should be noted that the cynodiids have squamose proboscides, as is the normal condition in the gelechioids, whereas the yponomeutoids have "naked" proboscides.

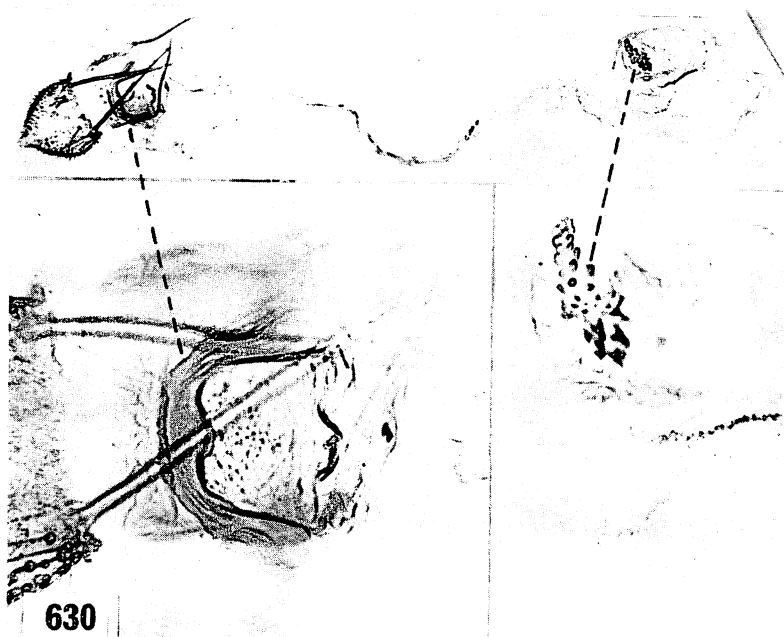


Figure 630—*Swezeyula loniceræ* Zimmerman and Bradley, female genitalia from a Honolulu specimen.

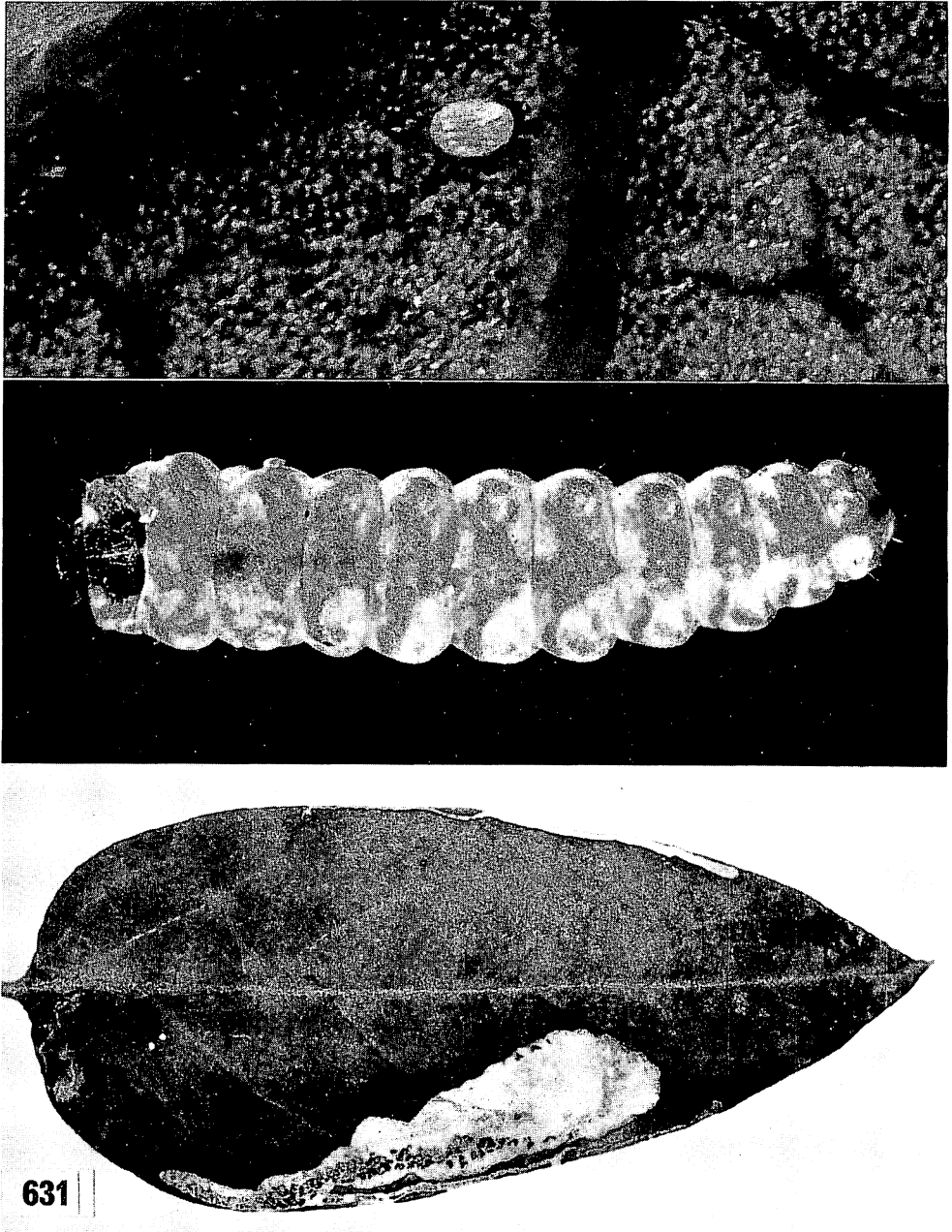


Figure 631—*Swezeyula lonicerae* Zimmerman and Bradley. Top, an egg on a *Lonicera* leaf. Middle, a larva. Bottom, a larval mine in a *Lonicera* leaf. Honolulu specimens.

Genus **SWEZEYULA** Zimmerman and Bradley

*Swezeyula* Zimmerman and Bradley, 1950: 191. Type-species: *Swezeyula loniceræ* Zimmerman and Bradley, 1950: 194, by original designation and monotypy.

This generic name was erected to include a foreign species which became established in Hawaii following the Second World War and for which no acceptable place could be found. *Swezeyula* is closely similar to *Perittia* Stainton, whose type-species feeds on *Lonicera* as does *Swezeyula*. It is possible that detailed study of more species may demonstrate that the characters upon which we erected *Swezeyula* are not sufficient to separate it from *Perittia*. The complex to which these moths belong is in such a taxonomic muddle that it will take much study before the truth is made known.

*Swezeyula* has a strong, multisquamose pecten on the first antennal segment; the latter is arcuate and concave beneath. The antennae are shorter than a forewing. The proboscis is squamose. The labial palpi are slender and drooping or semiporrect and obviously not strongly sickle shaped. The maxillary palpi are obsolete, and there are no ocelli. The metatibiae have long hairs above and beneath, and the ventral hairs are about as long as the submedial spurs.

***Swezeyula loniceræ*** Zimmerman and Bradley (figs. 11-A, g, antenna; 628, head, antenna, wing venation; 629, moth, male genitalia; 630, female genitalia; 631, egg, larva, mine; 632, pupa).

*Swezeyula loniceræ* Zimmerman and Bradley, 1950: 194, figs. 1-5.

The honeysuckle leaf miner.

Oahu.

Immigrant. Source not known, but possibly Asiatic. First discovered in Hawaii by Miss Wilhelmina Tenney in Honolulu in 1949.

Hostplant: *Lonicera japonica*.

Parasites: *PNIGALIO externa* (Timberlake), *SYMPIESIS vagans* (Timberlake), *ZAGRAMMOSOMA flavolineatum* Crawford.

The larvae of *Swezeyula* are distinctive in the Hawaiian fauna. The microsculpture of the derm is dark, coarse, and conspicuous, and the larvae appear highly pigmented. The head is depressed and the vertical triangle is deep and narrow, extending to about the middle of the head. The ventral prolegs are short, and they have only about five to ten crochets which are arranged in a single caudal row. The SD1 seta of the ventral proleg-bearing abdominal segments is above and just cephalad of a line drawn from the spiracle; setae L1 and L2 are below and behind the spiracle with L1 separated from L2 by a distance about equal to four or more times the diameter of a spiracle.

For a detailed discussion of the habits of this moth, see Swezey, 1950: 197, figs. 1-3, from which the following details have been abstracted: There is usually only one mine per leaf, but occasionally two mines will be found in a single leaf. The mine starts from the place where the egg is deposited near the margin of the upper surface of the leaf. The slender mine follows the leaf margin for some distance, enlarges gradually, forms an extensive blotch by expanding towards the middle of the leaf, and often doubles back along the slender part

of the mine. The full-grown larva has a reddish tint; the head is dark; the pronotum has two wide, dark vittae. The length is 4 to 5 mm., with a nearly even breadth. It is segmentally crenate laterally with the thoracic segments only slightly broader than the abdominal segments.

The pupa is about 4 mm. long; wings extend to fifth abdominal segment; abdominal segments are laterally crenate as in the larva; cauda is blunt, not attached to the cocoon; pupa not extruded from cocoon upon emergence of the moth; pupal period is about three weeks. The larva separates the epidermis from the other leaf tissues to form a kind of pocket in which pupation takes place. If it is supplied with certain kinds of paper it has the astonishing ability to split a sheet of paper to form a pupal chamber without disturbing either surface of the thin material. Generation follows generation continuously throughout the year in Honolulu.

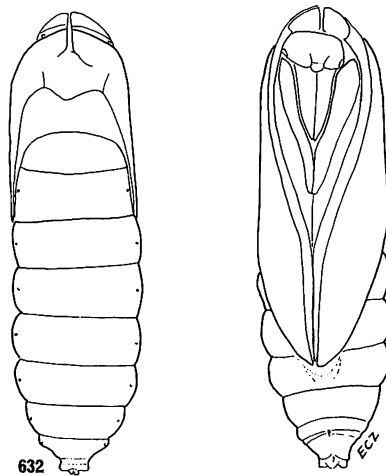


Figure 632—*Swezeyula loniceræ* Zimmerman and Bradley; dorsal and ventral aspects of the cast skin of a pupa; Honolulu; length 4 mm. The derm is coarsely, conspicuously microgranular all over. The setae are not obvious, and the spiracles are very small.



**GELECHIIDAE** (Stainton), **revised concept.**

Stainton, 1854:75

The Gelechiidae is a very large, systematically difficult, worldwide complex of genera. I do not know of a correct or adequate published definition of the family. Its literature is mostly in a state of confusion. The taxonomy of the Gelechioidea is "inflated"—many of the so-called families assigned to the superfamily surely deserve no higher ranking than subfamilies within the Gelechiidae, and some should not be ranked higher than tribes or subtribes. It is difficult to understand why so many authors desire to maintain such a confusingly inflated classification. Overemphasis of minor differences obfuscates true relationship. It is more meaningful to associate than to separate.

I have chosen, tentatively, to treat the Gelechiidae of Hawaii as including the following groups as subfamilies: Oecophorinae, Ethmiinae, Xyloryctinae, Blastobasinae, Chrysopeleinae, Momphinae, Cosmopteriginae, and Gelechiinae. These do not, however, all have equal weight, and further modification of the taxonomy is required. Some of these groups might better be reduced further to tribal status. Most authors consider them families, but some workers (Riedl, 1969, and Common, 1970, for example) treat the Chrysopeleinae (= Walshiinae), Momphinae, and Cosmopteriginae as subfamilies under one family name (which should, under such a system, be called Momphidae and not Cosmopterigidae as incorrectly used by some authors). An extensive revision of the generic classification of the Gelechioidea of the world is urgently required. See Forbes, 1923:229, 255, etc., for further discussion.

Many species of major and minor economic importance belong to the Gelechiidae, and a number of the pest species have been accidentally introduced to Hawaii.

**KEY TO THE SUBFAMILIES OF GELECHIIDAE IN HAWAII**

- 1. Forewings with a pterostigma between vein 11 and costa and with veins 2, 3, 4, and 5 all arising peculiarly from the posterior apical corner of the cell; abdominal tergites with strong transverse bands of spines; basal antennal segment with a well-developed pecten; as in figures 105*a*, 696–700  
 ..... **Blastobasinae.**
- Without such a combination of characters ..... 2
- 2(1). Hindwing of characteristic "normal gelechiine" shape with apex slightly or strongly produced and termen concave or sinuously concave; termen rather well separated in contour from posterior margin of wing, as in figures 1263, 1294, for example; vein 1c usually not developed .....  
 ..... part of **Gelechiinae.**
- Hindwing not so shaped; vein 1c variable ..... 3

- 3(2). Hindwing obviously broader than forewing; large species, about 20 to 50 mm. in expanse. . . . . 4  
 Hindwing usually narrower than forewing, at most about as broad as forewing, but never broader; mostly smaller species. . . . . 6
- 4(3). Forewing with vein 2 arising close to 3 at apex of cell; vein 1c not fully formed apically; wings shaped as in figure 1272 of *Crasimorpha*. . . . . part of **Gelechiinae**.  
 Forewing with vein 2 arising far from apex of cell and from vein 3; vein 1c fully formed at apex; wings obviously differently shaped and hindwing obviously proportionately broader than in figure 1272. . . . . 5
- 5(4). Hindwing with vein 5 closer to 6 than to 4 and veins 6 and 7 separate and parallel; abdominal tergites lacking apical bands of spines; one beautiful and strikingly colored species with black-spotted, pinkish grey forewings and yellow hindwings tipped with black, as in figure 639. . . . . **Ethmiinae**.  
 Hindwing with vein 5 closer to 4 than to 6 and veins 6 and 7 approximate or stalked at base; abdominal segments with characteristic transverse bands of spines on caudal parts of the tergites, as on figure 668 (best seen upon dissection or abrasion of the squamae but often distinctly visible as golden spinules; the only other moths in Hawaii with rather similar *transverse* bands of spines belong to the Oecophorinae and Blastobasinae). . . . . **Xyloryctinae**.
- 6(3). An unusual, flightless form with reduced wings from Haleakala, Maui, and as in figure 650; labial palpi long and sickle-shaped and rising far above the top of the head; abdominal tergites with typical rows of spines as described in the paragraph immediately above. . . . . part of **Xyloryctinae**.  
 Not such species. . . . . 7
- 7(6). Ocelli present; hindwings very narrow, venation of both pairs of wings as in figure 701 of *Ithome*; one small, dark colored, introduced species that breeds in blossoms of *Prosopis* and *Acacia*. . . . . **Chrysopeleinae**.  
 Ocelli absent; venation different. . . . . 8

- 8(7). Hindwings with greatly reduced venation and with only one vein forked, as in figure 706; abdominal tergites with *longitudinal* bands of spines (figure 710) . . . . . **Momphinae.**  
Hindwings obviously with more complex venation; abdominal tergites not longitudinally spinose . . . . . 9
- 9(8). Cell in hindwing less than one-half of length of wing in the species in Hawaii; venation as in figure 633 of *Endrosis* . . . . . **Oecophorinae.**  
Venation different, cell much longer . . . . . 10
- 10(9). Proboscis absent; wing venation and genitalia as in figures 634, 1260 of *Oecia* . . . . . part of **Gelechiinae.**  
Proboscis well developed; wing venation and genitalia different . . . . . 11
- 11(10). Vannal area (posterior basal area) of hindwing broad and expanded; hindwing somewhat broader than forewing, as in figure 1272; one introduced gall-maker on *Schinus* in Hawaii; as in figure 1273 of *Crasimorpha* . . . . . part of **Gelechiinae.**  
Vannal area of hindwing narrow, rounded off, hindwing narrower than forewing . . . . . **Cosmopteriginae.**

Subfamily **OECOPHORINAE** (Stainton), **revised status.**

*Epigraphidi* Guenée, 1845*b*:68. Morris, 1870:5.

*Epigraphidae*: Anonymous, 1858:75.

*Oecophoridae* Stainton, 1859*c*:280, 353.

*Oecophoridae*: Sauveur and Fologne, 1863:107. Meyrick, 1906:34.

*Oecophorinae*: Walsingham, 1890:147. Spuler, 1898*a*:31.

*Aecophoridae*: Lower, 1897:53.

*Poeciloptina* Herrich-Schäffer, 1857:58.

*Dasyceridae* Meyrick, 1883:119.

*Depressariidae* Meyrick, 1883:123.

Busck, 1908*b*:187, 207, early generic revision for America.

Meyrick, 1922*c*:1, in *Genera Insectorum*, and many other monographs.

Clarke, 1941*a*:33–286, pls. 1–48, revision for North America.

Diakonoff, 1954*b*:150, key to New Guinea genera.

The nearly forgotten family-group name *Epigraphidae* (Guenée, 1845*b*:68) has priority, but more confusion than uniformity would be introduced by its resurrection.

It appears impossible to maintain the oecophorids as a family distinct from the Gelechiidae as some authors continue to do. The groups blend together when they are viewed worldwide. Long ago, Walsingham, in 1890, and Spuler, in 1898, treated the oecophorids as a subfamily of the Gelechiidae as some other authors have considered them. Fracker, 1915:85, said, "This is

one of the families formerly included in Gelechiidae and the larvae are so similar to the latter that no satisfactory character has been found to distinguish the two groups." One of the characters usually suggested for the separation of adult oecophorids and gelechiids is that vein 1c is supposed to be developed as a tubular vein in the oecophorids but not developed in the gelechiids. This is a variable character in many groups of moths. Although it may serve to separate various clusters of species or genera in some faunas, it is of no basic significance. Once such characters get into the literature, they are often difficult to extinguish from general use although they may be shown to be of little or no value when large numbers of species are considered.

One of the most interesting features of the Hawaiian fauna is its lack of endemic oecophorids. The group is strongly developed in Eurasia and America, and evidently more than 2,500 species occur in Australia where it is by far the most extensively speciated family of Lepidoptera.

The one immigrant oecophorid in Hawaii has wide, transverse bands of stout spinules on the abdominal tergites that somewhat resemble those of the Xyloryctinae and Blastobasinae. The spinules can be revealed by abrading the squamae from the abdominal tergites.

#### Genus **ENDROSIS** Hübner

*Endrosis* Hübner, 1825:401. Type-species: *Phalaena Tinea sarcitrella* Linnaeus (= *Tinea lactella* Denis and Schiffermüller).

For a detailed description of the genus and other details, see Clarke, 1941:262. Benander, 1937:70, who described the larva, erroneously assigned the genus to the subfamily Blastobasinae in his arrangement. Perhaps he followed Fracker, 1915:86, who also wrongly included it in the Blastobasidae. Hinton, 1943:209, has shown that Fracker's observations were erroneous and that Benander did not know the larvae of the blastobasids. The genus has also been wrongly placed with the Cynodiidae (Elachistidae).

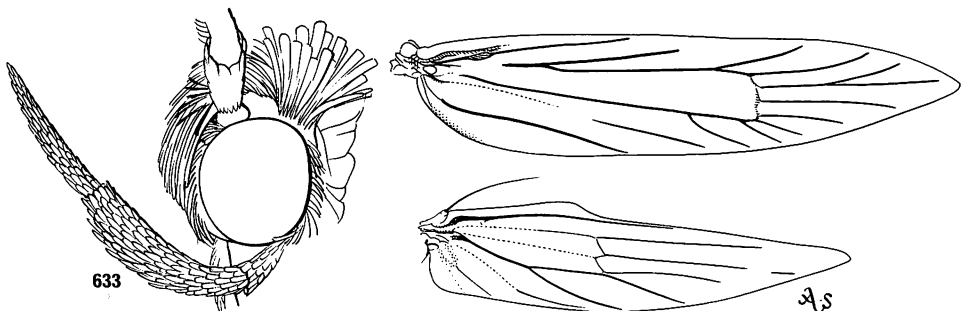


Figure 633—Head and wing venation of *Endrosis sarcitrella* (Linnaeus) (BM slide 4295).

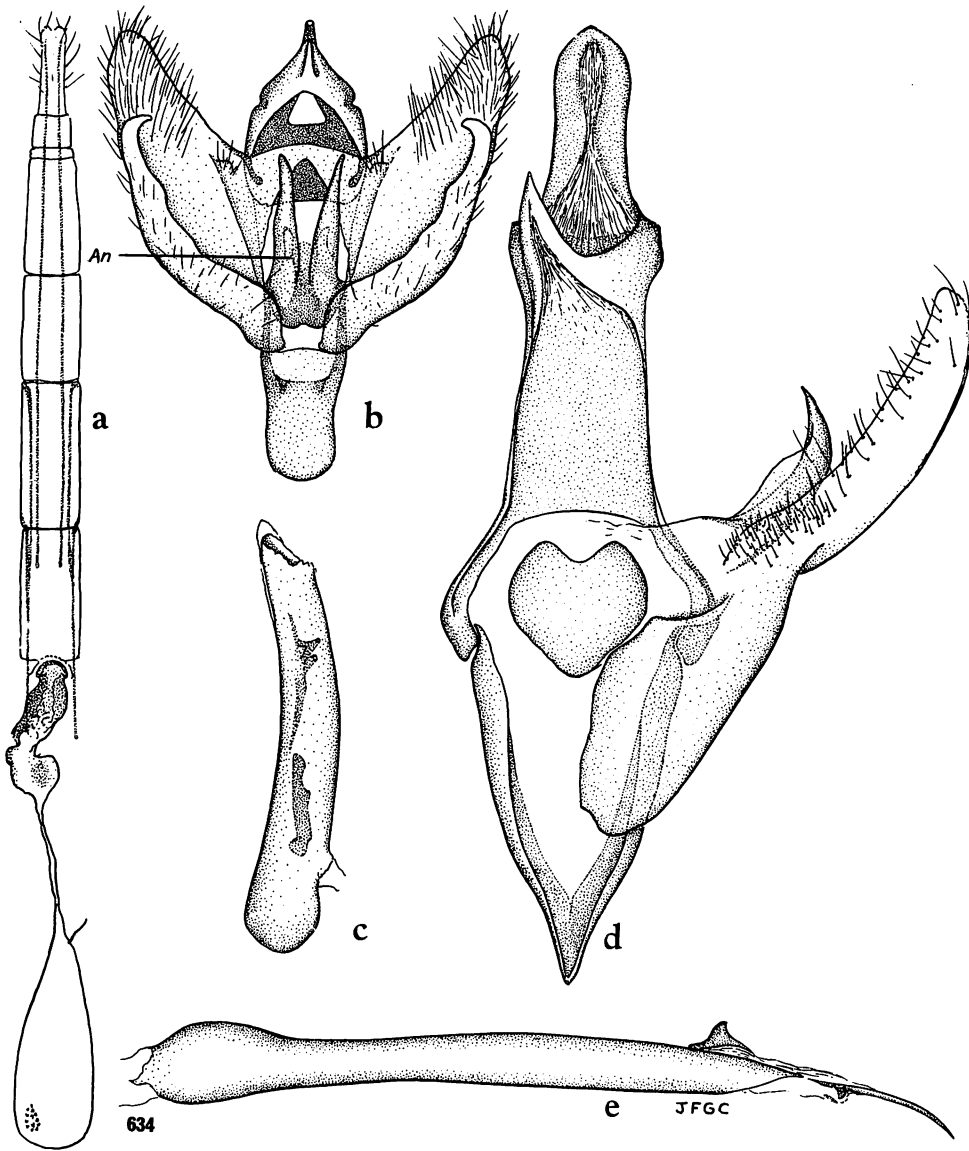


Figure 634—Oecophorid and gelechiid genitalia. *a, b, c*, *Endrosis sarcitrella* (Linnaeus), male and female (*An* = lobe of anellus). *d, e*, male *Oecia oecophila* (Staudinger). (Drawings by J. F. G. Clarke.)

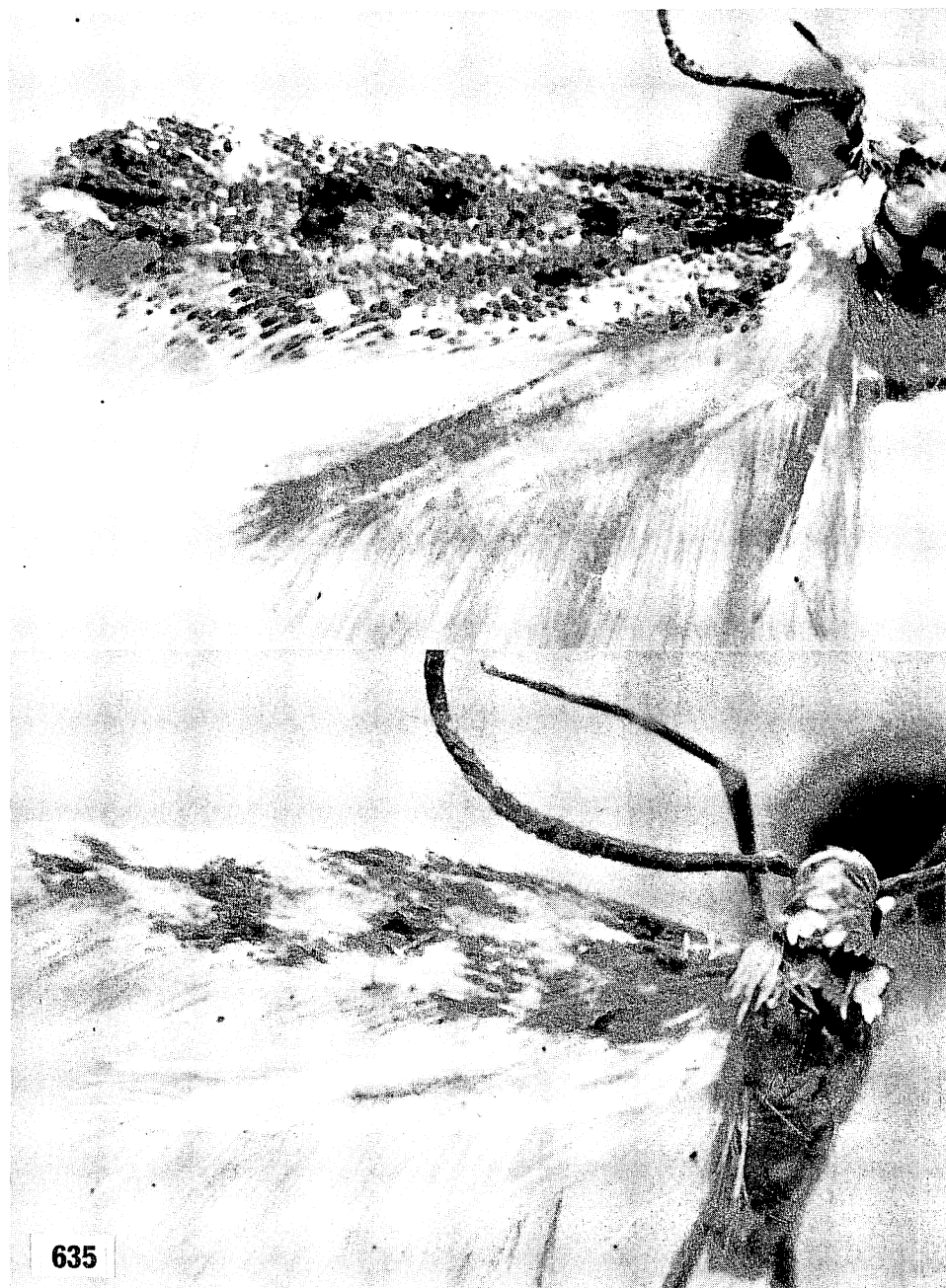


Figure 635—Top, *Endrosia sarcitrella* (Linnaeus), a European specimen; forewing=5.0 mm (BM slide 4295, male); the head and most of the thorax are white, and the forewing is white with pale brown and dark brown or fuscous maculae. Bottom, *Oecia oecophila* (Staudinger), holotype male of the synonymous *maculata* Walsingham from St. Thomas, U.S. Virgin Islands, West Indies; forewing=4.0 mm (BM slide 4202); the head and thorax are cream-colored or pale brownish, and the forewing is cream-colored with pale brown maculae.

**Endrosis sarcitrella** (Linnaeus) (figs. 633, head, wing venation; 634, male, female genitalia; 635, moth; 636, larva; 637, male genitalia).

*Phalaena Tinea sarcitrella* Linnaeus, 1758:536.

*Tinea lactella* Denis and Schiffermüller, 1775:139.

*Endrosis lactella* (Denis and Schiffermüller) Walsingham, 1907*b*:649.

For synonymy, see Corbet and Tams, 1943*a*:15. For description, bibliography, and general account in America, see Clarke, 1941:264–268, figs. 5, 51, 60, 60*a*, 116. Benander, 1937:70, fig. 15, larva. Hinton, 1943:171, 209, figs. 109, 112, 113, 115, 116, larva.

The white-shouldered house moth.

Hawaii.

Immigrant. A nearly cosmopolitan species. First recorded from Hawaii by Walsingham in 1907 from three specimens collected at Kona, Hawaii, by Perkins in 1902.

This is a household species in some regions. It is of some economic importance as a pest of stored grains, cereals, dried fruit, and foodstuffs. It has been recorded as feeding on animal matter, and it is occasionally found in birds' nests and in fungi. Linnaeus originally recorded it, evidently erroneously, from clothing (woolens). It has been collected, to my knowledge, only three times in Hawaii: once at Kilauea, once at 4,000 feet in Kona, and once at Paauhau.

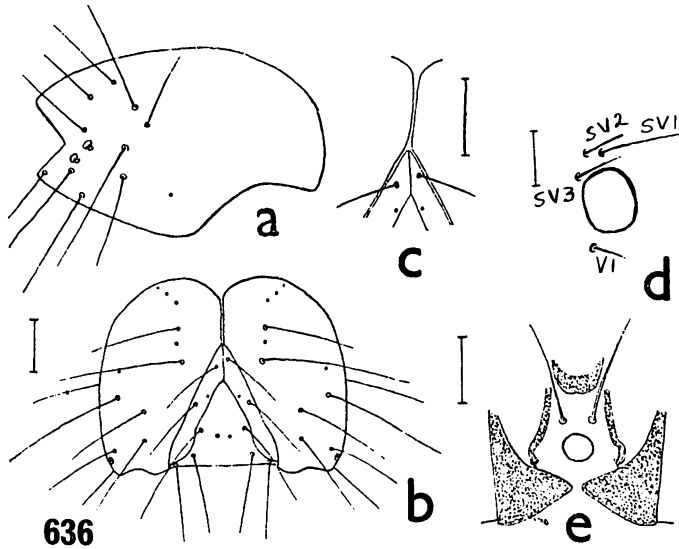


Figure 636—Details of the mature larva of *Endrosis sarcitrella* (Linnaeus) (modified from Hinton, 1943). *a*, left lateral, and *b*, frontal aspects of head capsule; *c*, enlarged diagram of the junction of the adfrontal sclerites and the long epicranial suture; *d*, setae adjacent to a proleg on the third abdominal segment; *e*, labium to show the subcircular mark, which is sometimes pitlike, on the postmentum (this "postmental pit" is not always clearly defined on whole specimens). Note particularly that there are only two ocelli and the adfrontal sclerites are far removed from the frontal triangle. The magnification reference lines represent 0.20 mm.

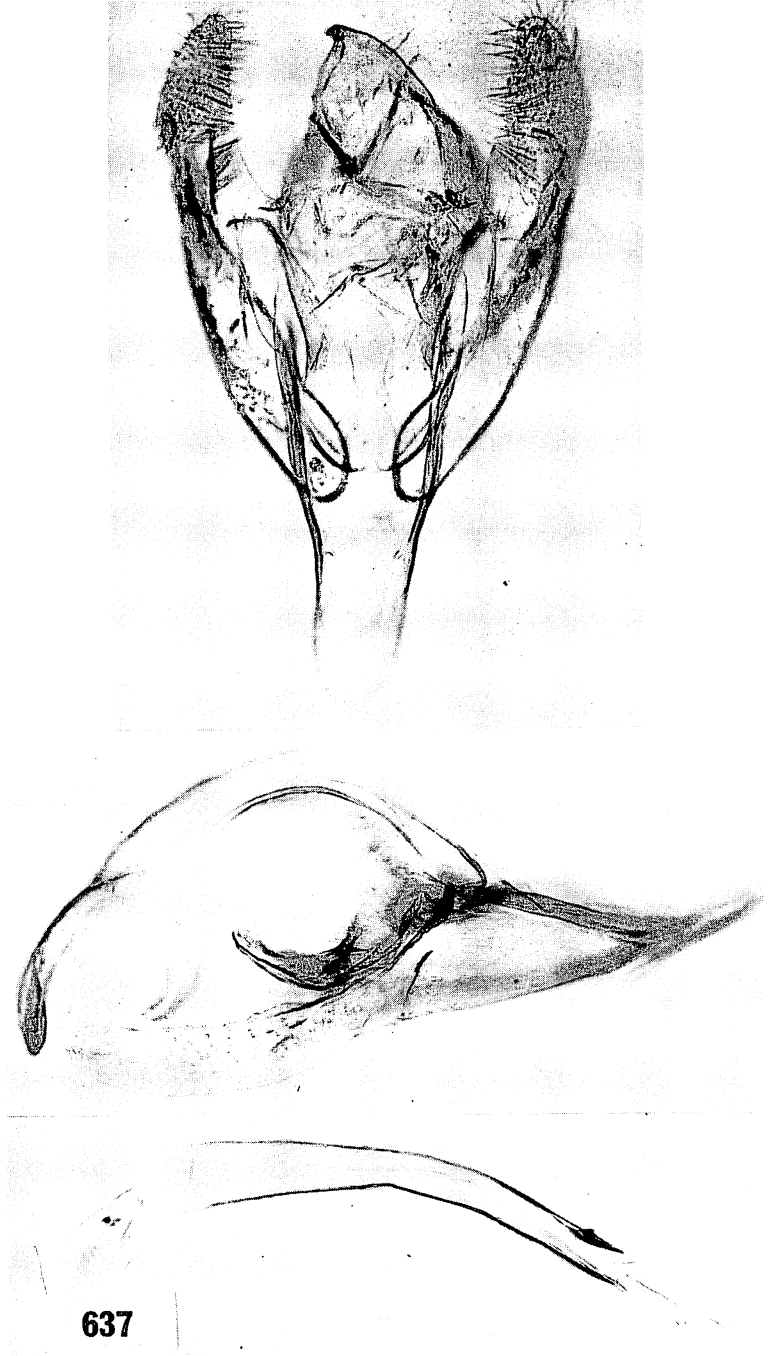


Figure 637—Top, male genitalia of *Endrosis sarcitrella* (Linnaeus), Europe (BM slide 4295). Bottom, male genitalia in lateral aspect of *Oecia oecophila* (Staudinger) from the holotype of the synonym *maculata* Walsingham, St. Thomas, U.S. Virgin Islands, West Indies (BM slide 4202).



All of these are on the island of Hawaii. It was probably introduced to that island with feedstuff used by the large cattle-raising industry. It is possible that it may be confined to the cooler uplands of Hawaii.

The larva has only two ocellar lenses on each side of the head, and the adfrontal sclerites are far removed from the vertical triangle. The submentum usually has a large ovate pigmented area or impression—in this it resembles the larvae of *Blastobasis*. Each of the trochanters of the prothoracic legs has an internal gibbosity.

Subfamily **ETHMIINAE** (Busck), **new status**.

*Azinidae* Walsingham, 1906:177.

*Ethmiidae* Busck, 1909:91–92. Brues and Melander, 1932:229. Sattler, 1967, a detailed study of the Palaearctic fauna; an excellent, well-illustrated monograph.

*Ethmiadae*: Meyrick, 1909*b*:422.

*Ethmiinae* of the Oecophoridae, Brues, Melander, and Carpenter, 1954:257.

It would appear that the correct family-group name for this assemblage should be *Azinidae* Walsingham, 1906, but that name has generally been overlooked or ignored. Walsingham proposed it in a rather obscure and indirect way when he said (1906:177), "I would now rather incline to placing *Tamarrha* with the *Azinidae*, founded on an Asiatic genus and characterized by the continuation of the discoidal vein direct to vein 8." Strictly applied priority would dictate that *Azinidae* be used. But in view of the longstanding, frequently used, and universally accepted name *Ethmiidae*, it would appear less confusing and a contribution to stability if we continue to use *Ethmiinae* and suppress *Azinidae*.

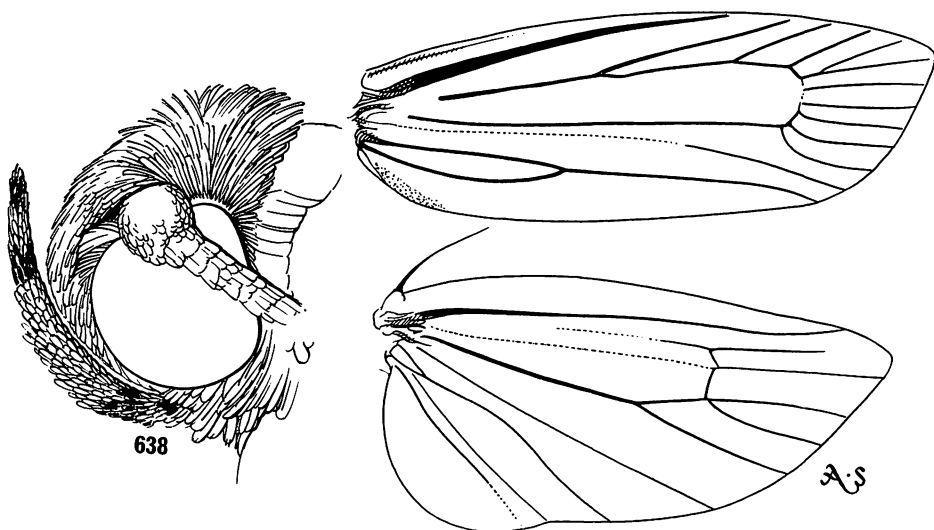


Figure 638—Head and wing venation of *Ethmia nigroapicella* (Saalmüller) from the holotype male of the synonymous *colonella* Walsingham from Honolulu (BM slide 7441).

I do not believe that this group represents a distinct family—I consider it only a subdivision of the Gelechiidae. It might best be assigned to the Oecophorinae as a tribe. Some authors have included it in the Oecophoridae, and others have wrongly placed it in the Yponomeutidae. The latter course is untenable because, among other things, the ethmiids have squamose proboscides whereas the yponomeutids have “naked” proboscides.

When Busck erected the family (1909:91–92), he said, “The main structural character by which this family may be distinguished from the Oecophoridae is the proximity of vein 5 in the hindwings to vein 6 instead of to vein 4, as in Oecophoridae, it being radial, not cubital; but the general habitus is very different from that of the hitherto supposed allies and the genus *Ethmia* has no near relationship with *Depressaria*, which has been regarded as a derivative from it.”

Sattler, in his admirable monograph of the Palaearctic ethmiids (1967:24), noted that with the close relationship between the ethmiids and the oecophorids firmly established one must ask whether the ethmiids should be included in the Oecophoridae as a subfamily as was done by Brues, Melander, and Carpenter (1954:257). (I do not know what led Brues, Melander, and Carpenter to their conclusion. Forbes, 1923:244, included *Ethmia* in the Oecophoridae.) Sattler said that to answer the question of relationship all known ethmiid genera and most of the oecophorid genera must be considered, and, in addition, precise definitions of all the families of the Gelechioidea (which we lack) are required. He noted that the most important “family characters” now accepted for the ethmiids are that vein 5 is nearer to vein 6 than to vein 4 in the hindwing, and the costa of the male genital valva is “segmented”. Sattler noted, however, that the nature of the venation is not always a reliable character, as can be demonstrated by the incorrect transfer of the typical North American oecophorid *Schiffermuelleria coloradella* Walsingham to the Ethmiidae by Clarke (1941:247).

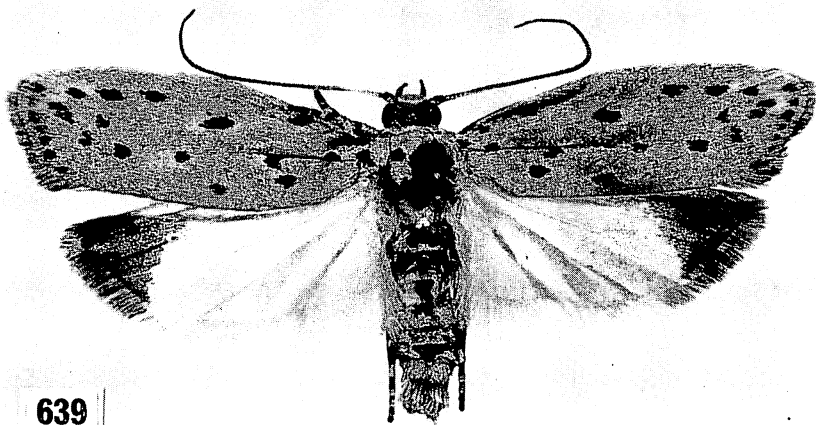


Figure 639—*Ethmia nigroapicella* (Saalmüller); forewing = 12 mm.; Barber's Point, Oahu; ex *Cordia subcordata*.

Sattler said that, in addition to the "segmented" nature of the costa of the male genital valva, the peculiar gnathus and the distinctive ventrocaudal processes on the pupa (see my figure 643) are characters which differentiate the ethmiids. Although they did not come within the scope of Sattler's study, it should be noted that the agonoxenids have remarkably similar, but undoubtedly separately evolved, ventrocaudal processes on their pupae (see figure 625). After careful consideration, Sattler stated that the specialized ethmiid features which he studied prevented him from merging the ethmiids with the oecophorids, and he was unable to demonstrate a close relationship

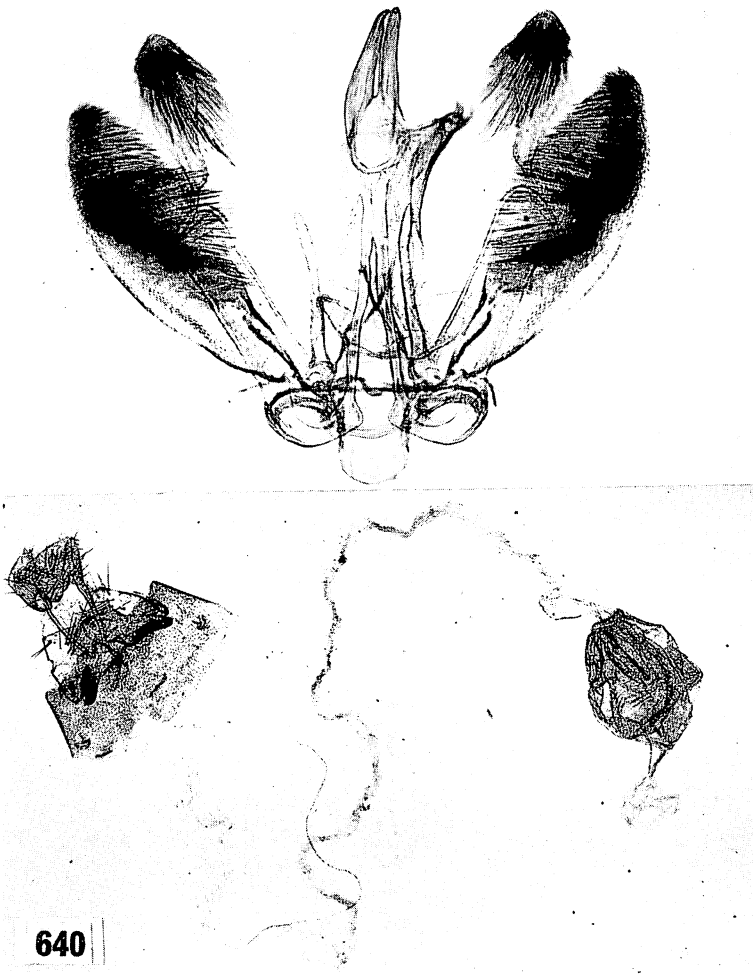


Figure 640—*Ethmia nigroapicella* (Saalmüller). Top, male genitalia (BM slide 2031); Honolulu. Bottom, female genitalia (BM slide 2032); Honolulu; see also figure 641.

with any true oecophorid genus known to him. He concluded, therefore, that he would treat the ethmiids as a full family.

The Ethmiinae is represented in Hawaii by only one immigrant species of the large, widely distributed genus *Ethmia*.

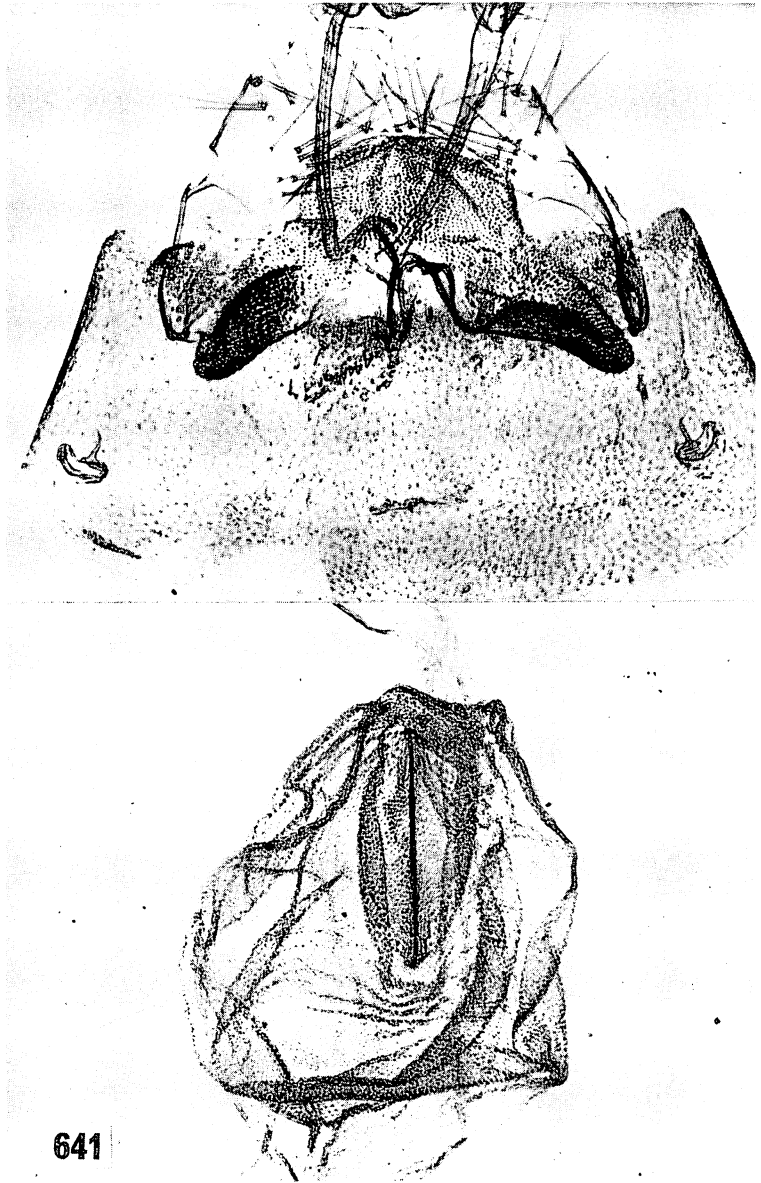


Figure 641—Female genitalia of *Ethmia nigroapicella* (Saalmüller) (BM slide 2032); Honolulu; see also figure 640.

Genus **ETHMIA** Hübner

*Ethmia* Hübner, 1819 (1816–1826): 163. Type-species: (*Ethmia pyrausta* Hübner, not Pallas) = *Tinea aurifluella* Hübner.

*Azinis* Walker, 1863: 541. Type-species: *Azinis hilarella* Walker.

Sattler, 1967: 37, detailed synonymy, redescription, and discussion.

***Ethmia nigroapicella*** (Saalmüller) (figs. 638, head and wing venation; 639, moth; 640, male and female genitalia; 641, female genitalia; 642, male genitalia; 643, larva, pupa).

*Psecadia Nigroapicella* Saalmüller, 1880: 310. Type locality: Nossi-Bé, Madagascar.

*Azinis hilarella*, as a misidentification by Butler, 1883: 180, not of Walker.

*Ethmia colonella* Walsingham, 1907b: 507, pl. 15, fig. 6. Type locality: Honolulu. Swezey, 1944a: 133–135. Synonymy by Sattler, 1967: 127.

*Ethmia meteoris* Meyrick, 1911b: 289. Clarke, 1965a: 422. Type locality: Seychelles.

*Ethmia systematica* Meyrick, 1922a: 552. Clarke, 1965a: 430. Type locality: Burma.

*Psecadia apicalis* Matsumura, 1931: 1084. Type locality: Okinawa.

*Ethmia nigroapicella* (Saalmüller) Sattler, 1967: 127, pl. 9, fig. 65; pl. 63, fig. 65–1, 65–2; pl. 104, fig. 65.

The *Cordia* defoliator or kou leaf worm.

Kauai, Oahu, Maui, Hawaii.

Immigrant. First recorded from Hawaii by Butler in 1883: 180 (then called *Azinis hilarella* Walker in error). Widely distributed from Madagascar to Hawaii including the Seychelles, India, Assam, Burma, Philippines, Taiwan, Ryukyu Islands, Kei Islands (near New Guinea), and Samoa and other islands.

Hostplants: *Cordia sebestena*, *Cordia subcordata* ("kou").

Parasites: *Apanteles marginiventris* (Cresson), *Ephialtes hawaiiensis* (Cameron), in the pupa.

Predator: *Pheidole megacephala* (Fabricius).

This is one of the most distinctively colored of all moths in Hawaii and is easily recognized. The forewings are pinkish grey with conspicuously distinct black maculae. The hindwings are yellow with black tips.

The larvae, protected by webs, feed upon the leaves. In earlier days when the *Cordia subcordata* trees were more common in Hawaii, the larvae kept the trees in such a nearly constant state of defoliation that few new trees were planted. The host trees are not common today in the islands, but the moth, although much reduced in numbers, persists. Mr. S. Au reported to me that on Kauai in April, 1963, he found *Cordia subcordata* had been heavily attacked but *Cordia sebestena* was only lightly attacked by the larvae.

Its food-plant is the 'Kou' (*Cordia subcordata*), a tree no doubt introduced by the natives themselves, who valued it highly. Since the introduction of the *Ethmia*, this tree has been robbed of all its beauty; many indeed have been entirely destroyed, while others are either continually defoliated or have the foliage so riddled by the attacks of the caterpillars as to be unworthy of preservation. The gaily-coloured caterpillars seem to be remarkably free from the attacks of any natural enemies, but sometimes the omnivorous ant *Pheidole megacephala* destroys numbers of them. The moth itself is comparatively rarely seen, though it may be found resting on tree-trunks and occasionally visits lights. (Perkins, 1913: clxiv.)

Hillebrand, in his classic *Flora*, 1888:321, said that the *Cordia* trees were found:

Along the sea shore here and there; formerly much planted by the natives round their houses, but now almost exterminated by the ravages of a small moth. The tree, although bearing an original native name "Kou" (Tahitian "Tou"), which occurs in old "meles" or songs, can hardly be considered indigenous. It ranges all the way from the Hawaiian Islands to Madagascar and Zanzibar, and would seem to have accompanied the Malayo-Maori race in their migrations, a reason for which may be found in the large shade afforded by its broad crown, particularly valuable in a littoral tree. The wood, rather soft but durable, is much prized for cabinet work, cups and dishes, exhibiting wavy ribbons of light and dark brown when polished.

Swezey said (1944a:133), "It was a favorite wood with the Hawaiians for making calabashes . . . and probably since Hillebrand's time, no trees have been able to grow large enough for this purpose. They are always kept stunted on account of the caterpillars . . . feeding on the young terminal foliage and checking the growth of the tree. In fact, the tree is so scarce that only an

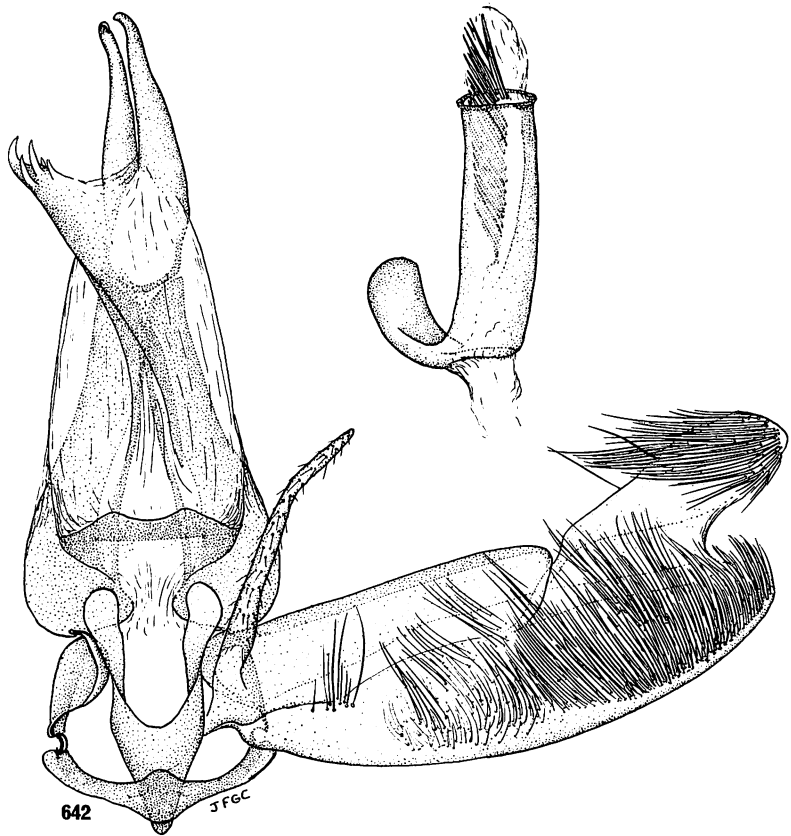


Figure 642—Male genitalia of *Ethmia nigroapicella* (Saalmüller).

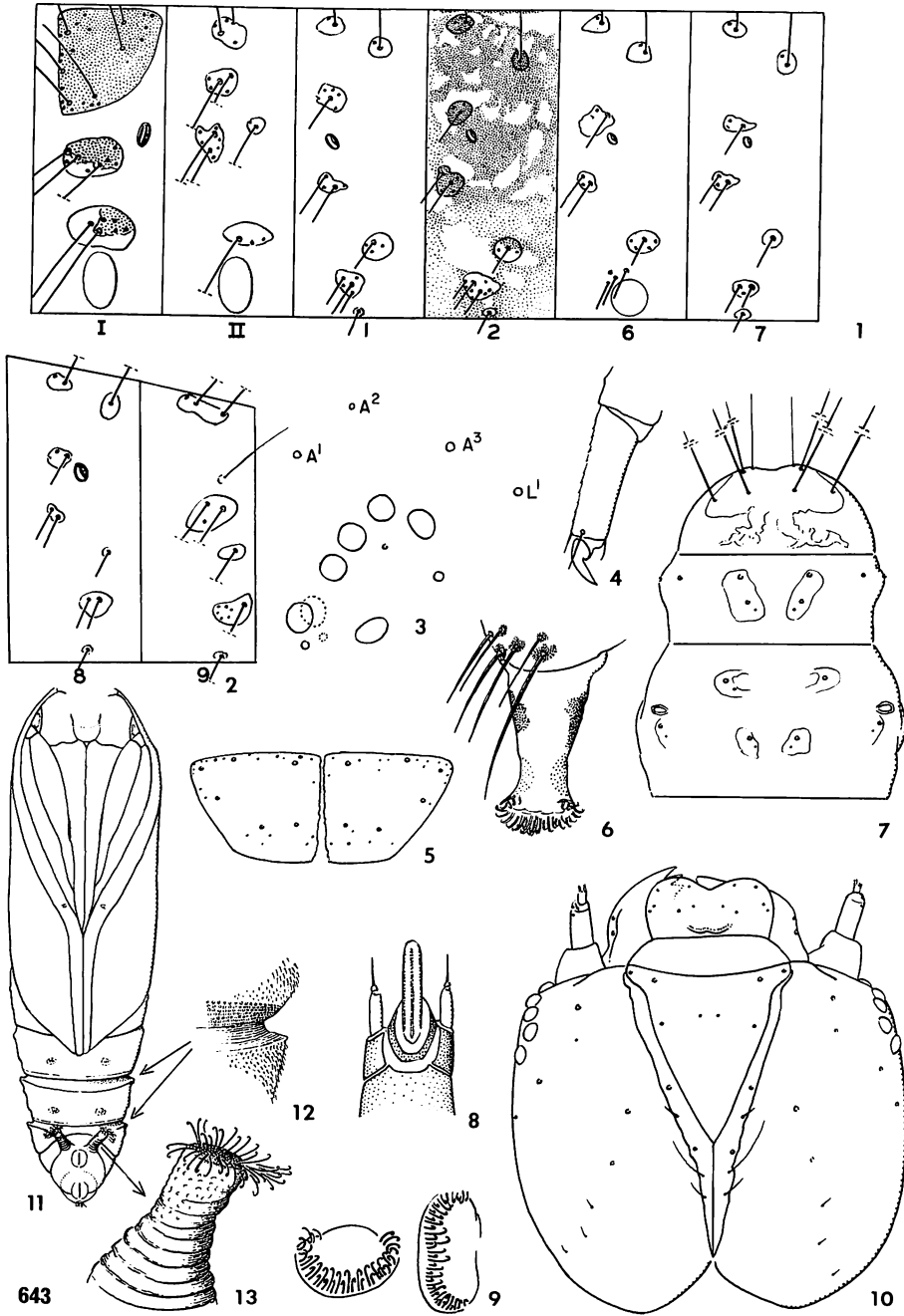


Figure 643—Details of the larva and pupa of *Ethmia nigroapicella* (Saalmüller), especially drawn for this text by Margaret MacKay. 1, setal map of pro- and mesothorax and abdominal segments 1, 2, 6, and 7 in lateral aspect; 2, setal map of abdominal segments 8 and 9, lateral aspect; 3, ocelli and associated setal sockets; 4, tarsus and claw of a thoracic leg, left side; 5, prothoracic shield; 6, a ventral proleg, lateral aspect; 7, dorsal aspect of abdominal segments 8 to 10; 8, spinneret and labial palpi, ventral aspect; 9, crochets of the prolegs of the sixth ventral and the anal prolegs on the left side; 10, frontal aspect of head; 11, ventral aspect of pupa; 12, 13, parts of pupa enlarged.

occasional stunted example is now seen." The trees once grew 30 to 50 feet high with trunks three feet in diameter (Rock, 1913:415).

The full-grown caterpillar is about 22 mm. long; black, with the dorsal and lateral surfaces speckled with numerous small irregular-shaped light yellow spots, a median dorsal pair of closely-parallel interrupted light yellow lines, laterally the spots are assembled in a distinct broken stripe just above the line of spiracles, which are small dark and nearly circular; cervical shield black with anterior margin widely light yellow and a median light yellow line; head black; head, cervical shield and dorsum with long slender black setae. Four pairs of slender abdominal prolegs.

The white cocoons are elongate oval, made rather flat on the surface of a leaf or other object. The pupa is 10 mm. long; uniformly reddish brown, surface smooth; wing and leg cases extend to the posterior margin of the fourth abdominal segment; cremaster has two stout [processes] situated ventrad a little forward from the apex of the abdomen and projected forward at a 45 degree angle, having numerous slender hooks to hold to the silk of the cocoon. This feature of the pupa distinguishes it from the pupa of any other moth in Hawaii. [But see *Agonoxena* which has rather similar processes but which became established in Hawaii after Dr. Swezey's paper was published.] The caterpillar, too, is distinct from any other occurring in Hawaii. (Swezey, 1944a:134.)

Subfamily **XYLORYCTINAE** (Meyrick), **new status.**

*Xyloryctidae* Meyrick, 1890a:23.

*Xylorictidae*: Dyar, 1903a(1902):518. Forbes, 1923:250. Brues and Melander, 1932, 1945:228.

*Cryptolechiidae* Meyrick, 1883b:124.

*Cryptolechidae*: Walsingham, 1891:100.

*Cryptophasidae* Kirby, 1897:303.

*Uzuchidae* Hampson, 1918:336.

Diakonoff, 1954b:89; key to New Guinea genera, p. 90.

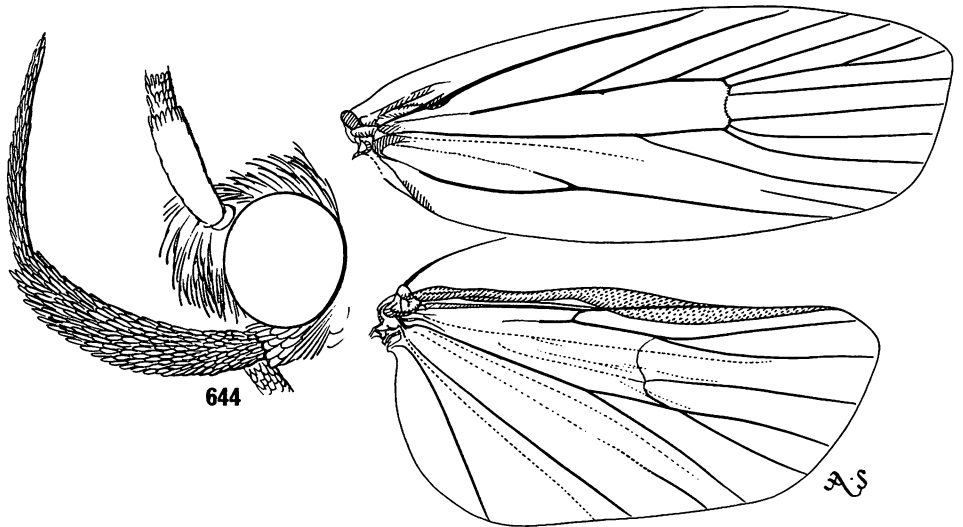


Figure 644—Head and wing venation of *Thyrocopa abusa* Walsingham, the type-species of *Thyrocopa*; from the male holotype (BM slide 4044); Oahu.



This group is usually given family rank by lepidopterists, but it can hardly be considered more than a subfamily of the Gelechiidae.

The name Cryptophasidae has been used by those who unfortunately believe that the family name should be based upon the oldest generic name within the family instead of on the oldest family-group name. It is based upon *Cryptophasa* Lewin, 1805. Hampson, 1918, proposed the synonymous name Uzuchidae for a similar reason. *Xylorycta* Meyrick, 1890a:57, is an Australian genus.

Walsingham, 1891:100, has explained how "Zeller's genus *Cryptolechia* falls into the family OEcophoridae of Meyrick, and annihilates Meyrick's family *Cryptolechidae*, which was not founded on the typical form. Mr. Meyrick, recognising this, has since recharacterised his family *Cryptolechidae* under the name *Xyloryctidae*. . . . The error, for which Mr. Meyrick cannot rightly be held responsible, has evidently arisen through confusion which Zeller created by his attempts to expand and amplify his original work." Additional details of importance will be found in Walsingham's discussion.

All the members of the Xyloryctinae in Hawaii are endemic. Walsingham divided them into five endemic "genera": *Thyrocopa*, *Catamempsis*, *Psychra*, *Ptychothrix*, and *Hodegia*. *Catamempsis*, *Psychra*, and *Ptychothrix* were separated from *Thyrocopa* largely on the basis of sexual characters of the male antennae. I cannot agree that such characters of one sex can be used to maintain genera. *Hodegia* was erected to receive a single female specimen with reduced wings. We now know that both sexes are flightless, but the species is otherwise a typical *Thyrocopa*. I have examined all of the Hawaiian species, including their wing venations and genitalia, and I can find nothing to indicate that more than one genus in the process of rapid specific radiation is involved. I am, therefore, reducing all of Walsingham's "generic" names to new synonyms of *Thyrocopa* Meyrick, 1883a.

Although my late friend August Busck had not examined the Hawaiian Xyloryctinae at the time, he had the following pertinent remarks to make in his 1908:137-138 review of Walsingham's *Fauna Hawaiiensis* monograph.

The writer regrets one single feature in this masterful work, namely, the erection of genera (*Ptychothrix*, *Catamempsis*) on secondary sexual characters alone, and this in spite of His Lordship's own statement in his remarks (page 738-9), that such characters are of very doubtful value, and especially so in the Hawaiian fauna, where the most embarrassing plasticity of such characters prevails. Undoubtedly, other sounder structural characters, common to both sexes, could have been found, or if not, the genera are, in the writer's judgment, not justified. To him it seems essential, for a sound appreciation of the natural grouping of the *Microlepidoptera*, that we get away altogether from these superficial characters, however tempting, and rely solely on the more . . . dependable . . . modifications. . . .

The greatest known development of the Xyloryctinae is in Australia where there are more than 400 species, but in nearby New Zealand the group is hardly represented. The subfamily is confined mostly to the Southern Hemisphere: Australia, South America, and southern Africa. There are none recorded from North America.

The abdominal tergites in this group have characteristic transverse bands of spines, as in figures 668 and 690. Except for *Endrosis*, *Oecia*, and *Blastobasis* no other group now known in Hawaii has *transverse* bands of spines, and the

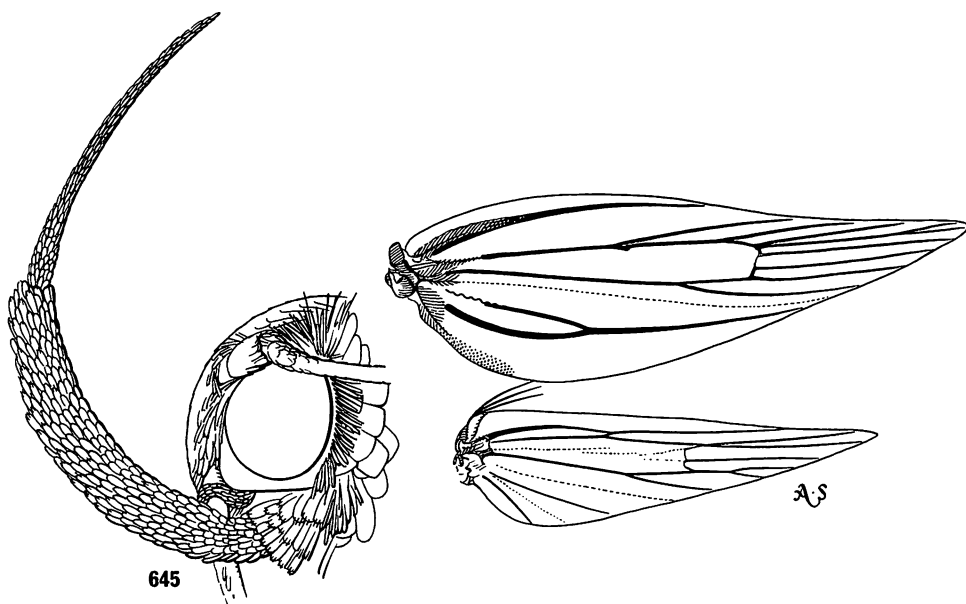


Figure 645—*Thyrocopa* (“*Hodegia*”) *apatela* (Walsingham), head and wing venation of the female holotype (BM slide 3955). This is the type-species of *Hodegia* Walsingham. The labial palpus may appear unusually long on this species, but other species of *Thyrocopa* have similar palpi. There is much variation in their lengths and shapes.

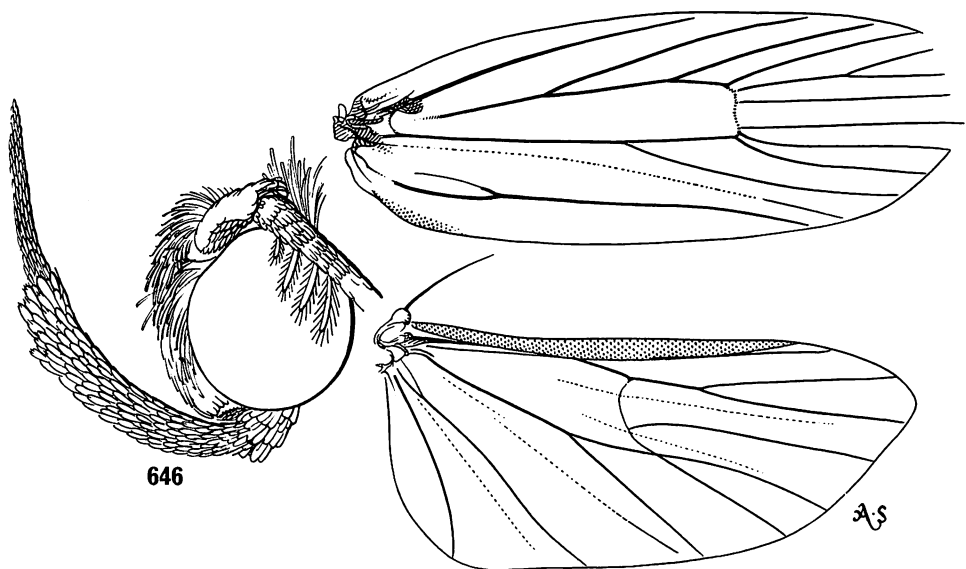


Figure 646—Head and wing venation of *Thyrocopa* (“*Ptychothrix*”) *vagans* (Walsingham), the type-species of *Ptychothrix*, from the male holotype (BM slide 4176); Halemanu, 4,000 feet, Kauai.

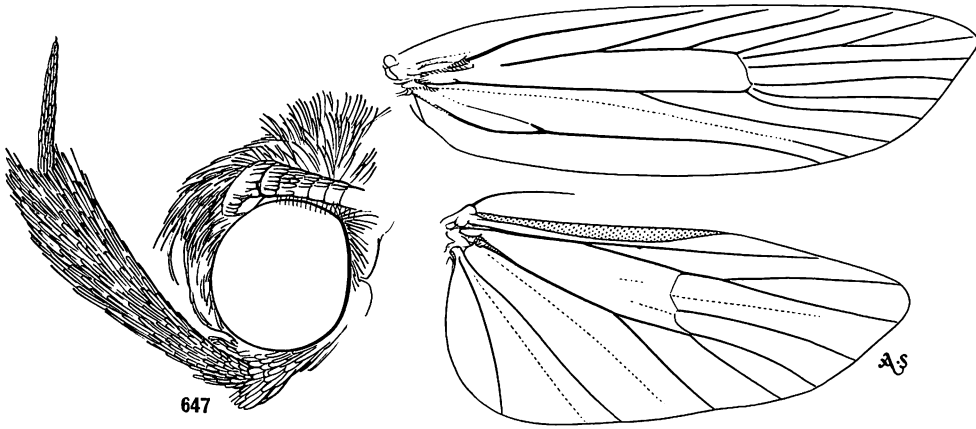


Figure 647—*Thyrocopa* ("Psychra") *phycidiformis* (Walsingham), the type-species of *Psychra*, from the male holotype (BM slide 4159); Kauai, 3,000 to 4,000 feet.

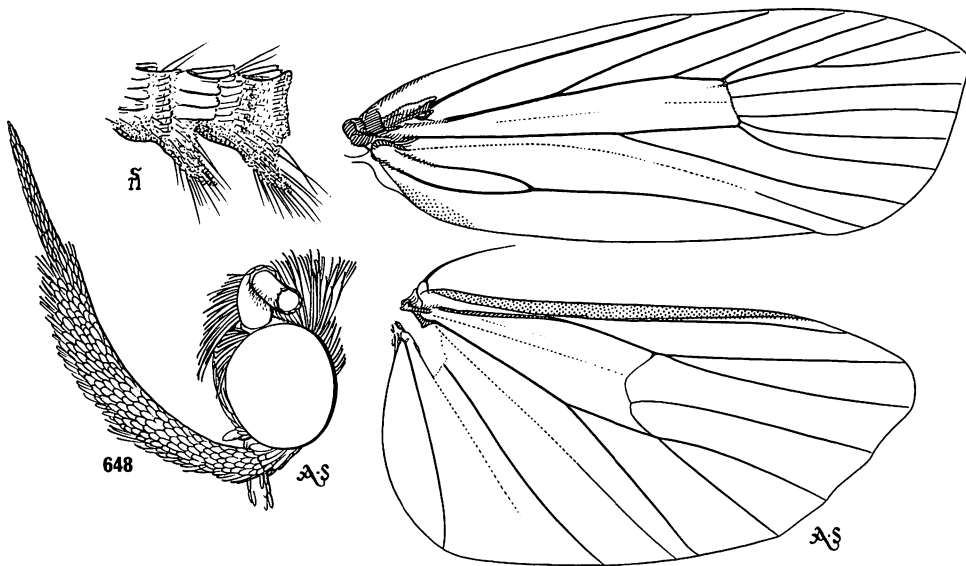


Figure 648—Head and wing venation of *Thyrocopa* ("Catamempsis") *decipiens* (Walsingham), the type-species of *Catamempsis*, from the male holotype (BM slide 4389); Oloa, 2,000 feet, Hawaii. An inset showing the structure of male antennal segments 17 and 18 is above the head.

character is almost diagnostic of the subfamily in Hawaii. Often the spines are easily seen on dried specimens where they may appear golden in color. *Batrachedra* also has spinose abdominal tergites, but its spines are placed in longitudinal rows. Vein 1c is preserved near the forewing margin in Hawaiian Xyloryctinae (except evidently in the highly modified flightless "*Hodegia*" *apatela*) as it is in the Hawaiian representatives of the Ethmiinae and *Endrosis* in the Oecophorinae.

In his detailed work on the Australian gelechiids Meyrick, 1904c:256, said: "Assuming that the *Xyloryctidae* are maintained as a distinct family (which still appears to me to be convenient, though I think ultimately it must be reduced to a group of the *Gelechiidae*), I rely for distinction mainly on the character of vein 2 of the forewings, which in that group rises widely remote from 3 (generally disproportionately so) . . ."

#### Genus **THYROCOPA** Meyrick

*Thyrocopa* Meyrick, 1883a:32. Type-species: *Thyrocopa abusa* Walsingham (= *Thyrocopa usitata* of Meyrick, 1883:33, not *Depressaria usitata* Butler, 1881:396). Clarke, 1969b:480.

*Synomotis* Meyrick, 1883a:33. Type-species: *Synomotis epicapna* Meyrick. Synonymy by Walsingham, 1907b:492.

*Hodegia* Walsingham, 1907b:488. Type-species: *Hodegia apatela* Walsingham.

#### **New synonym.**

*Ptychothrix* Walsingham, 1907b:489. Type-species: *Ptychothrix vagans* Walsingham. **New synonym.**

*Psychra* Walsingham, 1907b:489. Type-species: *Psychra phycidiformis* Walsingham. **New synonym.**

*Catamempsis* Walsingham, 1907b:491. Type-species: *Catamempsis decipiens* Walsingham. **New synonym.**

*Thyrocopa* is an endemic genus. I have been unable to discover whence it has come or to what genus it may be allied. It is evidently of Austral origin, and its immediate allies may have developed on archipelagos now worn away or submerged and marked by atolls. The group is in an active stage of evolutionary flowering in Hawaii, and there are many closely allied and confusing forms. The species have a remarkable range in size from about 14mm. to nearly 50mm. They form a dominant group in Hawaii.

The genitalia, which have not been studied heretofore, are remarkably similar throughout the genus. Most unfortunately, I have not found the shapes of the male genital valvae to be of use in separating the species. There are, however, certain differences in the processes of the sacculus (this structure may also have been referred to as the clasper or harpe of the valva) which are useful in the separation of the species. Some of the females have good characters in the signa of the bursa copulatrix. Some signa are small and round, and, in the opposite extreme, others are long and tapelike. There is a considerable range of specific development in the labial palpi. It would appear that there may be some confusion in the association of the sexes of various species in literature and in collections. The number of spines and the number of rows of

spines along the caudal parts of the abdominal tergites of the adults differ between the species. Further study may demonstrate that the nature of the spinulation of the abdominal tergites may be useful in the identification of the species.

A large amount of work remains to be done on *Thyrocopa*. It is a poorly understood genus, and many species probably await discovery and description. Unfortunately, I have not been allowed time and opportunity to enable an adequate study of the genus so that I must leave the group in an unsatisfactory taxonomic condition. I regret especially not being able to complete my key to the species.

The larvae of some species feed beneath silken webs on the bark of various plants, some bore in dead twigs or have been found in beetle borings, some feed on living tissue, and some feed upon leaves. Much remains to be learned of their habits. Perkins said (1913:clxiv):

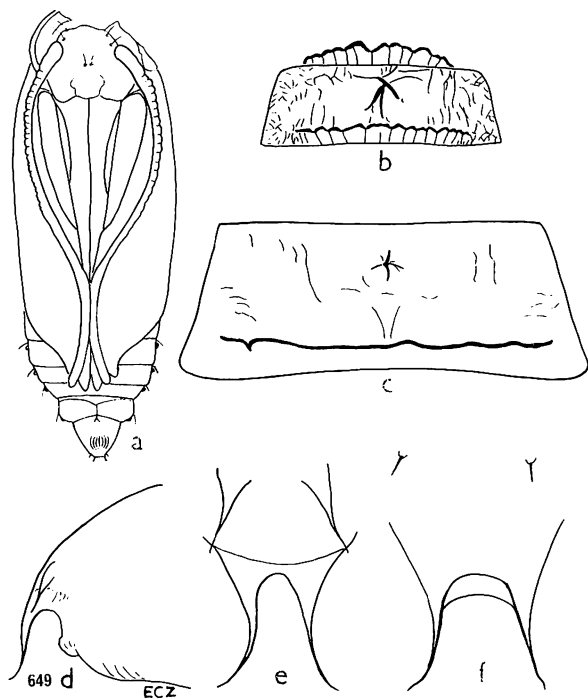


Figure 649—Details from cast pupal skins of *Thyrocopa*. *a*, ventral aspect of *sapindiella* Swezey, holotype female; Niu, Oahu; the dense, coarse reticulation of the derm is not shown. *b*, the same, first abdominal tergite and the caudal ridge of the metathorax. *c*, first abdominal tergite of *peleana* Swezey, holotype female, Waipio Ridge, Oahu. *d*, right lateral, and *e*, dorso-caudal aspects of the cremaster of *sapindiella*. *f*, dorso-caudal aspect of the hooks of the cremaster of *peleana*. Each of these species has four spines in the cremaster (note the great difference in the anterior pair in these species), but some species of *Thyrocopa* have only one caudal spine.

The numerous species of [*Thyrocopa*] are mostly feeders on dead wood, some occurring in the driest localities, living in the stems of both native and introduced plants, and one of them is common around Honolulu, feeding on the dried droppings of cattle. The moths are, many of them, very readily attracted to lights, and are very numerous in individuals. The caterpillars of some species, however, feed on living shoots, and some live in decaying logs so wet and rotten that the water can be squeezed from the wood. Some of the species are very variable, and in some there is a striking sexual dimorphism. The caterpillars in some localities (especially on the lowlands) are a favourite prey of the wasps of the genus *Odynerus* and *Pseudopterocheilus*, and in mountain districts they are eagerly sought for on the dead branches of trees by various Drepanid birds, e.g. *Hemignathus* and *Heterorhynchus*. We have also found them in the stomach of the little flycatchers of the genus *Chasiempis*, which may be seen investigating fallen decayed tree-trunks in search of this food.

*Thyrocopa* was originally assigned to the Gelechiidae by Meyrick.

*Hodegia* was erected for a single female specimen with reduced wings. I consider it to be only a *Thyrocopa* with reduced wings and not worthy of generic status. The genitalia are typical of *Thyrocopa*.

*Ptychothrix* was founded on a unique male which has conspicuously bipectinate antennae, but its genitalia are typical of *Thyrocopa*. It represents the extreme in the tendency of *Thyrocopa* toward the development of antennal pectinations which is demonstrated by the species Walsingham separated into the genera *Psychra* and *Catamempsis*. The antennae of the male of the type-species are distinctive, but this sexual character alone is not sufficient reason for separating the type-species into a genus separate from *Thyrocopa*.

*Psychra* was established for two species, *brevipalpis* and *phycidiformis*. The terminal segment of each labial palpus on these species is much reduced. Although the palpal segments in *Thyrocopa* are subject to considerable variation, the short palpi of these two species give them a distinctive appearance. The genitalia are typical of *Thyrocopa*. I cannot agree with Walsingham's description of the male antennae. They are not biciliate beneath; they are multiciliate, essentially as in other *Thyrocopa*, and the ciliation is somewhat more prominent than in most species. Walsingham also said that the male antennae are "serrate toward the apex". This statement refers to the scales on the dorsum being more erect there and not to the antennae being serrate beneath. This is only an emphasized male antennal character of *Thyrocopa*. The male antennae of *phycidiformis* are essentially similar to those of *Thyrocopa subahenea*, but Walsingham did not mention the antennal features of *subahenea*. *Thyrocopa pulverulenta*, *tessellatella* and *indecora* are intermediate. I consider the name *Psychra* to be only a synonym of *Thyrocopa*.

*Catamempsis* is based upon one of the very large species, *decipiens*, whose male has serrate antennae. This character of the male gives the antenna quite a distinctive appearance from the usual *Thyrocopa*, but the character is only sexual. The genitalia are typical of *Thyrocopa*, and the female is a normal *Thyrocopa*. I have thus merged *Catamempsis* with *Thyrocopa*.

It should be noted that when Walsingham knew only the female sex that he usually questioned the "generic" assignment of his species. This demonstrates that he could not determine his so-called genera in the absence of males.

See color plate 4, figures 7-8; 5, figures 1-3.

**DISTRIBUTION OF THYROCOPA**

Our knowledge of the geographical distribution of the *Thyrocopa* species is poor and probably in part misleading. We have only begun to study *Thyrocopa*. A tentative listing by island follows. Where the type locality is on an island other than that of the main listing, the type locality island is indicated by the word "type".

## Nihoa (1 species)

new species near *abusa* Walsingham

## Kauai (15 species)

*acetosa* Meyrick  
*albonubila* Walsingham  
*brevipalpis* (Walsingham)  
*cinerella* Walsingham  
*depressariella* Walsingham  
*epicapna* (Meyrick) + Hawaii  
*gigas* (Butler) + Oahu, Molokai, Maui (type)  
*immutata* Walsingham  
*librodes* Meyrick  
*pallida* Walsingham + Oahu, Molokai  
*phycidiformis* (Walsingham)  
*seminatella* Walsingham  
*usitata* (Butler) + Oahu (type), Hawaii  
*vagans* (Walsingham)  
*viduella* Walsingham

## Oahu (12 species)

*abusa* Walsingham  
*argentea* (Butler) + Hawaii  
*criminosa* Meyrick  
*decipiens* (Walsingham) + Molokai, Hawaii (type)  
*gigas* (Butler) + Kauai, Molokai, Maui (type)  
*ingeminata* Meyrick  
*pallida* Walsingham + Kauai (type), Molokai  
*peleana* Swezey  
*sapindiella* Swezey  
*spilobathra* Meyrick  
*sucosa* Meyrick  
*usitata* (Butler) + Kauai, Hawaii

## Molokai (6 species)

*decipiens* (Walsingham) + Oahu, Hawaii (type)  
*geminipuncta* Walsingham  
*gigas* (Butler) + Kauai, Oahu, Maui (type)  
*minor* Walsingham  
*pallida* Walsingham + Kauai (type), Oahu  
*subahenea* Walsingham

## Maui (7 species)

- alterna* Walsingham  
*apatela* (Walsingham)  
*fraudentella* Walsingham, + Hawaii (type)  
*gigas* (Butler) + Kauai, Oahu, Molokai  
*indecora* (Butler) + Hawaii  
*mediamaculata* Walsingham + Hawaii?  
*megas* Walsingham

## Lanai (1 species)

- leonina* Walsingham

## Hawaii (12 species)

- adumbrata* Walsingham  
*argentea* (Butler) + Oahu (type)  
*decipiens* (Walsingham) + Oahu, Molokai  
*epicapna* (Meyrick) + Kauai  
*fraudentella* Walsingham, + Maui  
*indecora* (Butler) + Maui (type)  
*inermis* Walsingham  
*mediamaculata* Walsingham? + Maui (type)  
*nubifer* Walsingham  
*pulverulenta* Walsingham  
*tessellatella* Walsingham  
*usitata* (Butler) + Kauai, Oahu (type)

**Thyrocopa abusa** Walsingham (figs. 644, head, wing venation; 652, 666, moth; 667, 670, male genitalia).

*Thyrocopa abusa* Walsingham, 1907*b*:504, 733, pl. 15, fig. 1.

*Thyrocopa usitata*, by error of identification by Meyrick, 1883*a*:33, not *Depressaria usitata* Butler, 1881:396.

Endemic. Oahu (type locality on Oahu not exactly known).

Hostplants: *Acacia koa*, *Cyrtandra*, *Freycinetia*, guava, *Ipomoea*, *Lantana*, *Pipturus*, *Ricinus*.

The brownish larvae, protected by a silken web or tunnel, bore in the dead twigs of many plants. They also feed on the bark and may feed to some extent upon the living tissues. See Swezey, 1910*e*:139 and 1912*c*:154, for details.

**Thyrocopa** new species near *abusa* (figs. 668, 669, male, female genitalia and abdomen).

Endemic. Nihoa Island.

Specimens of this species were collected by J. W. Beardsley in September, 1964. Some were collected at light, and one specimen was reared from a larva found in litter beneath shrubs. The reared specimen made a cocoon of thin white silk into which it incorporated an astonishing and varied amount of debris. Included are numerous pellets of lepidopterous frass, several kinds of



plant parts and fragments, parts of dead insects, cast larval skins of insects, the larval cases of two species of *Hyposmocoma*, and representatives of terrestrial Mollusca of the families Tornatellinidae and Endodontidae!

Externally this moth is quite similar to *Thyrocopa abusa* Walsingham, but its genitalia appear to differ significantly from that species.

**Thyrocopa acetosa** Meyrick (figs. 652, moth; 682, female genitalia).

*Thyrocopa acetosa* Meyrick, 1915a:371.

Endemic. Kauai (type locality not further determined).

Hostplant: unknown.

**Thyrocopa adumbrata** Walsingham (figs. 652, moth; 681, female genitalia).

*Thyrocopa adumbrata* Walsingham, 1907b:503, pl. 14, fig. 26.

Endemic. Hawaii (type locality: Kona, 3,000 feet).

Hostplant: unknown.

Described from one female.

**Thyrocopa albonubila** Walsingham (figs. 653, moth; 671, male genitalia).

*Thyrocopa albonubila* Walsingham, 1907b:495, pl. 14, fig. 11.

Endemic. Kauai (type locality: mountains, 3,000 to 4,000 feet).

Hostplant: unknown.

The Swezey references to this species (1910e:138 and 1931b:502) belong to *argentea*.

**Thyrocopa alterna** Walsingham (figs. 653, moth; 670, male genitalia).

*Thyrocopa alterna* Walsingham, 1907b:501, pl. 14, fig. 22.

Endemic. Maui (type locality: Olinda forest area), Hawaii.

Hostplant: unknown.

I have not seen a female.

**Thyrocopa apatela** (Walsingham), **new combination** (figs. 645, head and wing venation; 650, moth, female genitalia; 650-A, male genitalia).

*Hodegia apatela* Walsingham, 1907b:488, pl. 14, fig. 2. Type-species of *Hodegia*.

Endemic. Maui (type locality: Haleakala, above 9,000 feet).

Hostplant: bunchgrass? The originally unique female holotype was shaken from a tuft of grass by Dr. Perkins.

As my illustrations demonstrate, the wings of this moth are so reduced that the insect cannot fly. Thus it represents one of the most unusual insects of Hawaii. The genitalia are typical of other *Thyrocopa*, and those of the female are quite similar to those of *cinerella*. The type has the same kind of long, tapelike signum as does *cinerella*. The male genitalia (only recently seen by me) are closely similar to other species of *Thyrocopa*. I do not know how many species of *Thyrocopa* inhabit Haleakala, and I cannot suggest which species may have given rise to this unusual flightless moth. Its immediate ancestor could have come from some other island.

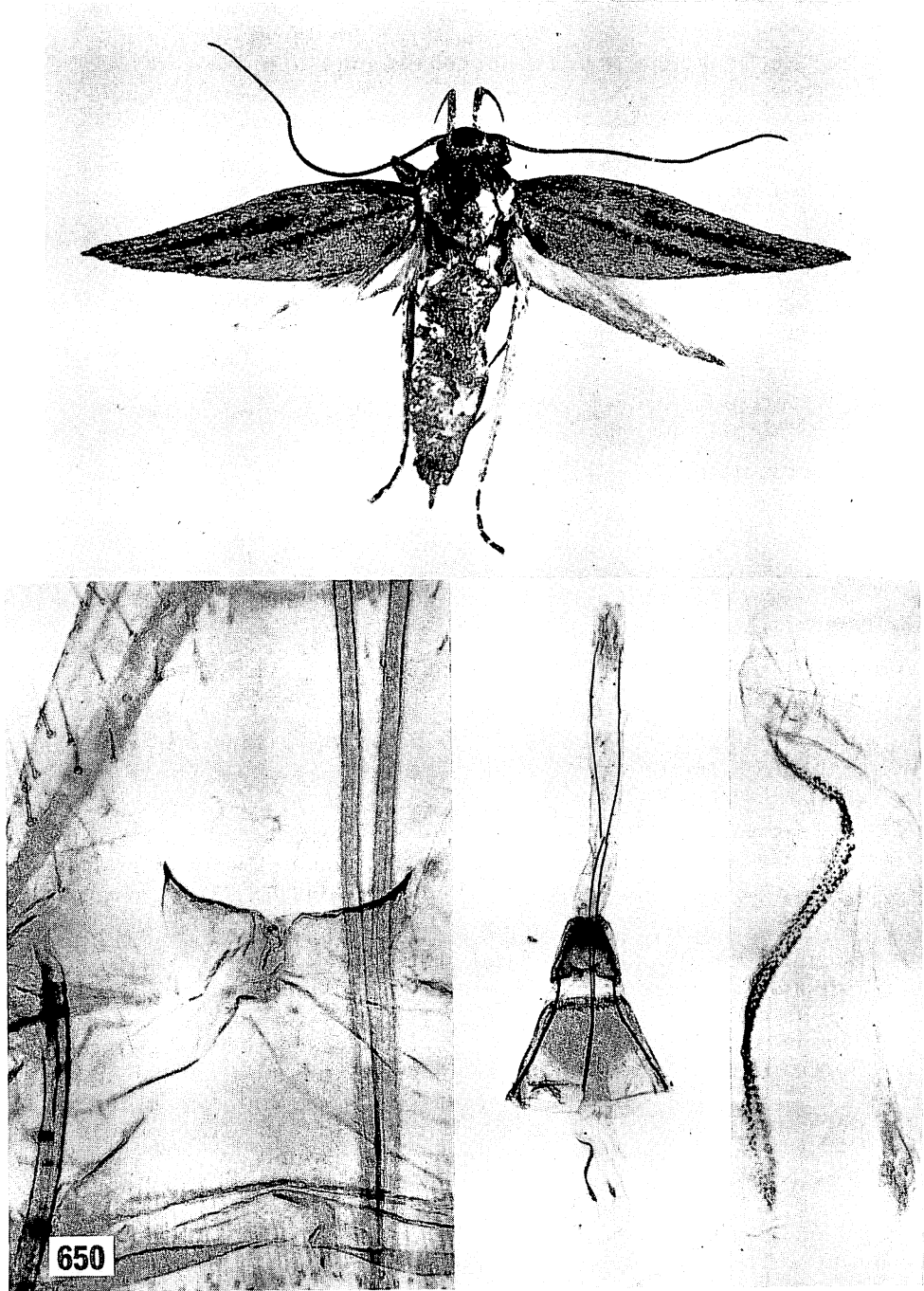
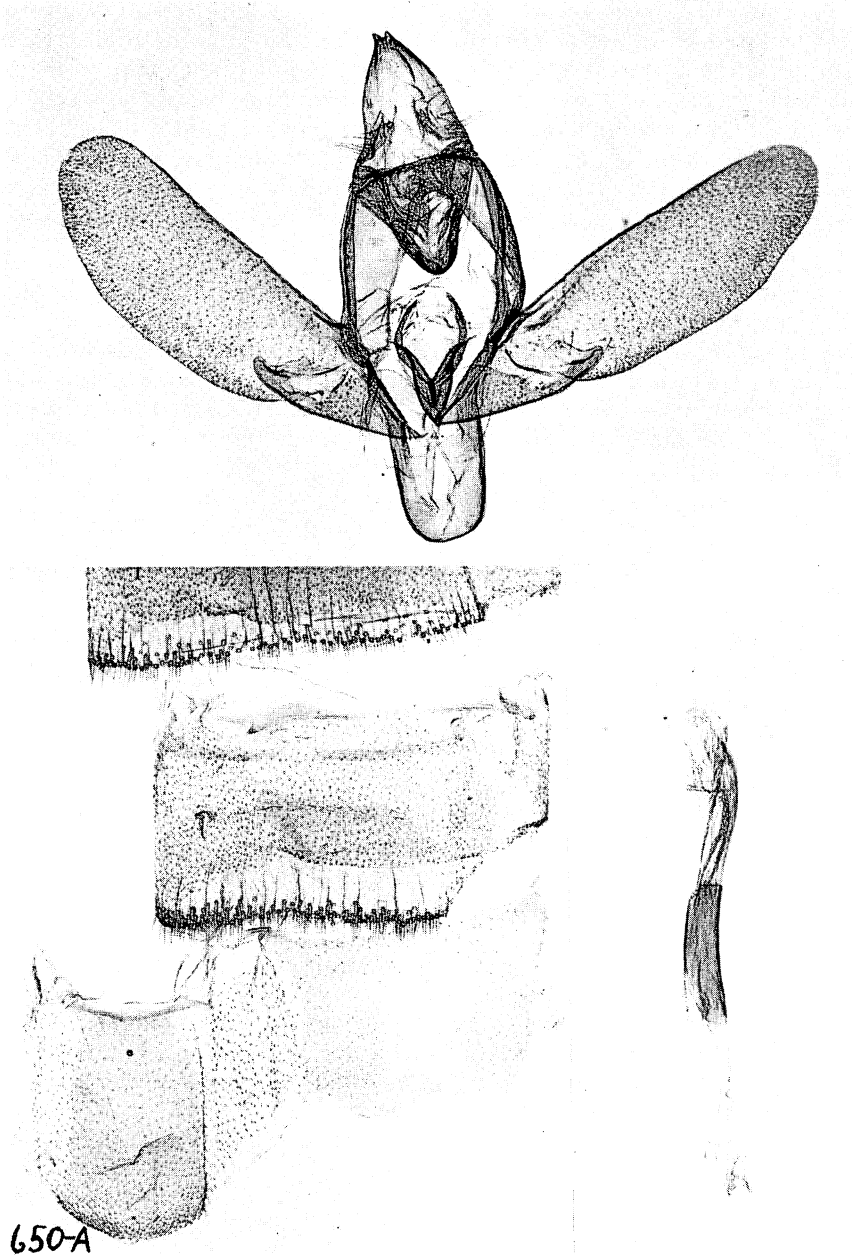


Figure 650—*Thyrocopa* ("Hodegia") *apatela* (Walsingham), the unique female holotype and its genitalia (BM slide 3955); Haleakala, 9,500 feet, Maui. This is the type-species of *Hodegia*.



650-A

Figure 650-A—*Thyrocopa* ("Hodegia") *apatela* (Walsingham). Male genitalia, with aedeagus (in lateral aspect) at bottom right and caudal abdominal segments at bottom left (terminal segment split open to show sclerotization of sternite and tergite); Haleakala, Maui, 10,000 feet, May 17, 1965, J. W. Beardsley. Dissection prepared by K. Sattler (Sattler 700) in the British Museum (Nat. Hist.).

Dr. Perkins (1913:clxiv) said: "*Hodegia apatela*, a flightless jumping insect with abbreviated wings, is only known in the female sex, the male probably being fully winged. It was found in the wind-swept open country near the summit of Haleakala, and one or two similar forms have been seen on the open lower slopes of Molokai, below the forest region, a locality also constantly swept by strong winds." It is strange that Perkins did not collect the specimens he saw on Molokai, or, if he did collect specimens, why no specimens were preserved in the collections he sent back to England for the *Fauna Hawaiiensis* studies.

Until about two and one-half years after the manuscript for this book was submitted to the Press for publication, I knew only the then unique female holotype of *apatela*. It was with great surprise and delight, therefore, that, long after my text on the Xyloryctinae was completed, I learned by chance that the species had been rediscovered by J. W. Beardsley. Dr. Beardsley kindly sent me a pair of specimens for study, and I have rewritten my text. The female was collected at about 9,000 feet on Haleakala on June 15, 1963, and the male was found at about 10,000 feet on May 17, 1965. The wings of both sexes are similarly reduced as they are on the holotype female. The suggestion by Perkins and others that the male was probably fully winged is, therefore, proved incorrect. This species is truly a totally flightless insect. There is considerable variation in the color pattern of the forewings.

Dr. Beardsley wrote to me that his "five specimens were collected at several different times and at different places on Haleakala, between 6,000 and 10,000 feet, during the time when I was working on *Nysius* aggregations (1964-67). The moths attracted my attention because of their unusual habit of skittering along the ground when disturbed. [Compare Perkins' statement quoted above regarding the species as a "jumping" insect.] I think most of those which I saw were hiding in clumps of bunchgrass when disturbed. I saw many more specimens than I collected as, unfortunately, I assumed they were probably something fairly common. Also, unfortunately, I did not make any notes on their behavior and so am relying on my memory of their habitat."

Dr. Beardsley's collections and observations of this species are among the most exciting of recent events of Hawaiian entomology. Until now it was not known whether the female holotype of *apatela* represented an abnormal individual, the normal flightless female of a species with winged males (as Perkins originally incorrectly assumed) or a species in which both sexes have peculiarly reduced wings and the species is totally flightless as Dr. Beardsley's valued discovery has proved is the true condition.

Credence is now given to Dr. Perkins' report (quoted above) that he found similar flightless moths on Molokai, and detailed searches should be made on Molokai and elsewhere in an attempt to discover other flightless species. Unhappily, however, such flightless moths that once occupied areas now invaded by the voracious introduced *Pheidole megacephala* ant have probably been exterminated.

[While this proof was being read, Klaus and Edith Sattler found fully-winged males of this species on Maui and the flightless females of another species on Mauna Kea, Hawaii.]

Text continued on page 953.

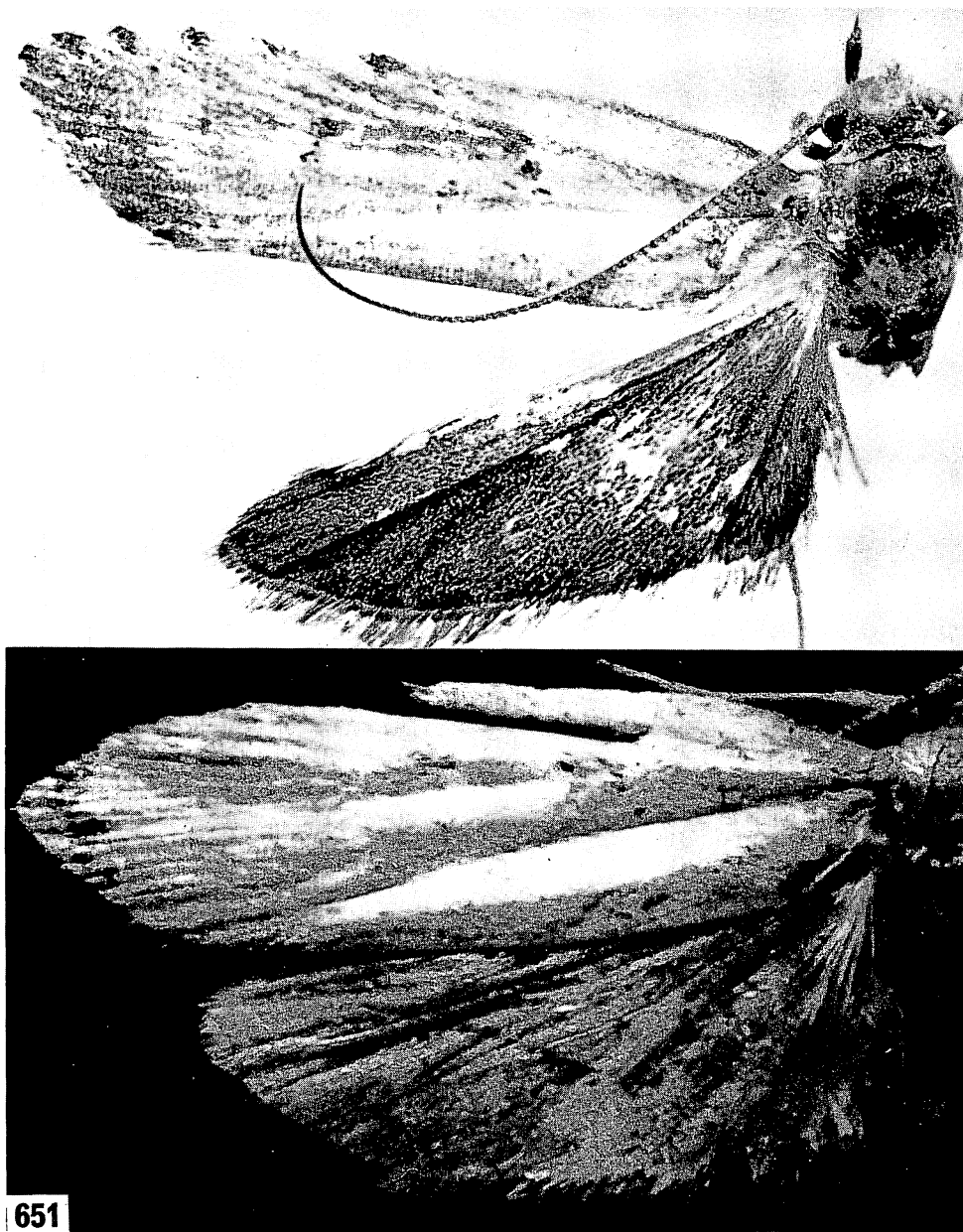


Figure 651—*Thyrocopa* species. Top, ("*Psychra*") *brevipalpis* (Walsingham), holotype male (BM slide 4158); Kaholuamano, 4,000 feet, Kauai; forewing=11 mm. The hindwings are dark fuscous. Bottom, ("*Ptychothrix*") *vagans* (Walsingham), male holotype (BM slide 4176); Halemanu, 4,000 feet, Kauai; forewing=10.5 mm.

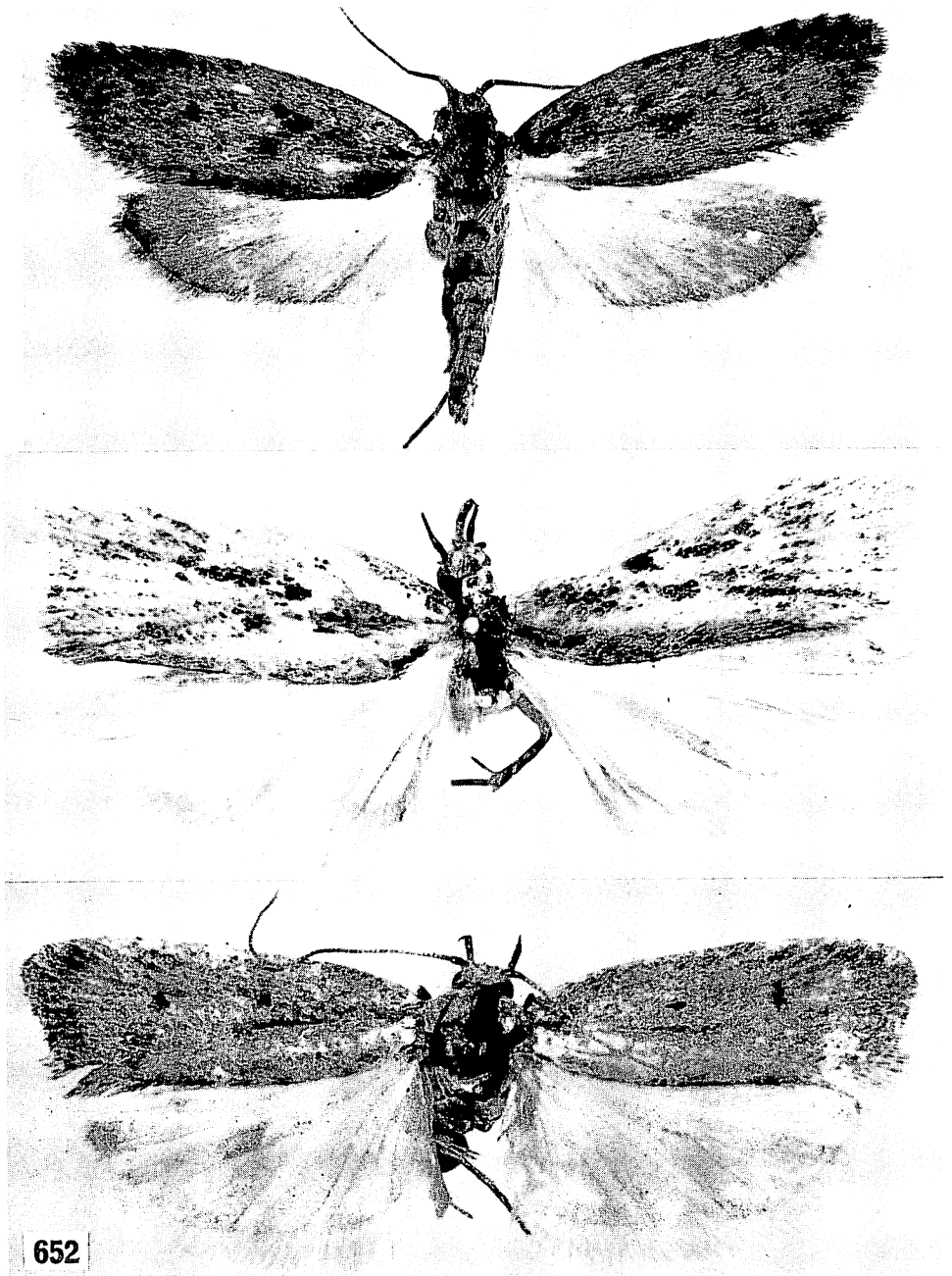


Figure 652—*Thyrocopa*. Top, a male of *abusa* Walsingham from the coast at Honolulu; expanse 18 mm.; see also figure 666. Middle, *acetosa* Meyrick, holotype female (BM slide 9554 Clarke); Kauai; expanse 21 mm. Bottom, *adumbrata* Walsingham, holotype female (BM slide 3942); Kona, 3,000 feet, Hawaii; expanse 22 mm.

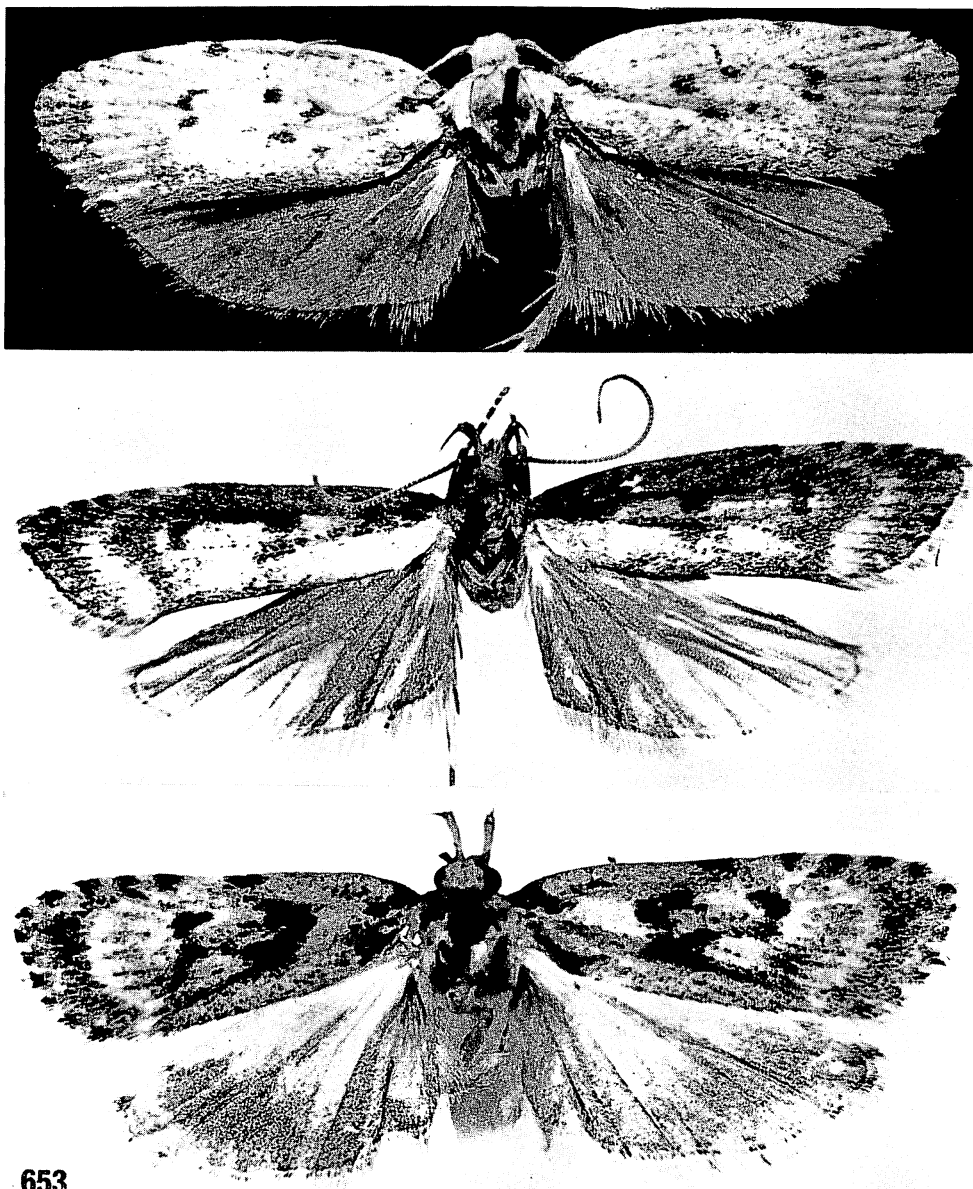


Figure 653—*Thyrocopa*. Top, *albonubila* Walsingham, holotype male (BM slide 4049); Kauai, 3,000 to 4,000 feet; expanse 24 mm. Middle, *alterna* Walsingham, male holotype (BM slide 4046); Haleakala, 5,000 feet, Maui; expanse 24 mm. Bottom, *indecora* (Butler) from the holotype female of the synonymous *lactea* Butler (BM slide 3895); labeled "Hawaiian Islands 81.7/129"; expanse 30mm.

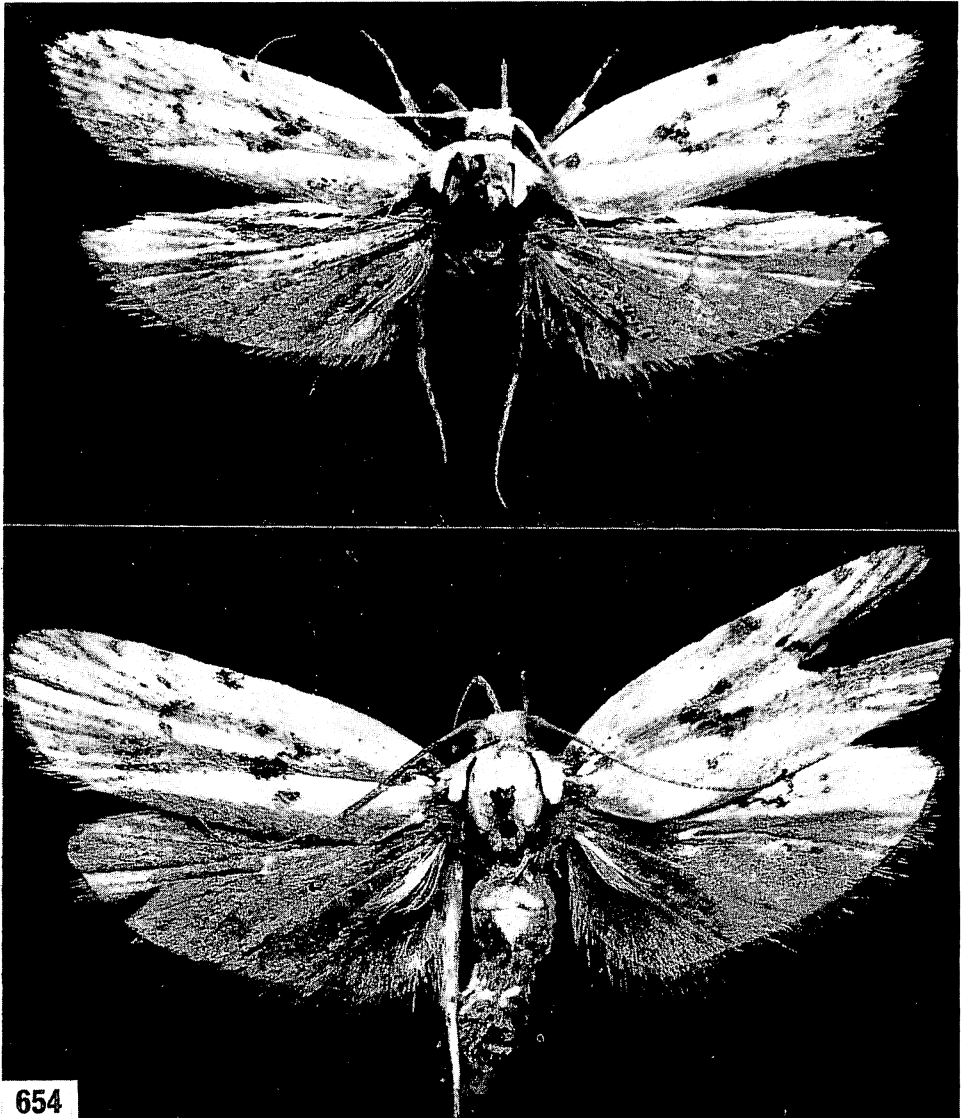
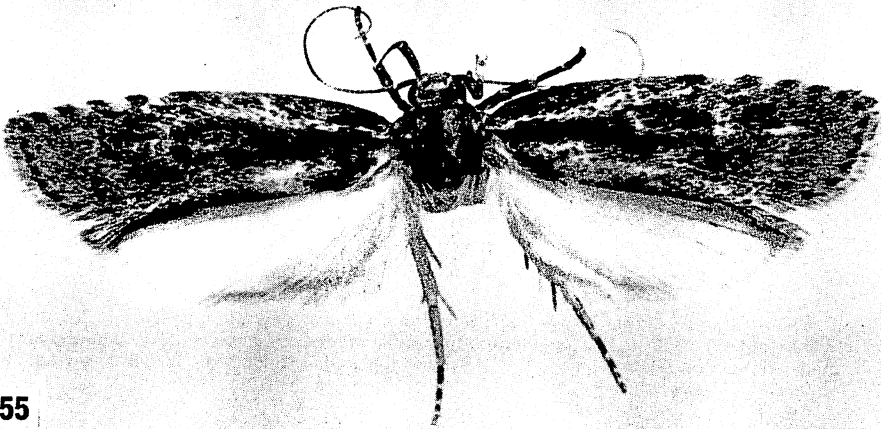
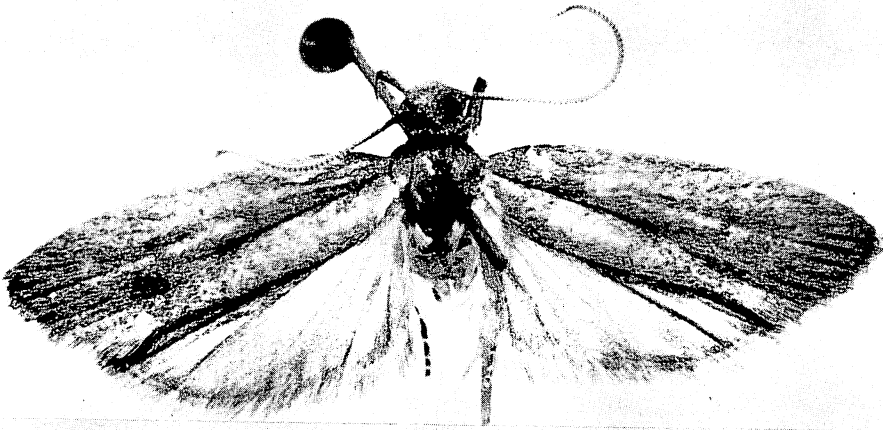
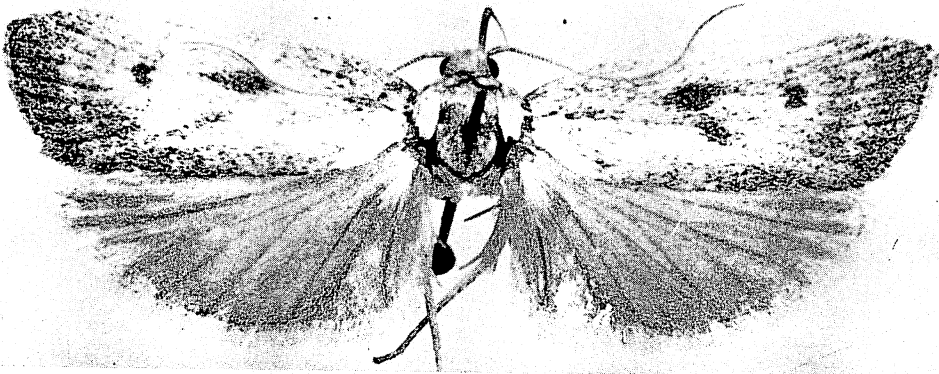


Figure 654—*Thyrocopa argentea* (Butler). Top, holotype female (originally thought to be a male) (BM slide 4045); expanse 14 mm. Bottom, the original allotype female; expanse 21.5 mm. Both specimens bear the Blackburn labels "Hawaiian Islands 81.7/100"; the locality code means taken in the mountains near Honolulu.





655

Figure 655—*Thyrocopa*. Top, *cinerella* Walsingham, holotype female (BM slide 3943); Kauai, 3,000 to 4,000 feet; expanse 39 mm. Middle, *crinosa* Meyrick, lectotype male (BM slide 9552 Clarke); Honolulu; expanse 19 mm. Bottom, *depressariella* Walsingham, holotype male (BM slide 4052); Kauai, 3,000 to 4,000 feet; expanse 23 mm.

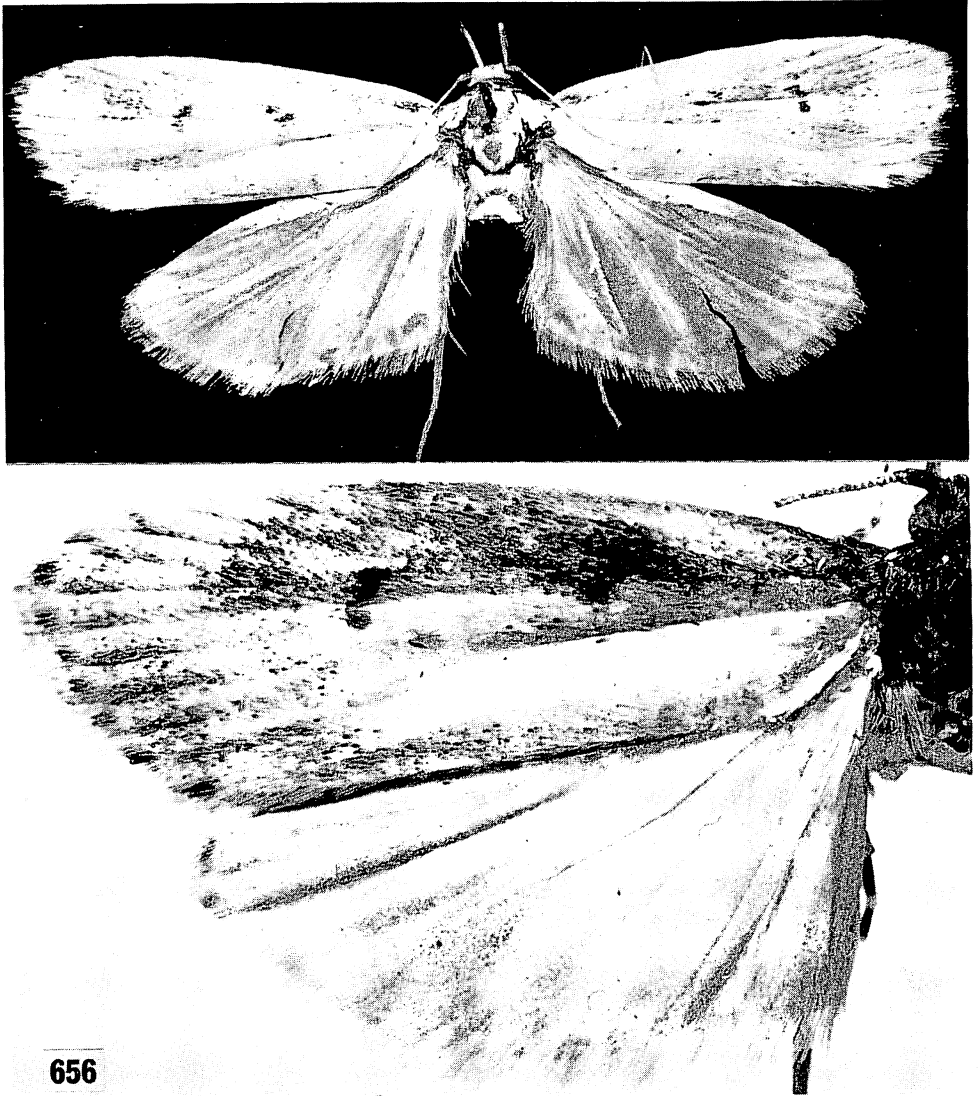


Figure 656—*Thyrocopa* ("Catamempsis") *decipiens* (Walsingham), Top, allotype female (BM slide 3944); Olaa, Hawaii; expanse 49 mm. This photograph makes the moth appear too white; it should appear more like the male in tone. Bottom, holotype male (BM slide 4389); Olaa, 2,000 feet, Hawaii; forewing = 18 mm.

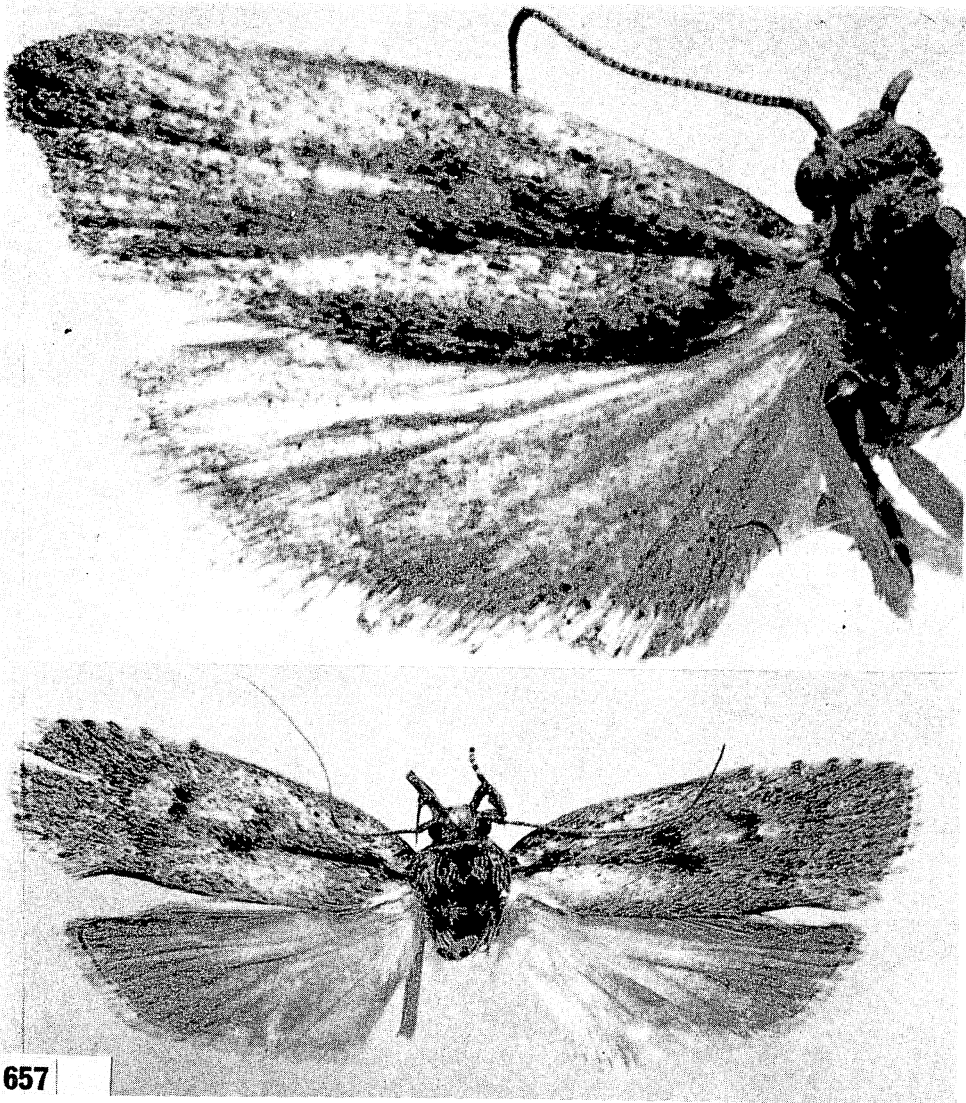


Figure 657—*Thyrocopa*. Top, *epicapna* (Meyrick), holotype male; forewing=9 mm.; locality unknown; abdomen lost (a female abdomen of another family was glued on the type; BM slide 4075). Bottom, *fraudentella* Walsingham, holotype male (BM slide 4076); Kilauea, Hawaii; expanse 25 mm.

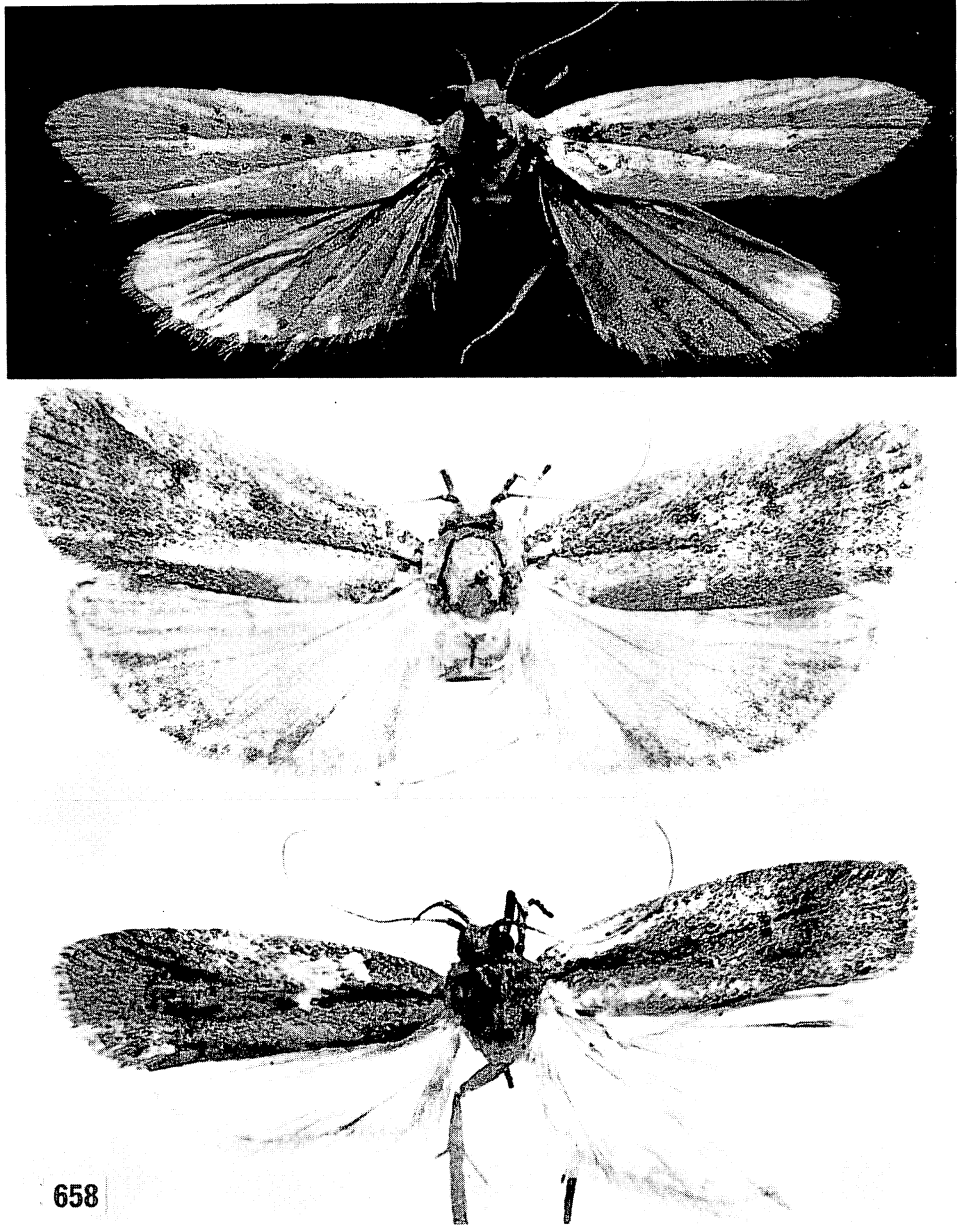
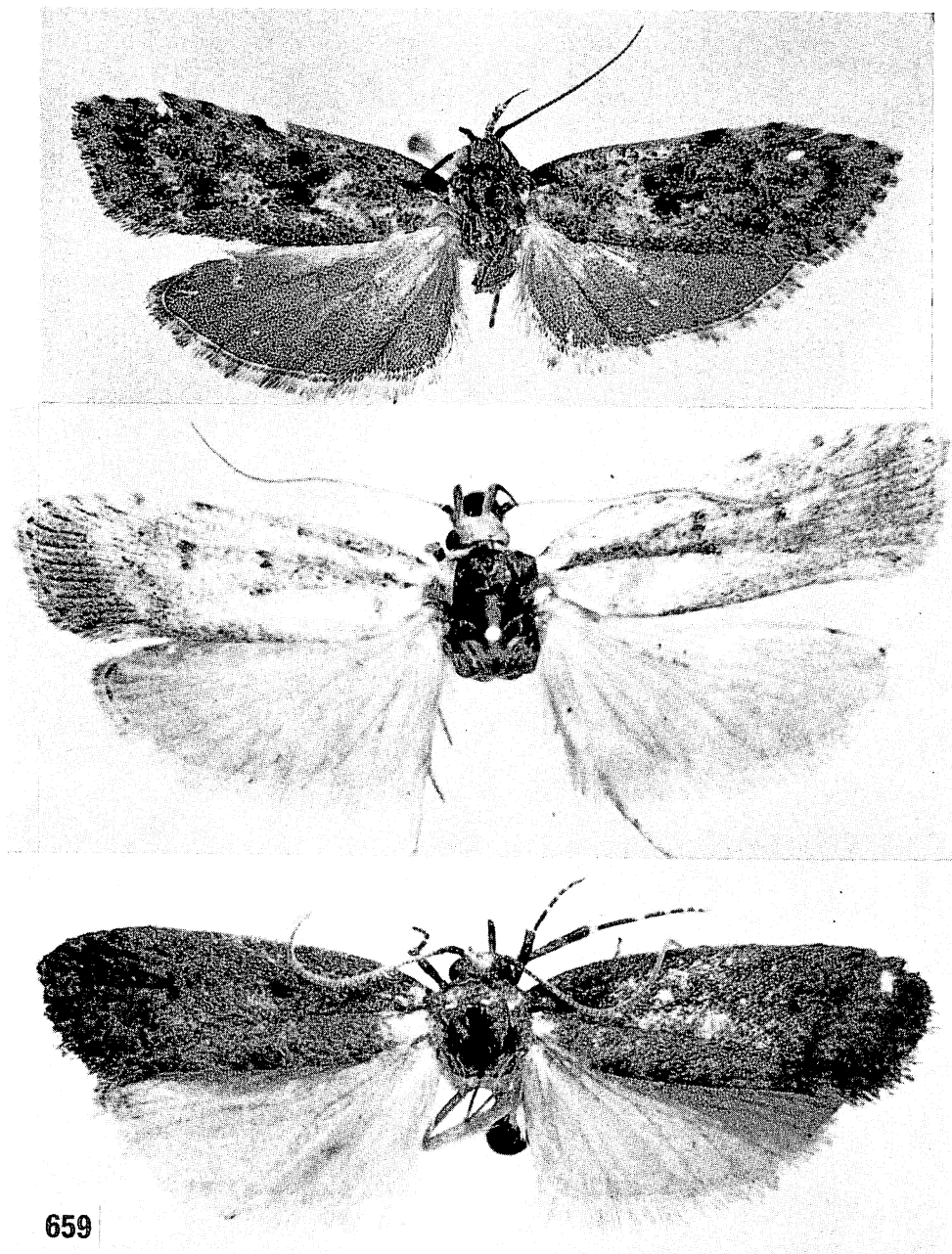


Figure 658—*Thyrocopa*. Top, *geminipuncta* Walsingham, holotype female (BM slide 3898); Molokai, 4,500 feet; expanse 21 mm; this is a straw-colored species. Middle, *gigas* (Butler), holotype male (BM slide 4048); Haleakala, 4,000 feet, Maui (the original Blackburn label reads "Hawaiian Islands 81.7/119"); expanse 45 mm. It is a brown species; the photograph makes it appear too pale. Bottom, *immutata* Walsingham, holotype male (BM slide 4155); Kaholuamano, 4,000 feet, Kauai; expanse 24.5 mm.



659  
Figure 659—*Thyrocopa*. Top, *indecora* (Butler), holotype male (BM slide 4050); Haleakala, 4,000 feet, Maui (Blackburn's number 81.7); expanse 27 mm. Middle, *ingeminata* Meyrick, lectotype female (BM slide 9551 Clarke); Honolulu; expanse 23 mm. Bottom, *inermis* Walsingham, holotype male (BM slide 4077); Kona, 3,000 feet, Hawaii; expanse 24 mm.

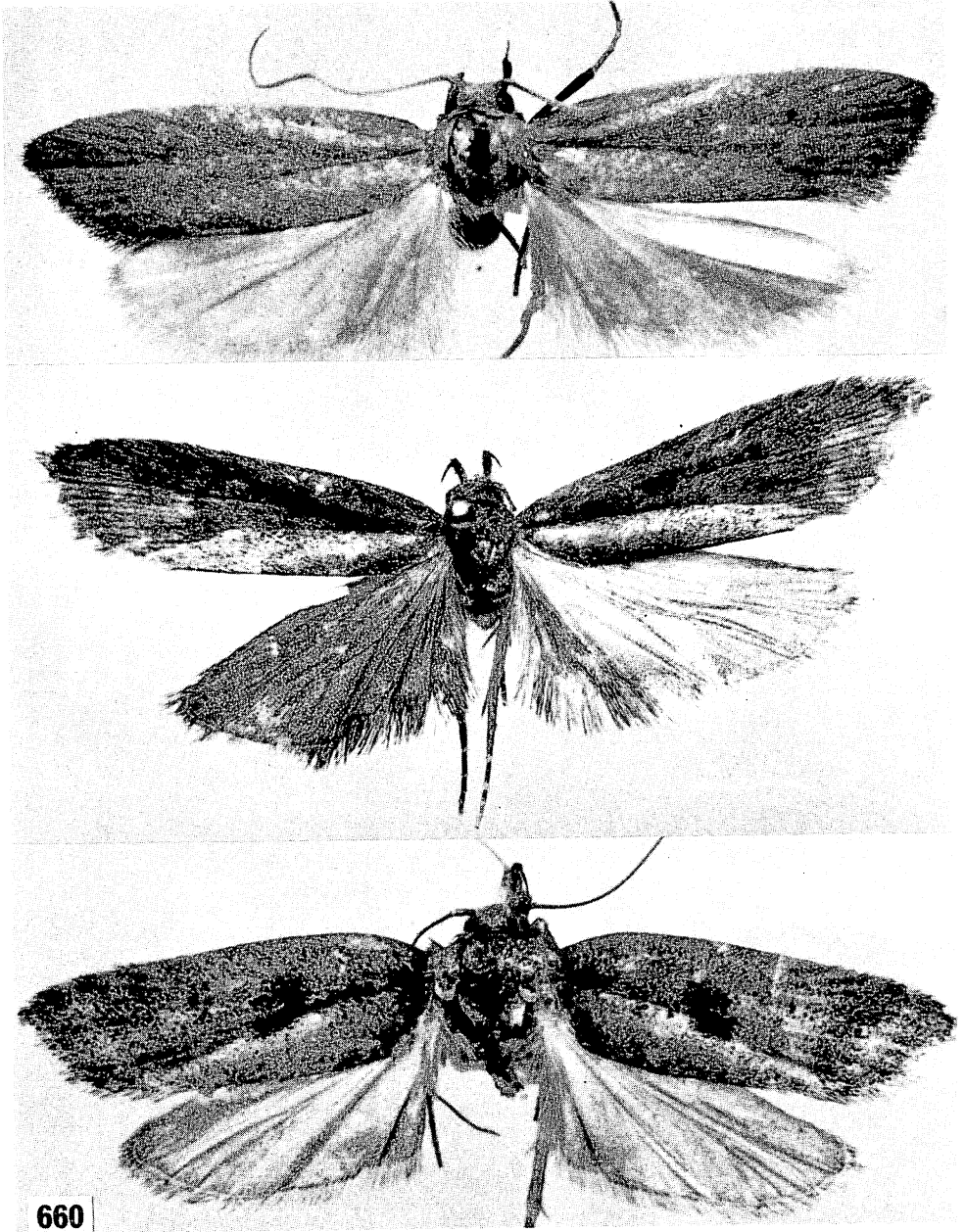
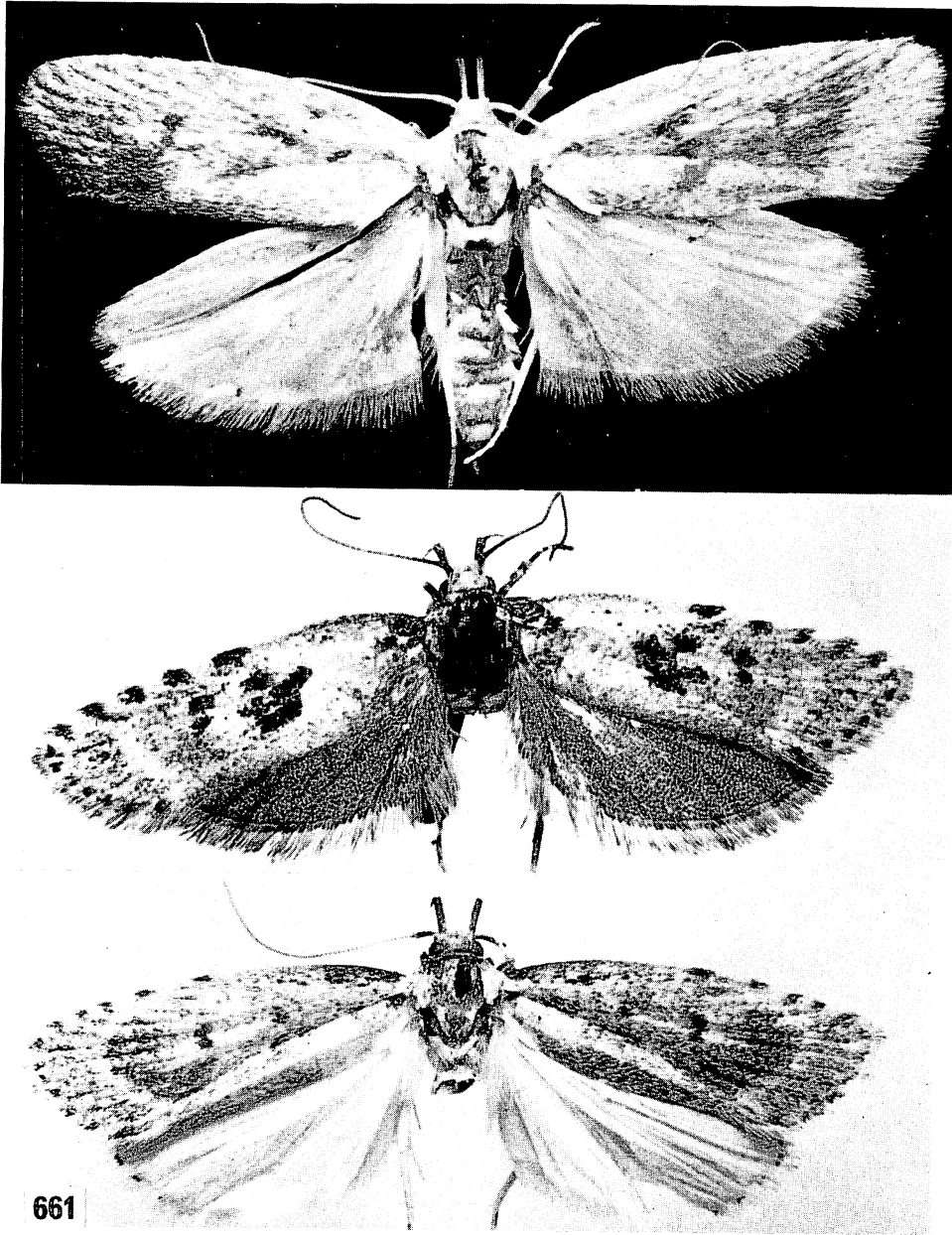


Figure 660—*Thyrocopa*. Top, *leonina* Walsingham, holotype male (BM slide 4078); Lanai, 2,000 feet; expanse 20.5 mm. Middle, *libroides* Meyrick, holotype female (BM slide 9555 Clarke); "Kauai, Palmer .00"; expanse 25 mm. Bottom, *mediomaculata* Walsingham, holotype female (BM slide 3899); Haleakala Crater, Maui; expanse 25 mm.



661

Figure 661—*Thyrocopa*. Top, *megas* Walsingham, holotype female; Haleakala, 5,000 feet, Maui; expanse 39 mm.; the forewings are too pale in the photograph. Middle, *minor* Walsingham, holotype female (BM slide 3946); Molokai, above 3,000 feet; expanse 18 mm. Bottom, *nubifer* Walsingham, holotype male (BM slide 4151); Kona, 4,000 feet, Hawaii; expanse 28 mm.

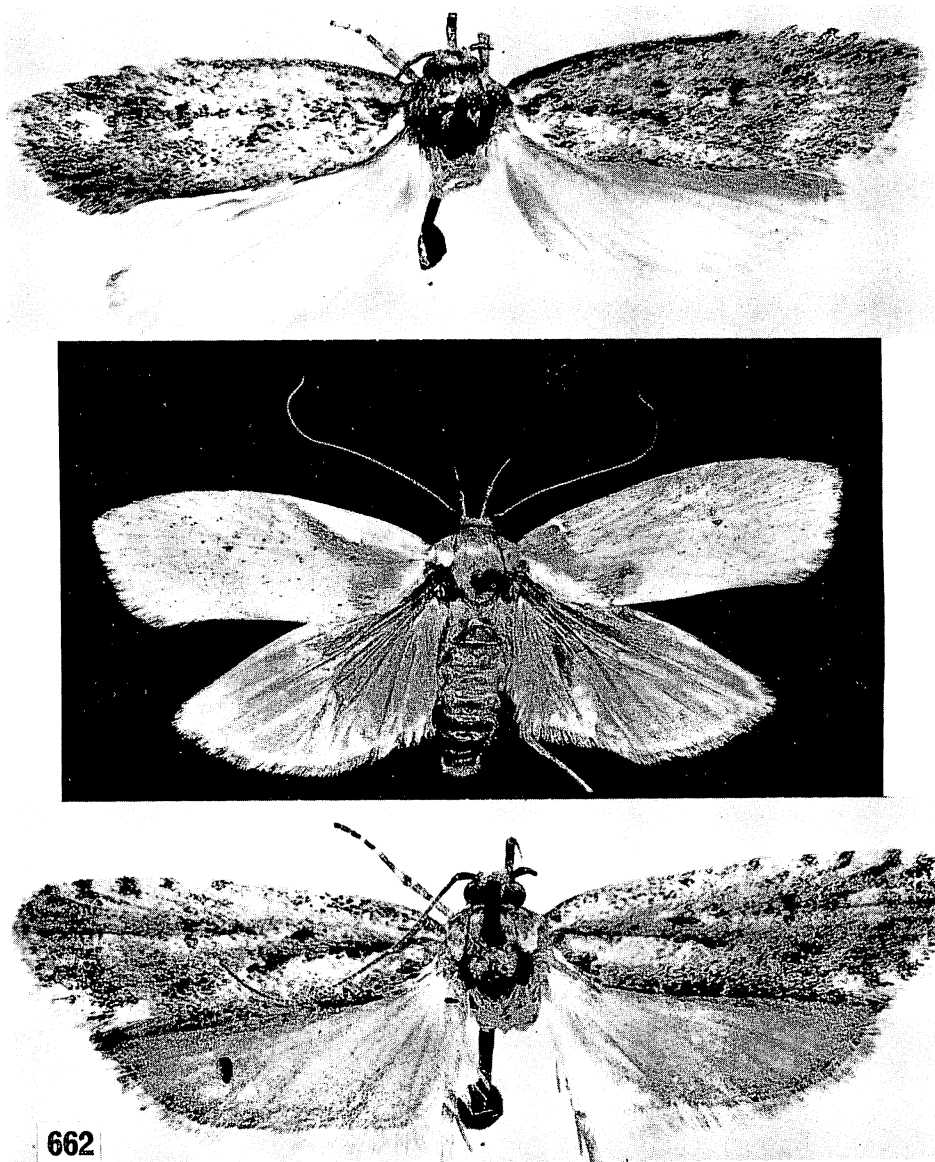


Figure 662—*Thyrocopa*. Top, *pallida* Walsingham, holotype male (BM slide 4152); Kaholuamano, 4,000 feet, Kauai; expanse 24.5 mm. Middle, *peleana* Swezey, holotype; Waipio Ridge, Oahu; ex *Pelea*; forewing=19 mm. Bottom, *pulverulenta* Walsingham, holotype male (BM slide 4153); Kona, 4,000 feet, Hawaii; expanse 25.5 mm.



It is remarkable that *apatela* remained an enigma for so long a time. The area it occupies has been collected over by almost all entomological collectors who have worked in the popular summit area of Haleakala. Dr. Swezey visited the area several times, and I collected extensively in the area on various occasions, but neither of us saw this moth. I must admit, however, that I did not make any special searches for ground-dwelling insects (excepting to search for Carabidae beneath objects lying on the ground), and, although I swept over them, I never searched bunchgrass clumps carefully in that locality. Much specialized collecting remains to be done in Hawaii.

Text continued on page 977.

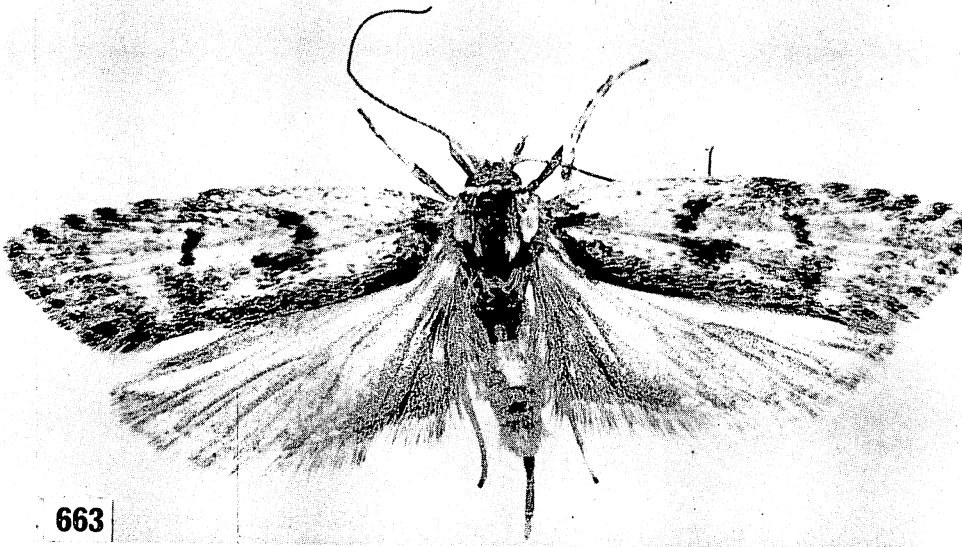


Figure 663—*Thyrocopa* ("Psychra") *phycidiformis* (Walsingham). Top, holotype male (BM slide 4159); Kauai, 3,000 to 4,000 feet; expanse 23 mm. Bottom, allotype female from the same locality; expanse 27 mm.

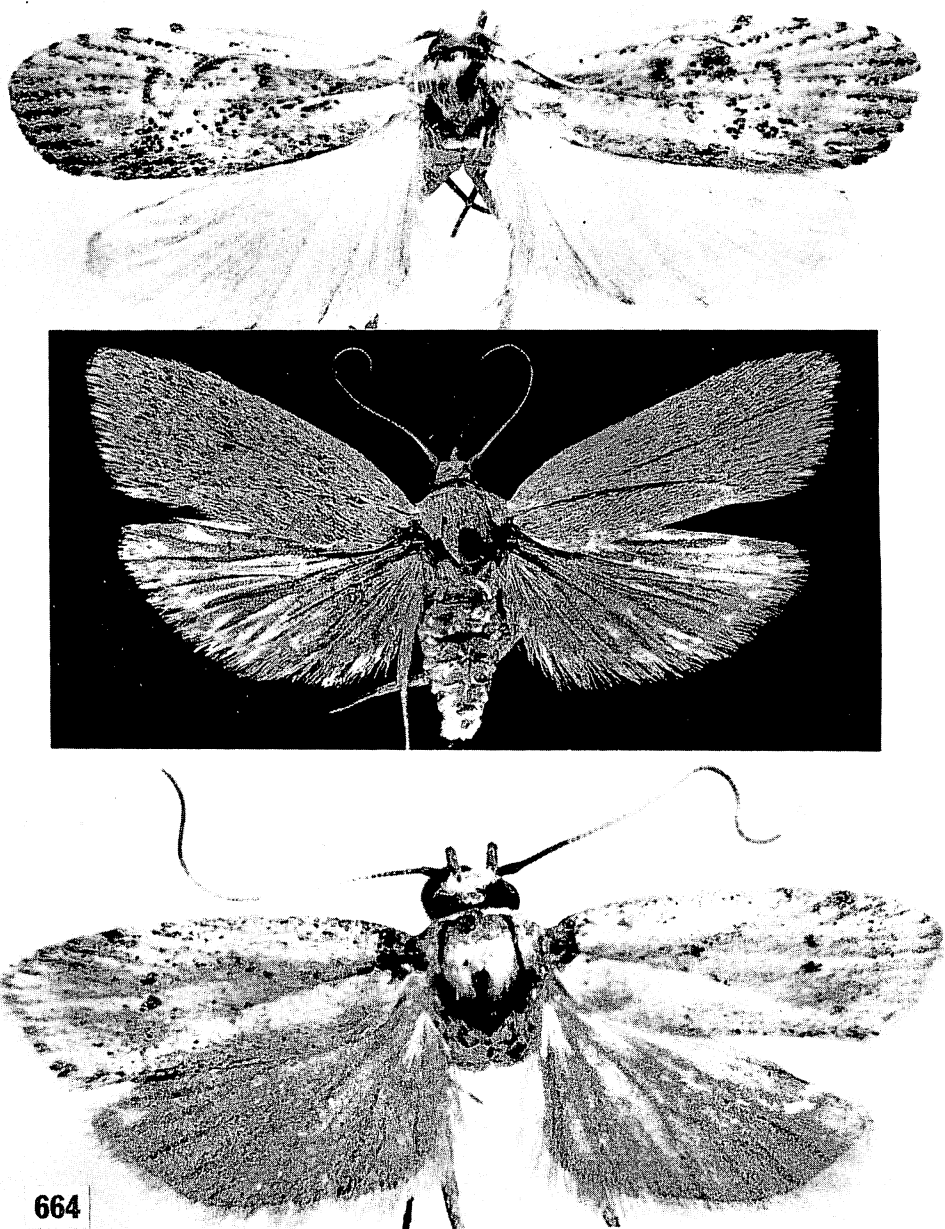
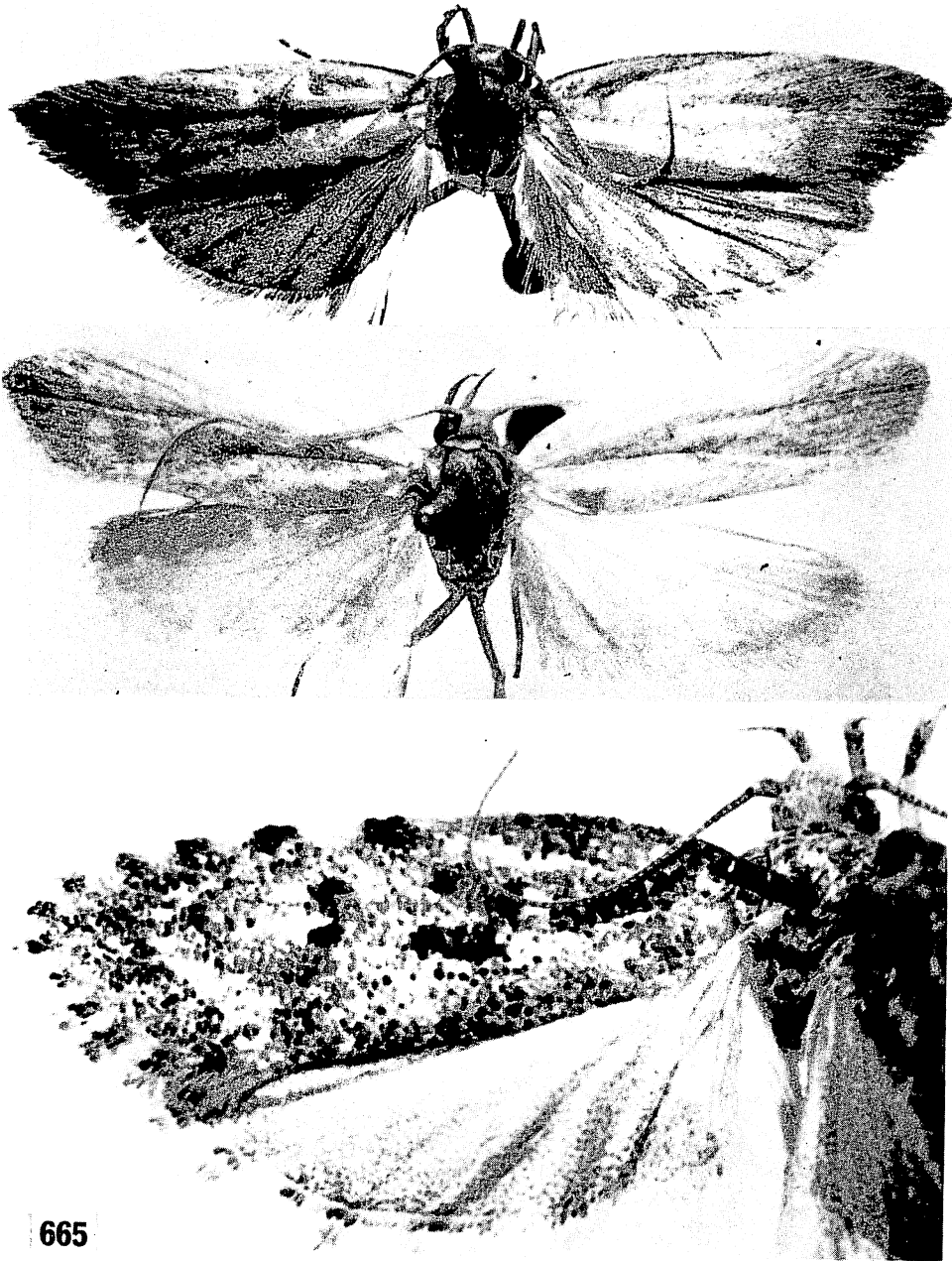


Figure 664—*Thyrocopa*. Top, *seminatella* Walsingham, holotype male (BM slide 4156); Haleakala, 4,000 feet, Maui, expanse 25.5 mm.; the photograph makes the wings appear too pale. Middle, *sapindiella* Swezey, holotype female; Niu, Oahu; forewing=10 mm. Bottom, *spilobathra* Meyrick, lectotype (BM slide 9547 Clarke); Honolulu, Oahu; expanse 18 mm.



665

Figure 665—*Thyrocopa*. Top, *subahenea* Walsingham, holotype male (BM slide 4157); Molokai, 3,000 feet; expanse 21 mm. Middle, *sucosa* Meyrick, holotype male (BM slide 9553 Clarke); Koolau Mts., Oahu; expanse 18 mm. Bottom, *tessellatella* Walsingham, holotype male (BM slide 4051); Kona, 4,000 feet, Hawaii.

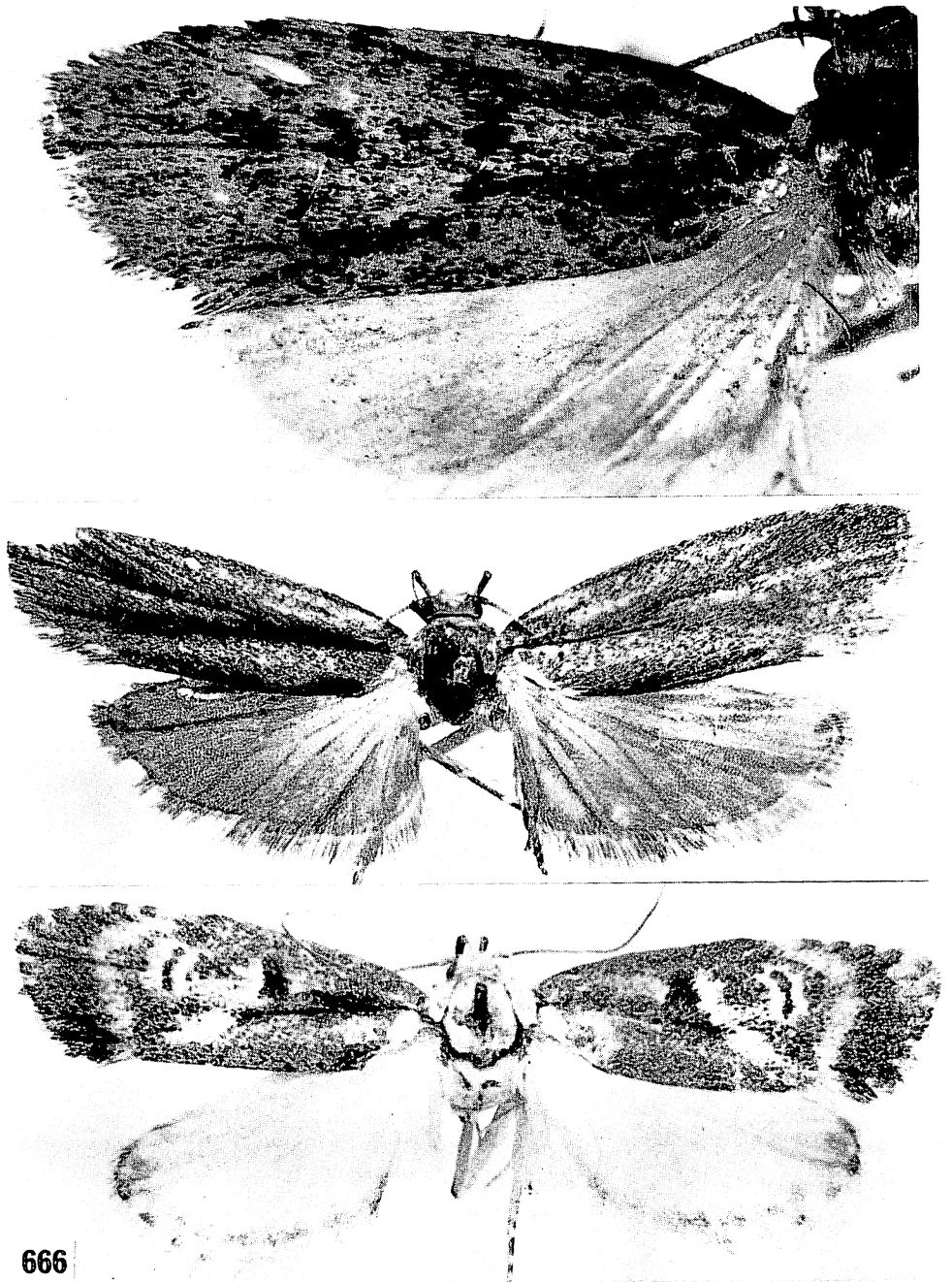


Figure 666—*Thyrocopa*. Top, *abusa* Walsingham, holotype male (BM slide 4044); Oahu; forewing= 8 mm.; the wings appear too dark on the photograph. Middle, *usitata* (Butler), holotype female (BM slide 3900); Oahu (probably near Honolulu; the Blackburn code is 81.7/69); expanse 24.5 mm. Bottom, *viduella* Walsingham, holotype female (BM slide 3945); Kauai, 3,000 to 4,000 feet; expanse with wings drooping as mounted, 33 mm.

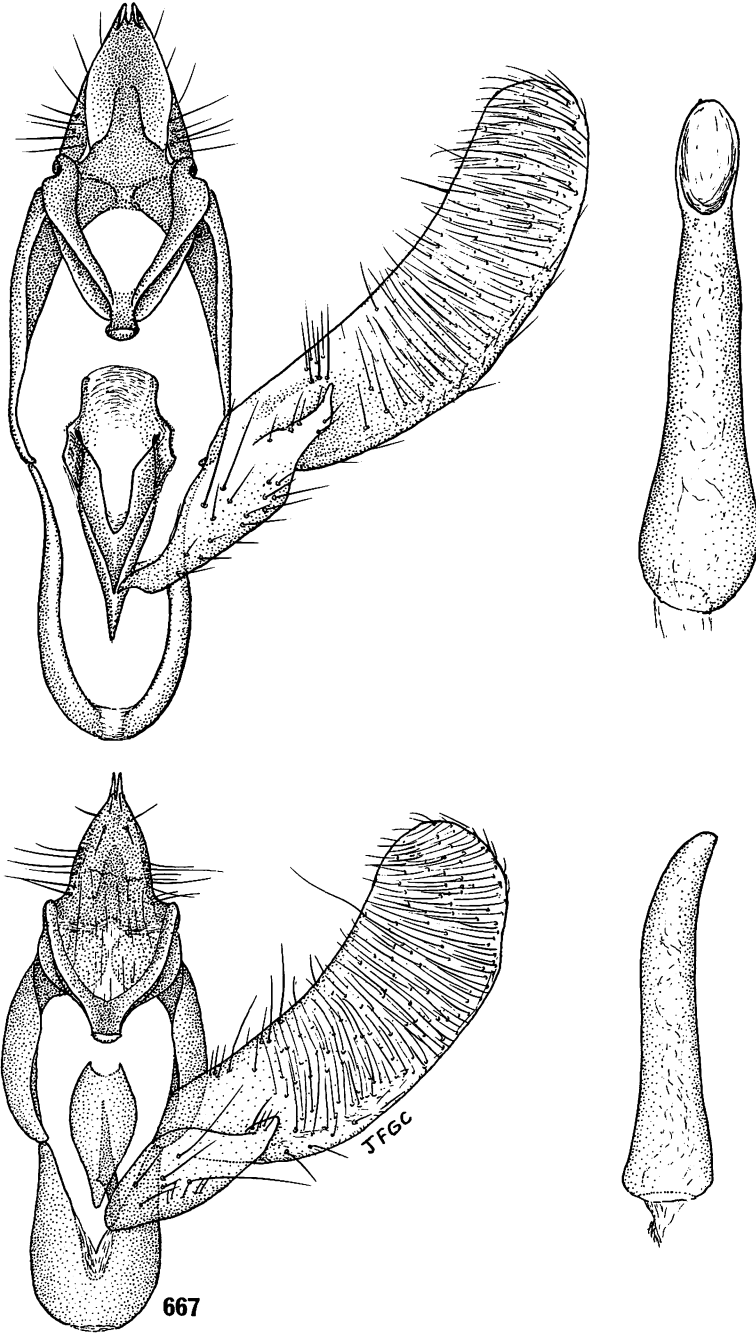


Figure 667—Male genitalia of *Thyrocopa*. Top, (*Psychra*) *phycidiiformis* (Walsingham). Bottom, *abusa* Walsingham? (an error in identification may be involved here; the drawing appears not to be the same as the holotype in figure 670).

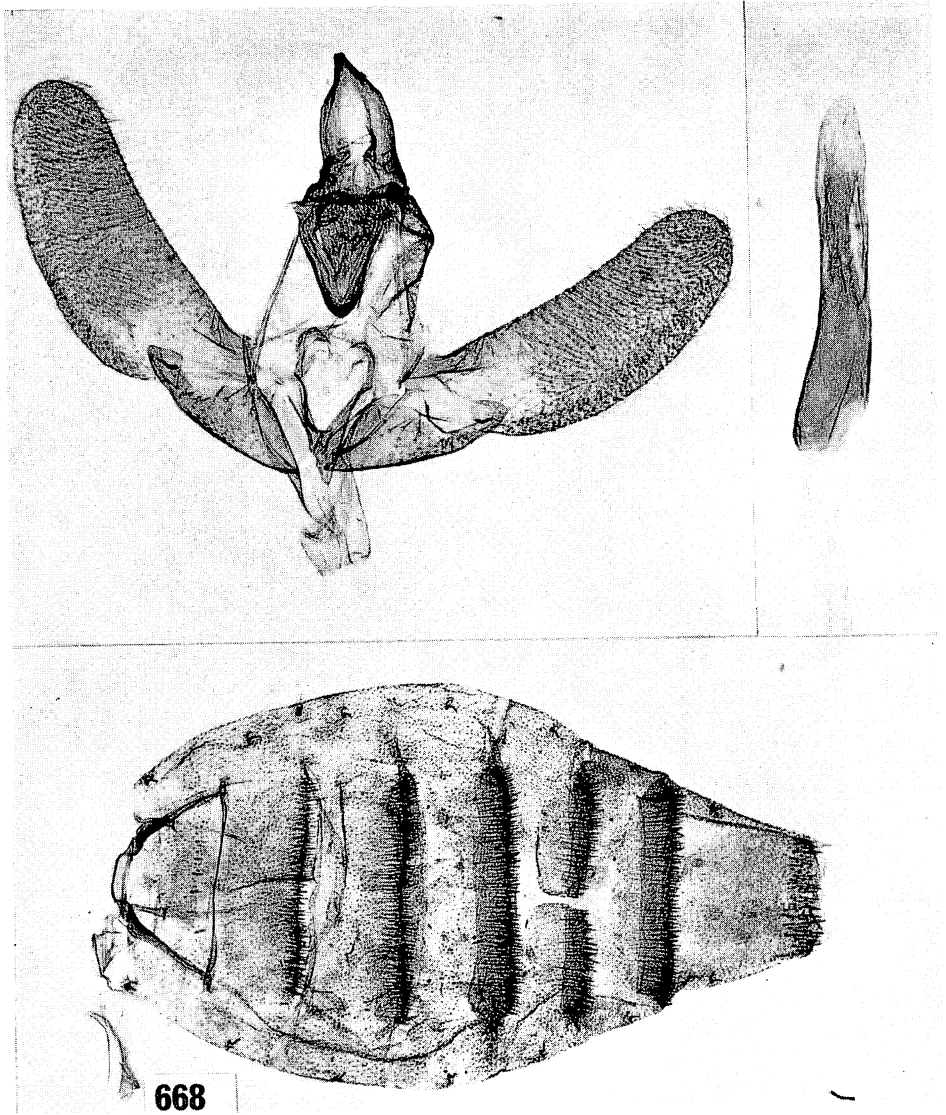


Figure 668—*Thyrocopa* species; Nihoa Island. Top, male genitalia (slide Z-II-28-65). Bottom, the abdominal skin of the female (slide Z-II-28-65-B). See also figure 669. Collected by J. W. Beardsley.

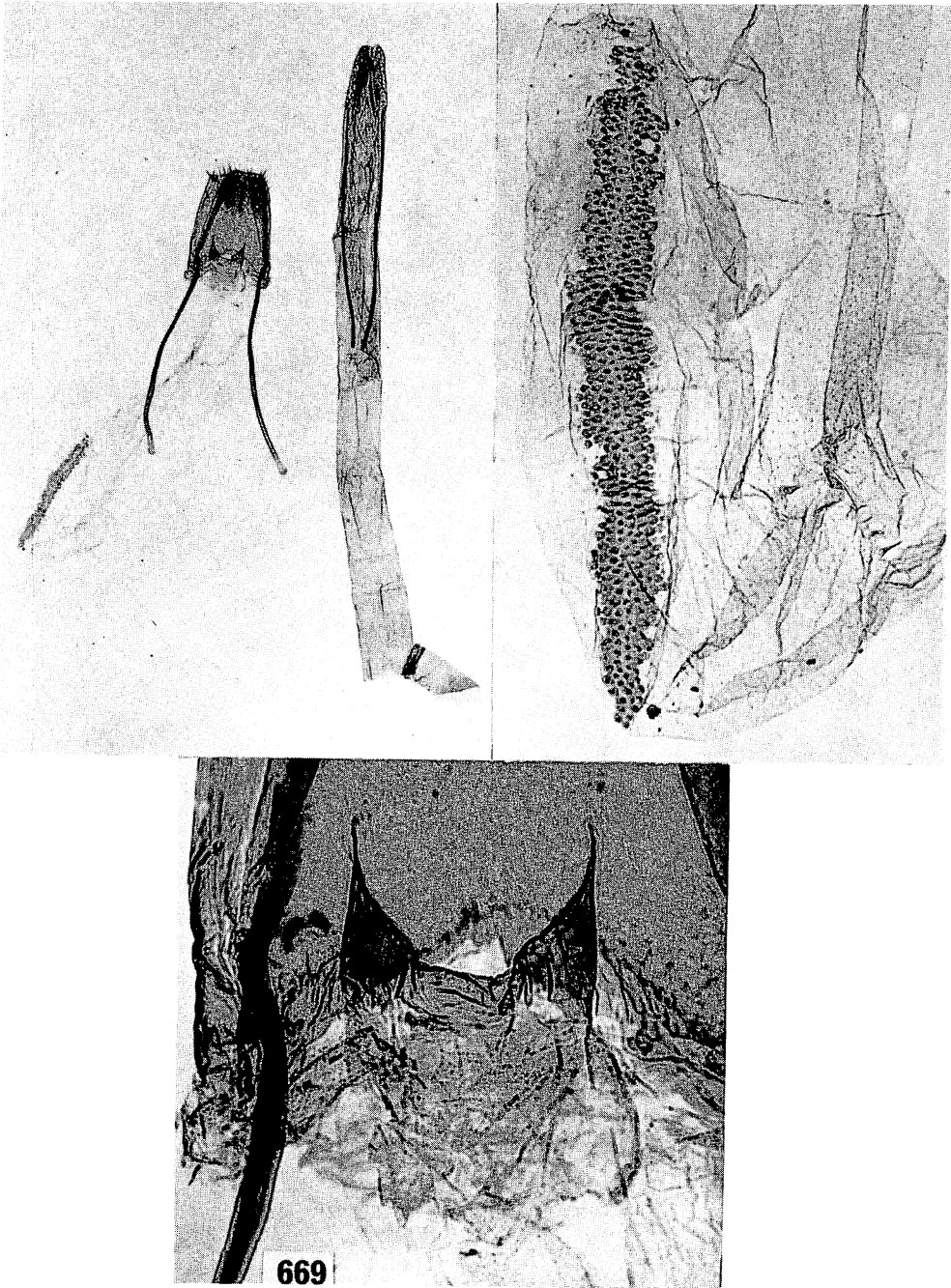
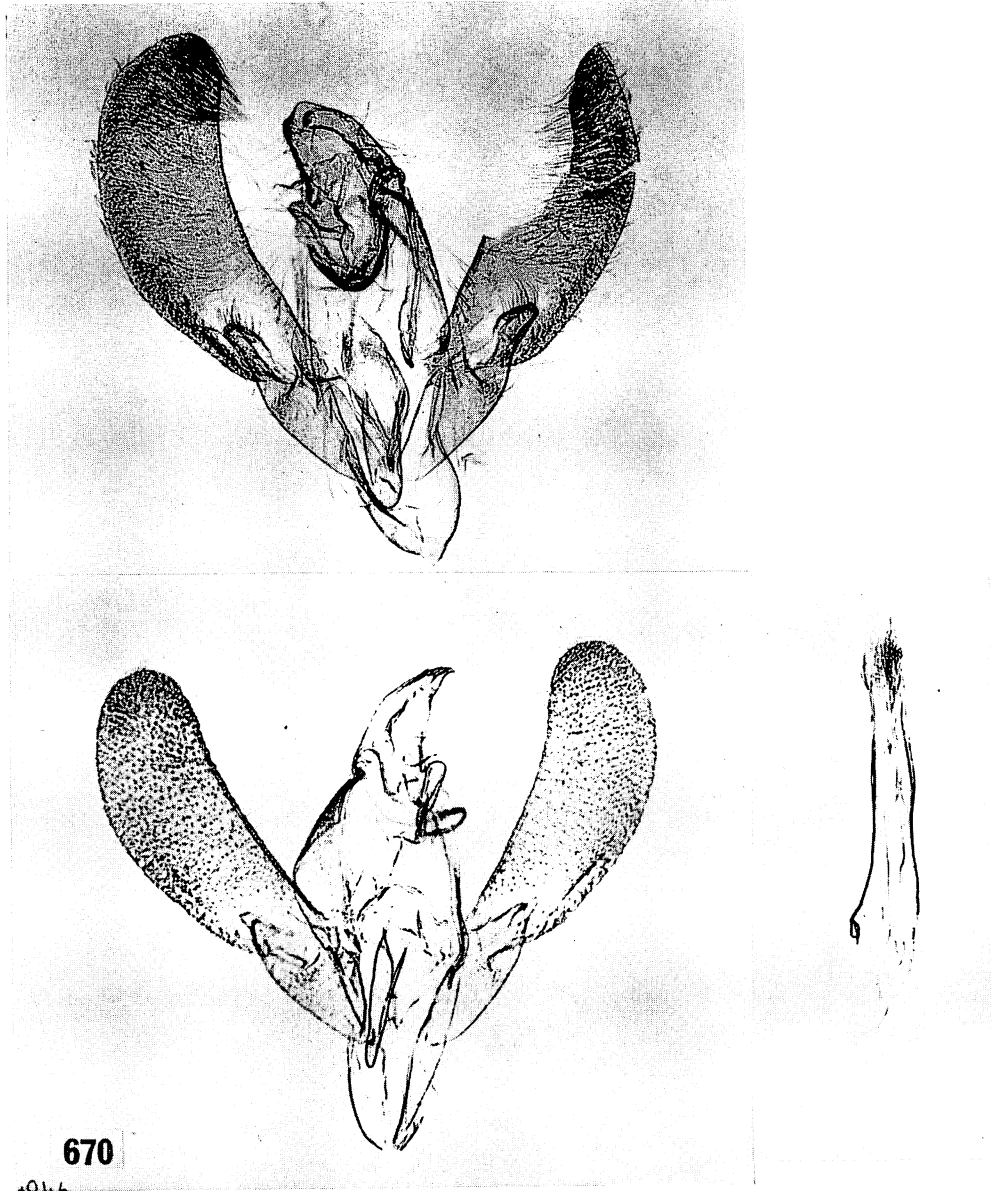


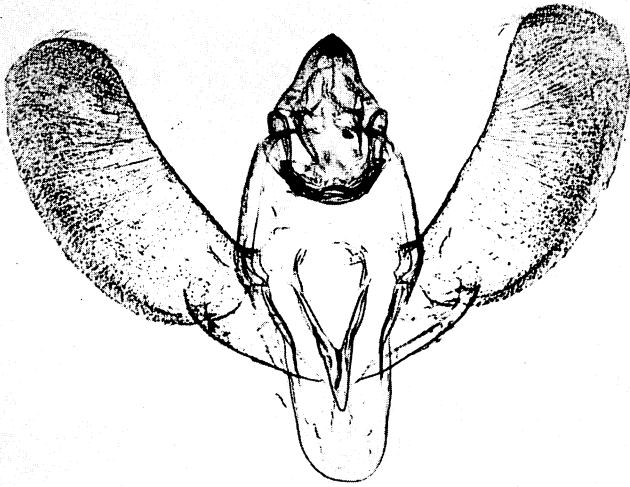
Figure 669—*Thyrocopa* species; Nihoa Island (slide Z-II-28-65-B). The posterior apophyses are broken. See figure 668 for the abdominal skin and for the male genitalia. Collected by J. W. Beardsley.



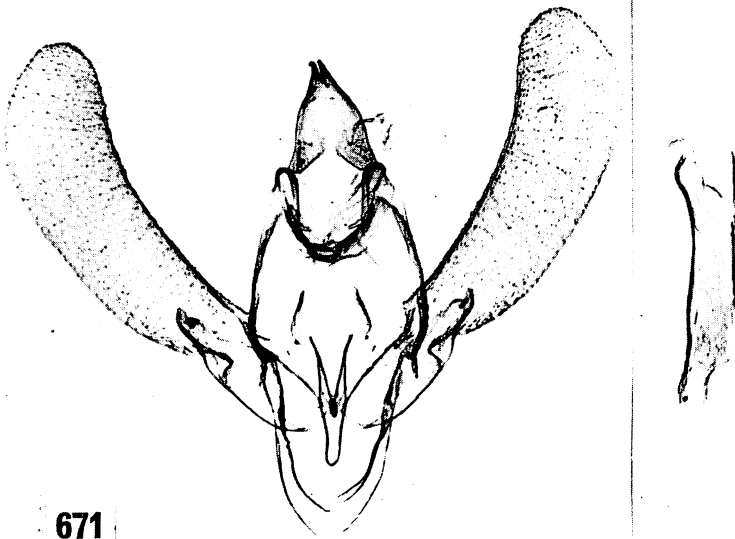
670

Figure 670—Male genitalia of *Thyrocopa*. Top, *abusa* Walsingham, holotype (BM slide 4044); Oahu; aedeagus lost. Bottom, *alterna* Walsingham, holotype (BM slide 4046); Haleakala, 5,000 feet. Compare the shapes of the ends of the sacculus on these and other species.





4049



671

Figure 671—Male genitalia of *Thyrocopa*. Top, *albonubila* Walsingham, holotype (BM slide 4049); aedeagus lost; Kauai, 3,000 to 4,000 feet; Bottom, *crinosa* Meyrick, lectotype (BM slide 9552 Clarke); Honolulu.

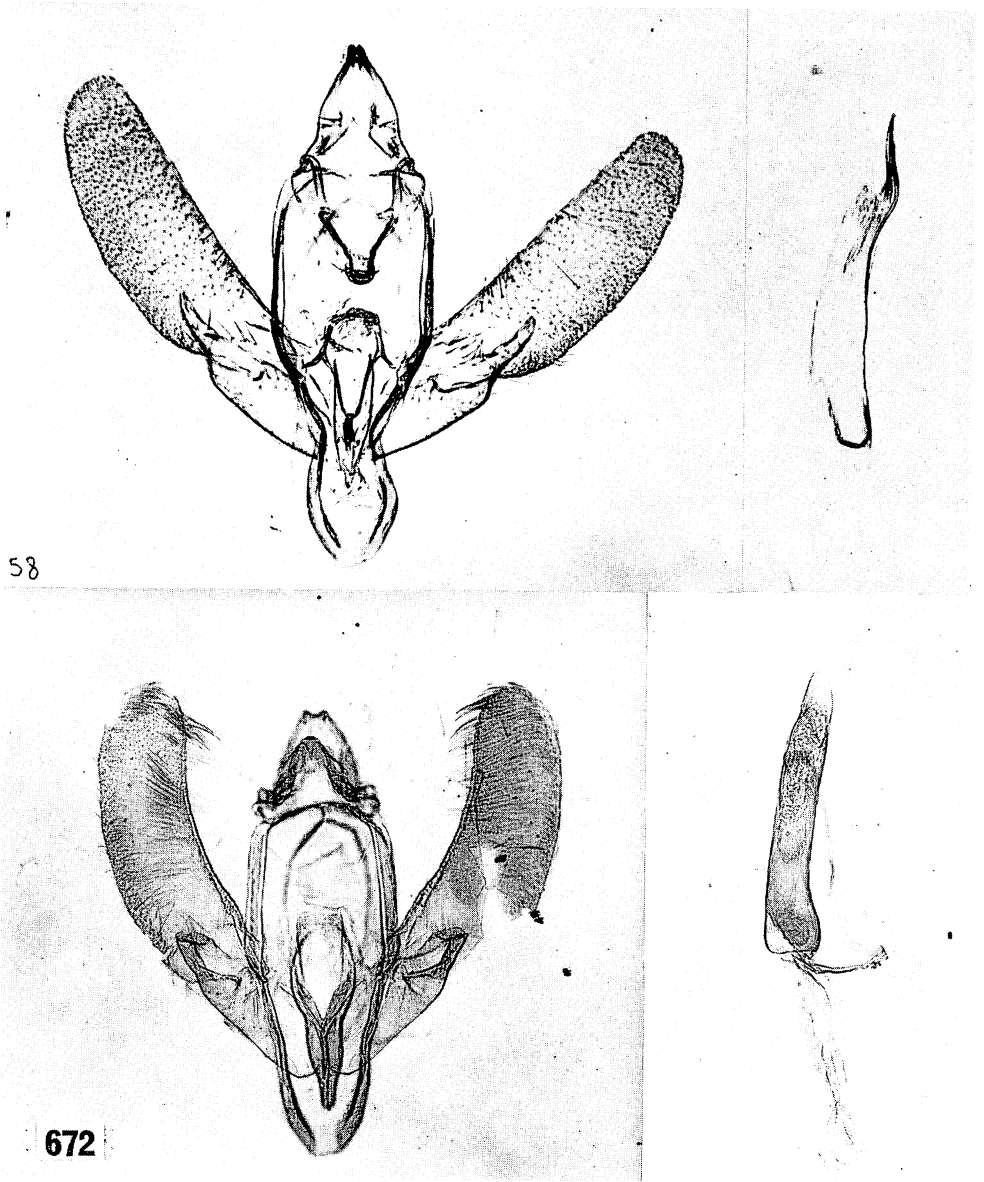


Figure 672—Male genitalia of *Thyrocopa*. Top, (*“Psychra”*) *brevipalpis* (Walsingham), holotype (BM slide 4158); Kaholuamano, Kauai; the aedeagus is shown in lateral aspect. Bottom, *depressariella* Walsingham, holotype (BM slide 4052); Kauai, 3,000 to 4,000 feet.

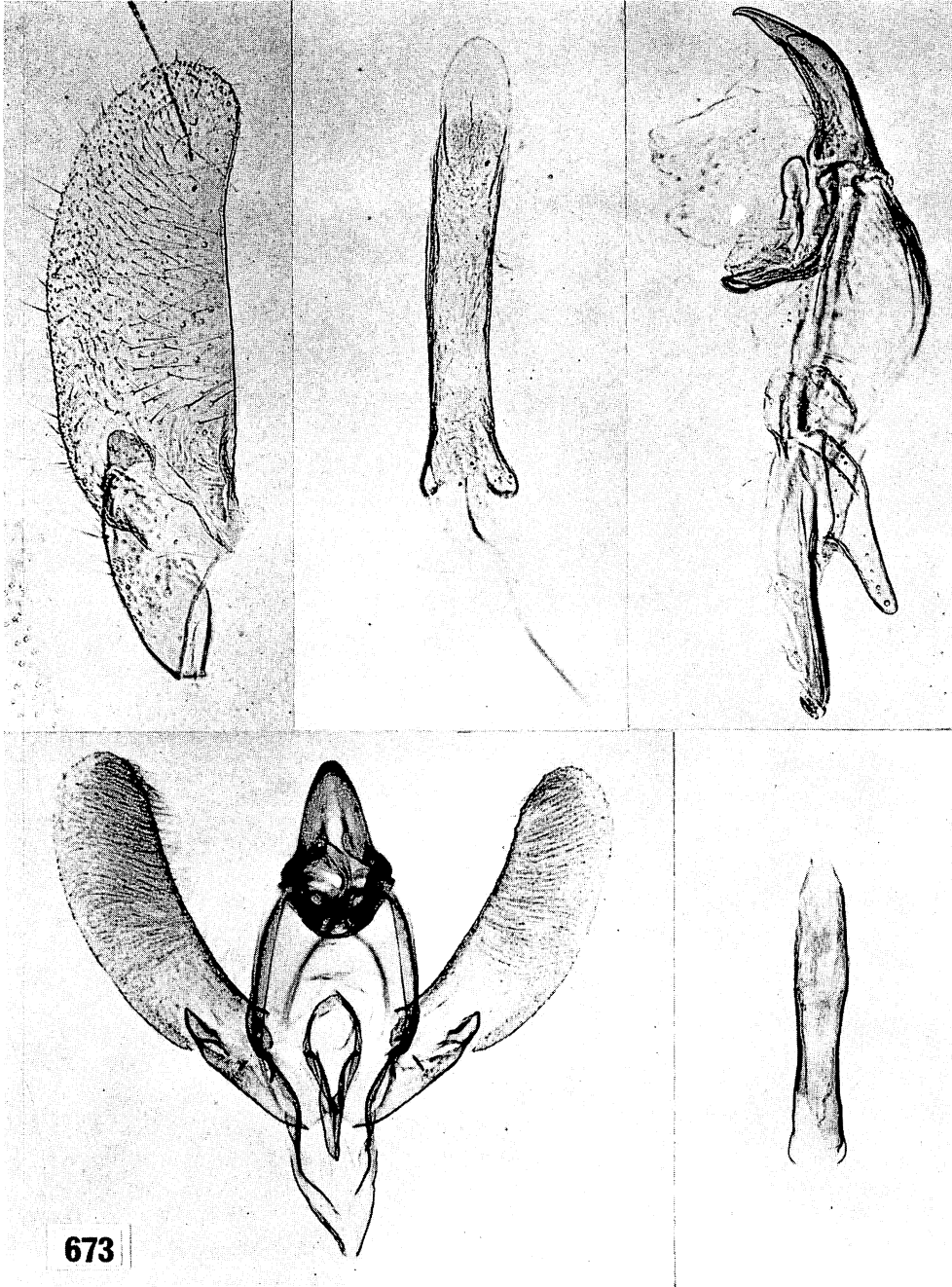


Figure 673—Male genitalia of *Thyrocopa*. Top, *sucosa* Meyrick, holotype (BM slide 9553, Clarke); Koolau Mts., Oahu. Bottom, *epicapna* (Meyrick) (BM slide 9602 Clarke); Kona, 4,000 feet, Hawaii.

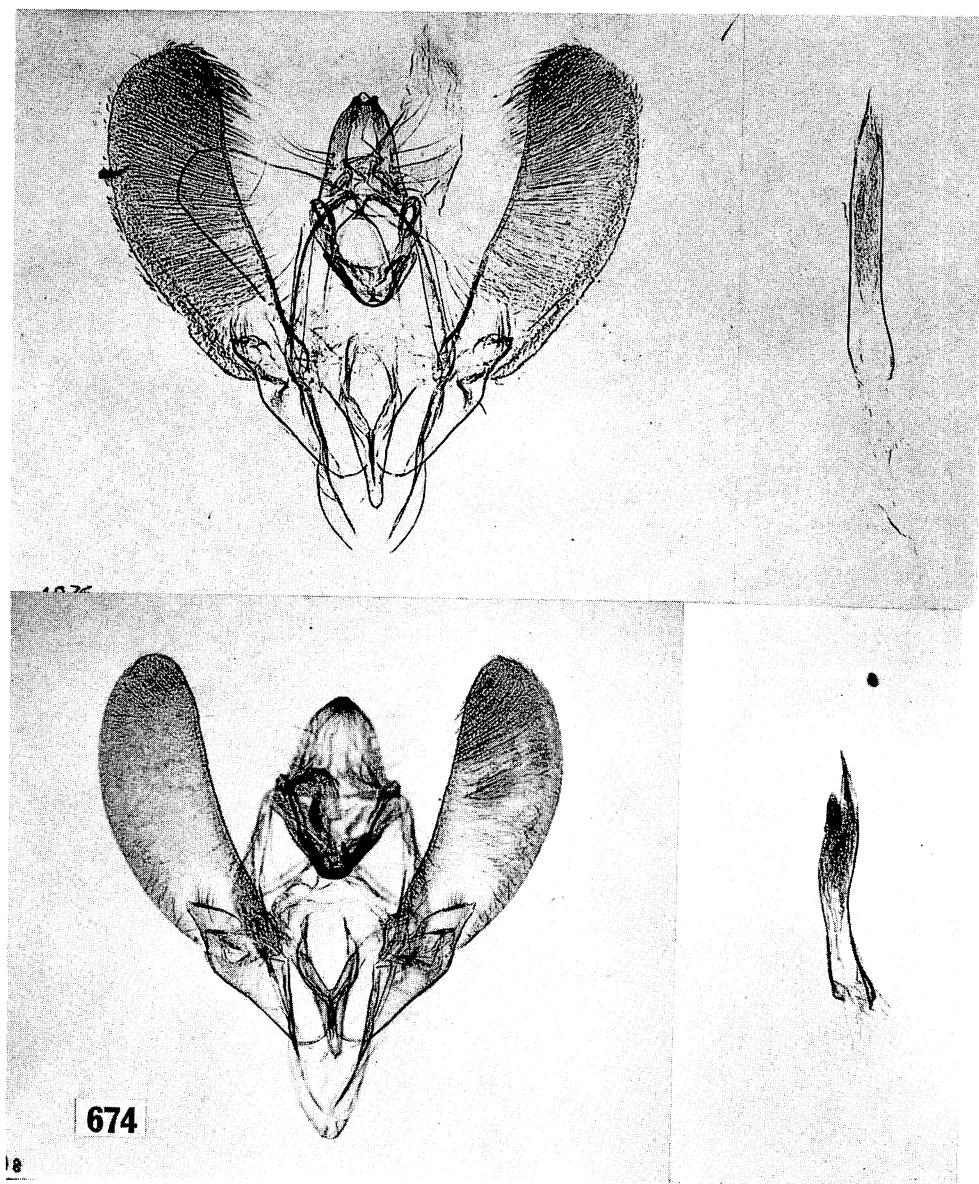


Figure 674—Male genitalia of *Thyrocopa*. Top, *fraudentella* Walsingham, holotype (BM slide 4076); Kilauea, Hawaii. Bottom, *gigas* Walsingham, holotype (BM slide 4048); Haleakala, 4,000 feet, Maui.

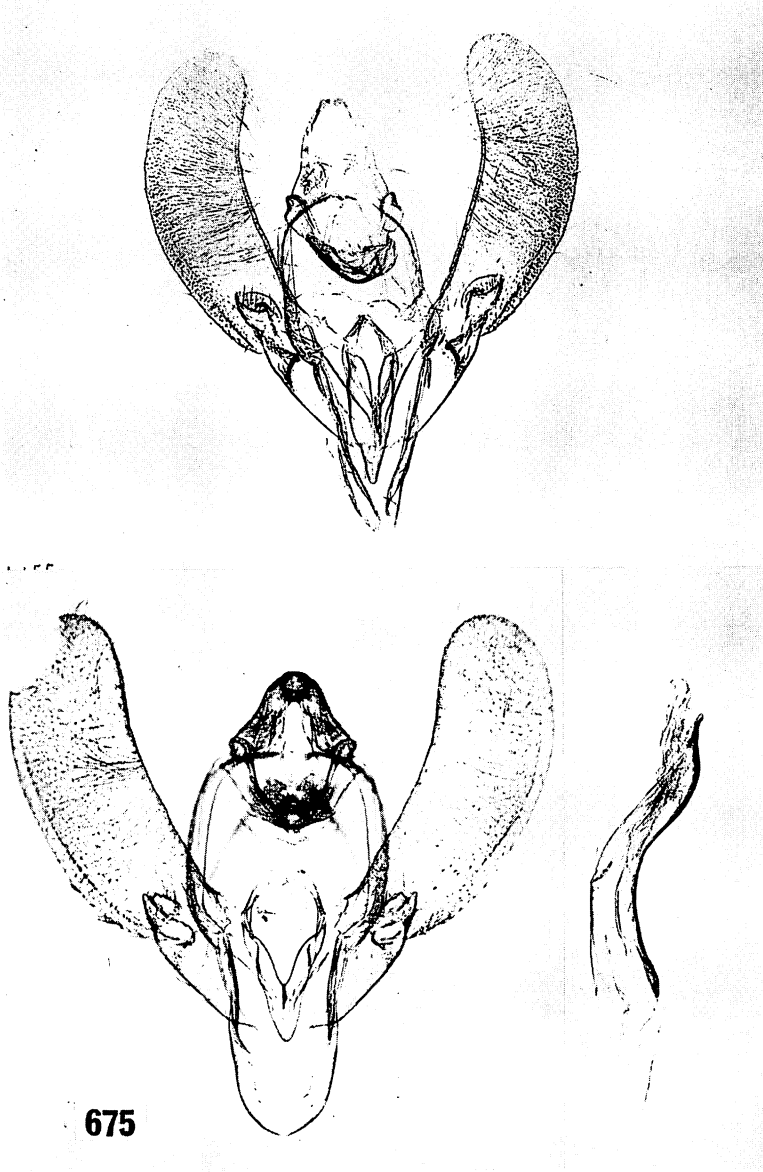


Figure 675—Male genitalia of *Thyrocopa*. Top, *immutata* Walsingham, holotype (BM slide 4155); aedeagus not photographed; Kaholuamano, 4,000 feet, Kauai. Bottom, *indecora* (Butler), holotype (BM slide 4050); Haleakala, 4,000 feet, Maui.

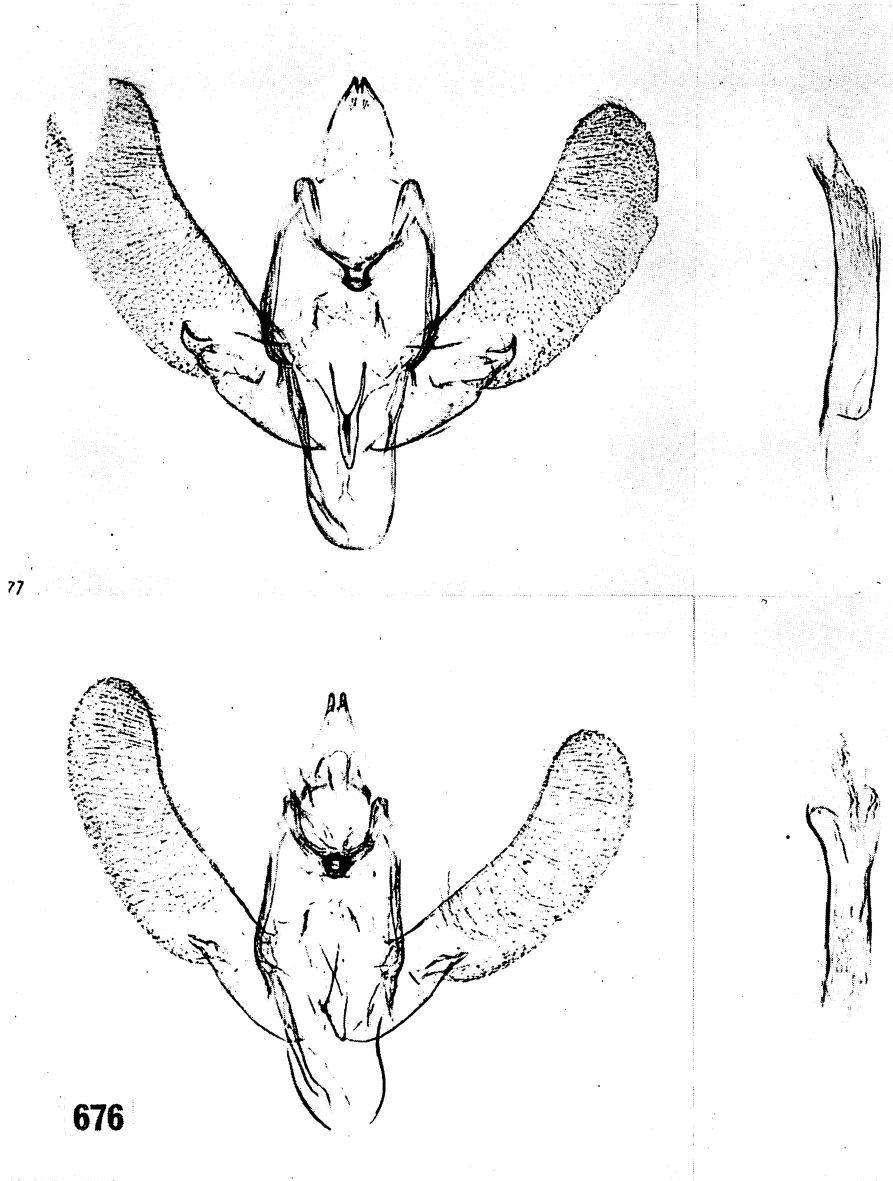


Figure 676—Male genitalia of *Thyrocopa*. Top, *inermis* Walsingham, holotype (BM slide 4077); Kona, 3,000 feet, Hawaii. Bottom, *leonina* Walsingham, holotype (BM slide 4078); Lanai, 2,000 feet.

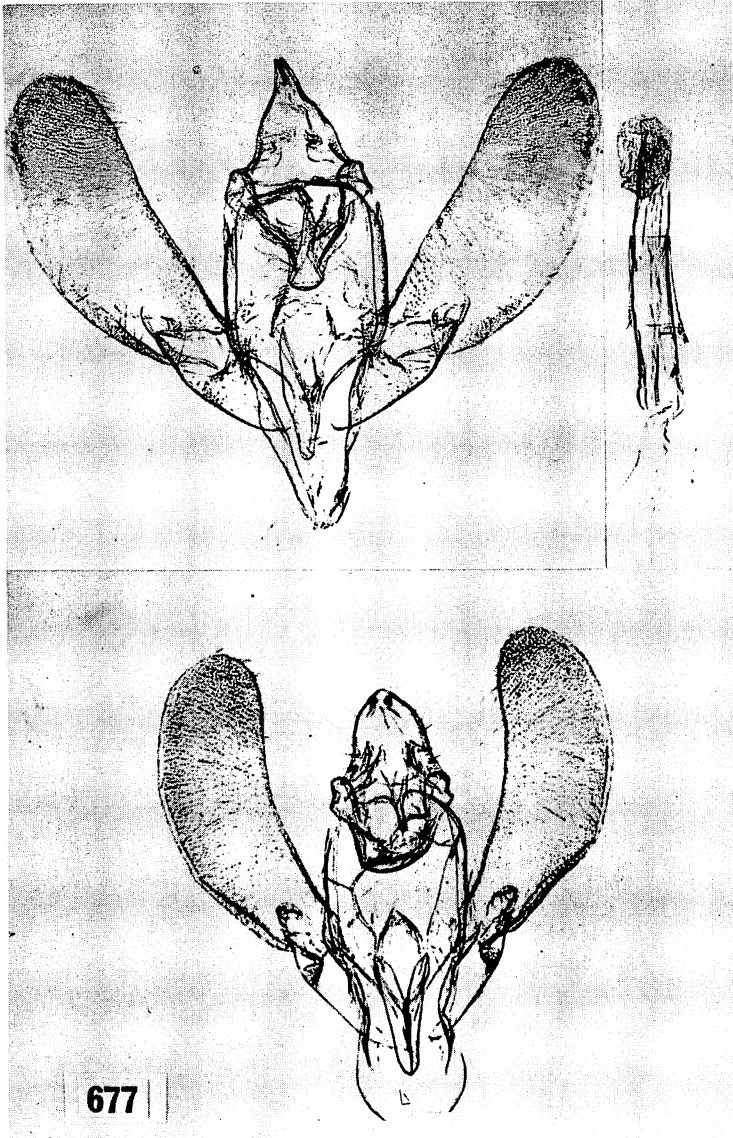


Figure 677—Male genitalia of *Thyrocopa*. Top, *megas* Walsingham, holotype (BM slide 4047); Haleakala, 5,000 feet Maui. Bottom, *nubifer* Walsingham, holotype (BM slide 4151); Kona, 4,000 feet, Hawaii; aedeagus not photographed.

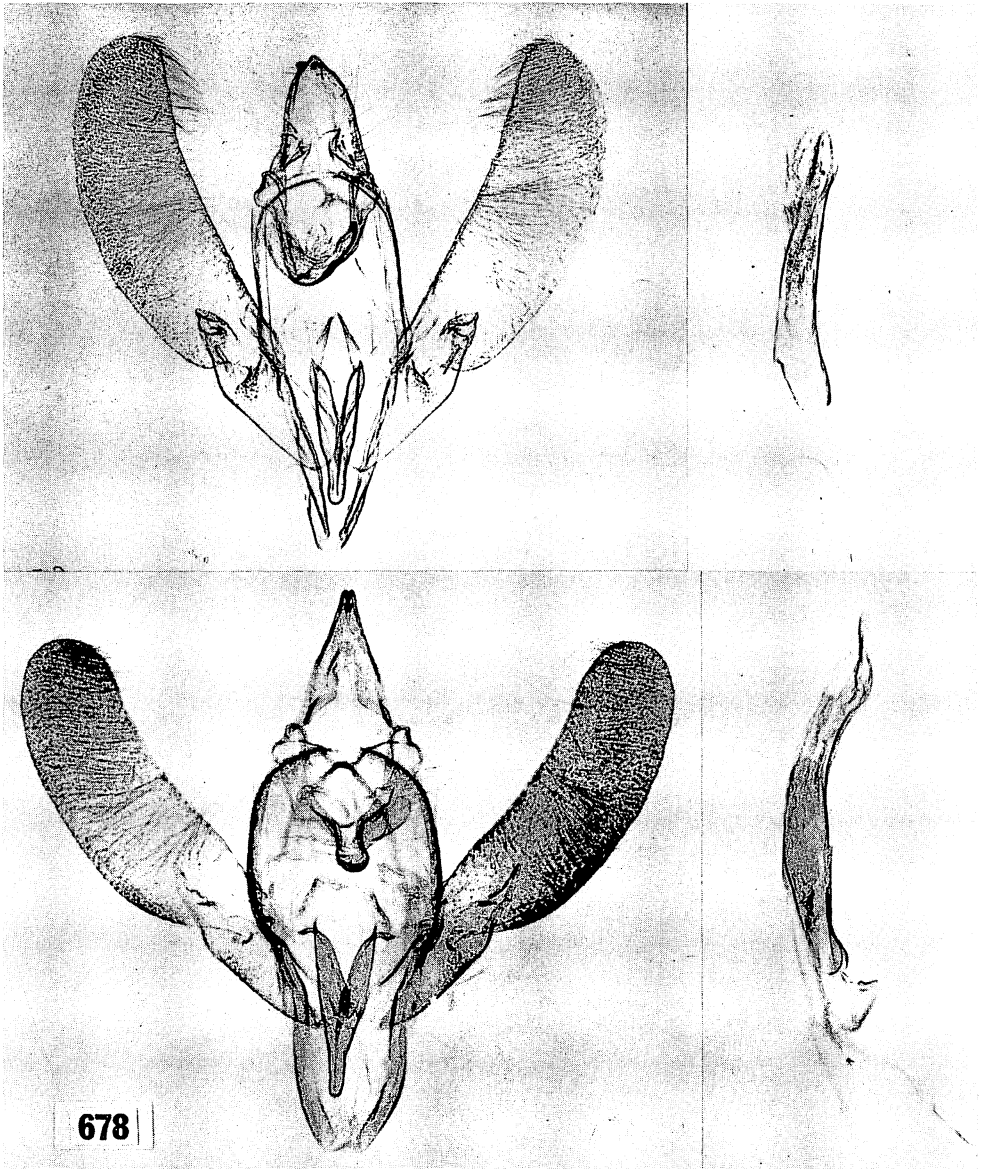


Figure 678—Male genitalia of *Thyrocopa*. Top, *pallida* Walsingham, holotype (BM slide 4152); Kaholua-  
mano, 4,000 feet, Kauai. Bottom, ("*Psychra*") *phycidiformis* (Walsingham), holotype (BM slide 4159);  
Kauai, 3,000 to 4,000 feet.



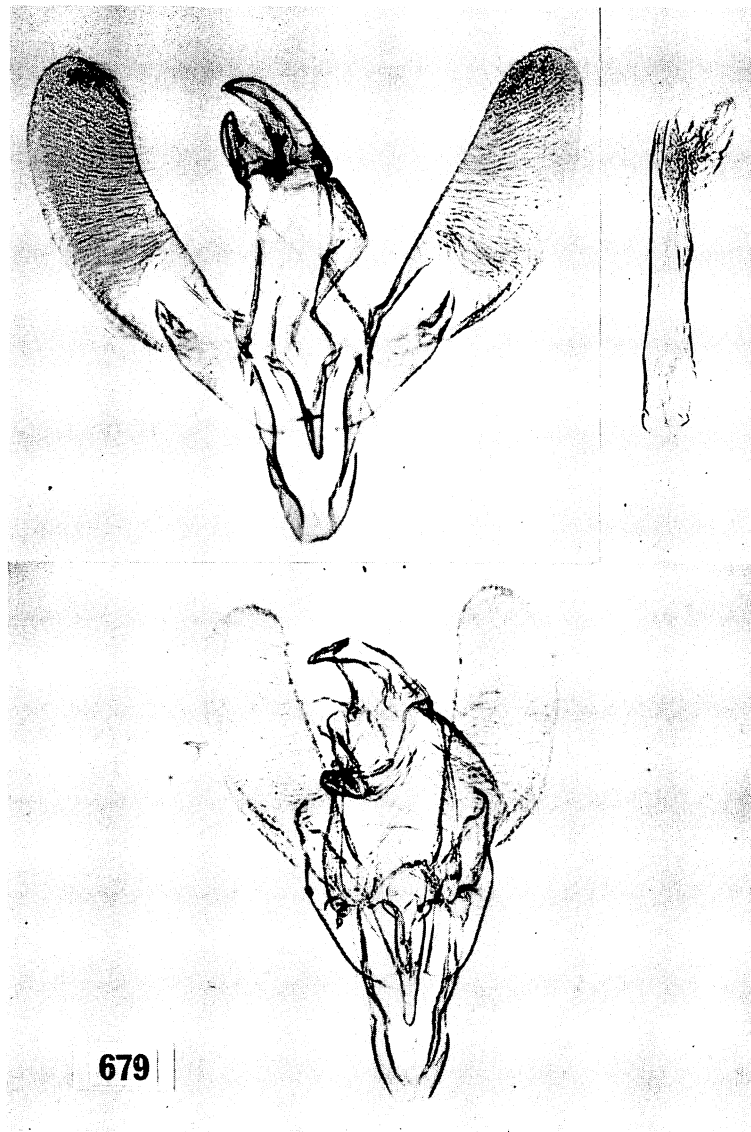
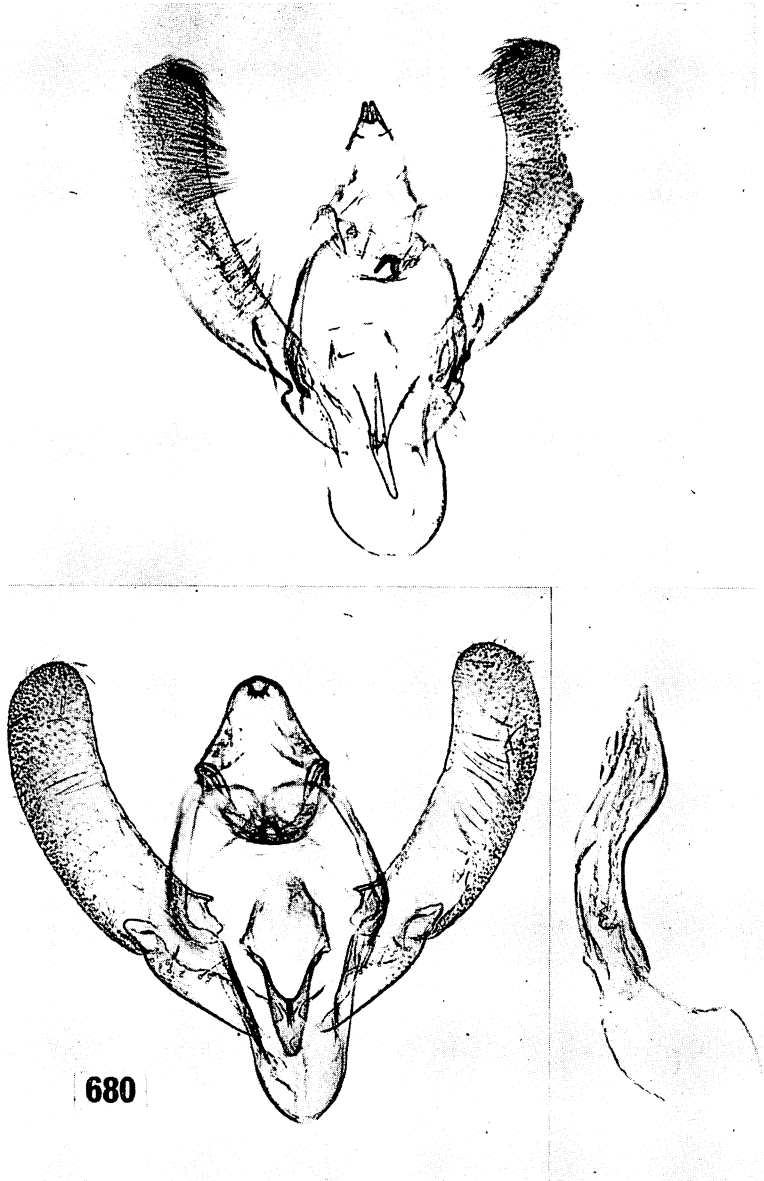
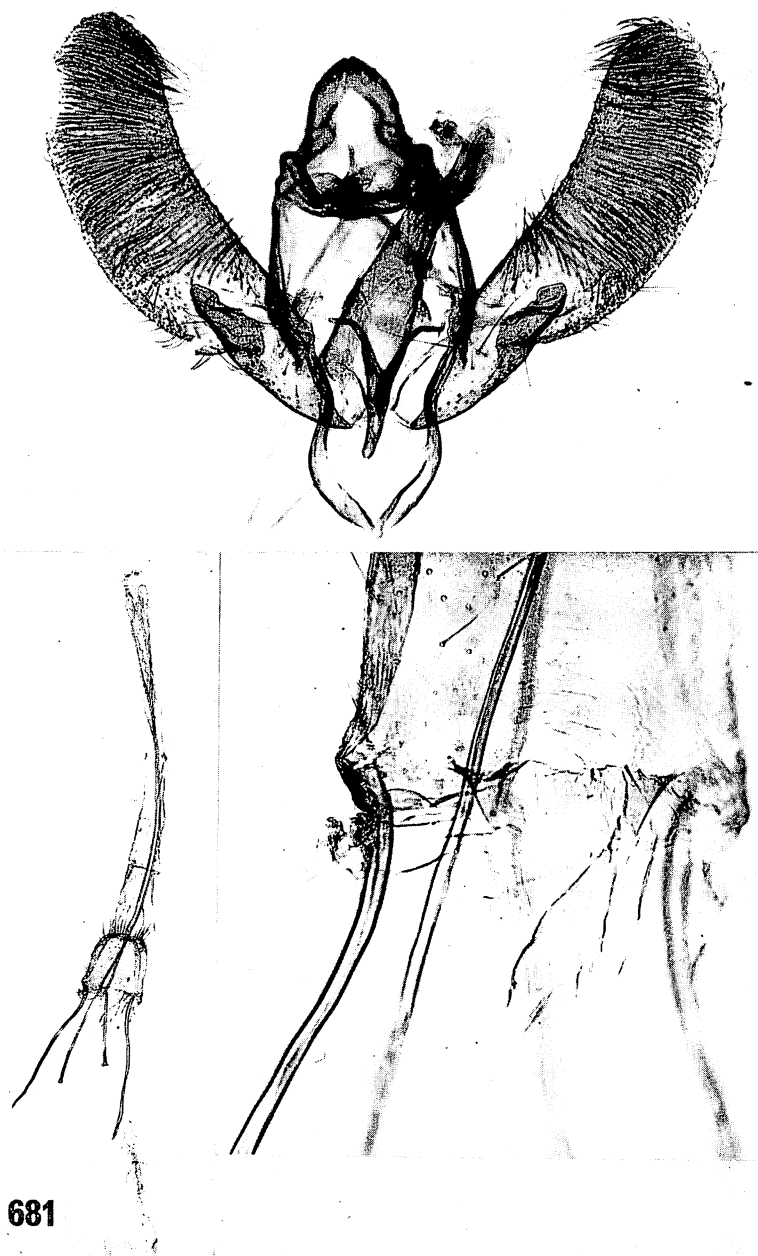


Figure 679—Male genitalia of *Thyrocopa*. Top, *pulverulenta* Walsingham, holotype (BM slide 4153). Bottom, *seminatella* Walsingham, holotype (BM slide 4156); Haleakala, 4,000 feet, Maui; aedeagus not photographed.



680

Figure 680—Male genitalia of *Thyrocopa*. Top, *subahenea* Walsingham, holotype (BM slide 4157); Molokai, 3,000 feet; aedeagus not photographed. Bottom, *tessellatella* Walsingham, holotype (BM slide 4051); Kona, 4,000 feet, Hawaii.



681

Figure 681—Genitalia of *Thyrocopa*. Top, ("*Ptychothrix*") *vagans* (Walsingham), holotype (BM slide 4176); aedeagus in situ; Halemanu, 4,000 feet, Kauai. Bottom, *adumbrata* Walsingham, holotype (BM slide 3942); Kona, 3,000 feet, Hawaii; the signum is long and tapelike.

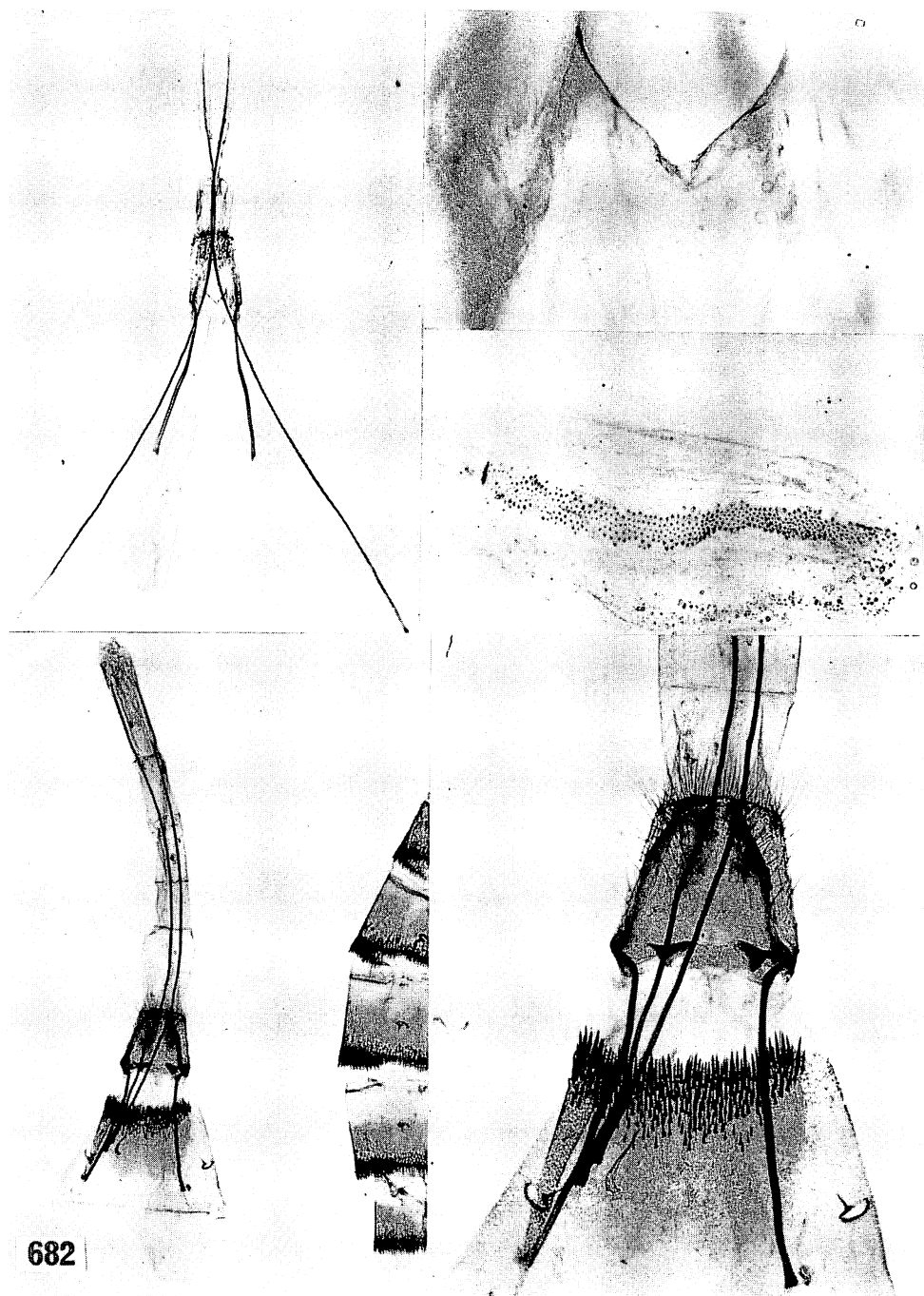


Figure 682—Female genitalia of *Thyrocopa*. Top, *acetosa* Meyrick, holotype (BM slide 9554 Clarke); Kauai ("Palmer .05"). Bottom ("*Calamemopsis*") *decipiens* (Walsingham), allotype (BM slide 3944); Olaa, Hawaii; the signum is long and tapelike. See also figure 685. Both photographic prints of *decipiens* have been reversed.

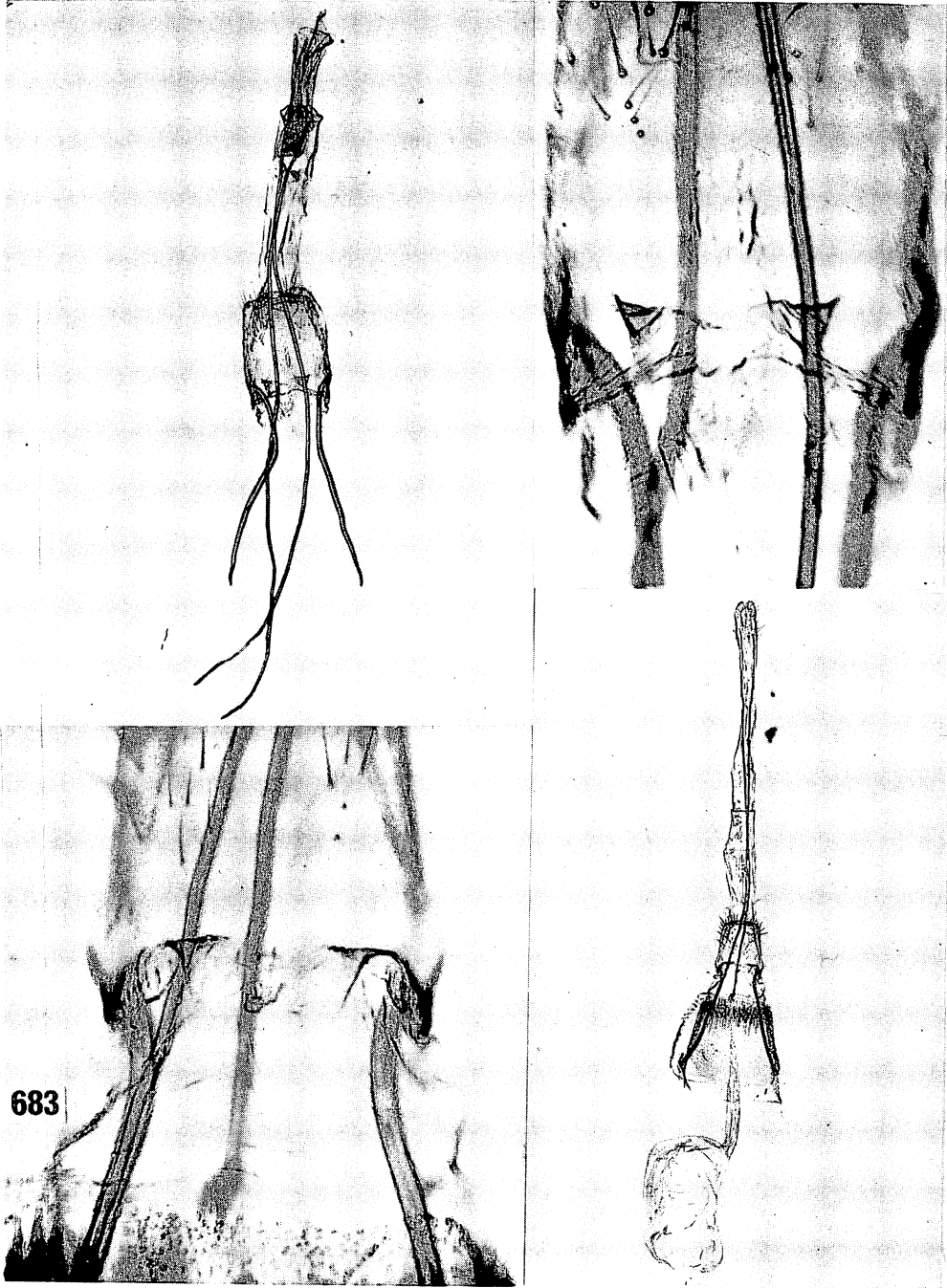


Figure 683—Female genitalia of *Thyrocopa*. Top, *argentea* (Butler), holotype (BM slide 4045); mountains near Honolulu. This specimen was erroneously labeled as being a male. The bursa is lost. Bottom, *geminipuncta* Walsingham, holotype (BM slide 3898); Molokai, 4,500 feet; the signum is long and tapelike.

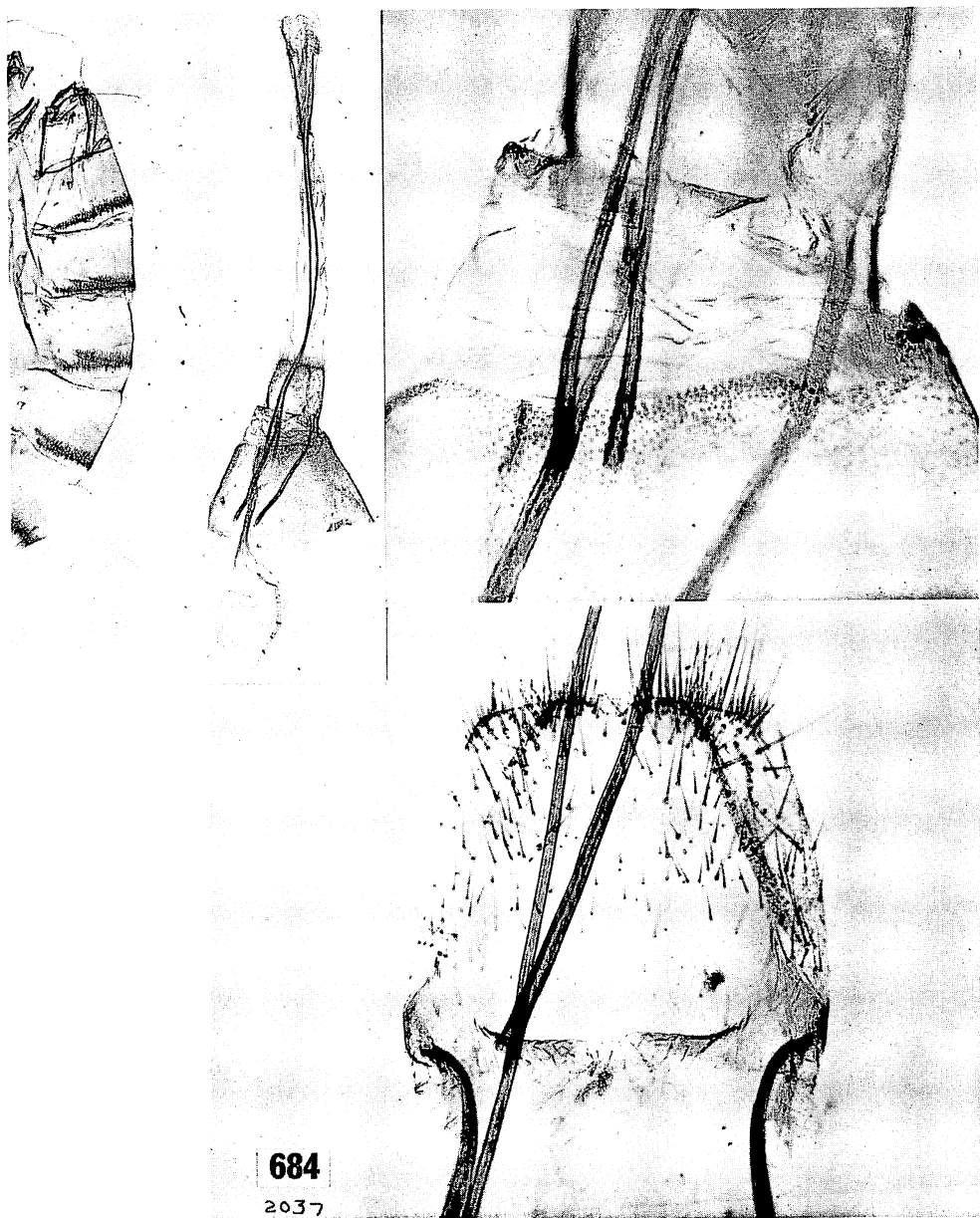


Figure 684—Female genitalia of *Thyrocopa cinerella* Walsingham. Top, holotype (BM slide 3943); Kauai, 3,000 to 4,000 feet; the ostium and surrounding area are partly folded. Bottom, a view of the ostium of another specimen (BM slide 2037); the signum is long and tapelike.

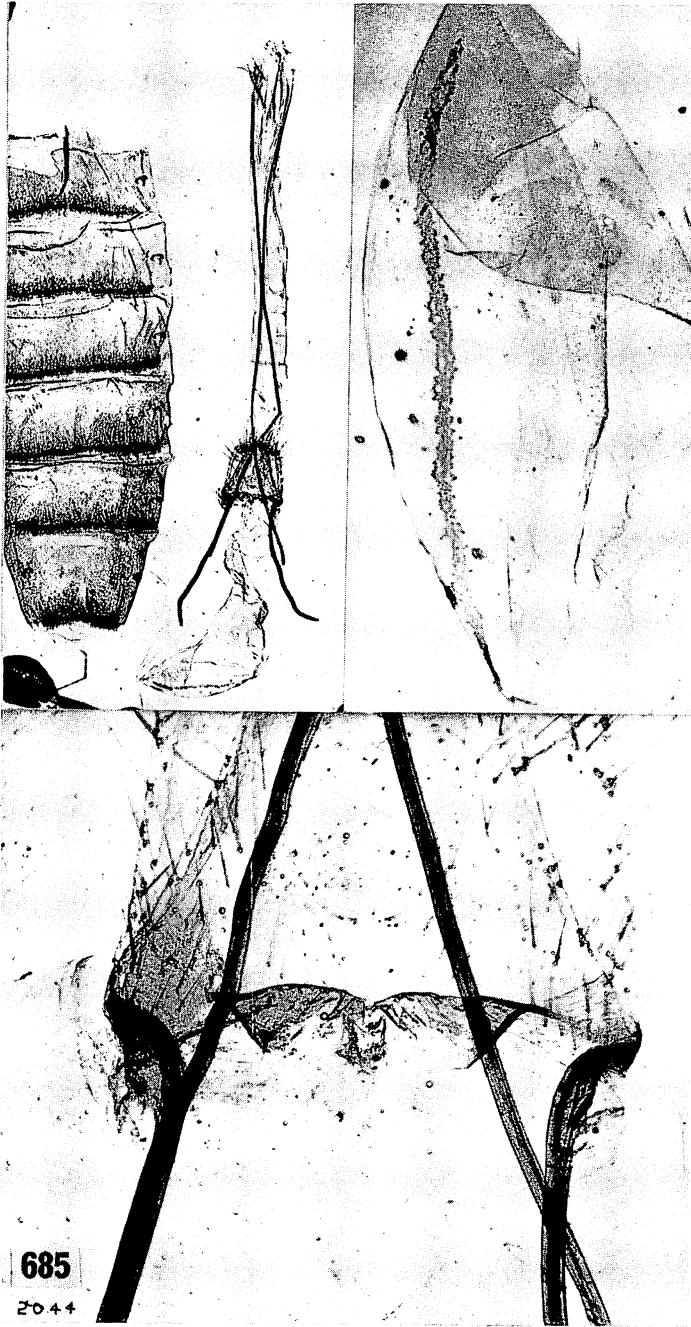
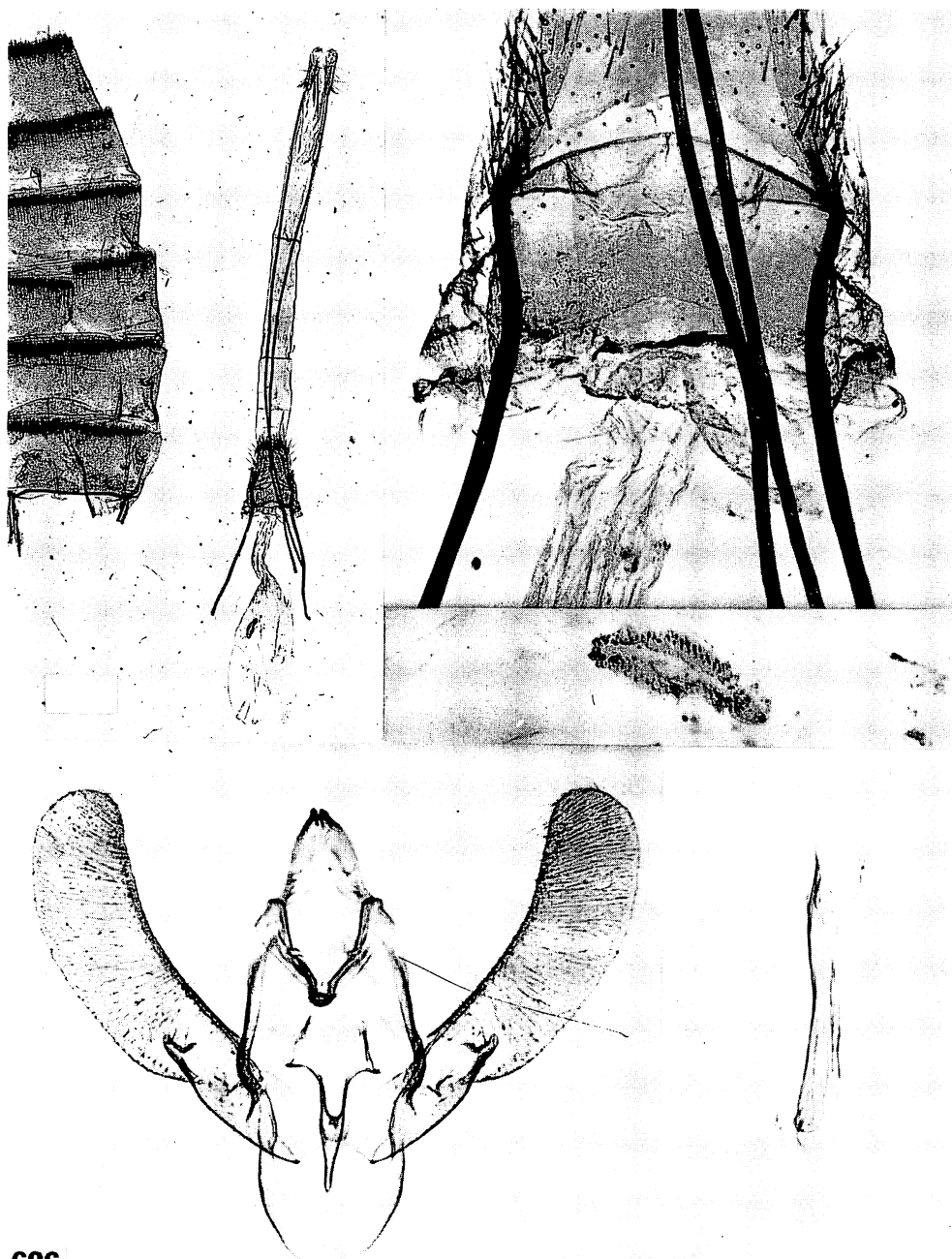


Figure 685—Female genitalia of *Thyrocopa* ("Catamempsis") *decipiens* (Walsingham), paratype (BM slide 2044); near head of Kaiwailoa Gulch, Oahu. Also see figure 682.



686

Figure 686—Top three figures, female genitalia of *Thyrocopa gigas* (Butler); Waianae Mts., 2,500 to 3,000 feet, Oahu (BM slide 2036). Bottom, male genitalia of *Thyrocopa spilobathra* Meyrick, lectotype; Koolau Mts., Oahu (BM slide Clarke 9547).



**Thyrocopa argentea** (Butler) (figs. 654, moth; 683, female genitalia).

*Depressaria argentea* Butler, 1881:399.

*Thyrocopa argentea* (Butler) Walsingham, 1907*b*:496, 733, pl. 14, fig. 12.

Endemic. Oahu (type locality: mountains near Honolulu), Hawaii.

Hostplants: *Acacia koa* (larvae often abundant in dead bark, twigs, and branches), *Rubus hawaiiensis*.

Walsingham said that the males expand "20-24"mm., but the female holotype (originally cited as a male) has an expanse of only about 14mm. Swezey (1910*e*:138, 1931*b*:502) misidentified this species as *albonubila*.

Text continued on page 984.



687

Figure 687—Female genitalia of *Thyrocopa indecora* (Butler) from the holotype of the synonymous *lactea* (BM slide 3895); Haleakala, 4,000 feet, Maui.

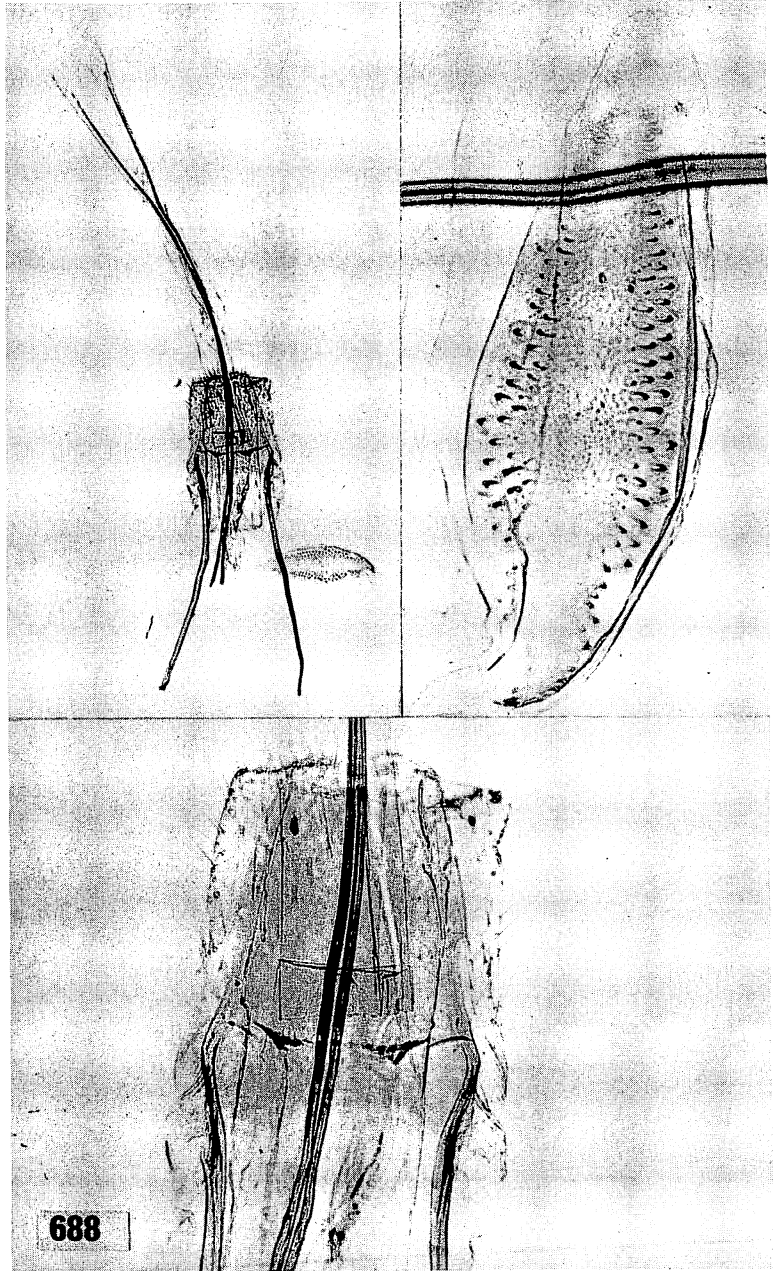


Figure 688—Female genitalia of *Thyrocopa ingeminata* Meyrick, lectotype (BM slide 9551, Clarke); Honolulu.

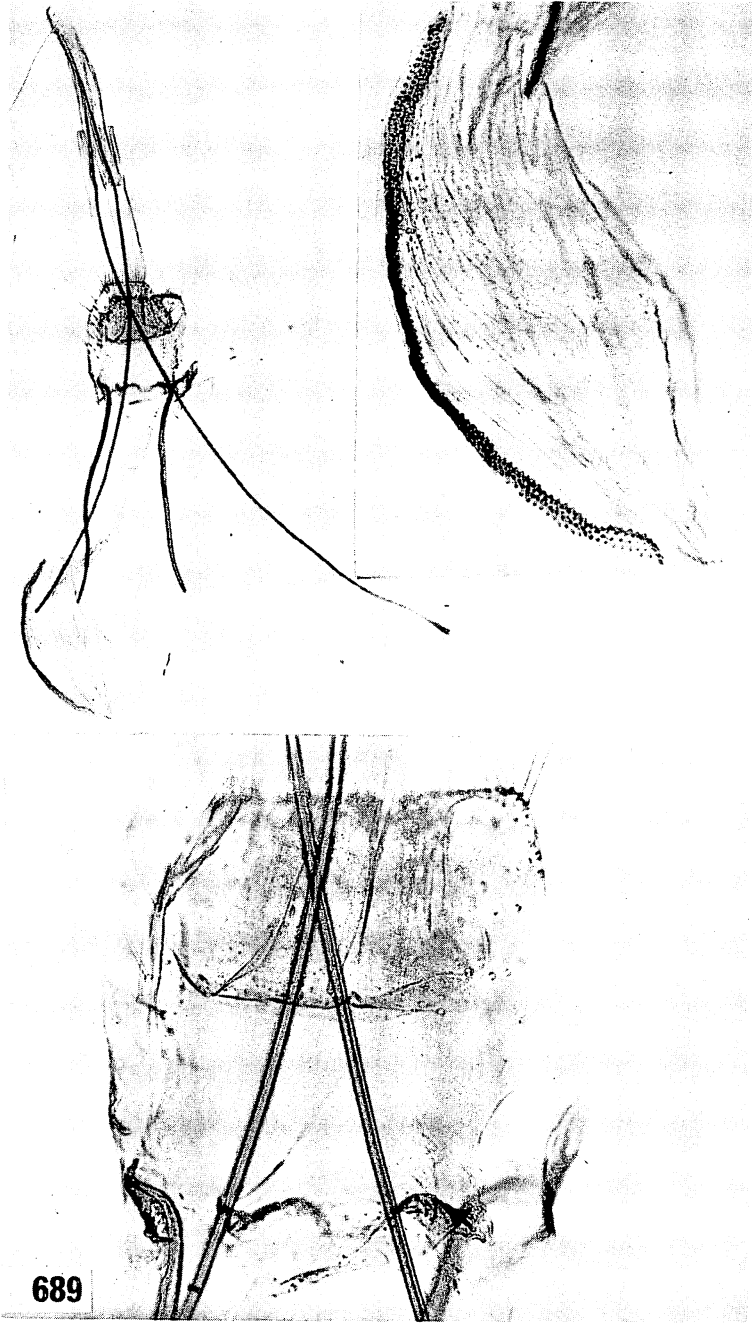
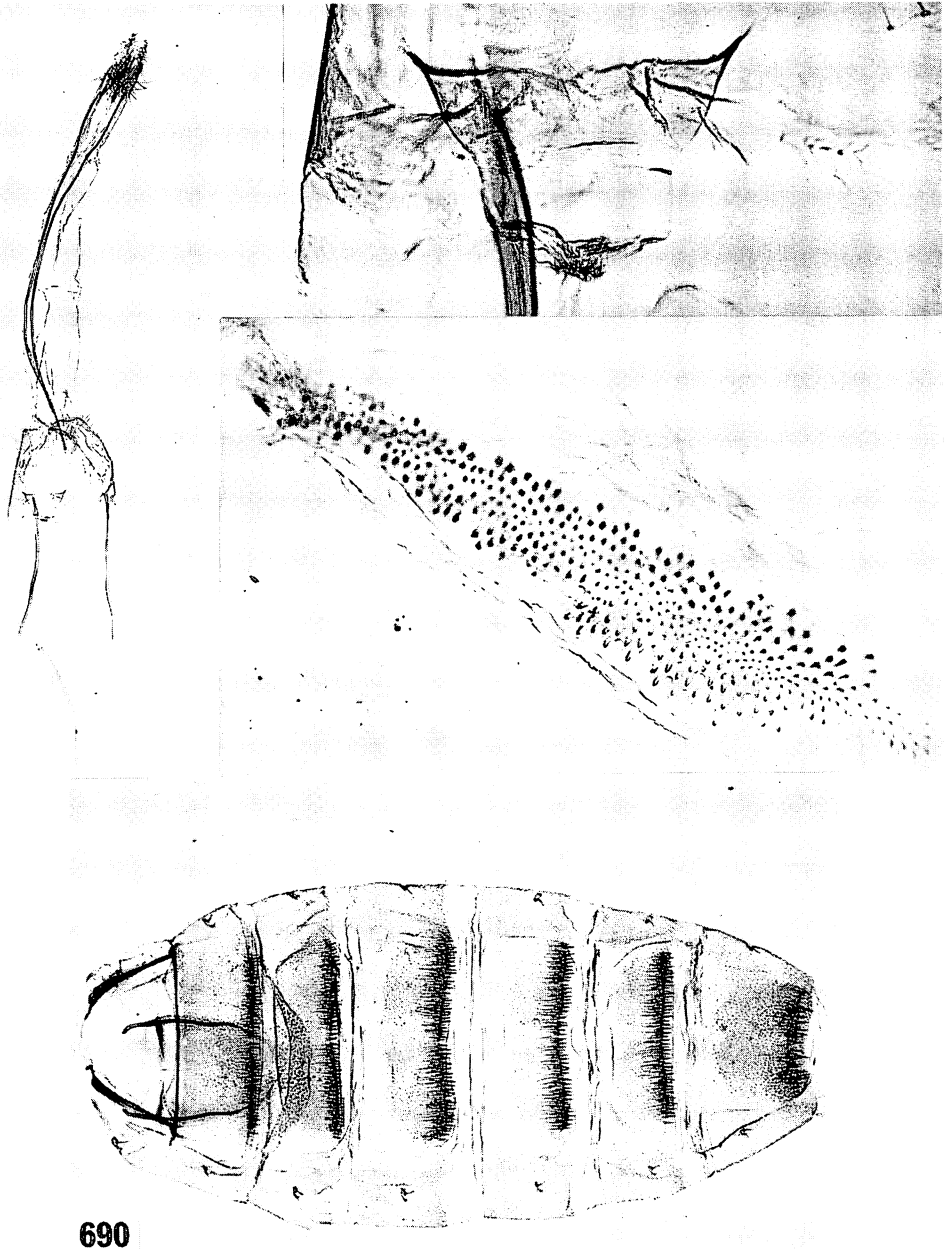


Figure 689—Female genitalia of *Thyrocopa librodes* Meyrick, holotype (BM slide 9555, Clarke); Kauai.



690

Figure 690—Top three figures, female genitalia of *Thyrocopa mediomaculata* Walsingham, holotype (BM slide 3899); Haleakala Crater, Maui. Bottom, the abdominal pelt of the holotype of *sapindiella* Swezey; Niu, Oahu (slide Z-70-11).



Figure 691—Female genitalia of *Thyrocopa minor* Walsingham, holotype (BM slide 3946); Molokai, above 3,000 feet.

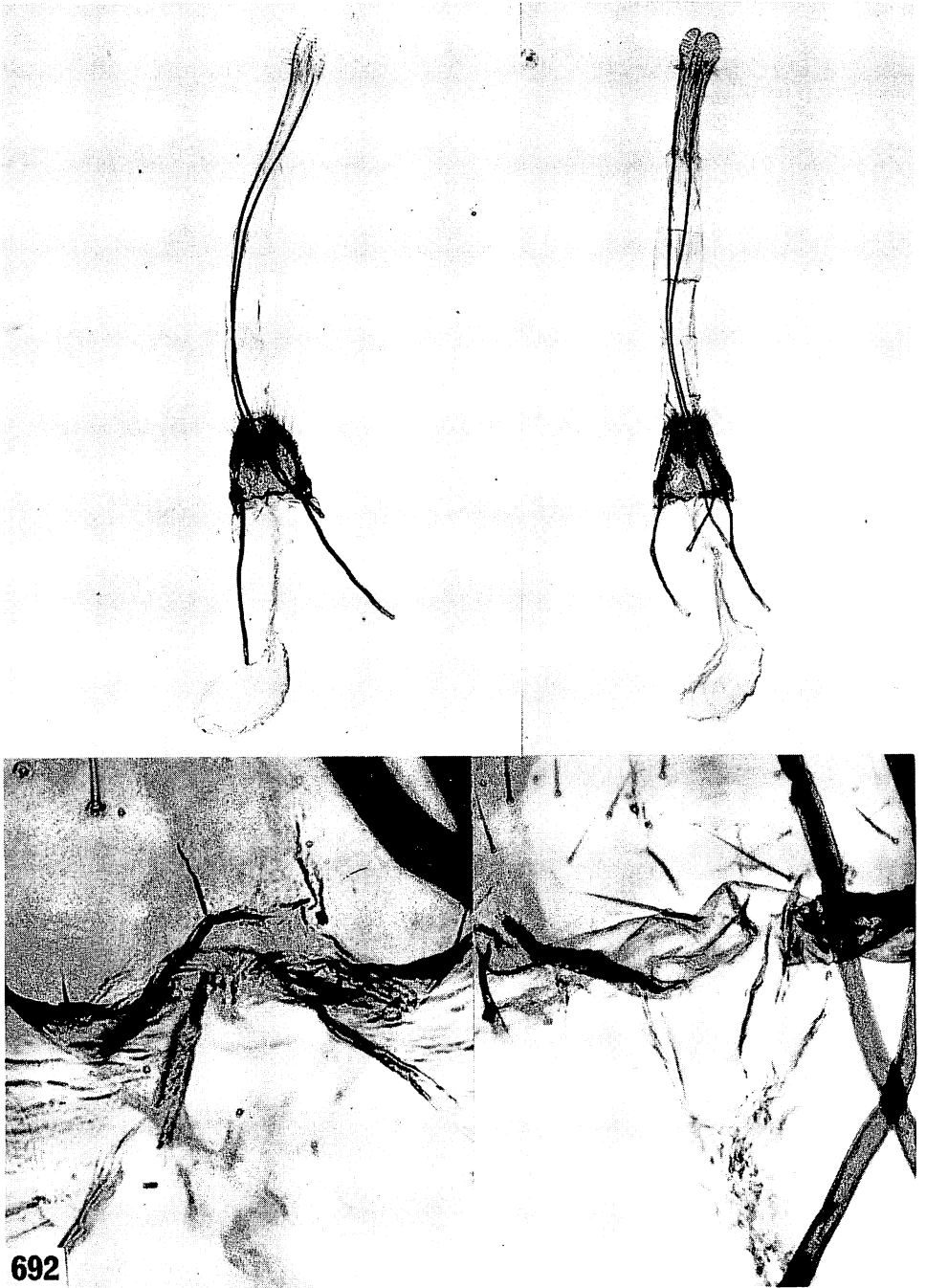


Figure 692—Female genitalia of two species of *Thyrocopa*. Left, top and bottom, *sapindiella* Swezey, holotype; Niu, Oahu (slide Z-70-11); see figure 690 for the abdominal pelt of this specimen. Right, top and bottom, *peleana* Swezey, holotype, Waipio, Oahu (slide Z-70-12). The ostia are enlarged in the bottom figures.



Figure 693—Female genitalia of *Thyrocopa* ("Psychra") *phycidiiformis* (Walsingham), paratype (BM slide 2046); Kauai, 3,000 to 4,000 feet. The enlargments of the ostium and the signum have been reversed.

***Thyrocopa brevipalpis*** (Walsingham), **new combination** (figs. 651, moth; 672, male genitalia; col. pl. 4:7).

*Psychra brevipalpis* Walsingham, 1907*b*:490, pl. 14, fig. 5.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

This species is known only from the male holotype. The terminal segment of the labial palpus is unusually short. It is the shortest of all species of the family now known in Hawaii.

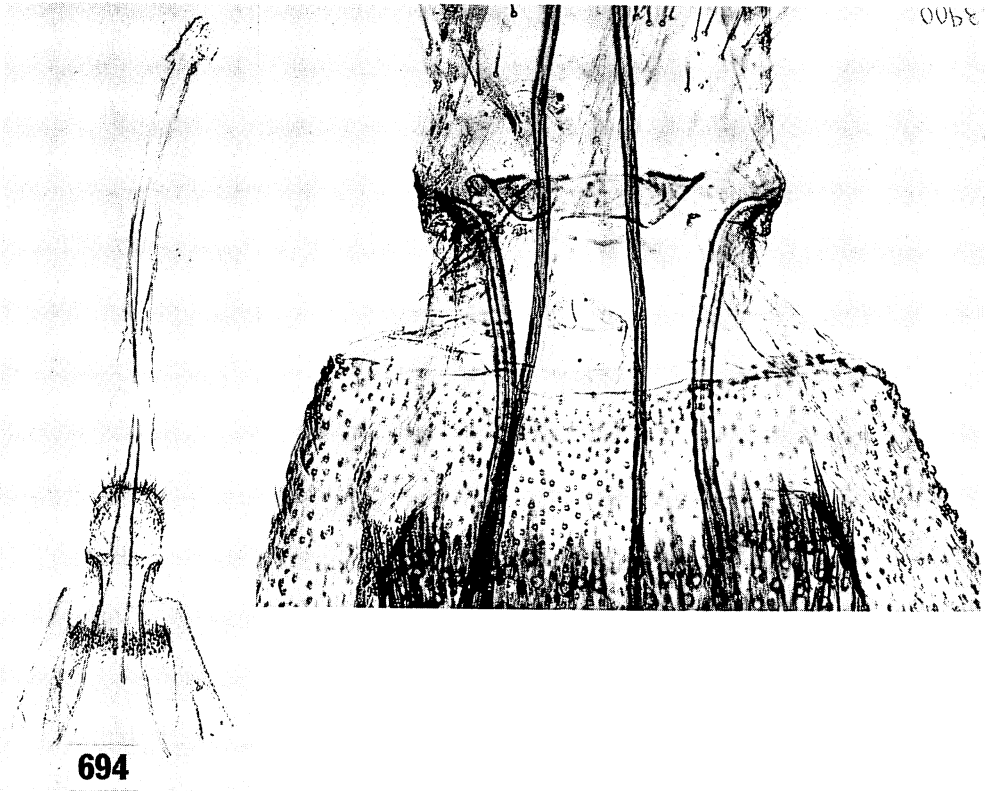


Figure 694—Female genitalia of *Thyrocopa usitata* (Butler), holotype (BM slide 3900); Oahu (probably near Honolulu); bursa copulatrix lost.



**Thyrocopa cinerella** Walsingham (figs. 655, moth; 684, female genitalia).

*Thyrocopa cinerella* Walsingham, 1907*b*:494, pl. 14, fig. 9.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

The female holotype in the British Museum is very similar to *megas*, but the hindwings are darker. The left labial palpus is missing. The second segment of the right palpus (measuring along the chords of the segments) is 65 units long and the third segment 50 units as compared with 21 for the height of the eye.

**Thyrocopa criminosa** Meyrick (figs. 655, moth; 671, male genitalia).

*Thyrocopa criminosa* Meyrick, 1915*a*:372.

Endemic. Oahu (type locality: Koolau Mountains).

Hostplant: unknown.

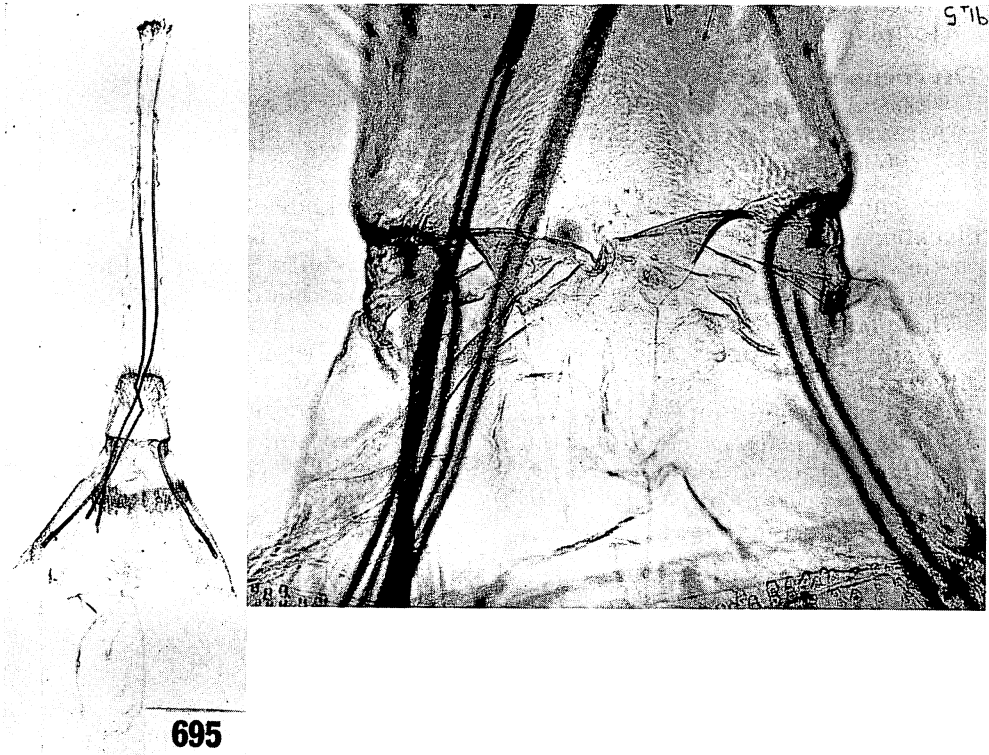


Figure 695—Female genitalia of *Thyrocopa viduella* Walsingham, holotype (BM slide 3945); Kauai, 3,000 to 4,000 feet; the signum is long and tapelike.

**Thyrocopa decipiens** (Walsingham), **new combination** (figs. 648, head, antenna, wing venation; 656, moth; 682, 685, female genitalia).

*Catamempsis decipiens* Walsingham, 1907*b*:491, pl. 14, fig. 6. Type-species of *Catamempsis*.

Endemic. Oahu, Molokai, Hawaii (type locality: Oloa, 2,000 feet).

Hostplant: *Freycinetia arborea*.

The caterpillars of this gelechiid moth feed in the tips of branches, eating the leaves of the unexpanded spindle. There may be a dozen or more feeding somewhat gregariously, and they produce a filthy condition in which such scavenger insects as nitidulid beetles may be found. They do not eat the terminal bud, however, so the growth of the branch continues, but is unsightly from the ragged appearance of the leaves when they have expanded after the caterpillars have finished their eating. The fullgrown caterpillar is about 25 mm., and the moth has a spread of about 40 mm. It is pale brown with a few black markings on forewing. It is seldom seen, but the caterpillars are often found, and the evidence of their work is commonly seen when one has become acquainted with the appearance of the injured leaves. It is known on Oahu, Molokai, and Hawaii. It probably occurs on the other islands as well. (Swezey, 1936*a*:191-192.)

**Thyrocopa depressariella** Walsingham (figs. 655, moth; 672, male genitalia).

*Thyrocopa depressariella* Walsingham, 1907*b*:498, pl. 14, fig. 17.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Thyrocopa epicapna** (Meyrick) (figs. 657, moth; 673, male genitalia).

*Synomotis epicapna* Meyrick, 1883*a*:33. Type-species of *Synomotis*.

*Thyrocopa epicapna* (Meyrick) Walsingham, 1907*b*:500, pl. 14, fig. 21. Clarke, 1969*b*:480, pl. 240.

Endemic. Kauai, Hawaii. The type locality is unknown. Meyrick had two Blackburn examples when he described the species, but no locality data are on the specimens other than "Hawaii, 1899, Blackburn". Perhaps the type locality is on neither Kauai nor Hawaii; it might be Oahu.

Hostplant: unknown.

A female abdomen was glued to the type, but it belongs to a species of a different family! Walsingham (1907*b*:501) said that there were "four specimens in poor condition" in the Blackburn material, and he said, "Perhaps a small form of *pulverulenta* Wlsm., but the original specimens are not in sufficiently good condition for critical comparison. The Kauai and Hawaii specimens vary but appear to be *epicapna* Meyr.; more material is however required to decide this with certainty."

**Thyrocopa fraudulentella** Walsingham (figs. 657, moth; 674, male genitalia).

*Thyrocopa fraudulentella* Walsingham, 1907*b*:502, pl. 14, fig. 24.

Endemic. Maui, Hawaii (type locality: Kilauea).

Hostplant: unknown.

Swezey (1910*e*:138) reported finding the larvae in silken tunnels in and beneath dried cow dung, but in later years he questioned his determination.

**Thyrocopa geminipuncta** Walsingham (figs. 658, moth; 683, female genitalia).

*Thyrocopa* (?) *geminipuncta* Walsingham, 1907*b*:506, pl. 15, fig. 4.

Endemic. Molokai (type locality: 4,500 feet).

Hostplant: unknown.

Walsingham felt uncertain as to which of his "genera" to assign this species because he described it from a unique female.

**Thyrocopa gigas** (Butler) (figs. 658, moth; 674, male genitalia; 686, female genitalia).

*Depressaria gigas* Butler, 1881:397. Meyrick, 1883*a*:32.

*Thyrocopa gigas* (Butler) Walsingham, 1907*b*:493, pl. 14, fig. 7.

Endemic. Kauai, Oahu, Molokai, Maui (type locality: "Three specimens taken; one was at sugar, the other two at light; all at about 4000 feet up Haleakala, Maui." Blackburn).

Hostplant: unknown.

The Blackburn reference to this species having been taken at sugar bait is one of the very few such references in Hawaiian entomology.

**Thyrocopa immutata** Walsingham (figs. 658, moth; 675, male genitalia).

*Thyrocopa immutata* Walsingham, 1907*b*:501, pl. 14, fig. 23.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

I have not seen the female.

**Thyrocopa indecora** (Butler) (figs. 653, 659, moth; 675, male genitalia; 687, female genitalia; col. pl. 5:1).

*Depressaria indecora* Butler, 1881:397.

*Depressaria lactea* Butler, 1881:398. Synonymy by Meyrick, 1883*a*:32, who noted that *lactea* was the female and *indecora* the male of the same species.

The same field data apply to both names.

*Thyrocopa indecora* (Butler) Walsingham, 1907*b*:497, pl. 14, fig. 14.

Endemic. Maui (type locality: Haleakala, 4,000 feet, bred from rotten wood), Hawaii.

Hostplants: *Acacia koa* (in rotten bark), *Sophora*.

**Thyrocopa inermis** Walsingham (figs. 659, moth; 676, male genitalia).

*Thyrocopa inermis* Walsingham, 1907*b*:503, pl. 14, fig. 27.

Endemic. Hawaii (type locality: Kona, 3,000 feet).

Hostplant: unknown.

**Thyrocopa ingeminata** Meyrick (figs. 659, moth; 688, female genitalia).

*Thyrocopa ingeminata* Meyrick, 1915*a*:371.

Endemic. Oahu (type locality: Koolau Mountains).

Hostplant: unknown.

**Thyrocopa leonina** Walsingham (figs. 660, moth; 676, male genitalia).

*Thyrocopa leonina* Walsingham, 1907*b*:505, pl. 15, fig. 3.

Endemic. Lanai (type locality: 2,000 feet).

Hostplant: unknown.

Known only from the male holotype.

**Thyrocopa librodes** Meyrick (figs. 660, moth; 689, female genitalia).

*Thyrocopa librodes* Meyrick, 1915*a*:370.

Endemic. Kauai (type locality: not further known).

Hostplant: unknown.

**Thyrocopa mediomaculata** Walsingham (figs. 660, moth; 690, female genitalia).

*Thyrocopa* (?) *mediomaculata* Walsingham, 1907*b*:506, pl. 15, fig. 5.

Endemic. Maui (type locality: Haleakala Crater), Hawaii?

Hostplant: unknown.

Walsingham questioned the generic assignment of this species. He said (1907*b*:506): "It is probable that a new genus is indicated by this specimen, but in the absence of the [male] this cannot be determined. The hindwings are narrower than in the typical forms of *Thyrocopa*, and in the forewings veins 7 and 8 are stalked for the greater part of their length. A [female] from Kona (28685) without a head and in very poor condition probably belongs to this species." I do not believe that this species can be separated from *Thyrocopa*. Only the female is known.

**Thyrocopa megas** Walsingham (figs. 661, moth; 677, male genitalia).

*Thyrocopa megas* Walsingham, 1907*b*:495, pl. 14, fig. 10.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

I made the following measurements of the allotype female in the British Museum: second segment of labial palpus 45 units, third segment 35 units, height of eye 20 units.

**Thyrocopa minor** Walsingham (figs. 661, moth; 691, female genitalia).

*Thyrocopa* (?) *minor* Walsingham, 1907*b*:496, pl. 14, fig. 13.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

Walsingham inserted the question mark in the name of this species because he knew only the female holotype, and thus he could not determine to which of his "genera" he should assign the species.

**Thyrocopa nubifer** Walsingham (figs. 661, moth; 677, male genitalia).

*Thyrocopa nubifer* Walsingham, 1907*b*:499, pl. 14, fig. 18.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

**Thyrocopa pallida** Walsingham (figs. 662, moth; 678, male genitalia).

*Thyrocopa pallida* Walsingham, 1907*b*: 502, 733, pl. 14, fig. 25.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet), Oahu, Molokai.

Hostplant: unknown.

**Thyrocopa peleana** Swezey (figs. 662, moth; 649, pupa; 692, female genitalia).

*Thyrocopa peleana* Swezey, 1932:200, pl. 13, fig. 3.

Endemic. Oahu (type locality: Waipio Ridge).

Hostplant: *Pelea*.

Dr. Swezey bred the species from burrows of the native cerambycid *Nesithmysus bridwelli* Perkins. "The larvae feed on decaying wood in the burrows, and also on the bark around the entrance, spinning a sheet of web to cover the place where feeding has taken place." (Swezey, 1932:200.)

**Thyrocopa phycidiformis** (Walsingham), **new combination** (figs. 647, head, wing venation; 663, moth; 667, 678, male genitalia; 693, female genitalia).

*Psychra phycidiformis* Walsingham, 1907*b*: 490, pl. 14, fig. 4. Type-species of *Psychra*.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

As explained in the discussion of the genus above, I do not consider that this species should be removed from *Thyrocopa*.

**Thyrocopa pulverulenta** Walsingham (figs. 662, moth; 679, male genitalia).

*Thyrocopa pulverulenta* Walsingham, 1907*b*: 500, pl. 14, fig. 20.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

The records by Dr. Swezey (1910*e*: 138) "larvae in base of grass tufts, also in rotten wood" may be based upon misidentifications.

I have not seen a female.

**Thyrocopa sapindiella** Swezey (figs. 664, moth; 649, pupa; 690, abdominal pelt; 692, female genitalia).

*Thyrocopa sapindiella* Swezey, 1913*f*: 274.

Endemic. Oahu (type locality: Niu).

Hostplants: *Abutilon*, *Sapindus oahuensis*.

Parasite: *Agathis hawaiiicola* (Ashmead).

The caterpillars feed upon leaves. Dr. Swezey (1913:274–275) made the following observations:

An egg-mass was found on the upper surface of a leaf beside the midrib near base. It contained 25 eggs, each one pale yellowish, roundish, about 1 mm. in longest diameter, finely reticulated, flat and overlapping shingle-like similarly to the eggs of *Omiodes*. [I question these details. See the note at the end of the quotation below.]

The caterpillars were quite numerous on some trees. The small ones feed on the under surface of the leaves, each producing a web covered with frass under which it feeds, eating off the surface of the leaf. The larger ones hide in rolled-together leaves, often several leaves in a bunch fastened together and there may be two or more caterpillars, each in a silken tunnel.

Small caterpillars are yellowish or pale green, with two lateral fuscous lines; cervical shield with black lateral margins and black dorsal spots; head with two black spots in front and lateral blackish markings, eyes black. Full-grown caterpillar about 30 mm.; pale yellowish with pale brown markings; most of surface above spiracles more or less brownish; head pale yellowish brown with some darker markings on sides and vertex, eyes black, several black dots in middle in front; cervical shield pale yellowish with several blackish dots dorsally, and two black spots longitudinally placed near each lateral margin; tubercles "i" [D1] and "ii" [D2] in direct longitudinal line slightly infuscated, "iii" [SD1] a little above spiracles each with a dark fuscous ring; setae pale; spiracles black, slightly oval.

Pupa 9 mm. Medium brown, darker dorsally; tips of wing sheaths and antenna-sheaths extend a little beyond apex of fourth abdominal segment; a low slightly serrated ridge at apical dorsal margin of metathorax and on abdominal segments; a somewhat interrupted median dorsal ridge on segments 1-4; minute longitudinal ridges on dorsum of abdominal segments, more or less reticulate on the anterior ones; thorax reticulated, somewhat transversely; cremaster with two ventrally curved spines, a minute one near base of each. The pupa is formed within the spun-together leaves where the caterpillar fed.

I believe that it is highly probable that the eggs described for this species by Dr. Swezey in the above account did not belong to this species or to this genus. It was not stated that larvae and moths were reared from the eggs, and I believe that an error in determination was made.

**Thyrocopa seminatella** Walsingham (figs. 664, moth; 679, male genitalia).

*Thyrocopa seminatella* Walsingham, 1907b:499, pl. 14, fig. 19.

Endemic. Kauai (type locality: Halemanu, 4,000 feet).

Hostplant: unknown.

**Thyrocopa spilobathra** Meyrick (figs. 664, moth; 686, male genitalia).

*Thyrocopa spilobathra* Meyrick, 1915a:372.

Endemic. Oahu (type locality: Koolau Mountains).

Hostplant: unknown.

**Thyrocopa subahenea** Walsingham (figs. 665, moth; 680, male genitalia).

*Thyrocopa subahenea* Walsingham, 1907b:505, pl. 15, fig. 2.

Endemic. Molokai (type locality: 3,000 feet).

Hostplant: unknown.

**Thyrocopa sucosa** Meyrick (figs. 665, moth; 673, male genitalia).

*Thyrocopa sucosa* Meyrick, 1915a:371.

Endemic. Oahu (type locality: Koolau Mountains).

Hostplants: unknown.

**Thyrocopa tessellatella** Walsingham (figs. 665, moth; 680, male genitalia).

*Thyrocopa tessellatella* Walsingham, 1907b:498, pl. 14, fig. 16.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

I have not seen the female.

**Thyrocopa usitata** (Butler) (figs. 666, moth; 694, female genitalia).

*Depressaria usitata* Butler, 1881:396.

*Thyrocopa usitata* (Butler) Meyrick, 1883a:33, but error in identification; see *abusa* Walsingham, 1907b:504, 733, pl. 14, fig. 28.

Endemic. Kauai, Oahu (type locality: "probably near Honolulu", Butler), Hawaii.

Hostplant: unknown.

**Thyrocopa vagans** (Walsingham), **new combination** (figs. 646, head, wing venation; 651, moth; 681, male genitalia).

*Ptychothrix vagans* Walsingham, 1907b:489, pl. 14, fig. 3. Type-species of *Ptychothrix*.

Endemic. Kauai (type locality: Halemanu, 4,000 feet).

Hostplant: unknown.

This species is known only from the male holotype which has conspicuously bipectinate antennae. As I stated in the discussion of this genus above, I do not consider that the secondary sexual characters used by Walsingham to elevate this single example to generic status are of generic value. Therefore, I have placed *Ptychothrix* in synonymy.

**Thyrocopa viduella** Walsingham (figs. 666, moth; 695, female genitalia).

*Thyrocopa* (?) *viduella* Walsingham, 1907b:494, pl. 14, fig. 8.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Walsingham considered this an unusual species, and he questioned its generic assignment. His conclusion was based on knowledge of only one female.

#### Subfamily **BLASTOBASINAE** (Walsingham), **new status**

*Blastobasinae* Walsingham, 1894:538, 546, of Tineidae.

*Blastobasidae*: Meyrick, 1894:22, name used without description. Walsingham, 1907a:199, key to genera; 1912 (1909–1915): 148. Walsingham and Durrant, 1909:46. Busck, 1908:187. Hampson, 1919:386.

*Butalinae* Walsingham, 1890: 148; 1891:122, of Tineidae.

Dietz, 1910:1, expanded description; revision of the Blastobasidae of North America.

There appears to be no valid reason for treating the blastobasids as a family distinct from the Gelechiidae. I consider them to be entitled to not more than subfamily rank.

The abdominal tergites on the blastobasids have *transverse*, caudal bands of spines that recall the abdominal features of the Xyloryctinae and Oecophorinae. This is an unusual character in the Hawaiian fauna. The spines are easily seen on dried specimens, but may be accidentally removed during the cleaning process when preparing an abdominal skin for mounting on a microscope slide. If the spines are removed, the coarse, peculiar, spinelike sockets remain in conspicuous bands across the tergites and are unmistakable (figure 699).

Genus **BLASTOBASIS** Zeller

*Blastobasis* Zeller, 1855:171. Walsingham and Durrant, 1909:47. Type-species: *Oecophora phycidella* Zeller, 1839. (Fig. 697, wing venation, male genitalia.)

The genus *Blastobasis* is thought to be almost cosmopolitan in distribution and includes a complex of many species.

**Blastobasis inana** (Butler) (figs. 105*a*, antenna; 696, head, wing venation; 698, moth, male, female genitalia; 699, abdomen, male genitalia; 700, female genitalia).

*Gracilaria inana* Butler, 1881:404.

*Blastobasis inana* (Butler) Walsingham, 1907*b*:648, pl. 25, fig. 3.

*Blastobasis explorata* Meyrick, 1918:158 (type locality: Pusa, Bengal, India).

**New synonym.**

Oahu (type locality: Honolulu), Lanai, Hawaii, and probably the other main islands.

Immigrant. Known previously only from Hawaii, it is a widely dispersed species whose distribution largely remains to be determined. We can now report it from various localities in India and from New Britain (new records). It is possible that several species names will prove synonymous when members of this group are studied in detail. Its scavenger habits have made possible its dispersal by commerce, and it must have been carried far and wide since the days of sailing ships. It is one of the earliest known foreign moths to be recorded in Hawaii.

Hostplants: garden beans, coffee berries, dead sugarcane, *Dioscorea* (yam).

Few records of this moth are known in Hawaii. However, it was commonly taken in Honolulu and in the Pearl Harbor area in light traps when they were placed in operation during the Second World War. An effort should be made to discover more about its habits. I identified specimens reared by W. C.

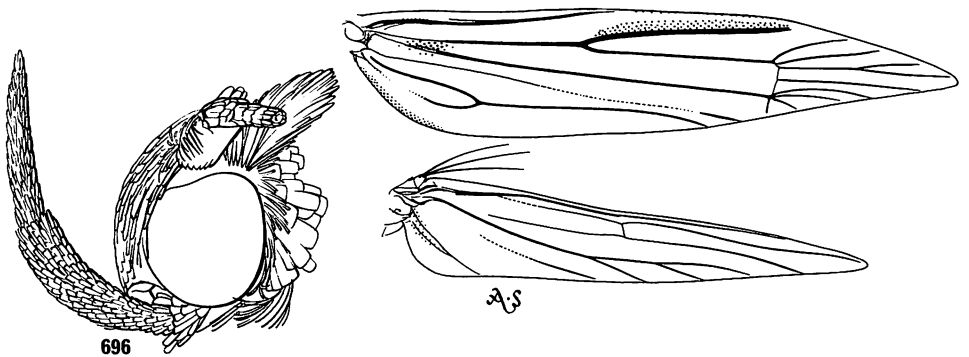


Figure 696—Head and wing venation of *Blastobasis inana* (Butler). Head from specimen from the Koolau Mts., Oahu; Meyrick collection. Wings (BM slide 3940) from the holotype.



Mitchell from fallen coffee berries collected at Kona, Hawaii, in 1964, and the new record from New Britain is based upon material reared from garlic at Rabaul.

This is an obscure, rather mouse-colored species with two small black spots along the middle line of each forewing. The scaling on the anterior part of the thorax is darker, almost black, and contrasts with the mostly pale, tan or cream-colored, scaling of the head. The scales on the front of the head are

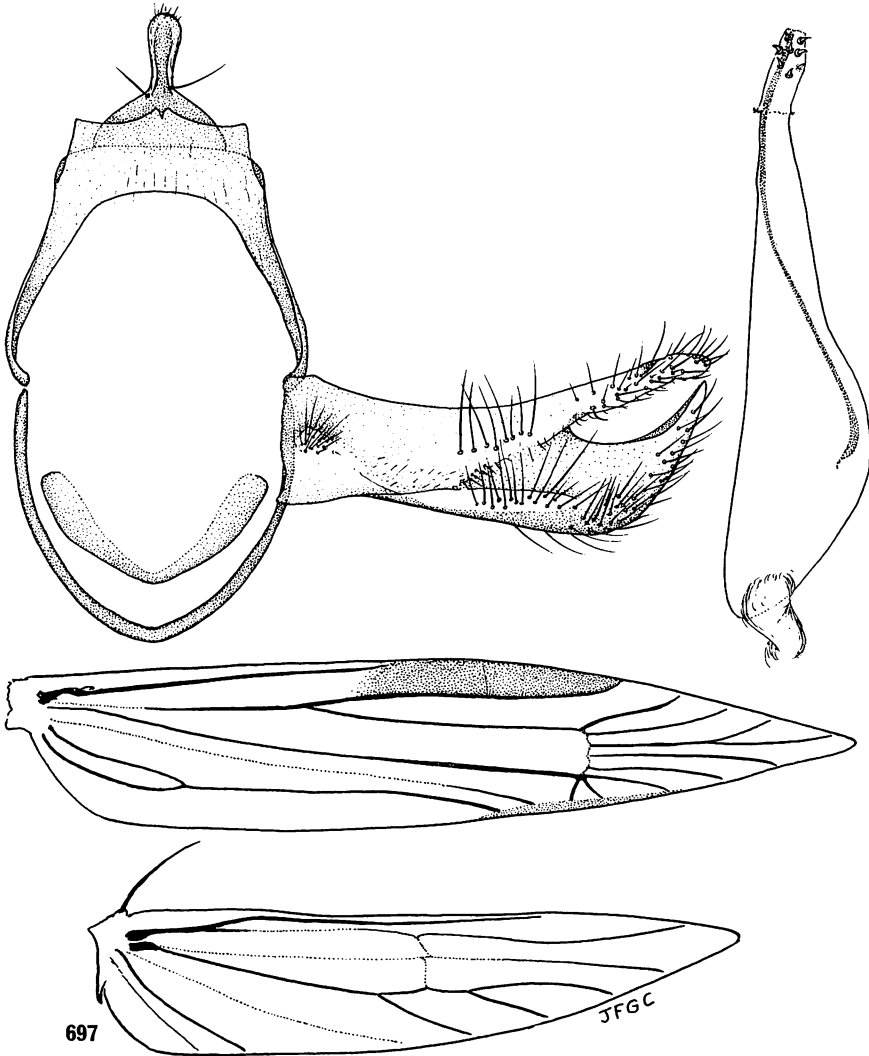


Figure 697—*Blastobasis*. Male genitalia and wing venation of *phycidella* (Zeller), the type-species of *Blastobasis*.

large and broad and lie smoothly forward. The first antennal segment is enlarged, flattened, slightly concave beneath and has a conspicuous pecten. The labial palpi curve strongly upward, and the terminal segment is well-developed and awl shaped. The proboscis is well developed but the maxillary palpi are obsolete. At first sight, this species might appear to belong near *Opogona*, but the squamose proboscis will serve as an immediate means of distinguishing *Blastobasis*. The transverse bands of spines on the abdominal tergites also signal its distinctiveness.

I am indebted to my friend Klaus Sattler for his expert aid in establishing the synonymy of Meyrick's name *explorata*.

Regrettably, I have not seen the larva or pupa of *Blastobasis inana*. I have, however, studied English material of *Blastobasis lignea* Walsingham. Although I do not know how many characters the two species share in the larval and pupal stages, I presume them to be rather similar. I have, therefore, incorporated notes taken from the English material into this text in the hope that they will be of assistance in Hawaii. I have included details of the larvae in the larval keys, and attention is drawn to the impression on the submentum which is a character shared with *Endrosis* and *Thyrocopa*.

The pupa shares with *Thyrocopa*, *Autosticha*, and *Stoerberhinus* the distinction of being among the only genera now known in the Hawaiian Gelechiidae with exposed profemora. The pupa of *lignea* is very compact. The labial palpi are entirely concealed, and the maxillary palpi are not evident. The antennae are contiguous on the abdomen as they are in most typical Gelechiinae. They reach the wing apices which extend on to the fifth abdominal sternite. The fifth abdominal segment is strongly curved caudo-ventrad so that the apex of the sternum is below a line drawn from about the middle of tergite seven, and the fifth sternite is only about one-third as broad as its tergite. Abdominal segments six and seven are rather similarly shaped. The mesothoracic spiracles are transverse; the abdominal spiracles are very small. Abdominal tergites two, three, and four combined are about equal in length to the remainder of the abdomen. The cauda is smoothly rounded, simple, and unarmed. The cocoon is covered with vegetable debris and frass.

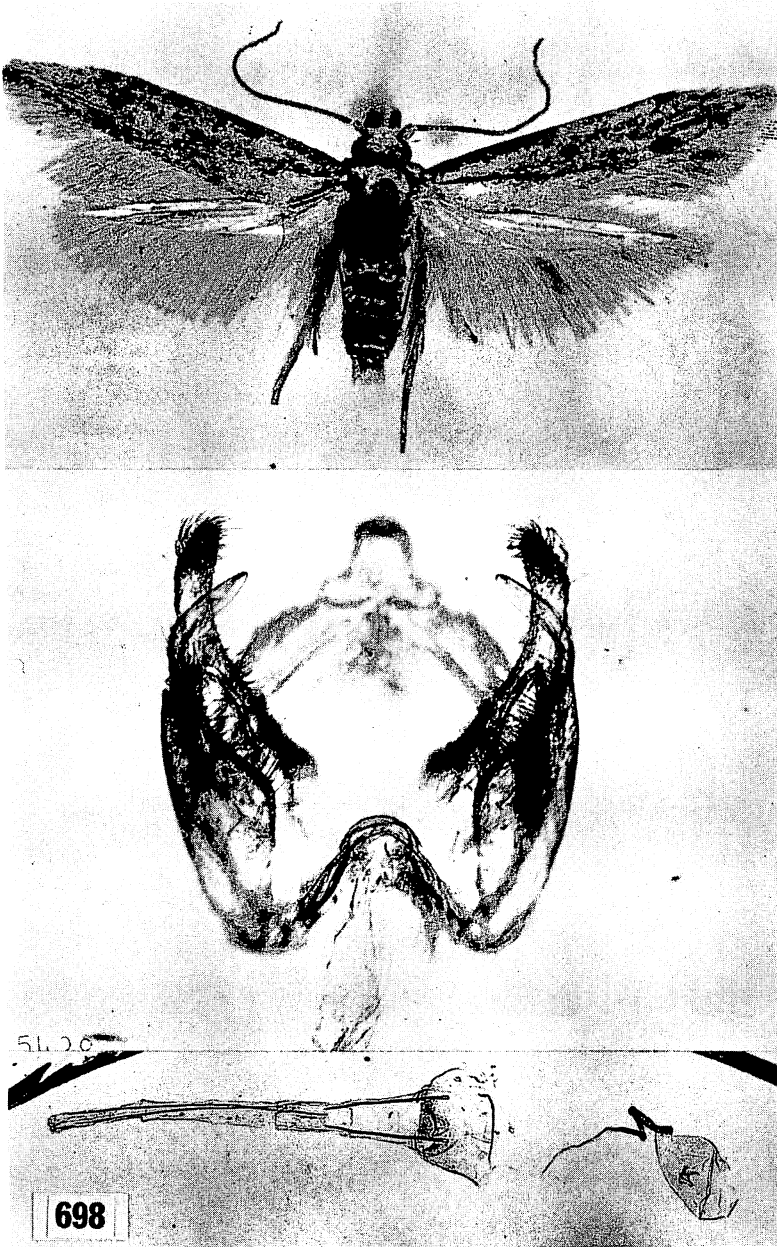
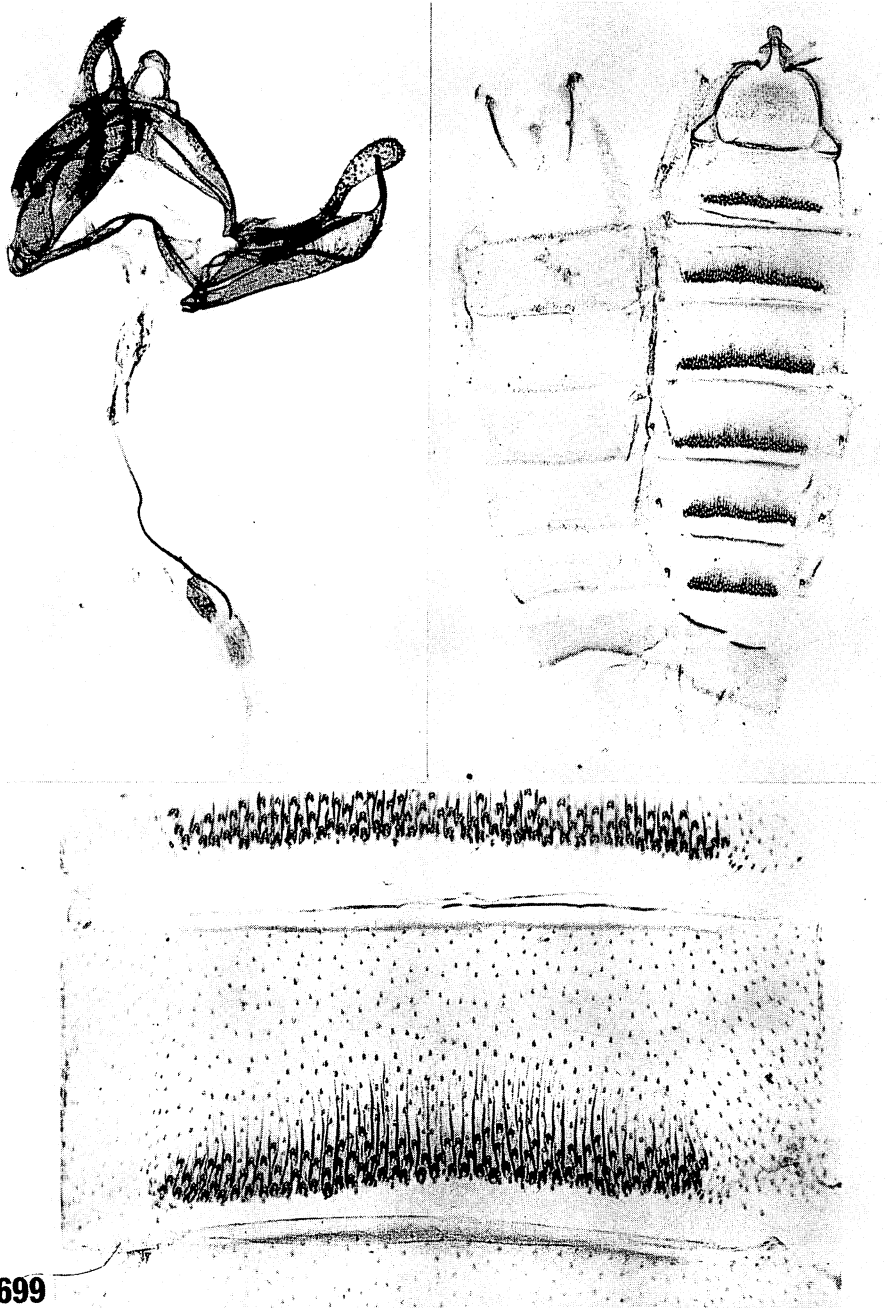


Figure 698—*Blastobasis inana* (Butler). Top, a specimen from Honolulu; forewing=6 mm. Middle, male genitalia, not spread (BM slide 5420) from an Oahu specimen; see figure 699. Bottom, female genitalia (BM slide 3941); see also figure 700.



699  
Figure 699—*Blastobasis inana* (Butler). Top left, male genitalia (compare figure 698). Top right, the abdominal pelt split open. Bottom, enlargement of abdominal tergites. Kona, Hawaii; ex coffee (slide Z-VII-10-64).

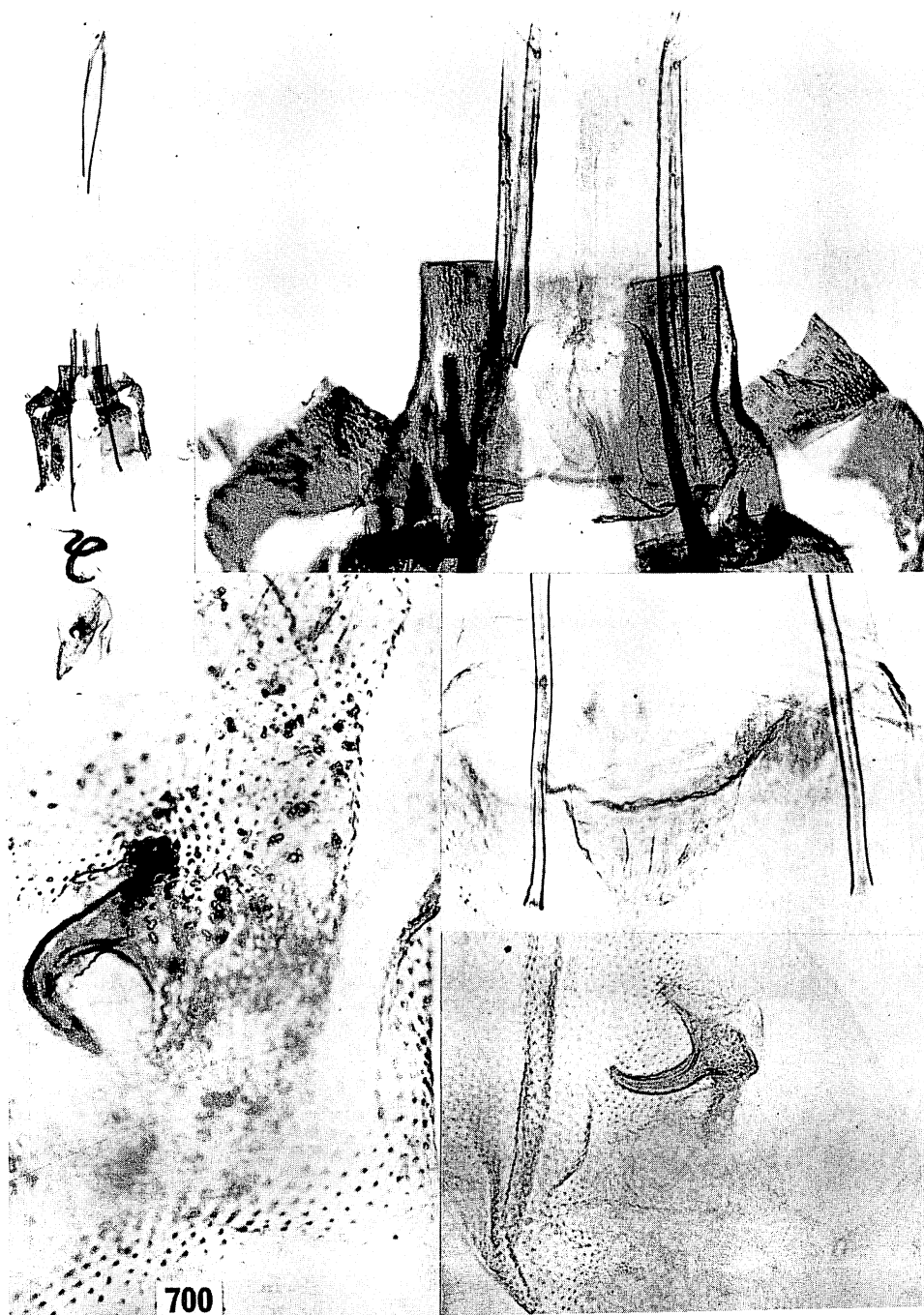


Figure 700—*Blastobasis inana* (Butler), female genitalia. Top, left and right, and bottom left, from the holotype (BM slide 3940); posterior apophyses broken; abdomen broken and glued. Middle right and bottom right, from another specimen (BM slide 3941); see the whole genitalia in figure 698.

Subfamily **CHRYSOPELEIINAE** (Mosher), **new status**

*Chrysopeleidae* Mosher, 1916:104.

*Walshiidae* Hodges, 1962a(1961):81-82; 1962b:7-8, redescription and modification of diagnosis; 1964b:291.

*Walshiinae*: Riedl, 1969:651. Common, 1970:822.

Incorrectly listed as a synonym of Elachistidae by Brues, Melander, and Carpenter, 1954:258.

This family-group name was erected by Mosher during her study of the classification of the Lepidoptera based upon the pupae. Unfortunately, she did not state clearly that she was proposing a new family name. Hodges proposed the name *Walshiidae* for the group, but he, too, neglected to state that he was erecting a new family name. These omissions have been the cause of confusion to other workers. I am indebted to Dr. Hodges for informing me that his name *Walshiidae* is a synonym of *Chrysopeleidae*.

Hodges published a review of the group for North America in 1964. He included a key to separate the *Chrysopeleinae* ("Walshiidae") from the *Momphinae* and *Cosmopteriginae*, and he presented a key to the North American genera. Hodges' paper may be consulted for detailed information regarding this small group. The subfamily is represented in Hawaii only by one introduced American species.

This group differs from our *Cosmopteriginae* in that its members have ocelli, the male genitalia have a developed uncus, and they lack brachia. These are not characters of family-group weight, but they do serve to differentiate the group in the Hawaiian fauna. The female genitalia are generally similar to cosmopterigids. The group might be reduced to a tribe of the *Cosmopteriginae* when the gelechiids become better known.

Genus **ITHOME** Chambers

*Ithome* Chambers, 1875:93. Type-species: *Ithome concolorella* (Chambers) (= *Ithome unimaculella* Chambers).

*Eriphia* Chambers, 1875:55 (homonym of *Eriphia* Meigen, 1826). Type-species: *Eriphia concolorella* Chambers, monotypic.

The extensive synonymy given by T. B. Fletcher, 1929:142, under *Mompha* is muddled and must be revised.

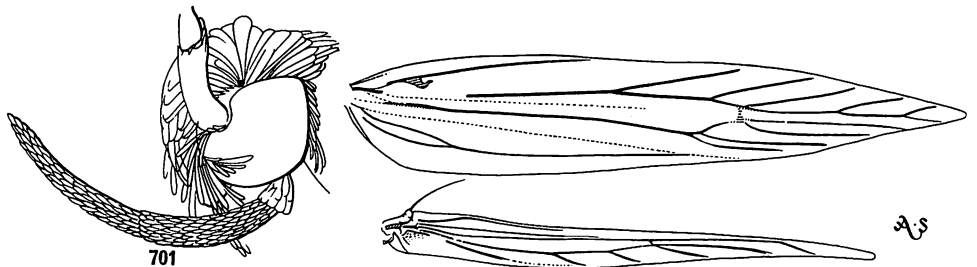


Figure 701—Head and wing venation of *Ithome concolorella* (Chambers) (BM slide 5207).

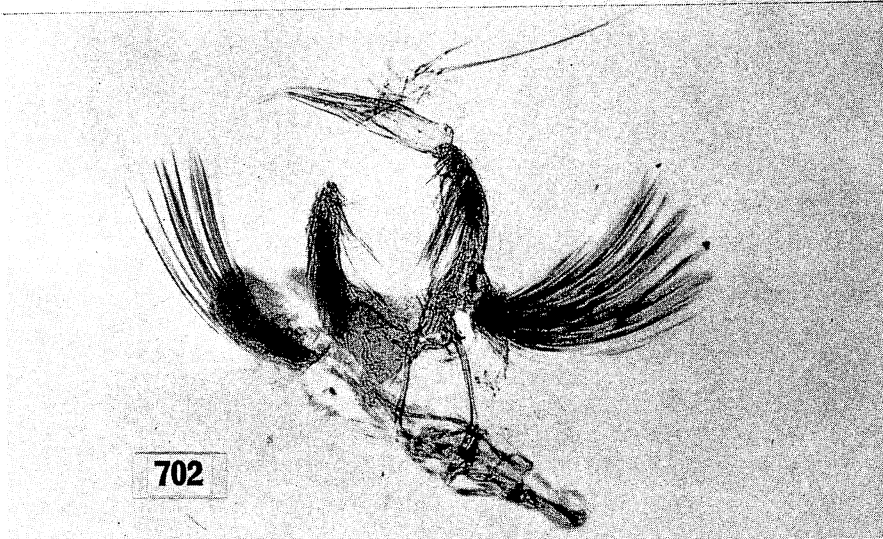
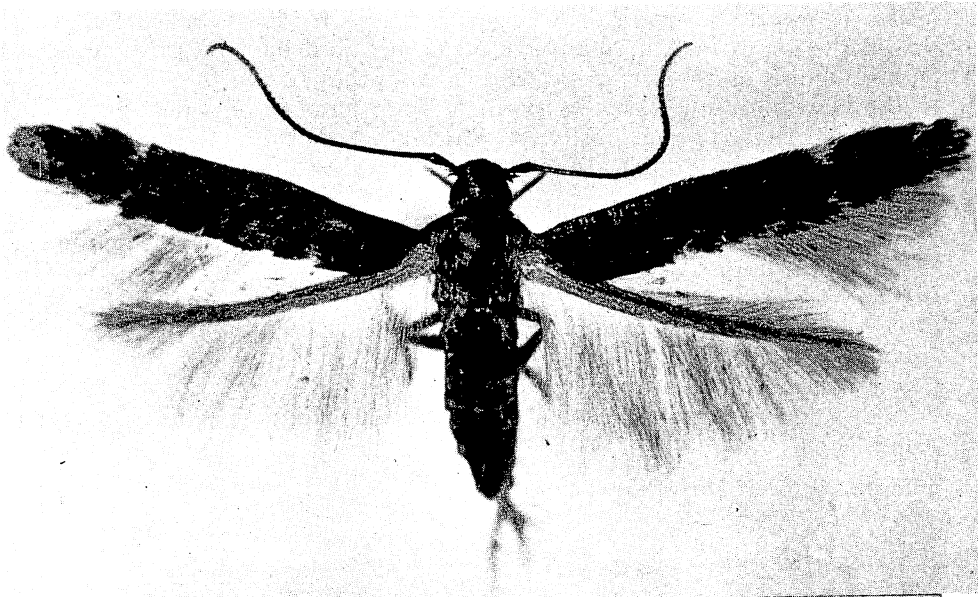


Figure 702—*Ithome concolorella* (Chambers). Top, a female from Illinois (photograph courtesy of USNM and Ron Hodges). Bottom, male genitalia (BM slide 5207); Ewa, Oahu. The moths have an expanse of about 5 to 7 mm.

*Ithome* is mostly a tropical American group. Hodges 1962a(1961) has reviewed the genus in America north of Mexico and has given descriptions, keys, and figures of the five species known from that region.

In the Hawaiian fauna, *Ithome* might be considered to be a member of the Cosmopteriginae. It may easily be distinguished from Cosmopteriginae because it has ocelli, which are lacking on the Hawaiian cosmopterigids.

***Ithome concolorella*** (Chambers) (figs. 701, head, wing venation; 702, moth, male genitalia; 703, female genitalia; 704, male, female genitalia; 705, larva, pupa).

*Eriphia concolorella* Chambers, 1875:55.

*Ithome concolorella* (Chambers) Barnes and McDunnough, 1917:152.  
Namba, 1956:95, figs. 1, A-G (larva, pupa), biology.

*Ithome unimaculella* Chambers, 1875:94.

For detailed synonymy and discussion, see Hodges, 1962a(1961):85, figs. 2, 7, 12.

The mesquite or kiawe flower moth.

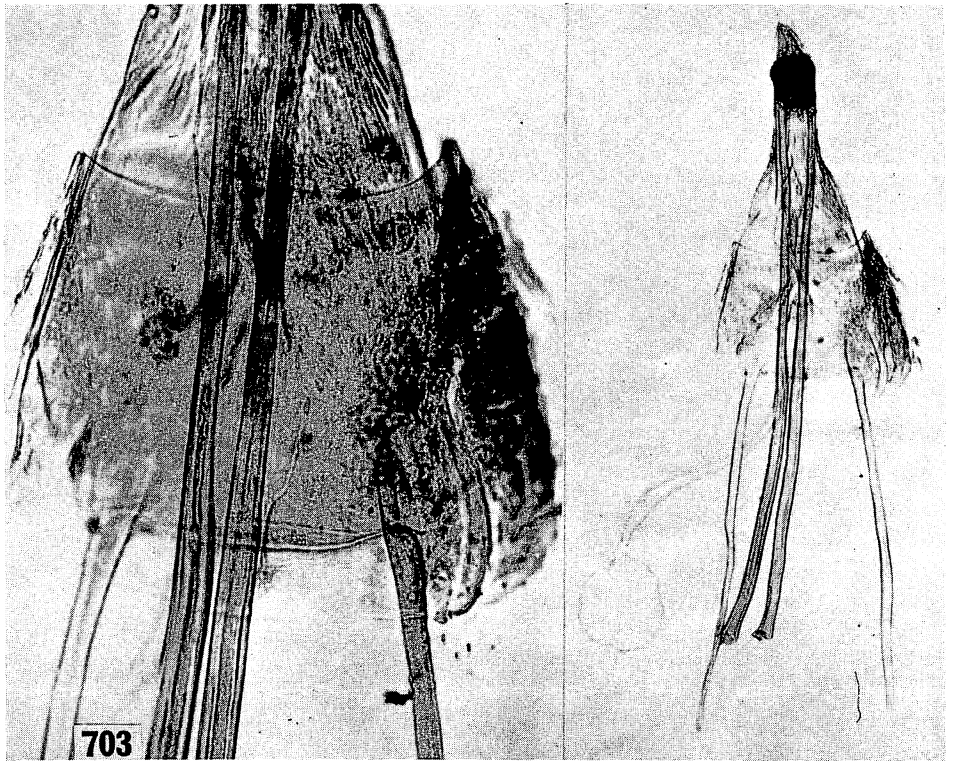


Figure 703—*Ithome concolorella* (Chambers), female genitalia (BM slide 5143); Ewa, Oahu.



Kauai, Oahu, Molokai, Maui, Hawaii.

Immigrant. It was described from Texas and is widespread in the southern United States and in Mexico. This species was first recorded in Hawaiian entomological literature by C.F. Clagg who discussed it at the June 8, 1953, meeting of the Hawaiian Entomological Society (*Proc. Hawaiian Ent. Soc.* 15(2):278, 1954). He reported it from Kauai and Hawaii. It was, however, present in Hawaii several years before 1953. It has dispersed rapidly and widely since its establishment in Hawaii.

Hostplants: *Acacia farnesiana* ("klu"), *Prosopis chilensis* (algaroba, mesquite, "kiawe").

Parasites: *Agathis* species near *cincta* Cresson, *Bracon gelechia* Ashmead, *Pristomerus hawaiiensis* Perkins, *Zatopis tortricidis* Crawford.

It is not known how long this moth has been established in Hawaii, but it was probably introduced during or soon after the Second World War. Evidently its presence was first made known by beekeepers who noted that the blossoms of *Prosopis chilensis*, the most important honey-producing plant in Hawaii, were being destroyed and the honey flow reduced. A marked reduction in honey production has followed the spread of the moth, especially since 1953. Stephen Au found the caterpillars on Kauai in May, 1953, and the moth was also found on Hawaii in the same month. Soon thereafter it was found on Oahu and Maui.

This is a small (expanse about 7 to 8 mm.; total length with wings closed, 3.5 to 4.0 mm.), dark-colored (fuscous) moth. The male genitalia are enclosed in creamy yellow tufts of hairs and scales. Namba (1956:95) has published a good paper on the biology of the moth in which he described the preadult stages and illustrated the larva and pupa.

The following information has been assembled from Namba's account: The cylindrical eggs, about 0.33 mm. long, are inserted in the flower buds and hatch in three to five days. The first stage caterpillar destroys the pistil

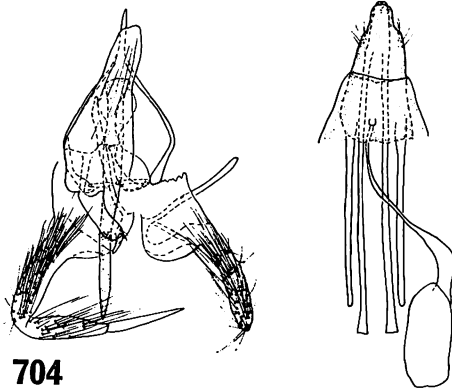


Figure 704—Male and female genitalia of *Ithome concolorella* (Chambers). (After Hodges, 1962.)

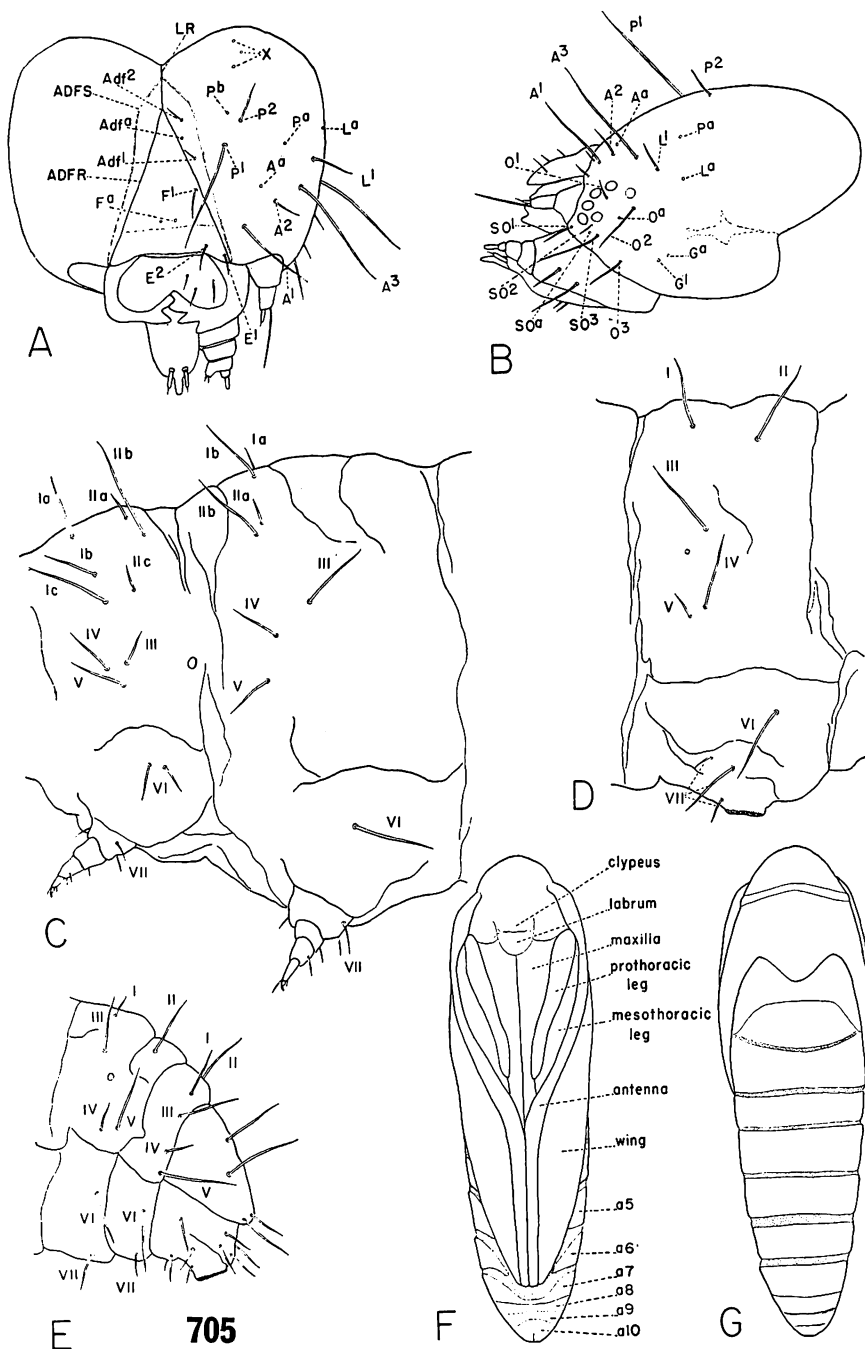


Figure 705—*Ithome concolorella* (Chambers), details of larva and pupa (after Namba, 1956). *A, B*, frontal and lateral aspects of head; *C*, lateral aspect of the pro- and mesothorax; *D*, lateral aspect of third abdominal segment; *E*, lateral aspect of abdominal segments 8, 9, and 10; *F* and *G*, ventral and dorsal aspects of pupa.

and stamens in the bud in which the egg was deposited. More mature larvae bore into other buds and opened florets; a single larva may destroy as many as 15 florets. The damaged flower parts are webbed together and formed into a tunnel in which the mature larva may be found. There are four larval instars which were found to last one day, one to four days, two to six days, and three to six days, respectively. The pupal period was found to be six to ten days. The mature larvae leave the hostplant, drop to the ground, and spin silken cocoons. With the egg stage of four days, the preadult period averages about 23 days. As many as one-half of the blossoms of *Prosopis* may be destroyed by the caterpillars.

It will be interesting to observe the progress of this moth in Hawaii. It may eventually cause damage to other acacia-like plants in the islands. Parasites and predators may exert more control upon it after it has been present in the islands for a number of years so that its attacks may not be as severe as during the period of the population's initial growth and dispersal. Its introduction to Hawaii has been a most unfortunate event.

Subfamily **MOMPHINAE** (Hübner), **new status**

*Momphae* Hübner, 1825 (1816–1826):414.

*Momphina*: Herrich-Schäffer, 1857:58.

*Momphinae*: (= Laverninae) of Elachistidae, Staudinger, and Rebel, 1901:184 (including *Batrachedra*, *Cosmopteryx*, etc.).

*Momphinae*: Riedl, 1969:651. Common, 1970:822.

*Momphidae*: Spuler, 1910 (1901–1910):381. Hampson, 1918:386, including *Cosmopterigidae*. Hodges, 1962*b*:6, redescription. Riedl, 1969:651.

*Batrachedrae* Heinemann and Wocke, 1876:524.

*Batrachedrinae*: Walsingham, 1890:149; 1891:125.

The members of this subfamily, most of which are small and slender, might, upon superficial examination, be considered to be associated with *Bedellia* in the Lyonetiidae. However, the two are not related and can easily be separated. *Bedellia* has a very large and conspicuous pecten composed of hairs and scales on the first antennal segment. Our momphines lack this structure although an occasional specimen may have one or two bristles or long squamae on the first antennal segment. Also, the momphines have squamose proboscides, but those of *Bedellia* are "naked". Some workers include the Chrysopeliinae and the Cosmopteriginae in the "Momphidae". In the future they may come to be considered as tribes within one subfamily of Gelechiidae.

The momphines in Hawaii all have *longitudinal*, medial, double bands of spines on the abdominal tergites (usually to be seen only in descaled dissections although they may be revealed on abraded moths). The only other adult Microlepidoptera in Hawaii now known to have spined abdominal tergites are the Oecophorinae, Xyloryctinae (figure 690), and Blastobasinae (figure 699), but in those groups the spines are arranged in *transverse* instead of *longitudinal* rows. Thus, the presence of double bands of spines arranged in *longitudinal* rows on the abdominal tergites of the moths is now diagnostic of the Momphinae in Hawaii (figure 710). The Hawaiian species were incorrectly

placed in the "Hyponomeutidae" by Walsingham in *Fauna Hawaiiensis*. The momphines are, of course, gelechioid and not yponomeutoid.

Nine species of Momphinae from Hawaii have been recorded as belonging to *Batrachedra* Herrich-Schäffer, 1853 (1843–1856):54 [type-species: *Gracillaria praeangusta* Haworth, 1828 (1803–1828):530; see my figure 707 for the male genitalia]. However, none of these are *Batrachedra*, and two new generic names must be added to the Hawaiian faunal list. It is probable that there are more species involved in the published Hawaiian records than there are names—some misidentifications may have occurred. The number of species of this subfamily in Hawaii is considerably greater than that recorded. Dr. Swezey found the larvae of unknown species, and I have examined undescribed species. It is remarkable that all except one of the described species were collected by Dr. Perkins and described by Lord Walsingham. During all of Dr. Swezey's careful work in the islands he rediscovered only five of the eight species originally found by Perkins, and only one new species was described from Dr. Swezey's collections.

There are two distinct groups of Momphinae in Hawaii, and they can be distinguished by morphological features as well as hostplant group. One of these contains two known species (possibly introduced?); the larvae of one of these feeds on sedge and the larvae of the other feeds upon grass. The larvae of the second group feed, in so far as is now known, upon fern sporangia. The wing venation is similar in the two genera. These groups may be separated as follows:

#### KEY TO THE GENERA OF MOMPHINAE IN HAWAII

1. Male genitalia with uncus apically entire, arms of gnathus apically fused into a single, narrow, median process, and valvae with well-developed claspers; forewings pale straw-colored flecked with black and usually with three small dark dots or dashes—one on the fold, one near apex of cell, and one at about distal third or fourth of wing—forming a very simple pattern; larvae in sedges and grasses. . . . . **Chedra.**
2. Male genitalia with uncus apically forked (bifid) or tripartite (trifid), gnathus apically broad, sometimes divided, and valvae without claspers; forewings with more complex color patterns; larvae feed upon fern sporangia. . . . . **Batrachedrodes.**

In addition to the two species of *Chedra* recorded here, there is before me a male specimen of a *Chedra*-like species that was reared from a pupa that Dr. Swezey took from a stem of *Eragrostis* grass on Mt. Kaala, Oahu, July 11, 1929. It has lost its left wings, and most unfortunately, its abdomen, and I cannot determine its identity. The moth is externally quite similar to the *Chedra* in Hawaii, but it has longer antennae—they are longer than the forewings. I have illustrated details of its pupal skin in figure 708a.

It will be noted that the cauda and antennae of this specimen differ from *Chedra* and *Batrachedrodes*. The wings overlap the base of the eighth abdominal sternum. The hind legs extend slightly beyond the apex of the abdomen. The antennae extend far behind the apex of the abdomen (about the length of the five caudal abdominal segments beyond the apex in the example seen). The spiracles of the eighth abdominal segment are much more protuberant than are those of the other segments, and the abdominal spiracles are much larger than are those of *Chedra microstigma*. The mesothoracic spiracles differ from those of *microstigma* in being slightly curved, somewhat more "thumb-like", and not so semicircular. There is no protruding cremasteral process; the cremasteral area appears nearly bare (it has only some fine hairs), and it lacks the conspicuous, hooked, dorsal setae that are found on *microstigma*. It would appear that this example represents yet another genus of Momphinae in Hawaii, but it is impossible to say more until the genitalia can be studied.

For many years the American Army kept large numbers of horses and mules in Hawaii, and the Army imported large quantities of hay. Hay has also been imported over many years by the dairy and livestock industries. It is possible that the *Chedra*-like species recorded here as being established in Hawaii were imported in such hay.

#### Genus **CHEDRA** Hodges

*Chedra* Hodges, 1966a:636. Type-species: *Chedra pensor* Hodges, 1966a:368, by original designation.

*Chedra* was proposed as a generic name to include two species from North America and one from Chile. Hodges (1966a:637) said that "males of *Chedra* may be separated from those of *Batrachedra* by the presence of the single, strong

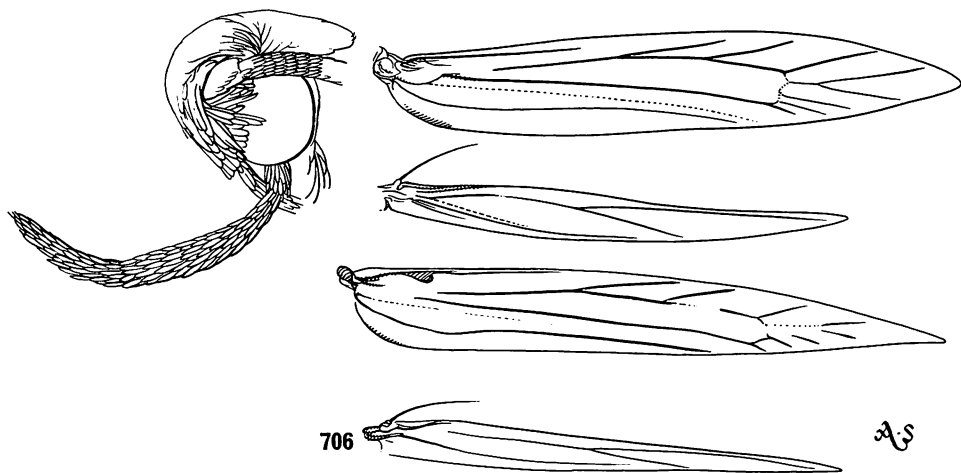


Figure 706—Head and wing venation of *Batrachedrodes* and *Chedra*. Top, left and right, the holotype of *Batrachedrodes syrrhaphella* (Walsingham) (slide BM 4228); Waianac Mts., 2,000 feet, Oahu. Bottom, wings of a paratype BM slide 5257) of *Chedra microstigma* (Walsingham); Waianac Mts., Oahu.

apical spine on the ampulla. The presence of long apophyses . . . , the absence of a signum and accessory pouches, and the corpus bursae being poorly set off from the ductus bursae may be used to separate females of *Chedra* from those of *Batrachedra*." Hodges used the term "ampulla" for the structure on the inner face of the male genital valva which some authors call the clasper. The ampulla was considered originally to be a process of the clasper; see Tuxen, *et al.*, 1956, for example.

The name *Batrachedra* was derived from *batrachos*, a frog, and *edra*, a seat. It refers to the way the moths sit with the legs extended back and the head end of the body elevated. The meaningless name *Chedra* would have been termed a "nonsense name" by Meyrick.

Two species heretofore placed in *Batrachedra* in Hawaii must be transferred to *Chedra*. Although these species appear to be introductions from America, I cannot state positively that they are recent introductions. It is possible that they were introduced with hay from North America. The hostplants of the two known North American species remain undetermined, but the South American species has been reared from the seeds of a sedge. One of the species in Hawaii has been reared from sedges, and the other has been reared from *Eragrostis* grass.

The two species of *Chedra* in Hawaii that are known to me are so closely similar that considerable confusion exists regarding them. The confusion began in 1907 when Walsingham included both species in his type series when he described *microstigma*. Busck, without referring to Walsingham's work, evidently redescribed *microstigma* as *cuniculator* on the basis of Dr. Swezey's information that he had reared a distinct species from sedges. The holotype and one paratype of Walsingham's *microstigma* were collected at an elevation of about 2,000 feet in the Waianae Mountains of Oahu, and six paratypes were collected at Kona, Hawaii. My dissections reveal that the so-called paratypes from Kona represent a different species from the Oahu holotype and paratype. Moreover, Busck's name *cuniculator* appears to have been applied to specimens of *microstigma*. Actually the species reared from *Eragrostis* and considered by Dr. Swezey and others to be *microstigma* is an unnamed species which is the same as the Perkins' material collected in Kona, Hawaii.

Most unfortunately, the Hawaiian specimens which I have been able to examine during this brief study have been inadequate for a proper revision of the group so that I must separate the species on characters of the male genitalia only. The abdomen of the male holotype of *microstigma* is lost. Fortunately, the male paratype of *microstigma* has retained its abdomen, and the abdomens of two of the males of the new species *mimica* from Kona were intact. Because of the lack of sufficient material in good condition, I cannot be satisfied with my preliminary treatment of this genus in Hawaii.

*Chedra* pupae may at first sight appear to resemble the pupae of *Philodoria* in the Gracillariidae. They are, however, easily distinguishable. The abdominal segments of *Chedra* pupae lack the tergal spinules characteristic of *Philodoria*, the dorsal setae are long and conspicuous, and the antennae are shorter and are not recurved over the abdomen. The spiracles are unusually large, and those on the eighth abdominal segment are obviously protuberant.

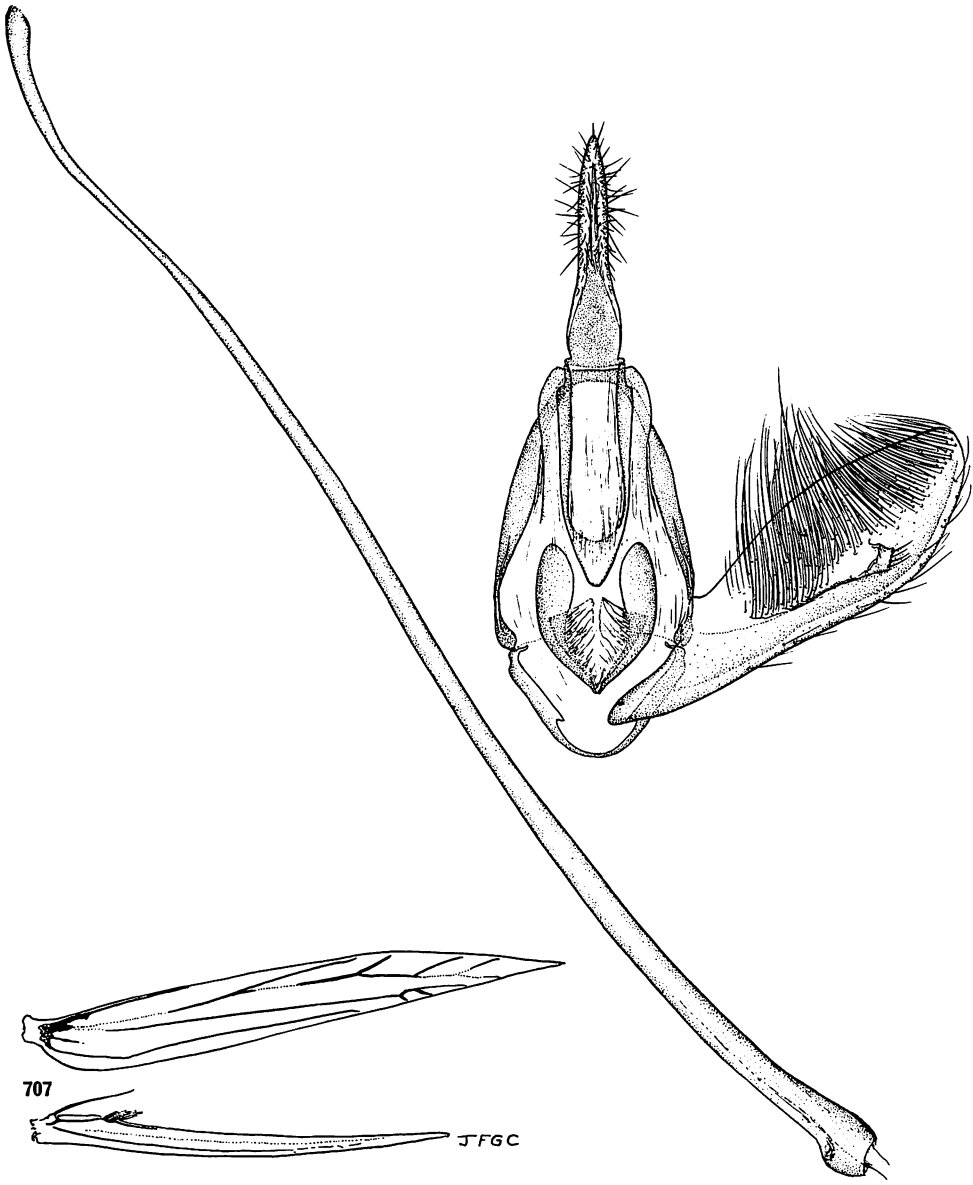


Figure 707—Wing venation and male genitalia of *Batrachedra praeangusta* (Haworth), the type-species of *Batrachedra*. The aedeagus is drawn to the same scale as the remainder of the genitalia.

## KEY TO THE SPECIES OF CHEDRA IN HAWAII

1. Male genital valva with dorsal ("costal") margin slightly convex in outline; uncus obviously swollen before apex; as in figures 710, 711. . . . . **microstigma** (Walsingham).
  2. Male genital valva with dorsal margin obviously concave in outline; uncus in dorsal or ventral aspect straightly acuminate; figure 712. . . . . **mimica** Zimmerman.
- See color plate 5, figure 4.

**Chedra microstigma** (Walsingham), **new combination** (figs. 706, wing venation; 709, moth; 710, 711, male genitalia, abdomen; 713, female genitalia).

*Batrachedra microstigma* Walsingham, 1907*b*:510, pl. 15, fig. 10.

*Batrachedra cuniculator* Busck, 1914*b*:106. **New synonym.**

*Batrachedra foliocuniculator*, misspelling by Swezey, 1954:194.

Oahu (type locality of *microstigma*: Waianae Mountains, 2,000 feet; of *cuniculator*: Kewalo Swamps, Honolulu, now filled and occupied by the city).

Immigrant? Possibly a North American species.

Hostplants: *Cyperus laevigatus*, *Scirpus maritimus*.

Parasites: *Bracon swezeyi* (Bridwell), *Chelonus* (*Microchelonus*) *blackburni* Cameron, *Trathala* ("Cremastus", "Zaleptopygus") *flavo-orbitalis* (Cameron).

Dr. Swezey knew that *microstigma* had been recorded from the Waianae Mountains of Oahu, but when he found a species boring in the stems of sedges

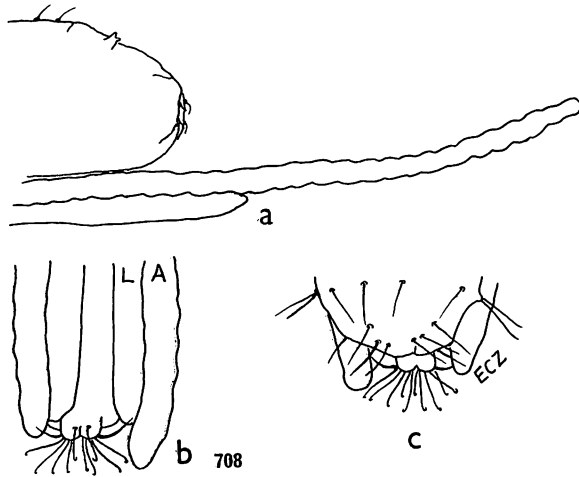


Figure 708—Details of the cast skins of the pupae of two species of Momphinae. *a*, left lateral aspect of the apex of the abdomen of a *Chedra*-like species; ex stem of *Eragrostis*; Mt. Kaala, Oahu. Note how far beyond the cauda the antennae extend. See the discussion of this example in the text under *Chedra mimica*. *b* and *c*, ventral and dorsal aspects of the cauda of *Batrachedrodes sophroniella* (Walsingham); Pauoa, Oahu; ex *Aspidium cyathoides*. On figure *b*, *A* = antenna and *L* = leg; note the separation of the antennae and compare their shorter lengths with those of *a*.



in the former lowland swamps at Kewalo, Honolulu, he concluded that he had a new species. He sent material to Busck who described it as *cuniculator*. Busck said (1914b:106): "Bred by Mr. Swezey, who writes that it is a leaf-miner in sedges, *Scirpus maritimus*, in the swamps near the coast; it also bores in the stems of *Cyperus laevigatus*, which is leafless and has cylindrical stems resembling rushes. Mr. Swezey considers this moth a recent introduction to Hawaii; it had not been noticed until about a year ago." I cannot explain why Dr. Swezey appears not to have seen the species in Honolulu until 1913 or why he then thought that it was a newly introduced species.

I have been unable to separate specimens reared from sedges from the type locality of *cuniculator* from the holotype and paratype of *microstigma* from the Waianae Mountains. The male genitalia are similar, as the illustrations demonstrate. Hence, Busck's name *cuniculator* must fall.

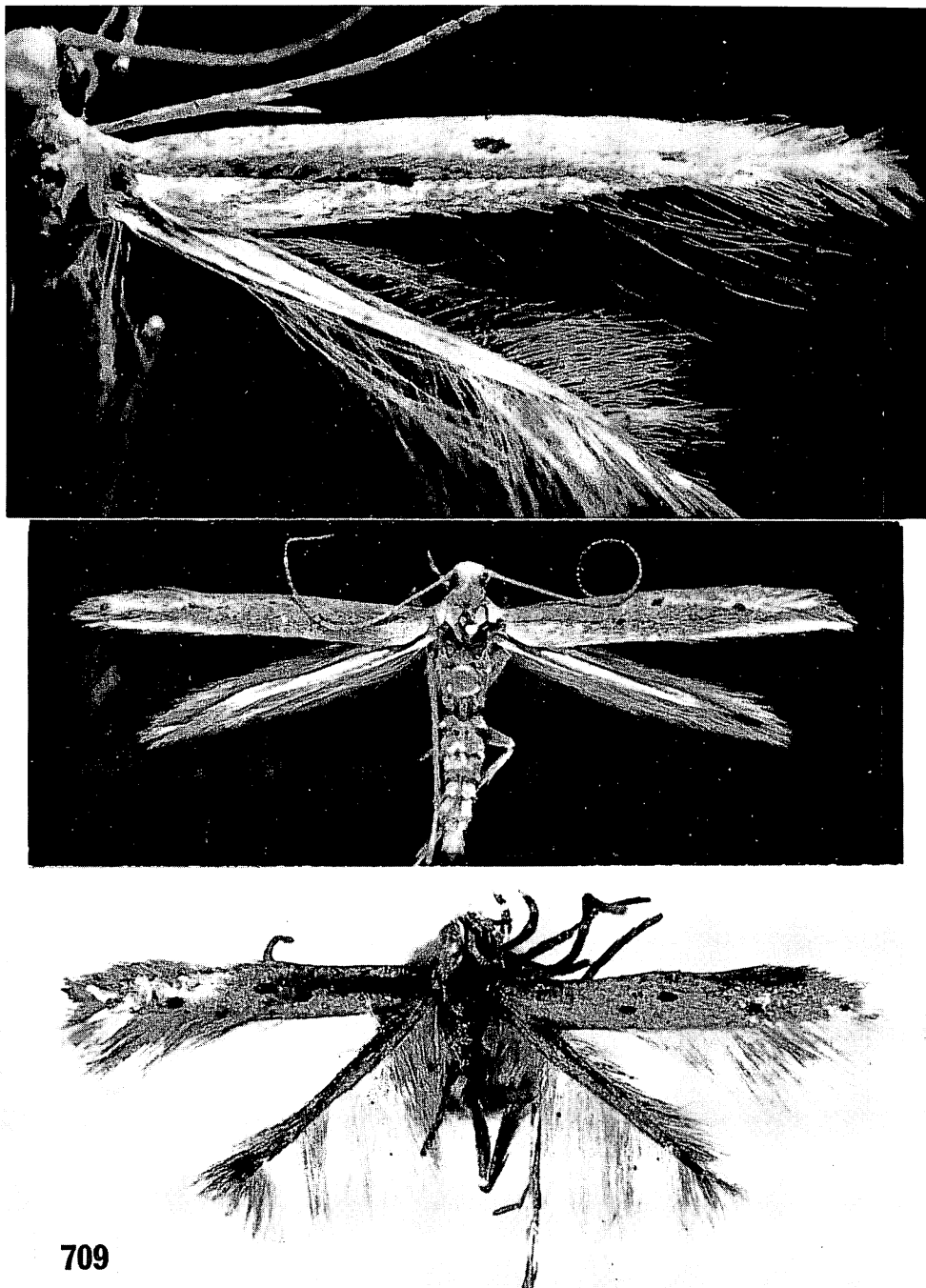
As noted under the discussion of the genus above, Walsingham's paratypes from Kona, Hawaii, are not the same as his holotype and paratype from the Waianae Mountains of Oahu. They evidently represent a new species which is described below.

On the pupa of *Chedra microstigma* the labial palpi, profemora, and maxillary palpi are all exposed. It is unusual, but not unique, for a member of the Gelechiidae to have exposed labial palpi and profemora. The antennae extend beyond the apices of the wings and caudad of the metatarsi, but they do not reach the apex of the abdomen. They touch each other at their extreme apices only. They are kept separated elsewhere by the mid and hind legs which lie between them. The exposed parts of the mesothoracic spiracles form conspicuous, semicircular pilose pads which lie on the mesothorax. On each side of the medial line of the ventro-caudal margin of the cauda is a low process that bears a cluster of about six conspicuous, hooked setae.

***Chedra mimica*** Zimmerman, **new species** (figs. 709, moth; 712, male genitalia; 713, female genitalia).

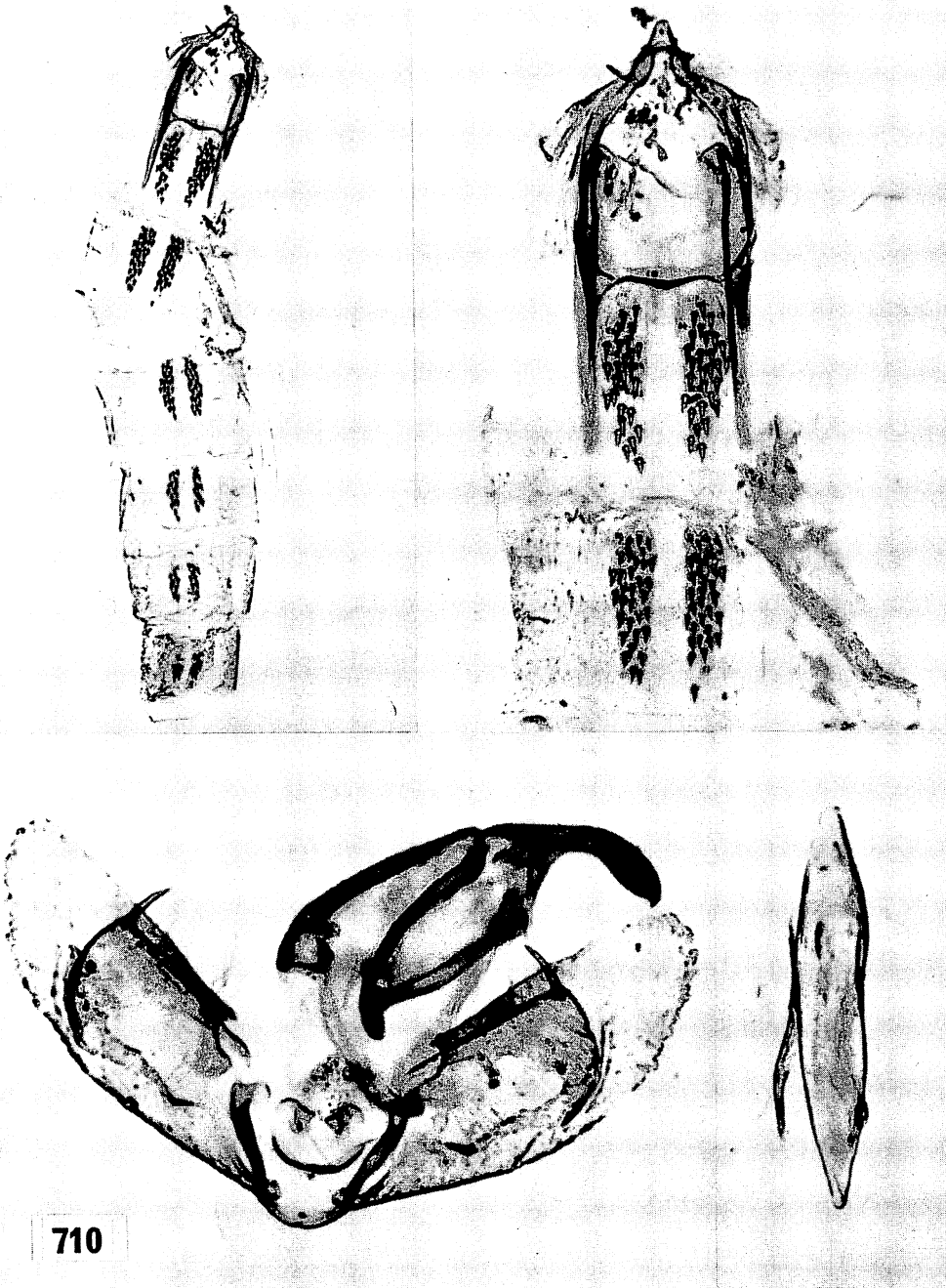
*Batrachedra microstigma* Walsingham, 1907b:510, in part.

A mostly straw-colored species flecked or marked with brown and fuscous. Labial palpi in lateral aspect with the second segment fuscous near base with the fuscous extending toward or beyond middle and with a fuscous apical fascia; third segment with a basal fuscous fascia and another between the middle and apex but not extending to apex on sides although sometimes reaching apex along the dorsum; these fuscous maculae are variable. Head and thorax straw color; head without maculae. Antennae straw color with brown annulations. Legs outwardly sprinkled with brown and fuscous and with the bases of the tarsal segments ringed with brown. Wings basically straw color; forewings sprinkled with brown scales and with three small, variable, fuscous dots: one in the fold near the basal third of the wing length, another somewhat basad of the middle of the wing but in the cell and thus costad of the macula in the fold, and the third at the end of the cell at a point about twice as far from the submedial macula as that is from the most basal macula; as illustrated. Male and female genitalia as illustrated. Expanse 6.5 to 12.0 mm.



709

Figure 709—*Chedra* species. Top, *microstigma* (Walsingham), holotype; abdomen lost; Waianae Mts., 2,000 feet, Oahu; forewing 3.6 mm. Middle, the same species from a specimen determined as the synonymous *cuniculator* Busck; Kewalo, Oahu; ex *Cyperus laevigatus*; forewing 5 mm. Bottom, *mimica* Zimmerman, holotype male (BM slide 2240); Kona, above 2,000 feet, Hawaii; forewing 3.5 mm. The three fuscous spots on the straw-colored wing, which is dusted with brown scales, are diagnostic of *Chedra* in Hawaii.



710

Figure 710—*Chedra microstigma* (Walsingham). Top, abdominal skin and enlarged basal tergites. Bottom, male genitalia; the apex of the aedeagus is at the bottom. From a paratype (BM slide 5257); Waianae Mts., Oahu.

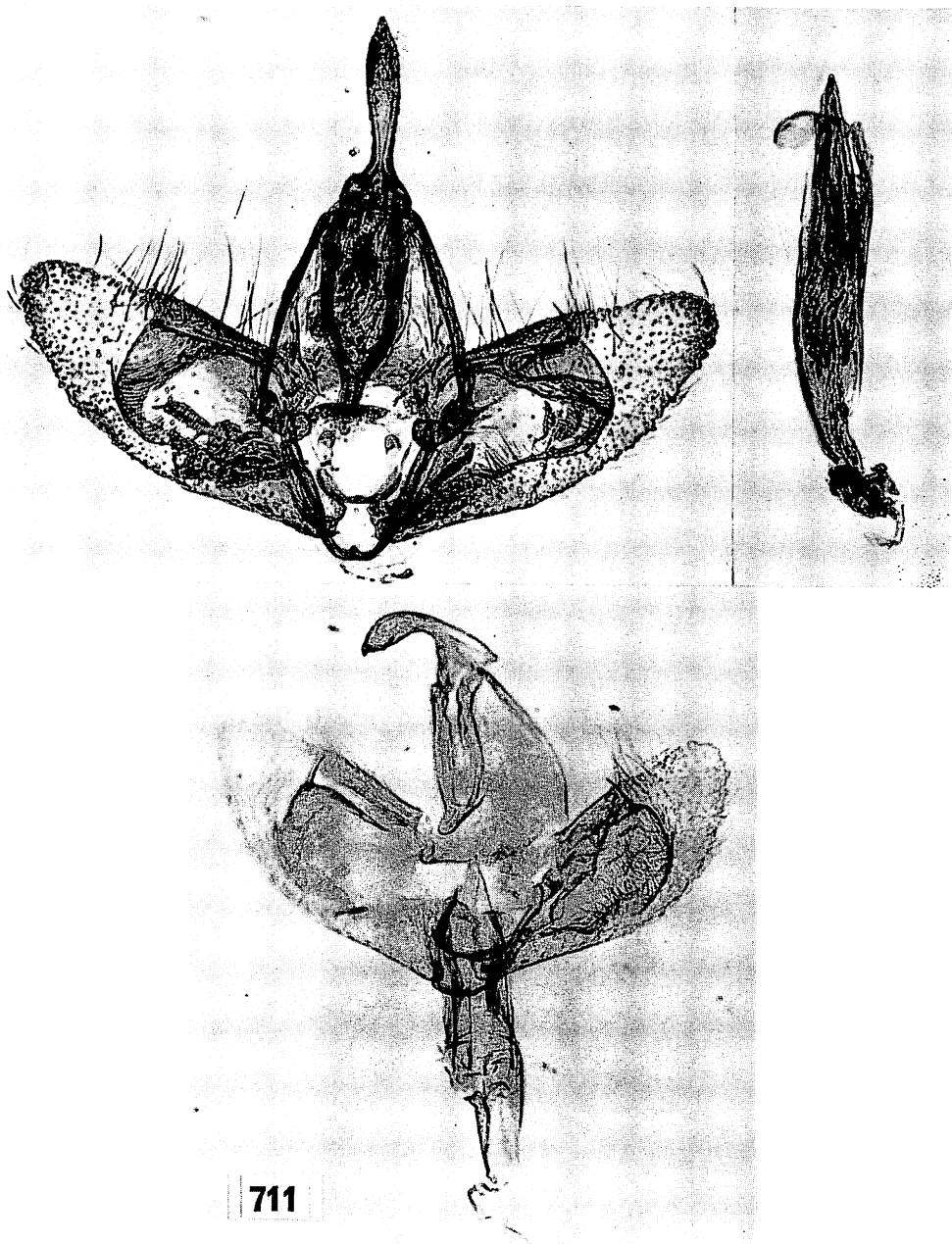


Figure 711—Male genitalia of *Chedra microstigma* (Walsingham) from specimens determined as *cuniculator* Busck, a synonym. Both specimens reared from *Cyperus laevigatus*; Kewalo, Oahu. The top specimen is on BM slide 14304; the bottom specimen is on Busck's slide 176.

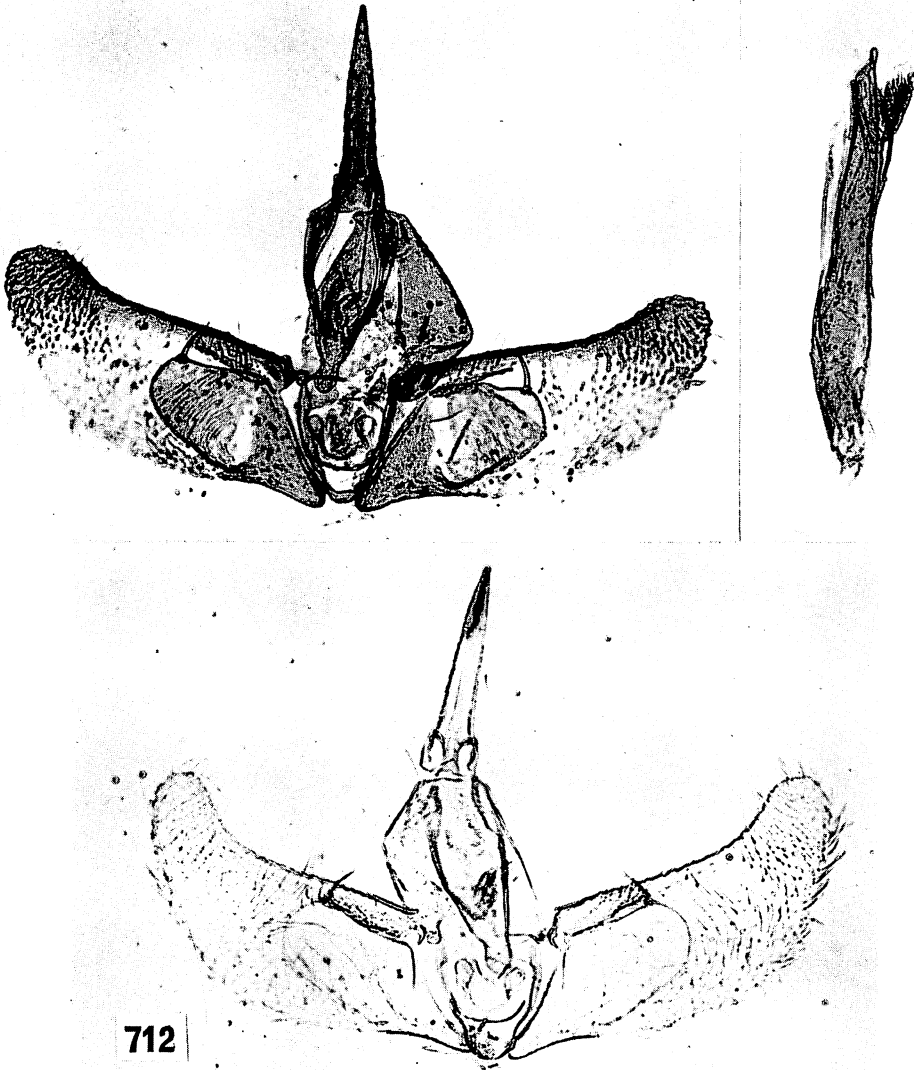


Figure 712—Male genitalia of *Chedra mimica* Zimmerman. Top specimen is a paratype from a former paratype of *microstigma* Walsingham from Kaawaloa, Kona, over 2,000 feet, Hawaii (BM slide 14303). Bottom specimen, the holotype (BM slide 2240), from a former paratype of *microstigma* from Kona, above 2,000 feet, Hawaii. Note the concave costae of the valvae and acuminate uncus, and compare the same of *microstigma* in figure 711.

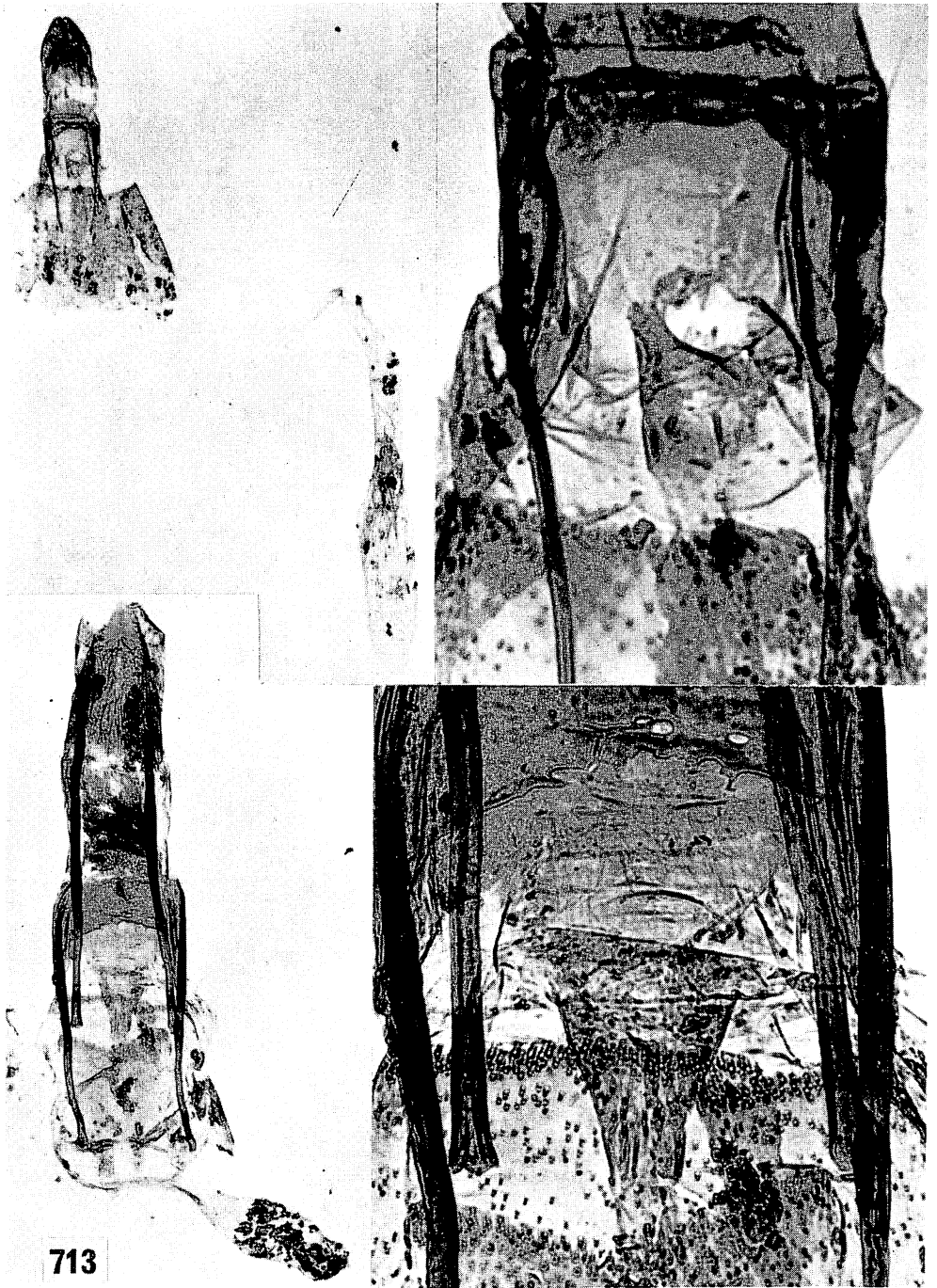


Figure 713—Female genitalia of *Chedra*. Top, *microstigma* (Walsingham) from a specimen determined as *culicator* Busck; Kewalo, Oahu; ex *Cyperus laevigatus* (BM slide 14302). Bottom, *Chedra mimica* Zimmerman, paratype (slide Z-II-14-67); Kolekole Pass, Oahu; ex heads of *Eragrostis*. The abdomens of both specimens appear to be partly decomposed. Note the difference in the breadths of the sclerotized areas connecting the caudal ends of the anterior apophyses.

Holotype male (BM slide 2240); Kona, above 2,000 feet, Hawaii, September, 1892, Perkins; Walsingham specimen number 25349. Allotype female (BM slide 5287); Kona, 4,000 feet, 8 September 1892, Perkins; Walsingham specimen number 25569. One female paratype, Kona, 4,000 feet, Hawaii, 8 September 1892, Perkins; Walsingham specimen number 25562. One male paratype (BM slide 14303), Kaawaloa, above 2,000 feet, Kona, Hawaii, September 1892; Walsingham specimen number 25668. (The foregoing specimens are in the British Museum.) Two female paratypes (in the Bishop Museum) reared "ex heads of *Eragrostis*" grass at Kōlekole Pass, Oahu, 10 April 1927, O.H. Swezey (one of these with genitalia on slide Z-II-14-67). One female paratype with the same data but labeled "*Eragrostis*" (instead of "ex heads of *Eragrostis*") and from the Meyrick collection in the British Museum.

Known distribution: Oahu and Hawaii.

Immigrant? Possibly a North American species.

Hostplant: *Eragrostis* grass; the larvae bore in the stems? and flower heads.

Genus **BATRACHEDRODES** Zimmerman, **new genus**

Head as in figure 706; ocelli absent; antennae about three-fourths as long as forewing, simple, without a distinct pecten on first segment or with only a single bristle; labial palpi as figured, long, upturned, sickle shaped; maxillary palpi minute or rudimentary; proboscis well developed, squamose. Scaling of head and thorax smooth; squamae of face extending laterally over edges of eyes. Wing shape and venation as in figure 706. Legs with hind tibiae with abundant slanting erect hairs along dorsum and with a tuft of long hair-scales from apices; tarsi without any obvious spines protruding above the squamae of the ventral surfaces. Genitalia as in figures 717-724. Larvae feed among fern sporangia.

Type-species: *Batrachedra syrraphella* Walsingham.

Although the species of this group bear a superficial resemblance to some *Batrachedra*, they form an endemic generic segregate. The genitalia are quite distinct from those of the type-species of *Batrachedra*, *praeangusta* (Haworth) (figure 707). Walsingham at first considered them to be distinct, but he changed his mind and published them as *Batrachedra* in *Fauna Hawaiiensis*. However, none of the American *Batrachedra* that I have examined has genitalia like those of the Hawaiian group.

The female genitalia are extraordinary delicate so that the preparation of satisfactory dissections is difficult. This is especially true when the abdomens are decomposed as appears to be the situation with some of the specimens I have studied.

The supposed distribution of the species of *Batrachedrodes* is peculiar, and it appears that there is some confusion in this regard. I have not studied enough specimens to be able to confirm or deny the supposed distribution. Four of the seven described species are said to occur on two or more islands, but no species has been recorded from Kauai or Lanai where surely there are species. Four species have been recorded from Oahu, but all four of them have also been listed from other islands. One species is recorded only from Molokai,

one only from Maui, and one only from Hawaii. Obviously, we know little about the distribution of these small moths, and I cannot guess as to how many species may exist in Hawaii. I regret that the material I have seen is inadequate to make possible a proper study of the group.

The larvae have the interesting habit of living among the sporangia of *Asplenium*, *Elaphoglossum*, *Aspidium*, *Dryopteris*, and perhaps other genera of ferns and they are protected by a webbing. Detailed study of the habits of the group is recommended.

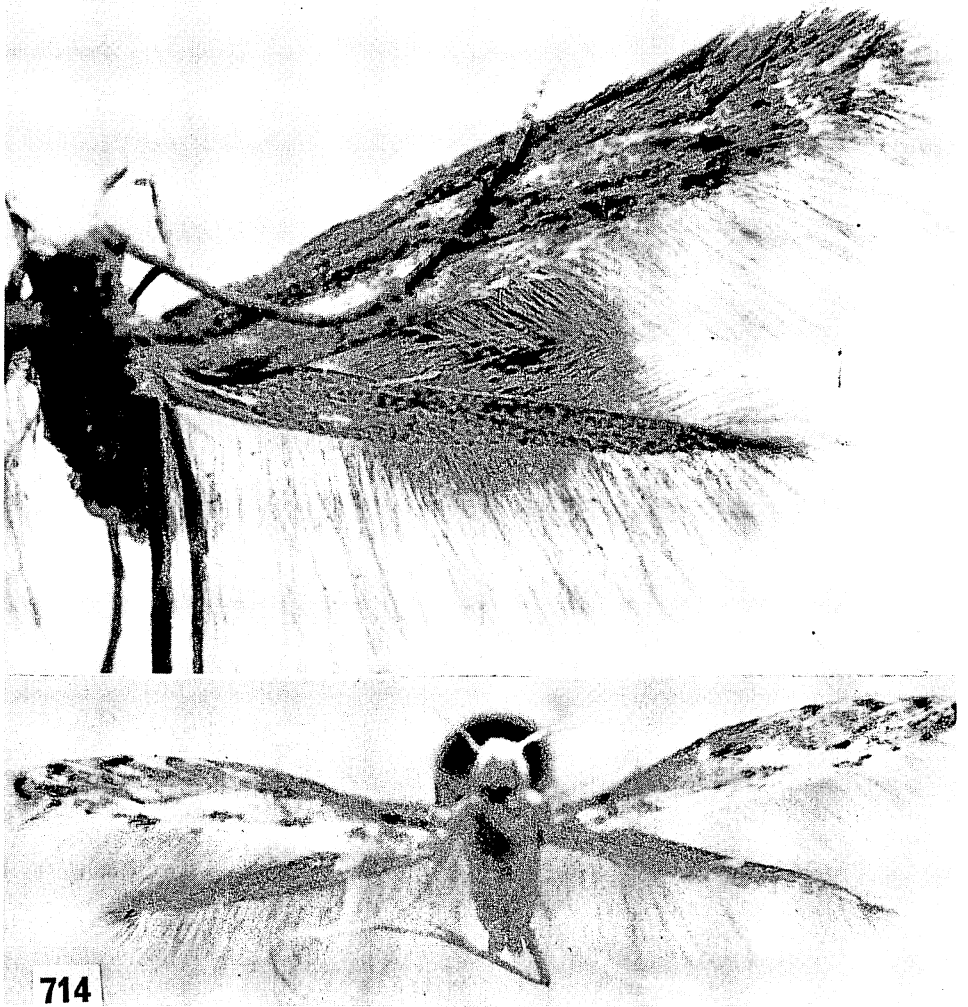


Figure 714—*Batrachedrodes*. Top, *bedelliella* (Walsingham), holotype male (BM slide 4206); Haleakala, 5,000 feet, Maui; forewing 4 mm. Bottom, *ephelus* (Walsingham), holotype male (BM slide 4203); Molokai, above 3,000 feet; expanse 10 mm.



The pupa is enclosed in a dense, parchmentlike, canopylike cocoon spun against the undersides of the fern pinnae. The abdominal tergites of the pupae have long, erect bristles; the wing sheaths extend on the sixth abdominal sternite; and the antennal sheaths reach to about the apex of the abdomen or a little beyond. The labial palpi and the profemora are exposed. It appears that the maxillary palpi are also exposed, but the material available for study is inadequate to make a positive decision. The antennae extend only slightly beyond the apices of the metatarsi, and they are separated from each other for their entire lengths on *lomentella* and *sophroniella* (the only material seen). The exposed parts of the mesothoracic spiracles are narrow and elongate and appear to be joined more to the prothorax than to the mesothorax. The cauda has a medial ventral process (appearing to be a pair of processes fused) which is armed on each side with a prominent cluster of six or seven hooked setae that radiate laterad.

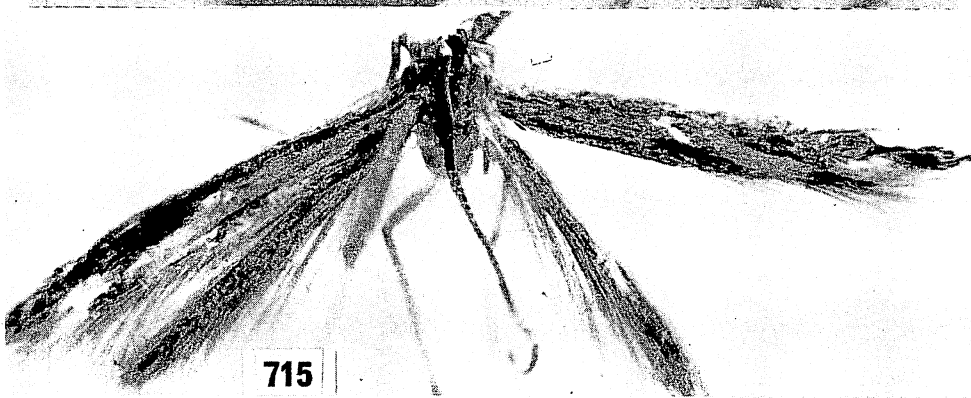
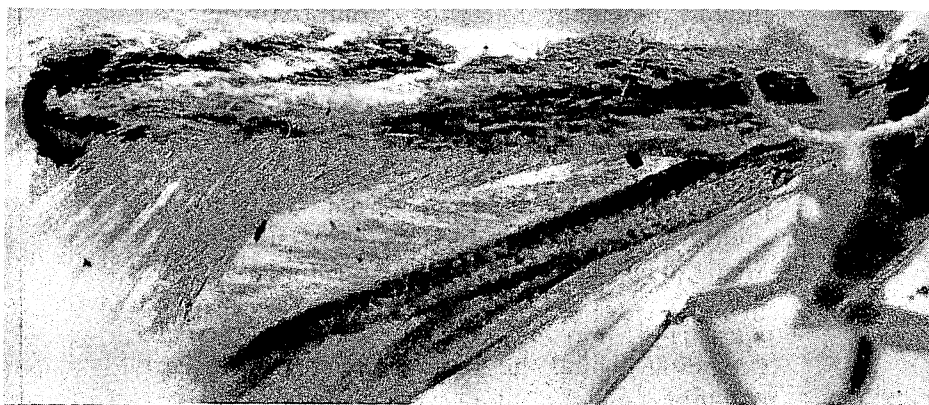


Figure 715—*Batrachedrodes*. Top, *lomentella* (Walsingham), holotype male (BM slide 4227); Waianae Mts., about 2,000 feet, Oahu; forewing 3.75 mm. Bottom, male holotype (BM slide 4207) of *ruficiliata* Walsingham, now a synonym of *sophroniella* (Walsingham); Kona, over 2,000 feet, Hawaii; right wing 4 mm.

## KEY TO THE SPECIES OF BATRACHEDRODES

1. Hindwing of male with a subcostal brush; uncus bifid . . . 2  
    Hindwing of male without a subcostal brush; uncus  
    bifid or trifid . . . . . 4
- 2(1). Gnathus reduced to an isolated, small lobe on either  
    side; forewings with a pattern of brown and fuscous  
    maculae on a cream-colored background, as in  
    figure 714 . . . . . **ephelus** (Walsingham).  
    Gnathus longlobed and with a "bridge" between the  
    lobes so that it is somewhat H-shaped . . . . . 3
- 3(2). Fore- and hindwings nearly concolorous fuscous;  
    fringes dark; hind tibiae and tarsi almost entirely  
    fuscous above; figure 714 . . . **bedelliella** (Walsingham).  
    Forewings basically cream-colored and with numerous  
    fuscous maculae; hindwings comparatively pale  
    fuscous; all fringes pale or white; hind tibiae and  
    tarsi pale cream or white with conspicuous fuscous  
    diagonal maculae; figure 716 . . . . .  
    . . . . . **syrraphella** (Walsingham).
- 4(1). Uncus bifid; posterior marginal areas of forewings  
    broadly cream-colored or pale from base to beyond  
    middle and without any fuscous maculae in that  
    area and no dark scaling behind the fold, as in figure  
    716 . . . . . **supercincta** (Walsingham).  
    Uncus trifid; forewings with some dark maculae  
    extending behind the fold and reaching, or nearly  
    reaching, hind margin of wing on basal half . . . . . 5
- 5(4). Forewings with almost entire area from base to middle  
    with dark scaling, as in figure 715, and without  
    any medial pale vitta from base . . . . .  
    . . . . . **lomentella** (Walsingham).  
    Forewings with a conspicuous pale (yellow and cream)  
    medial vitta extending from base to near apex, as  
    in figures 715, 716 . . . . . **sophroniella** (Walsingham).

**Batrachedrodes bedelliella** (Walsingham), **new combination** (figs. 714, moth; 717, male genitalia).

*Batrachedra bedelliella* Walsingham, 1907b:509, pl. 15, fig. 9.

Endemic. Oahu, Molokai, Maui (type locality: Haleakala 5,000 feet), Hawaii.

Hostplants: the larvae feed among the sporangia of *Asplenium nidus* and *Elaphoglossum reticulatum*.

I have not examined specimens from all four islands from which this species has been recorded, and I am unable to comment upon the recorded distribution. The species was described from five specimens from Maui and Molokai.

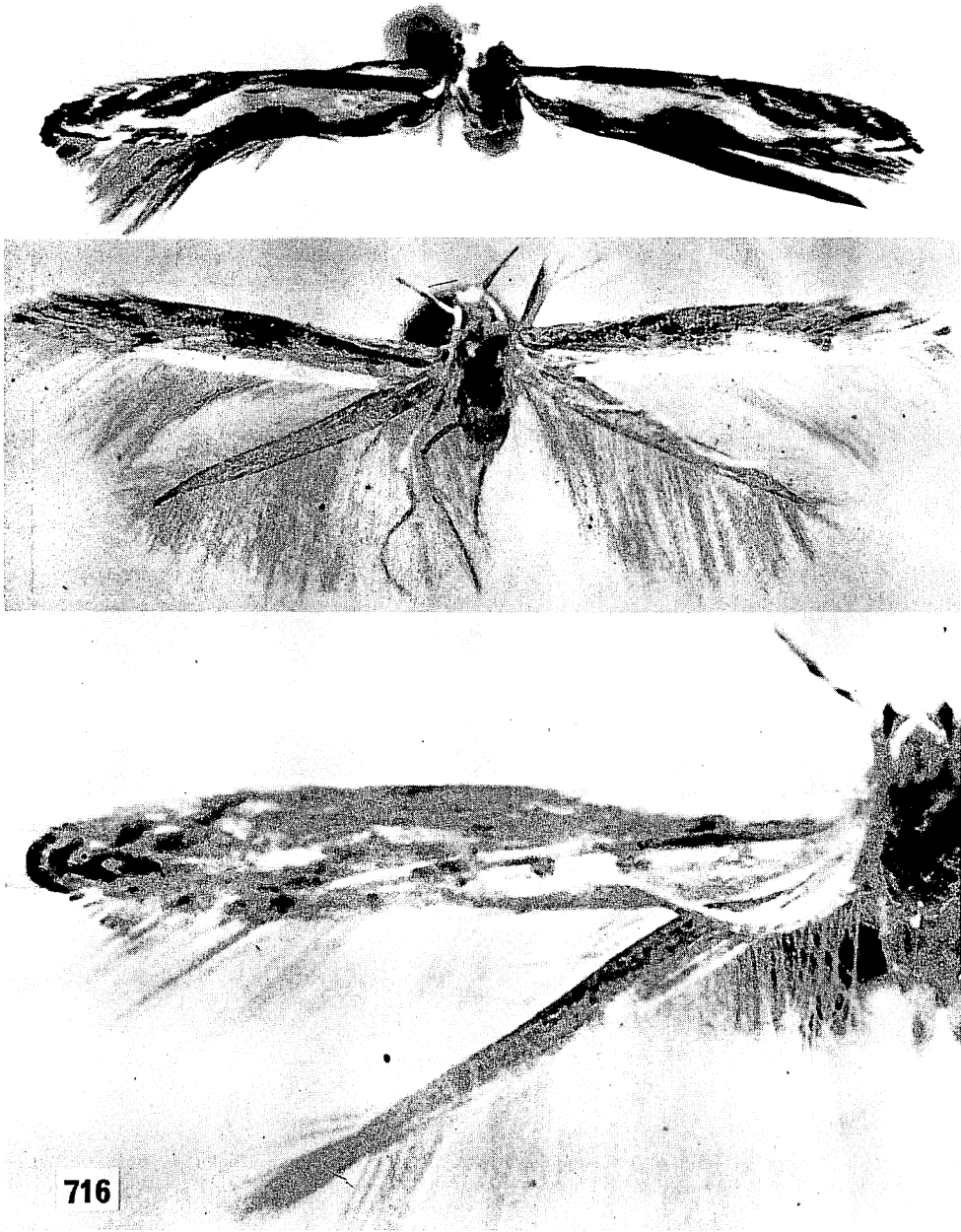


Figure 716—*Batrachedrodes*. Top, *sophroniella* (Walsingham), holotype female; near head of Kawailoa Gulch, Oahu; expanse 10 mm. Middle, *supercincta* (Walsingham), holotype male (BM slide 4226); Haleakala, 5,000 feet, Maui; forewing 3.75 mm. Bottom, *syrphella* (Walsingham), holotype male (BM slide 4228); Waianae Mts., 2,000 feet, Oahu.

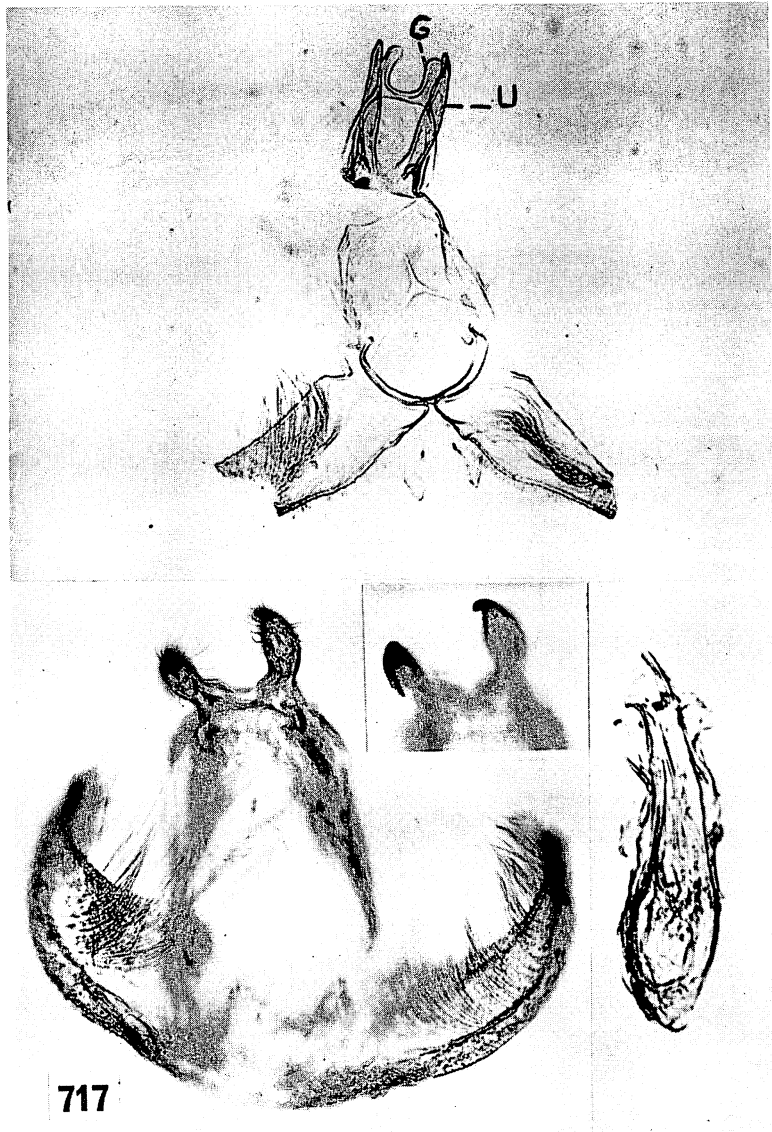


Figure 717—Male genitalia of *Batrachedrodes*. Top, *bedelliella* (Walsingham), holotype (BM slide 4206); Halcakala, 5,000 feet, Maui. The valvae are damaged and the aedeagus lost. The gnathus (*G*) is bent up between the arms of the uncus (*U*) and is viewed from below in this figure. Below, *ephelus* (Walsingham), holotype (BM slide 4203); Molokai, above 3,000 feet. The mount is not flattened, and most of the specimen is out of focus. The small inset figure is a different focus on the uncus. The gnathus is reduced to a small lobe on each side. Although I cannot see any evidence of damage, it is possible that the gnathus has been broken away and only the two stumps remain.

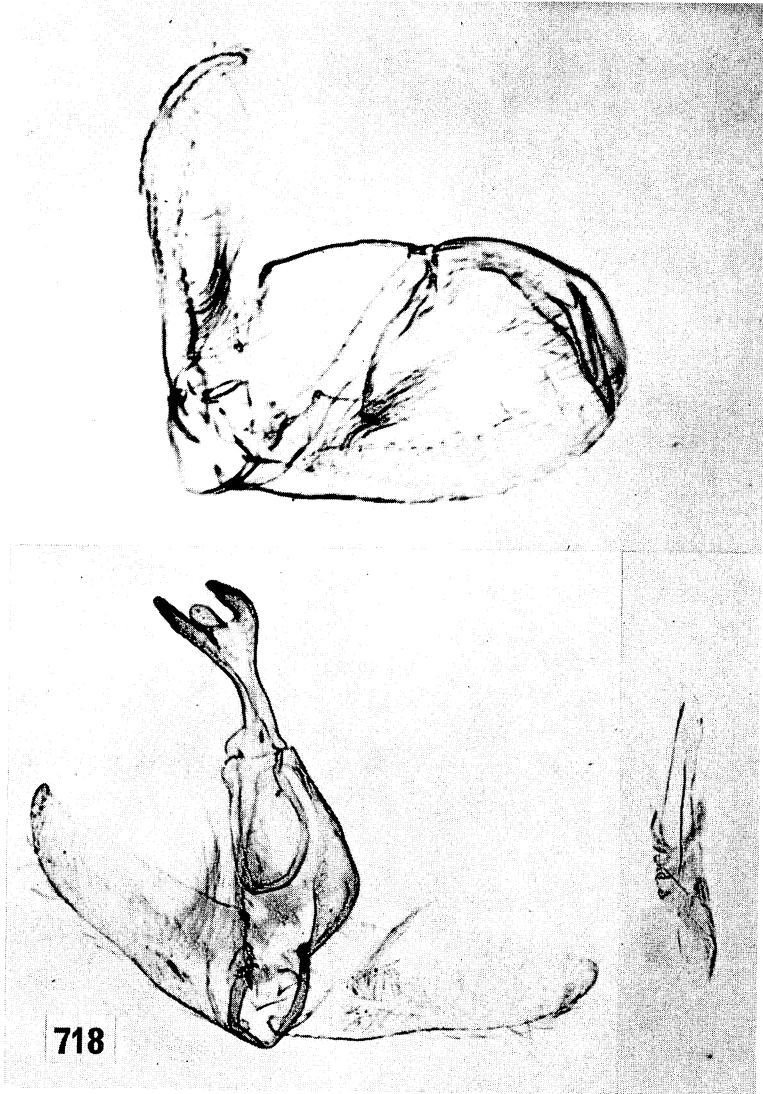


Figure 718—Male genitalia of *Batrachedrodes*. Top, *lomentella* (Walsingham), holotype (BM slide 4227); Waianae Mts., above 2,000 feet, Oahu. This is a poor mount. The genitalia resemble those of *sophroniella*; compare figure 719. Bottom, *sophroniella* (Walsingham), from the holotype of the synonymous *ruficiliata* Walsingham (BM slide 4207); Kona, over 2,000 feet, Hawaii. The figure of the aedeagus is not altogether satisfactory and may be misleading.

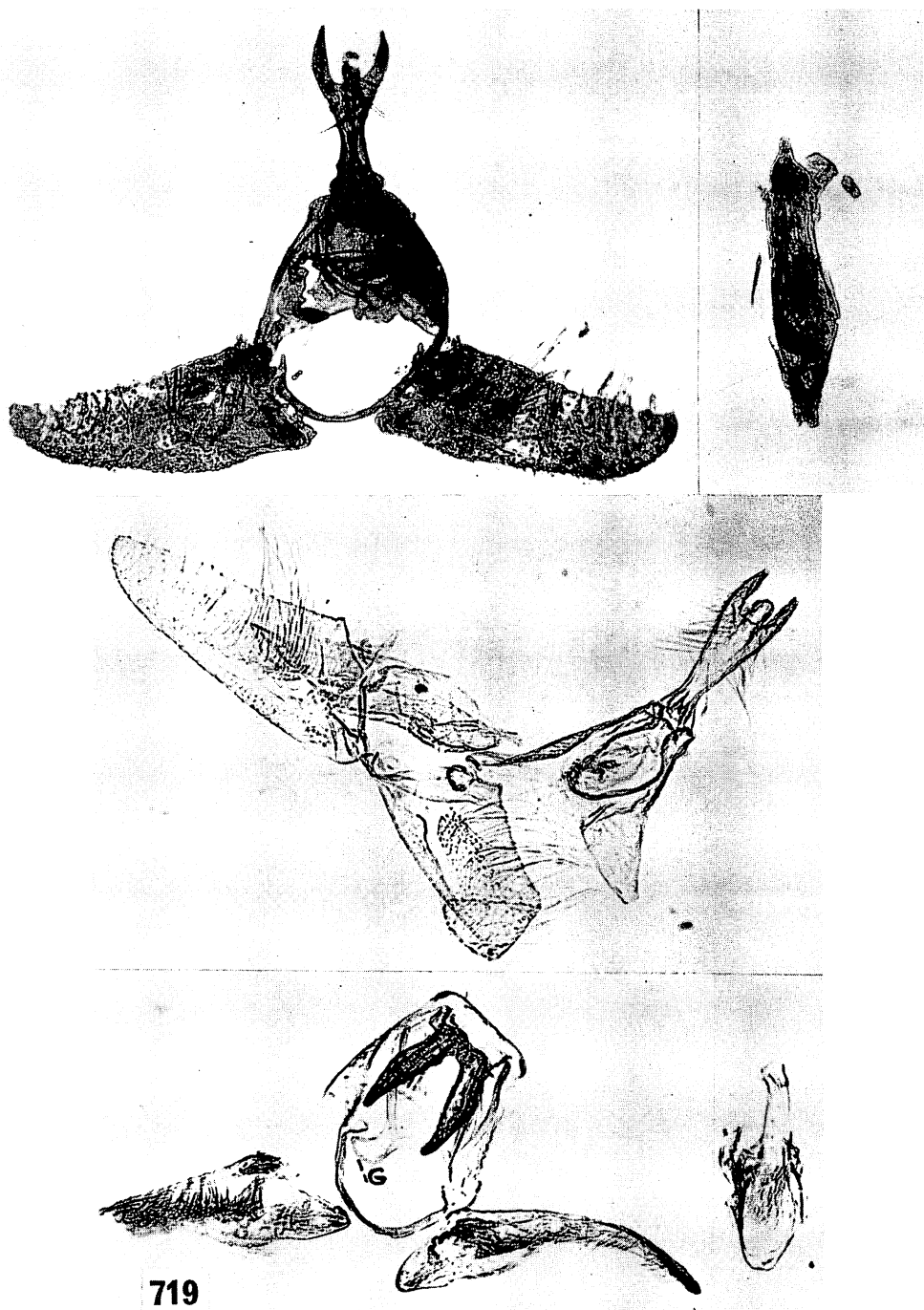


Figure 719—Male genitalia of *Batrachedrodes*. Top, a paratype of *lomentella* (Walsingham) (BM slide 14293); Waianae Mts., about 2,000 feet, Oahu; abdomen decomposed. Middle, *sophoniella* (Walsingham) (Busck slide 177); Mt. Tantalus, Oahu. Bottom, *supercincta* (Walsingham), holotype (BM slide 4226); Haleakala, 5,000 feet, Maui. The valvae have been damaged. Note the median projection on the gnathus (G).

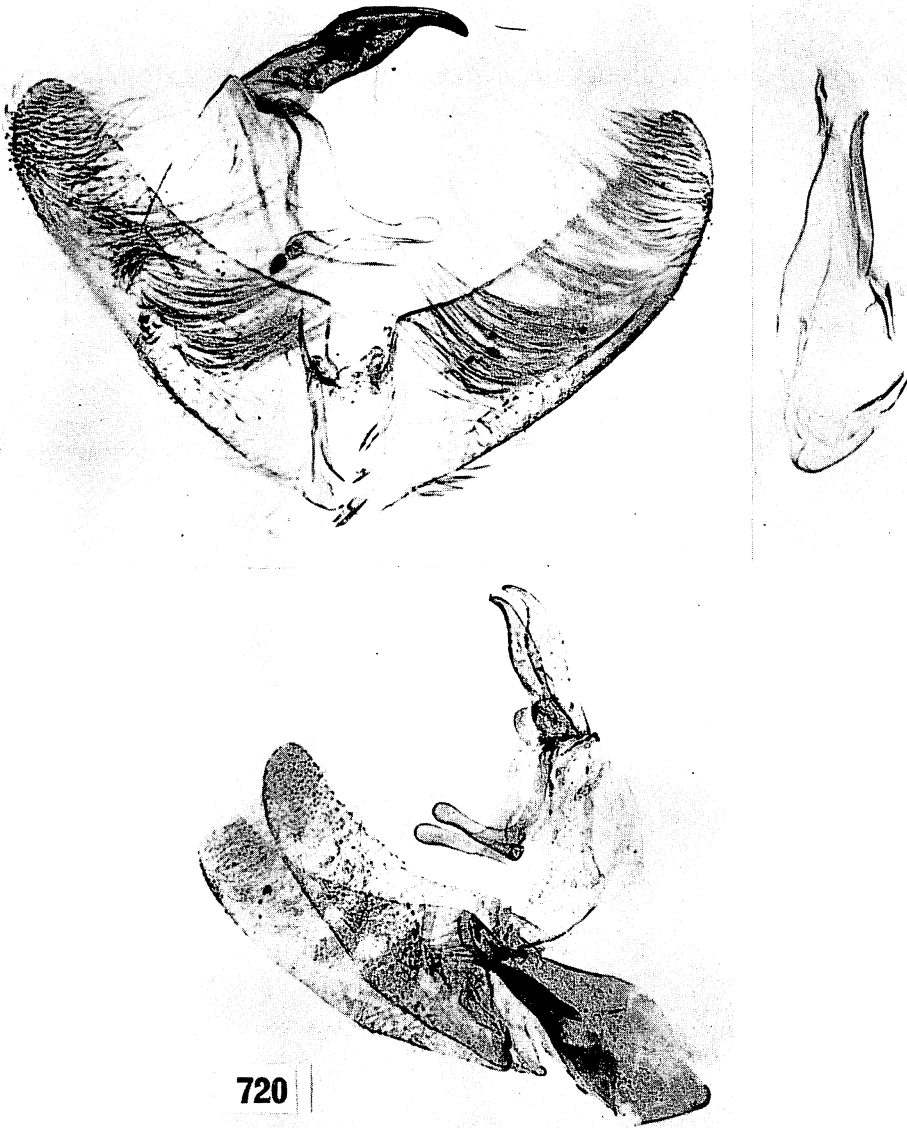


Figure 720—Male genitalia of *Batrachedrodes syrraphella* (Walsingham). Top, the holotype (BM slide 4228); Waianae Mts., about 2,000 feet, Oahu. Bottom, a paratype from Oahu, in lateral view (Busck slide 250) with aedeagus in situ. Compare figure 721.

***Batrachedrodes ephelus*** (Walsingham), **new combination** (figs. 714, moth; male genitalia; 722, female genitalia).

*Batrachedra ephelus* Walsingham, 1907b:509, pl. 15, fig. 8.

Endemic. Molokai (type locality: male, over 3,000 feet; female, 4,500 feet).

Hostplant: unknown, but presumed to be a fern.

This moth is known only from the type pair.

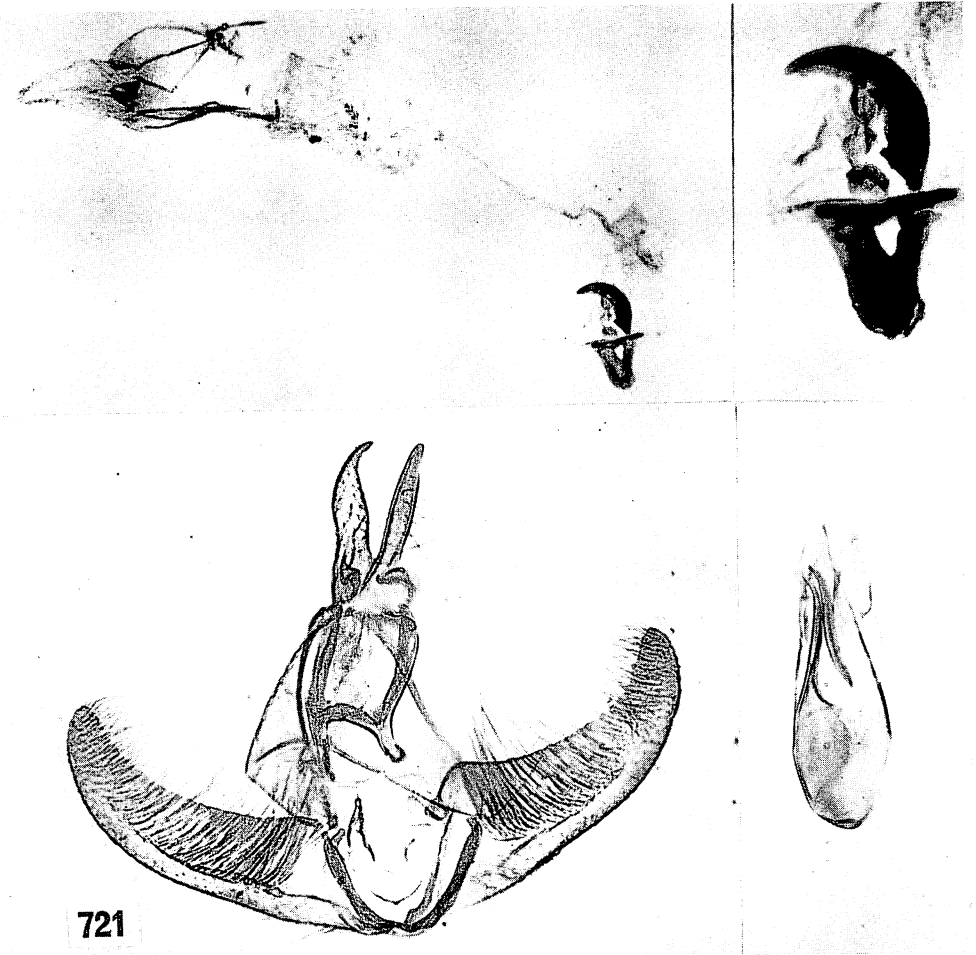


Figure 721—*Batrachedrodes syrraphella* (Walsingham). Top, female genitalia of a paratype (Busck slide 251). The curved piece of the signum has been broken off at the hole in the lower part. Bottom, male genitalia of a paratype (BM slide 2244); Waianae Mts., about 2,000 feet, Oahu. The left arm of the gnathus is partly obscured. Compare figure 720.



**Batrachedrodes lomentella** (Walsingham), **new combination** (figs. 715, moth; 718, 719, male genitalia; 723, female genitalia).

*Batrachedra lomentella* Walsingham, 1907b:511, pl. 15, fig. 13.

Endemic. Oahu (type locality: Waianae Mountains, over 2,000 feet), Hawaii.

Hostplant: described from six specimens found among the dead leaves of an unidentified fern.

This form is very close to *sophroniella*—it has similar male genitalia. It may prove not to be a different species.

**Batrachedrodes sophroniella** (Walsingham), **new combination** (figs. 708, pupa; 715, 716, moth; 718, 719, male genitalia; 723, female genitalia).

*Batrachedra sophroniella* Walsingham, 1907b:511, pl. 15, fig. 14.

*Batrachedra ruficiliata* Walsingham, 1907b:510, pl. 15, fig. 12. **New synonym.**

Endemic. Oahu (type locality: near head of Kawailoa Gulch), Maui, Hawaii (type locality of *ruficiliata*: Kona, above 2,000 feet).

Hostplant: *Aspidium* (*Dryopteris*) *cyatheoides*.

Parasites: *Eupelmus* species, *Sierola timberlakei* Fullaway.

This moth was described as *sophroniella* from one female, and as *ruficiliata* from one male. Although the holotype of the latter is a faded, partly abraded specimen, its color pattern agrees with other examples of *sophroniella*, and its genitalia are the same. Hence the name *ruficiliata* is placed in synonymy. I have compared specimens reared from ferns by Dr. Swezey with the holotype of *sophroniella* and have found them to be the same.

The larvae, protected by a web, feed, at times abundantly, upon the sporangia of the hostplant. "When there are no more sporangia, they feed on the undersurface of the frond, eating away the parenchyma and leaving the upper epidermis which then shows as dead spots. Pupation takes place within a cocoon alongside of the midrib of a pinna." (Swezey, 1922:58.)

**Batrachedrodes supercincta** (Walsingham), **new combination** (figs. 716, moth; 719, male genitalia; 724, female genitalia).

*Batrachedra supercincta* Walsingham, 1907b:510, pl. 15, fig. 11.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown, but fern presumed.

Only the holotype and allotype have been seen.

**Batrachedrodes syrrophella** (Walsingham), **new combination** (figs. 706, head, wing venation; 716, moth; 720, 721 (male, female genitalia).

*Batrachedra syrrophella* Walsingham, 1907b:509, 734, pl. 15, fig. 7.

Endemic. Oahu (type locality: Waianae Mountains, about 2,000 feet), Hawaii.

Hostplant: *Dryopteris parasitica*.

The larvae make tubes of white silk among the sporangia upon which they feed. More specimens of this species have been seen than any other of the genus. It has been found in both of the mountain ranges of Oahu, and I presume that it is much more widely distributed than the meager records indicate.

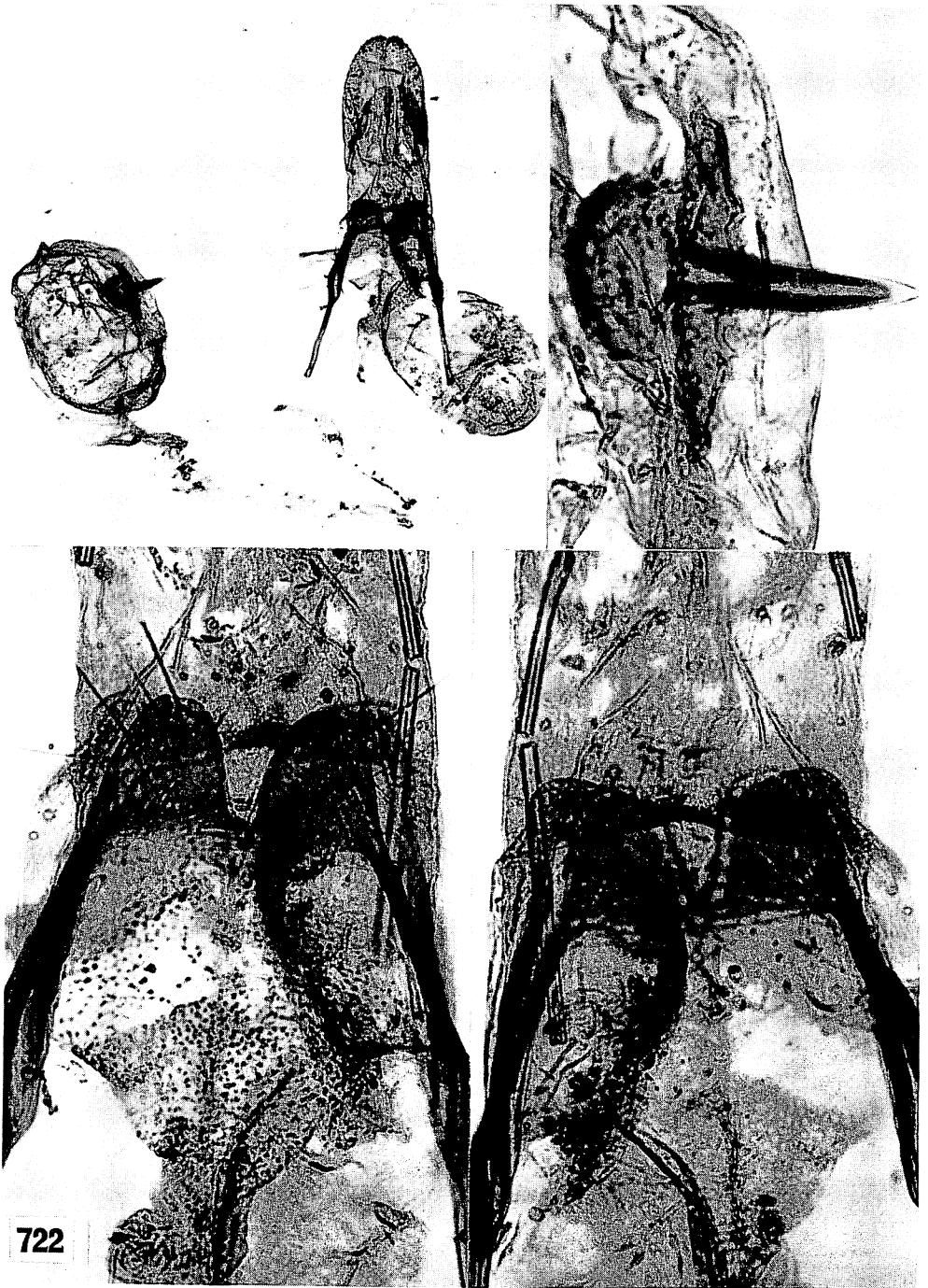


Figure 722—*Batrachedrodes ephelus* (Walsingham), genitalia of the allotype female (BM slide 14305). Bottom, the left figure is dorsal and the right, ventral.



Figure 723—Female genitalia of *Batrachedres*. Top left, part of the allotype (BM slide 14294) of *lomentella* (Walsingham); Waianae Mts., about 2,000 feet, Oahu. The abdomen was badly decomposed. Top right and two bottom figures are of a specimen of *sophoniella* (Walsingham) (BM slide 14296); Pauoa, Oahu; ex *Aspidium cyatheoides*. Bottom left is the signum; bottom right is the ostium. The abdomen was decomposed.

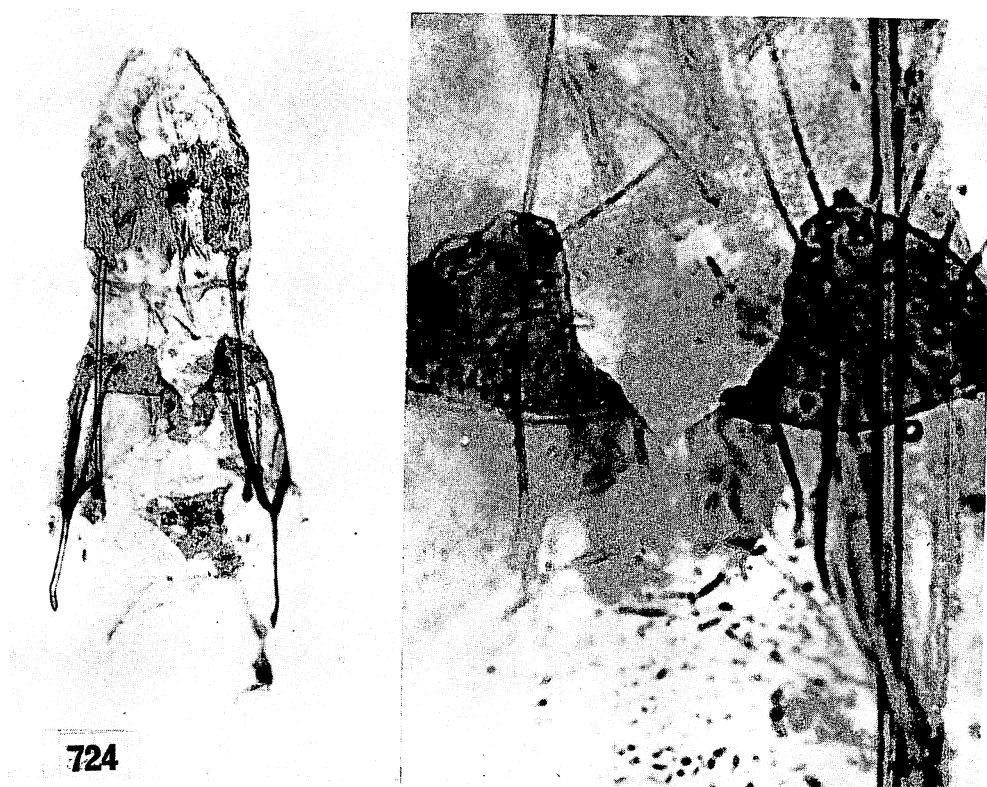


Figure 724—*Batrachedrodes supercincta* (Walsingham), part of the genitalia of the allotype female (BM slide 14295); Haleakala, 5,000 feet, Maui.

Subfamily **COSMOPTERIGINAE** (Wocke), **revised status**

*Cosmopterygidae* Wocke, in Heinemann and Wocke, 1876 (1877):520. Meyrick, 1909b:410. Busck, 1912:1. T. B. Fletcher, 1928a, Indian fauna.

*Cosmopteryginae*: Walsingham, 1891:124, of Tineidae. Spuler, 1898a:32, of Lavernidae.

*Cosmopterigidae, auctororum*. Diakonoff, 1954b:63, key to New Guinea genera. Hodges, 1962b:1, revision of North American fauna; 1966b:155. Common, 1970:822, details on Australian fauna.

*Cosmopteriginae*: Riedl, 1969:651.

*Lavernidae*: in the sense of Walsingham, 1890:147, and Busck, 1909:93.

*Diplosaridae* Meyrick, 1915a:339; 1919b:351–372. Hampson, 1918:386, as a synonym of Hyposmocomidae.

*Hyposmocomidae* Hampson 1918:386. Brues and Melander, 1932:233. Brues, Melander and Carpenter, 1954:261. **New synonym.**

*Hyposmocomini*: Handlirsch, 1924:888. **New synonym.**

Some authors have included the cosmopterigines in the “Mompidae”, others have assigned them to the Lavernidae, and Walsingham, for reasons unknown, placed them in the “Hyponomeutidae” in *Fauna Hawaiiensis*. Hampson’s name Hyposmocomidae is only an invalid replacement name for Meyrick’s Diplosaridae which is a synonym of Cosmopteriginae. Meyrick always referred to the Hawaiian members of the group as “Diplosaridae” which he kept separate from the “Cosmopterigidae”. (See the quotation from Meyrick under *Irenicodes* below).

The reason for the use of the spelling Cosmopteriginae instead of the more correct Cosmopteryginae is as follows: The type-genus was originally spelled *Cosmopterix* by Hübner because of incorrect transliteration, and under Article 32a(ii) of the Code of Nomenclature, this is the correct original spelling. Zeller (1839) emended it to the correctly transliterated form *Cosmopteryx*, but under the Code this correction is not now allowed. I consider it unfortunate that the more correct form *Cosmopteryx* is not accepted. See also Hodges, 1966b:155–156, regarding the designation of a type-species for *Cosmopterix* and related problems.

The Cosmopteriginae is the largest family-group of Hawaiian Lepidoptera and one of the largest of all groups of organisms in Hawaii. It is poorly understood the world over. The more than 350 Hawaiian species included here exceed the combined total of 168 Hawaiian Macrolepidoptera reported in my seventh volume and the 226 Hawaiian Pyraloidea listed in my eighth volume of *Insects of Hawaii*. It is probable that the number of Hawaiian Cosmopteriginae exceeds 500 species. A large number of species in collections remains to be described, and untold numbers of uncollected new forms must exist on all of the islands. This extraordinary development of the Cosmopteriginae in such a small land area (about 6,440 square miles) is a great contrast to the cosmopterigine fauna of America north of Mexico. Hodges, in his 1962b American revision, records only 67 species in 10 genera from that vast region, and the largest genus, *Cosmopterix*, includes only 28 species as compared with more than 350 species for the largest genus in Hawaii. One could spend a long lifetime studying this one subfamily in Hawaii and not exhaust the

possibilities of interesting, highly exciting, and worthwhile research. I regret most sincerely that, because of frustrating difficulties beyond my control, I am unable to pursue the study of this family in Hawaii as my experience dictates that it should be followed. I realize more than any other person how inadequate is my introduction to this astounding Hawaiian complex of complexes.

A concise description of the Cosmopteriginae is difficult because the group is so large and diverse. A study of the illustrations, especially those of the genitalia, will reveal the essential features of the group. In Hawaii, the following combination of characters will enable members of this subfamily to be separated from all others in the islands:

Head and pronotum smooth scaled, the scales often broad; ocelli absent; proboscis well developed, squamose; maxillary palpi present, usually rather short; labial palpi upcurved in front of face, variable in shape, often long and slender, never with erect, specialized bristles; antennae varying from about three-fourths of the length of the forewings to about as long as the forewings, first segment with or without a pecten of several setae. Legs variable. Wings with shape and venation variable, as in figures; forewings with 9 to 12 veins, vein 7, when present, runs to costa or occasionally to apex but never to termen; hindwings not broader than forewings and often much narrower than forewings, the apex not produced in the Hawaiian species, venation variable, costal contour variably arcuate but not irregular and not lobed. Abdominal tergites without setose bands. Male genitalia as illustrated, uncus evidently lost in most species and the gnathus (or gnathus and socii?) developed into asymmetrical arms that may appear uncuslike; lobes of anellus developed, often asymmetrical and in some forms the right arm may be reduced and only the left arm evident; valvae variable, often asymmetrical and often armed with extraordinary, modified setae and processes. Female genitalia with the ostium often heavily sclerotized and protuberant, evidently retractile in some species and long and tubelike in others. (Note: for simplification, and because

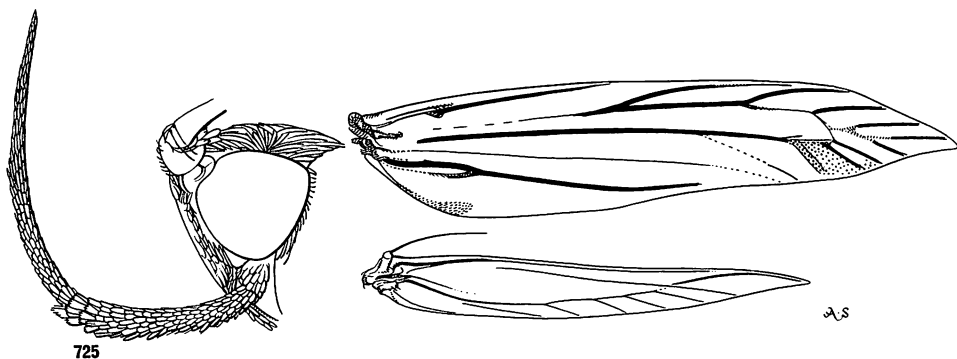


Figure 725—Head and wing venation of *Trissodoris honorariella* (Walsingham) from the holotype male from Pitcairn Island (BM slide 9610). The dots at the end of the cell indicate the tuft of specialized, erect, yellow setae on the underside of the forewing of the male.

it appears that the homologies of the ostial area are not completely understood, I have called the *ostium* that which might also be called the *sterigma* or the fused *lamellae antevaginalis* + *lamella postvaginalis*, or the *lamellae vaginales*.)

The identification of Hawaiian Cosmopteriginae is difficult. Before attempting determinations in this subfamily, one should become familiar with the morphology of the group by careful and detailed study of illustrations and specimens. Dissections are essential for the determination of most species. Some species are closely similar in external appearance, and, unless extreme care is taken, misidentifications and improper associations can easily be made.

KEY TO THE GENERA OF COSMOPTERIGINAE IN HAWAII

Note: I have placed *Ithome* (Chrysopeleiinae) in this key, because it might be considered a typical cosmopterigine without careful study or a specialist's knowledge.

- 1. Ocelli present (minute; check your specimen carefully); one small, dark-colored species about 7 mm. in expanse; larvae feed in blossoms of *Prosopis* and *Acacia*; figures 701, 702.....  
 .....**Ithome** in the Chrysopeleiinae.  
 Ocelli absent, Cosmopteriginae.....2
- 2(1). Hindwings very narrow, straplike or narrowly blade-like, and/or the cell much attenuated distad, narrowly pointed at apex and discocellulars very short, if distinguishable, as in figures 725, 732-734.....3  
 Hindwings at most moderately narrowed and cell at least moderately broad distad and discocellulars either well developed or absent with cell broadly open at apex, or not as described above.....4
- 3(2). Forewing boldly marked with broad, alternating, pale and dark fasciae, vein 5 from cell near 4 and vein 6 out of 7; hindwing with vein 6 from apex of cell or connate with 7; scaling on posterior, apical corner of basal antennal segment of both sexes extended, thus forming a "notch" with the base of the remainder of the antenna; figures 725, 727, 730.....**Trissodoris**.  
 Forewing without such fasciae, vein 5 out of 8 and distant from 4, vein 7 out of 8 and 6 out of 7; hindwing with vein 6 long-stalked with 7; basal antennal segment lacking such an apical expansion of the scaling; figures 732-736.....**Anatrachyntis**.
- 4(2). Forewing (at least in male, the only sex known) with an extraordinary, thornlike process protruding from the scales on the ventral surface beyond apex of cell (as a modification of vein 3), as in figures 775,

777, cell narrow, venation unusual; hindwing with only seven veins, veins 4 and 5 evidently fused; venation of fore- and hindwings as in figure 775

..... **Hyposmocoma (Euperissus) sordidella** (Walsingham).

Forewing without such an elongate process (but compare figure 776 of *Hyposmocoma (Euperissus) mystodoxa*) and with different venation; hindwing usually with eight fully developed veins except in *Asymphorodes* and a few species of *Hyposmocoma*.....5

5(4). Venation unusual, differing in the two sexes, as in figures 745 and 746; hindwing with vein 8 obscure or reduced or with only seven or fewer veins; forewing with vein 3 leaving cell opposite to a point between origins of veins 10 and 11; male genitalia as in figures 749-752, with vinculum well developed and elongate, thus the valvae are articulated far from base of tegumen; right anellar lobe obsolete, the left lobe developed but adhering closely to aedeagus; forewings of known species brown with white or cream-colored vittae, as in figure 748; the moths rest with antennae extended forward in front of body

..... **Asymphorodes.**

Venation different from above, as in figures 758-774 and 807-866; hindwings usually with eight distinct veins; forewings with vein 3 leaving cell opposite to a point between veins 9 and 10, often near apex of cell; male genitalia different from figures 749-752, and with vinculum rudimentary or obsolete and the valvae apparently articulated to base of tegumen; both anellar lobes fully developed and free; forewings of many colors and patterns; the moths rest with antennae extended caudad.....

..... **Hyposmocoma.**

Genus **TRISSODORIS** Meyrick

*Trissodoris* Meyrick, 1914a:775 (the page number is incorrectly stated by Neave, 1940:568, to be 776). Type-species: *Stagmatophora honorariella* Walsingham, 1907b:515, by original designation.

Although only two species were previously assigned to this genus, we know that there are several distinct new species on various islands from southeastern Polynesia westward. It is possible that *Trissodoris* is a synonym of an earlier name, but studies of the problems involved have not been completed.



The larvae mine the leaves of *Pandanus*, in which they make characteristic "keyholes". Although most of the reared material seen has come from dead leaves, Dr. Swezey found a new species mining green *Pandanus* leaves when we were collecting together in Samoa in 1940.

Bradley (1957:30) described a form which he called *Trissodoris honorariella* subspecies *pansella* from Rennell Island (off the southern Solomon Islands). Although it is closely similar to *honorariella*, I believe that the differences exhibited by this form, such as the difference in the right brachium for example, demonstrate that the moth is a full species. It should be known as *Trissodoris pansella* Bradley, **new status**. Only one male of *pansella* is known, but it appears that the patch of specialized setae on the underside of the forewing differs from that of *honorariella*.

The species that was formerly called *Stagmatophora? sordidella* Walsingham is here transferred to *Hyposmocoma*.

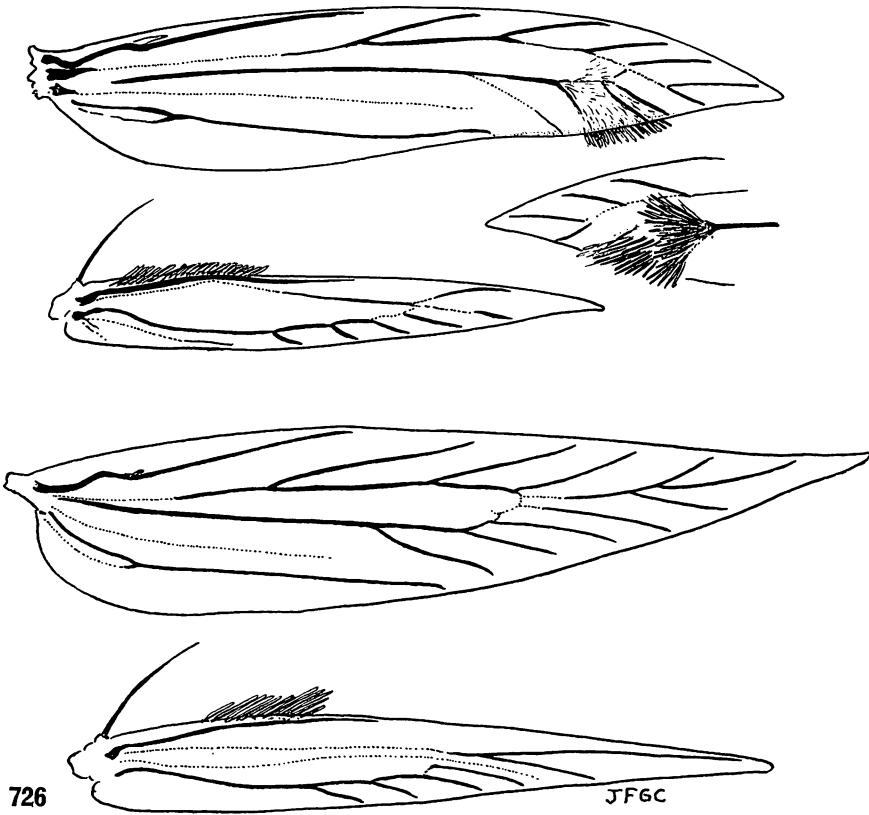


Figure 726—Top, wing venation of *Trissodoris honorariella* (Walsingham) with an inset of the underside of the apex of the forewing of the male to show the tuft of erect hair, setae, and scales. Bottom, wing venation of *Stagmatophora heydeniella* (Fischer von Roeslerstamm), the type-species of *Stagmatophora*, in which genus *honorariella* was originally described in *Fauna Hawaïensis*.

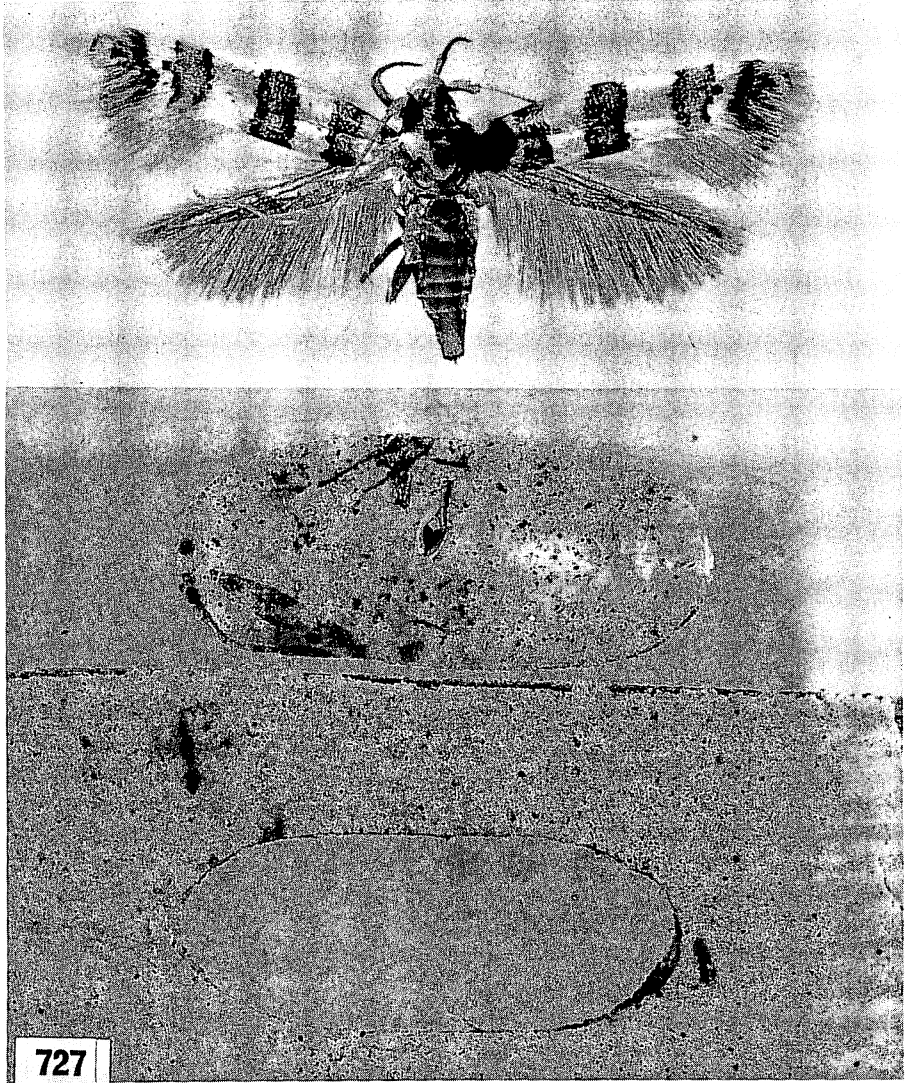


Figure 727—*Trissodoris honoraieiella* (Walsingham). Top, a female from Laie, Oahu; forewing 6 mm.; the background scaling of the forewings is creamy white, the inner areas of the fasciae are brownish yellow, and their edges are fuscous. The dorsal squamae of the abdomen are peculiar. The scales are deeply divided into sharp points so that it appears that the abdomen is clothed with dense yellow spines. Middle, pupal case. Bottom, part of a *Pandanus* leaf showing a typical hole from which a pupal case has been removed by a larva. Length of the pupal case is 12.5 mm.; the hole near its middle is a pinhole. Specimens from Oahu.

**Trissodoris honorariella** (Walsingham) (figs. 725, 726, head, wing venation; 727, moth, pupal case; 728, 729, male genitalia; 730, female genitalia, underside male moth; 731, pupa).

*Stigmatophora honorariella* Walsingham, 1907*b*:515, pl. 15, fig. 21, male. Perkins, 1913:clxv.

*Trissodoris honorariella* (Walsingham) Meyrick, 1914*a*:776; 1927*c*:92. Swezey, 1942:212. Clarke, 1965*a*:550, pl. 271 (illustrates the wings, wing venation, head, and genitalia of the holotype which is in the British Museum).

*Stigmatophora quadrifasciata* Walsingham, 1907*b*:516, pl. 15, fig. 22, female. Synonymy by Meyrick, 1914*a*:776.

*Trissodoris quadrifasciata* (Walsingham) Swezey, 1954:146.

The Pandanus leaf perforator.

Kauai, Oahu, Molokai, Maui, Lanai, Hawaii.

Immigrant. Described from Pitcairn Island (type locality of *honorariella*), New Guinea (type locality of *quadrifasciata*), and Hawaii. The first specimens collected in Hawaii were taken by Blackburn on Lanai. The species is supposedly widespread from Ceylon in the west through the New Hebrides, Fiji, and Samoa to Pitcairn and the Marquesas in the east, but it is not recorded from most of the localities in which it occurs. The genitalia of males from Kauai and Oahu agree with those from Hivaoa, Marquesas.

Hostplants: *Pandanus* species.

Parasite: *Eupelmus* (species not determined).

This pretty, boldly marked moth is common and widespread in Hawaii, and I suppose that it may be found throughout the range of its host *Pandanus* in the islands. Its presence is easily detected because of the conspicuous "key hole" perforations its larvae make in dead *Pandanus* leaves. Figure 727 illustrates one of these perforations. The larvae mine the interiors of the dead leaves. When they reach maturity the larvae cut through both upper and lower leaf surfaces which are as smoothly and regularly cut as if by a metal punch. Then the larvae fasten the cut-out sections of leaf together to form their large pupal cases. The cases thus made are usually pulled into the surrounding mined-out interior of the leaf, and this results in clean-cut, ovate holes being made which pass completely through the leaves. Where the moth is common, the dead leaves are frequently riddled with holes.

The habits of this moth have enabled it to be distributed far and wide by the native peoples of the Pacific. These people use the leaves of *Pandanus* for the making of mats, baskets, and other plaited items which for generations have accompanied voyaging islanders, and the moth has thus been widely dispersed by man.

The female genitalia are extraordinary. The ovipositor is armed with a pair of long, slender, serrated, sawlike blades (see figure 730). The caudal parts of the abdomen are strongly sclerotized, and the blades are attached to stout apophyses which are activated by strong muscles. It is obvious that the saws are used to cut into plant tissue, and they must be efficient organs. I have not seen any structure similar to these double saws in other Hawaiian moths

I have studied. I have not seen such organs described, although various moths with cutting or piercing ovipositors of different kinds are known.

The males have a strongly developed, long brush of yellow hairs on the metapleuron beneath the anterior corner of the root of each hindwing, and there is a peculiar patch of erect yellow setae on the underside of each forewing of the male, as shown by figures 726 and 730.

The larvae of *Trissodoris* are unusual and distinctive in the Hawaiian fauna. They are very long and slender and reach a length of about 15 mm. The

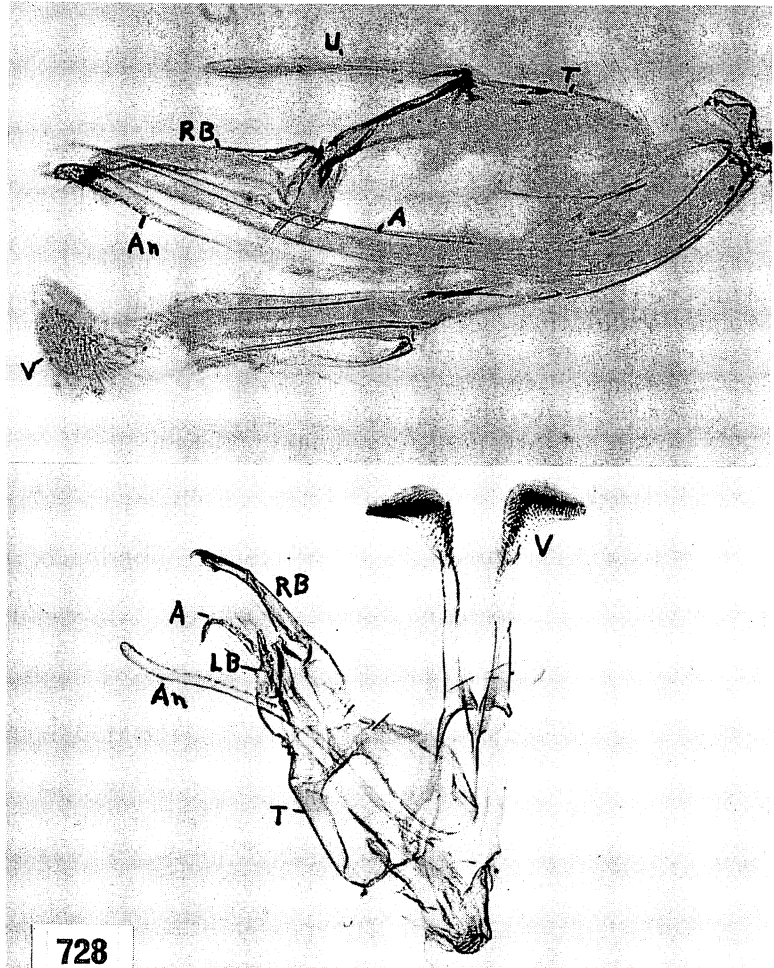
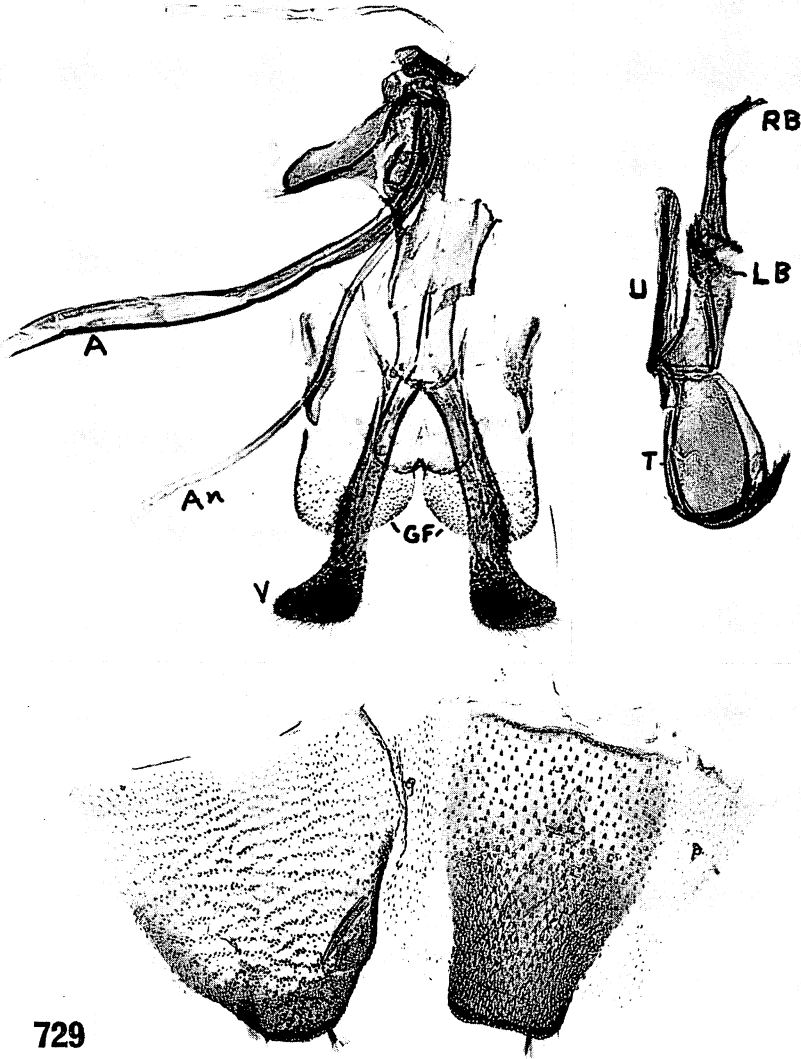


Figure 728—*Trissodoris honorariella* (Walsingham), male genitalia. Top, the holotype from Pitcairn Island (BM slide 9610 Clarke); lateral aspect; aedeagus in situ. Bottom, a specimen from the Marquesas (Busck slide 132); aedeagus removed. *A*, aedeagus; *An*, anellar lobe; *LB*, left brachium; *RB*, right brachium; *T*, tegumen; *U*, uncus.

thoracic segments are notably broader than the abdominal segments; the mesothorax is the broadest segment. A particularly noteworthy character is that the ventral proleg-bearing abdominal segments are narrower cephalad than caudad. The ventral prolegs are within the caudal third of the segments and thus appear unusually far caudad. The mandibles have four teeth. The



729

Figure 729—*Trissodoris honorariella* (Walsingham), male genitalia. Top left, aedeagus, anellar lobe, valvae, and genital "flaps" of eighth sternum. Top right, tegumen, uncus, and brachia. Bottom, apex of abdomen split open to show dorsal, lateral, and ventral surfaces. Kaena, Oahu (slide Z-VI-25-61). *A*, aedeagus; *An*, anellar lobe; *GF*, genital flaps; *LB*, left brachium; *RB*, right brachium; *T*, tegumen; *U*, uncus; *V*, valva.

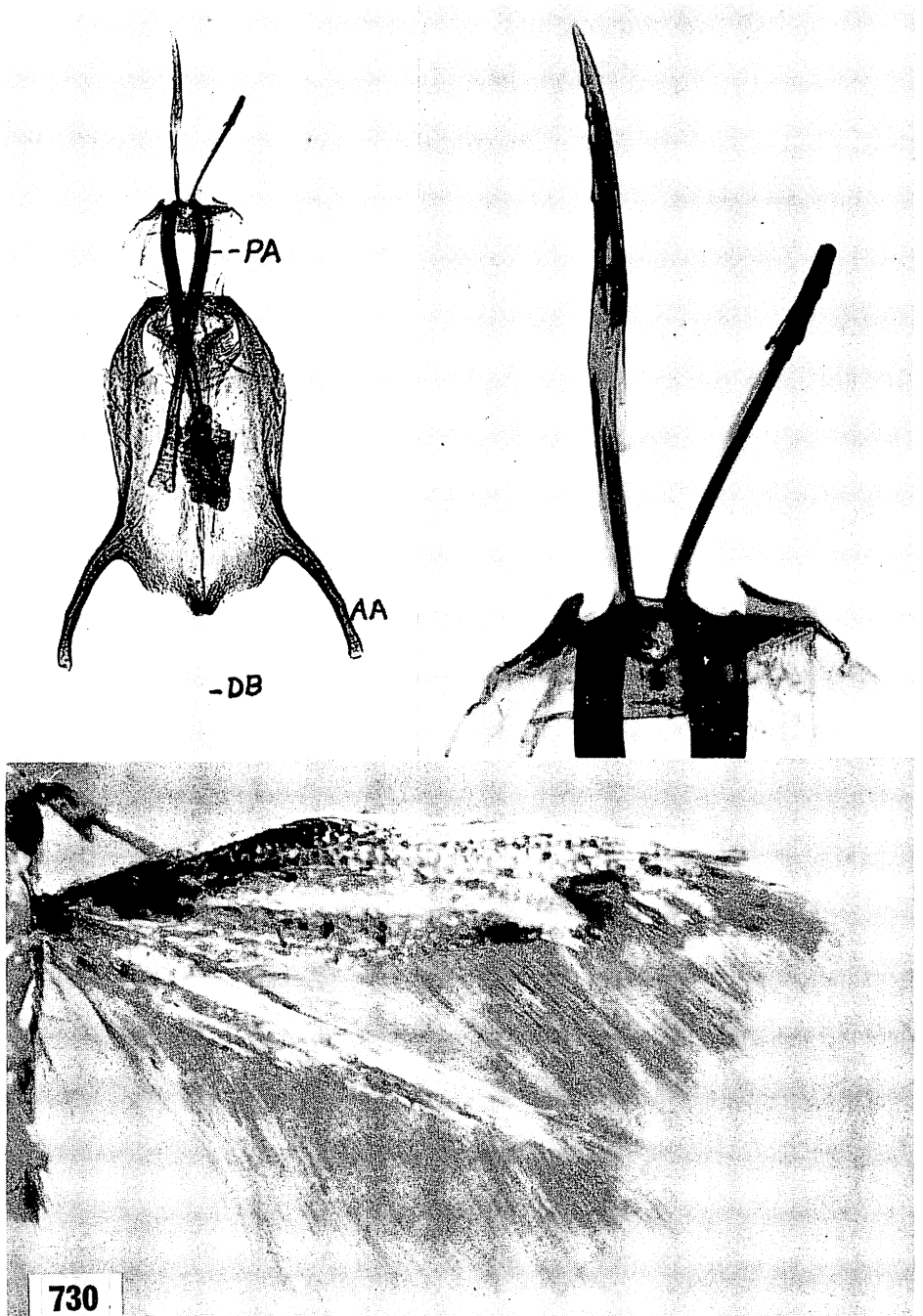


Figure 730—*Trissodoris honorariella* (Walsingham). Top, female genitalia; one "saw" lobe broken; Laie, Oahu (slide Z-VI-26-61). Bottom, ventral aspect of a male from Buru to show the strong "notch" on the antenna and the cluster of erect yellow hairs and setae near the distal quarter of the forewing. AA, PA, anterior and posterior apophyses; DB, ductus bursae.

adfrontal sclerites of the head extend only about one-half the distance to the vertical triangle and do not reach the P2 setae. The prothoracic prespiracular L setae are arranged in a subhorizontal line at the lower edge of a distinctly pigmented, elongate, slightly oblique macula cephalad of the large, elongate spiracle which has well pigmented peritremes. The thoracic leg coxae are much more distantly separated than the transverse diameters of the coxae.

On abdominal segments 1 to 8 the D1 setae are short, the D2 setae very long and almost directly in line caudad of the D1 setae (the D2 setae are very slightly more distantly separated than the D1's). On abdominal segments 1 to 7 the SD1 setae are above the spiracles and about two to three times as far from the spiracles as the lengths of the spiracles. The spiracles are ovate, those on segment 8 are about twice as long as those on segments 1 to 7 and the prothoracic spiracles are larger than those of the eighth abdominal segment. On abdominal segments 1 to 8, seta L3 is near the caudal margin of the segments and in line beneath seta D2. The SV setae on abdominal segments 1 to 8 are arranged as follows: 2 on 1, 3 on 2 to 6, 2 on 7, and 1 on 8. The crochets on the ventral prolegs are arranged in complete biordinal circles, and the crochets may appear longer on the cephalic sides of the prolegs.

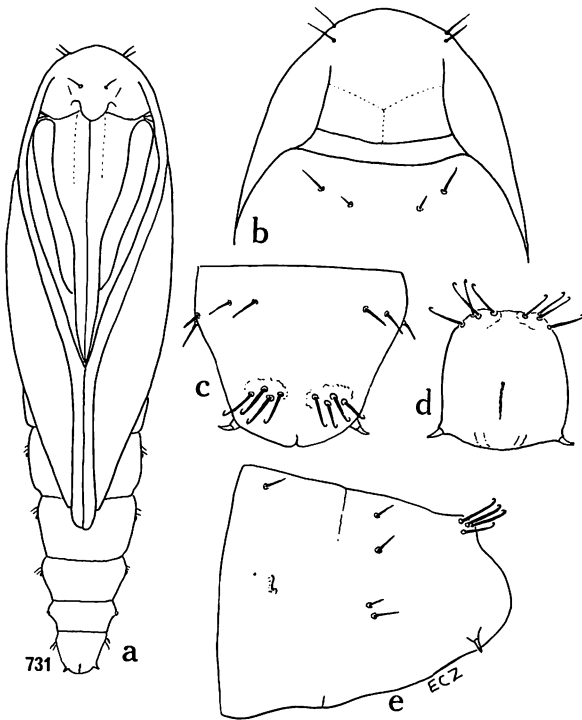


Figure 731—Details of the pupa of *Trissodoris honorariella* (Walsingham). Lihue, Kauai, ex *Pandanus* leaf. Length 5.5 mm. *a*, ventral aspect of pupa; *b*, dorsal aspect of head, pronotum, and part of mesonotum; *c*, dorsal aspect of cauda; *d*, direct caudal aspect of cauda; *e*, left lateral aspect of the three caudal abdominal segments.

Genus **ANATRACHYNTIS** Meyrick

*Anatrachyntis* Meyrick, 1915a:325. Type-species: *Gracilaria*? *falcatella* Stainton, 1859b:121 (= *Pyroderces spodoctha* Meyrick), by original designation (figs. 732, 740).

*Sathrobrotia* Hodges, 1962b:73. Type-species: *Batrachedra rileyi* Walsingham.  
**New synonym.**

While studying in the British Museum with J. D. Bradley in 1958, he and I found that the genitalia of this genus are distinct from those of *Pyroderces* Herrich-Schäffer (type-species: *Cosmopterix argyrogrammos* Zeller, 1847a:38; male genitalia on my figure 738). Therefore the two species heretofore assigned to *Pyroderces* in Hawaii are transferred to *Anatrachyntis*. Much confusion exists concerning this group of difficult, poorly known or misunderstood species, but it is beyond the scope of this book to extend the study beyond the species occurring in Hawaii. The genus is probably a large one, and many of

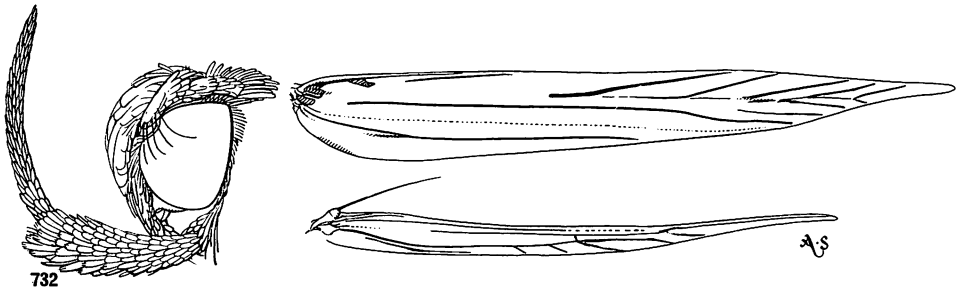


Figure 732—Head and wing venation of *Anatrachyntis falcatella* (Stainton), the type-species of *Anatrachyntis*; India (BM slide 5213); color pattern of palpus not shown. The number of setae in the antennal pecten on this and other species of the genus is variable. Evidently, veins 2 and 3 are fused in the forewing and not 3 and 4.

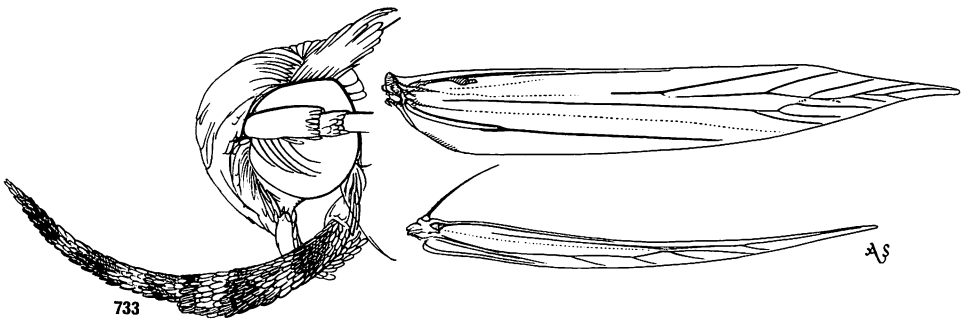


Figure 733—Head and wing venation of *Anatrachyntis rileyi* (Walsingham). Head from a Honolulu specimen; wings from an Oahu specimen (on Corbet slide 6 in the British Museum).



the species are closely similar in appearance. Specific determinations are not easy, and no doubt many records in literature are based upon misidentifications.

When Meyrick described *Anatrachyntis*, he made a serious error in stating that ocelli are present—they are absent.

Hodges found independently that *Pyroderces* has been used in a compound sense. However, the generic name *Sathrobrotia* proposed by him is unnecessary and is a synonym of Meyrick's *Anatrachyntis*.

*Anatrachyntis* appears to have its greatest development in the Oriental Region. It has spread eastward as far as Australia and New Zealand, south-westward into Africa, and it has penetrated America. The three representatives in Hawaii are widely distributed foreign species.

The female genitalia include a peculiar mass of densely packed squamae which lies to the right of the tubelike ostium. It appears as a heavy, dark mass in dissections. This structure requires study and description. No doubt it is associated with scent dispersal. I have not seen anything similar to it elsewhere.

The larvae of *Anatrachyntis* have the following features in common (Capps, 1956): Prothorax with three setae in the prespiracular group, these borne from a pinaculum; pronotal shield with seta D1 on or above the level of XD1. Abdominal proleg crochets uniordinal and in a complete ring. Eighth abdominal segment with seta SD1 directly in front of the spiracle. Ninth abdominal segment with paired seta D2 not on a pinaculum; seta D1 close to seta SD2 and on the same pinaculum. Setae L1 and L2 of proleg-bearing abdominal segments close together below the spiracle.

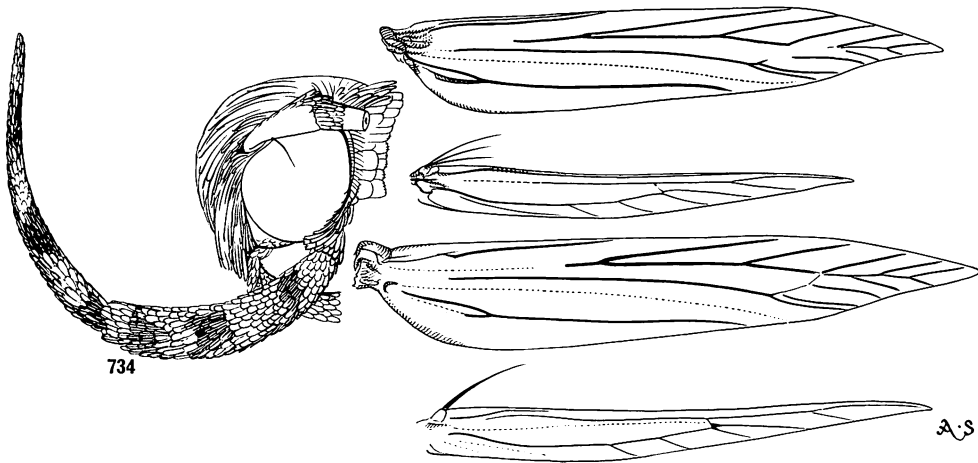


Figure 734—Head and wing venation of *Anatrachyntis incertulella* (Walker). The head is from the female holotype from Hawaii (Beechy Expedition); the upper wings are from a female paratype from Rapa (BM slide 4308); the lower wings are from a male specimen from Honolulu (Busck slide 174). The antennal pecten is evidently abraded.

## KEY TO THE SPECIES OF ANATRACHYNTIS IN HAWAII

1. Background color of forewings more or less mauve; underside of abdomen with conspicuous, dark, diagonal lines directed dorsocaudad; male and female genitalia as in figures 740, 741, right brachium of male genitalia expanded distad and subspatulate. . . **incertulella** (Walker).  
Background color of forewings orange-brown to reddish brown; undersides of abdomen without such diagonal lines; right brachium of male genitalia acuminate. . . . . 2
2. Outer side of metatibia with the diagonal white area arising immediately above base of submedial spur divided by a line of brown squamae, as in figure 739*d*; left anellar lobe of male genitalia expanded, broad and blunt distad, as in figure 739*a, b*; female with the tube-like ostium shorter and broader than in *badia*, much shorter than caudal margin of seventh (caudal) sternite, as in figure 742. . . . . **rileyi** (Walsingham).  
Outer side of metatibia with the white fascia immediately above the submedial spur entirely white, as in figure 739*e*; left lobe of anellus of male genitalia acuminate, sharply pointed, as in figure 739*c*; ostium longer and more slender than in *rileyi*, about as long as the caudal breadth of the seventh (caudal) sternite, as in figure 742 . . . . . **badia** (Hodges).

**Anatrachyntis badia** (Hodges), **new combination** (figs. 735, 736, moth; 737, moth, head, leg; 739, leg, male genitalia; 742, female genitalia).

*Sathrobrotia badia* Hodges, 1962*b*: 76, figs. 60, 118, 170.

*Pyroderces rileyi*, in part as used by Busck, 1917:362-366, pl. 8, fig. D, and other authors as a misidentification.

Oahu, Molokai, and probably most of the other Islands, but it has been confused with *rileyi*.

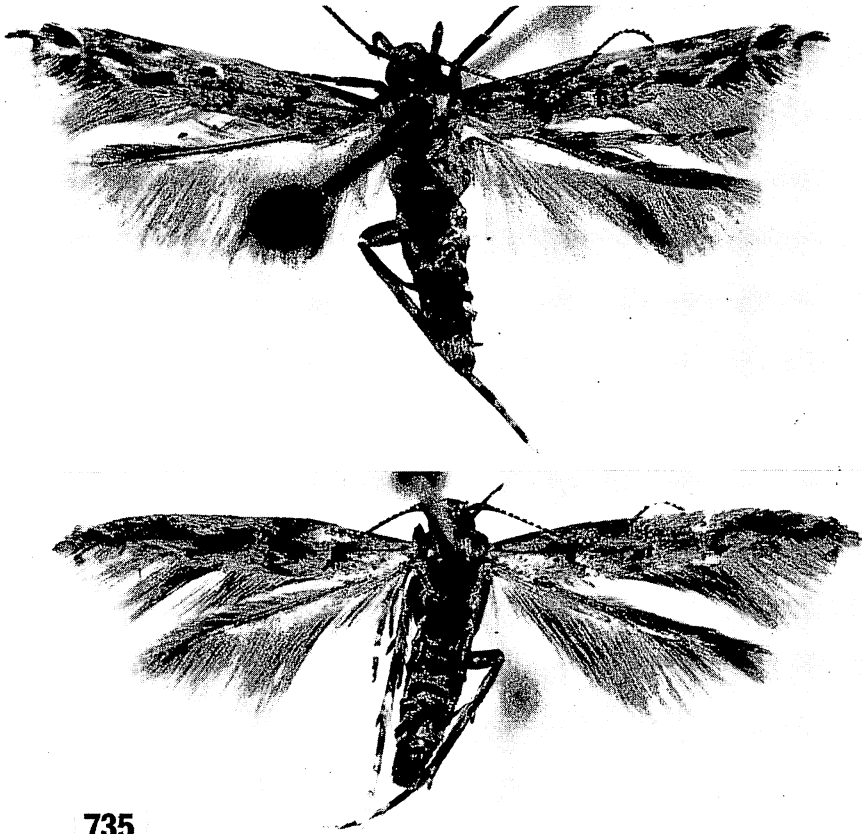
Immigrant. Known from a long series of specimens from many localities in the southern United States from Florida to California and as far north as Maryland (type locality: southern Florida). The true range remains to be determined because of confusion regarding its identification.

Hostplants: These have not yet been determined in Hawaii because the species has been confused with *rileyi*. It has been reared from staminate flowers of the introduced *Pinus pinaster* by C. J. Davis. Dr. Swezey reared specimens from the "cocoon" of an *Argiope* spider, but he misidentified them as *rileyi*. Hodges (1962:77) recorded it in America from the cones of several species of *Pinus*; *Cassia* pods; "mummy" fruits of peach and loquat; lime, grapefruit, banana, cabbage, coconut blossoms; and elm leaves. The larvae are scavengers whose habits are evidently generally similar to those of *rileyi*.

Parasites: None have as yet been recorded in Hawaii, but most or all of those recorded from *rileyi* may also attack this species.

*Anatrachyntis badia* is so superficially similar to *rileyi* that it has long been confused with that species even by some expert microlepidopterists. During the preparation of this text I had become aware of confusion regarding *rileyi* in Hawaii. I am indebted to Ronald Hodges for telling me that he had seen specimens of *badia* from Hawaii and thus alerting me to the presence of this species.

Many of the records and details regarding *rileyi* in Hawaii probably apply to this species because of misidentifications. I regret that I have not been able to examine all of the specimens which formed the bases for the Hawaiian records of *rileyi* and thus to be able to correct the published accounts of the species in Hawaii.



735

Figure 735—*Anatrachyntis* species. Top, *incertulella* (Walker); Manoa, Honolulu; forewing 5.75 mm. This is the first species of Microlepidoptera that was described from Hawaii. Bottom, *badia* (Hodges); Manoa, Honolulu; forewing 5.25 mm.; bred from an *Argiope* spider egg case; this example was misidentified and recorded as *rileyi* (Walsingham). See also figure 736.

**Anatrachyntis incertulella** (Walker), **new combination** (figs. 734, head, wing venation; 735, moth; 740, 741, male, female genitalia).

*Gelechia incertulella* Walker, 1864a:658.

*Stigmatophora* (*Proterocosma*) *incertulella* (Walker) Walsingham, 1907b:515, pl. 15, fig. 20.

*Aeoloscelis aulacosema* Lower, 1904:172 (type locality: Mackay, Queensland).  
Synonymy by Meyrick, 1928a:497.

*Pyroderces incertulella* (Walker) Meyrick, 1928a:497.

*Stigmatophora* (*Proterocosma*) *tridigitella* Walsingham, 1907b:515. Synonymy by Meyrick, 1928a:497.

The pandanus flower moth.

Oahu, Hawaii (type locality: "Sandwich Islands, Presented by the Lords of the Admiralty"). The type was collected by the Beechey Expedition and was one of the first species of Lepidoptera to be collected in Hawaii.)

Immigrant. Widely distributed in the Pacific from Australia, Fiji, Austral Islands, Rapa, Pitcairn, and many other localities.

Hostplant: *Pandanus*.

Parasite: *Idechthis* species.

The larvae feed in large numbers in the male inflorescences of *Pandanus*. Swezey (1954:146) said "... from one inflorescence 266 adult moths were reared. In the absence of flowers, the caterpillars feed on dead leaves." I have often seen large numbers of the moths swarming at the male blossoms of *Pandanus*.

**Anatrachyntis rileyi** (Walsingham), **new combination** (figs. 64, larval head; 219, moth, larva; 733, head and wing venation; 736, moth, female genitalia; 739, leg, male genitalia; 740, male genitalia; 742, female genitalia; 743, larva; 744, larva, pupa).

*Batrachedra rileyi* Walsingham, 1882:198. Swezey, 1909d:22, pl. 3, figs. 9-11.

*Pyroderces rileyi* (Walsingham) Durrant, 1912:207 (in part), fig. 3. Busck, 1917:362-366, figs. 5, 6, 7, 8, 10, 11, 12 (in part). Williams, 1931:158, pl. 27, figs. 9-11. Silvestri, 1943:247-250, figs. 307-309. Peterson, 1962:136, pl. L13, figs. Q-U, larva.

*Sathrobrotia rileyi* (Walsingham) Hodges, 1962b:74, figs. 59, 117, 169; redescription, hosts, and distribution in North America.

*Batrachedra stigmatophora* Walsingham, 1897b:104. Synonymy suggested by Hodges, 1962b:74, established by him (1962b:121) after consultation with J. D. Bradley, and I have confirmed the synonymy after study at the British Museum.

*Pyroderces stigmatophora* (Walsingham) Meyrick, 1914b:203.

*Anatrachyntis stigmatophora* (Walsingham) Meyrick, 1915a:326.

In 1914b:203, Meyrick reduced his *tripola* to a synonym, but in 1915a:326 he said that he was in error and that two species are involved.

The pink cornworm, pink bud moth or pink scavenger caterpillar.

Kauai, Oahu, Molokai, Maui, Lanai, Hawaii. Although I have not examined specimens from Kauai, I have no doubt that the species is present there and is widely distributed over all of the main Hawaiian Islands.

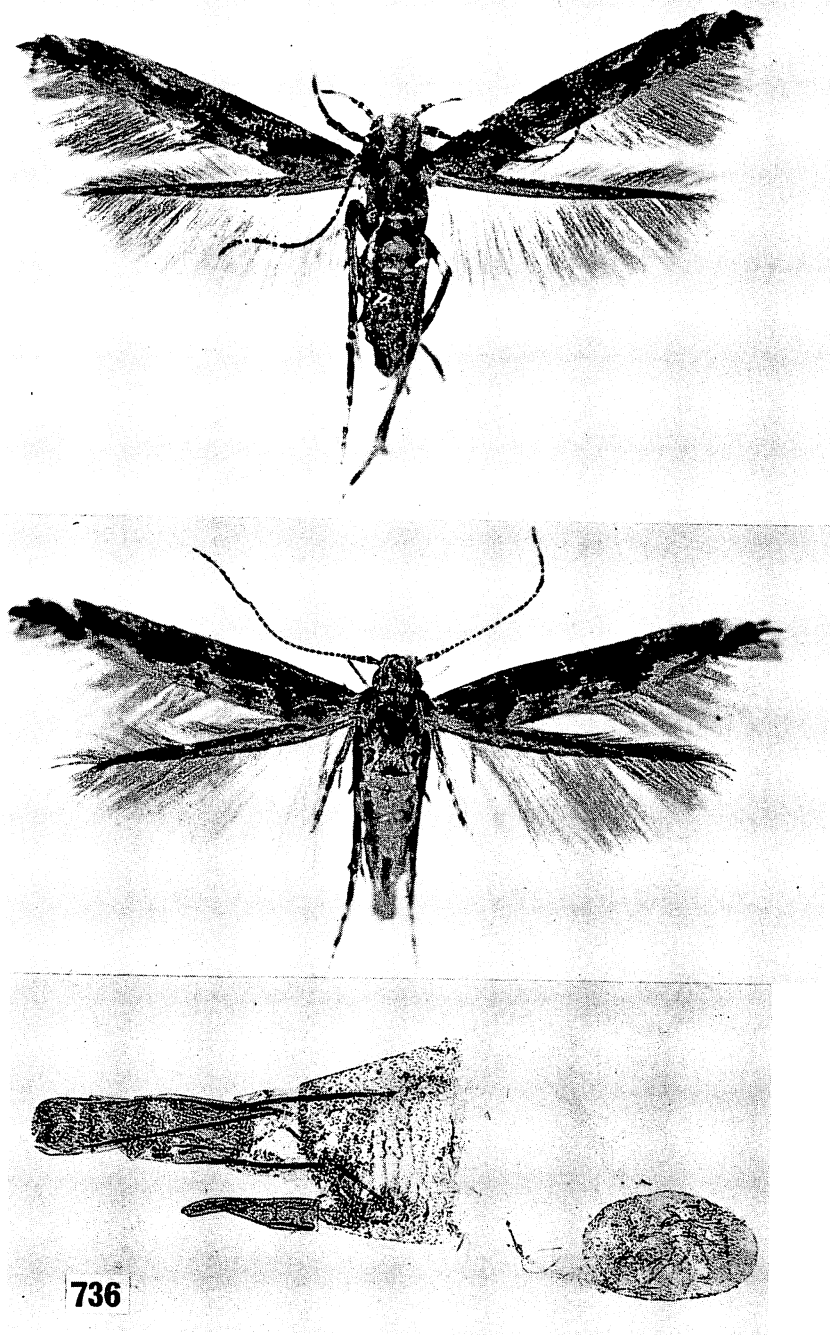


Figure 736—*Anatrachyntis* species. Top, *badia* (Hodges), a female from Florida; see also figure 735. Bottom, *rileyi* (Walsingham), a female from Texas. (USNM photographs, courtesy Ron Hodges.) Bottom, lateral aspect of the female genitalia of *rileyi* (Walsingham); Makiki Valley, Honolulu; ex *Ricinus* capsule (slide Z-VI-28-61).

Immigrant. Described from specimens bred from "rotten cotton-bolls" at Savannah, Georgia, and widely distributed in the southern United States. It is evidently dispersed widely in some of the warm or tropical areas of the world, and it is probably an introduction to North America. Meyrick thought it to be an African species. It was first recorded from Hawaii by Dr. Swezey in 1909*d*:22. Although the species was collected in Hawaii as early as 1892 by Dr. Perkins, it was not included in *Fauna Hawaiiensis*. I have examined specimens collected at Kaimuki, Honolulu, by Perkins in 1907. Williams, 1931:159, stated that it was known there prior to 1892.

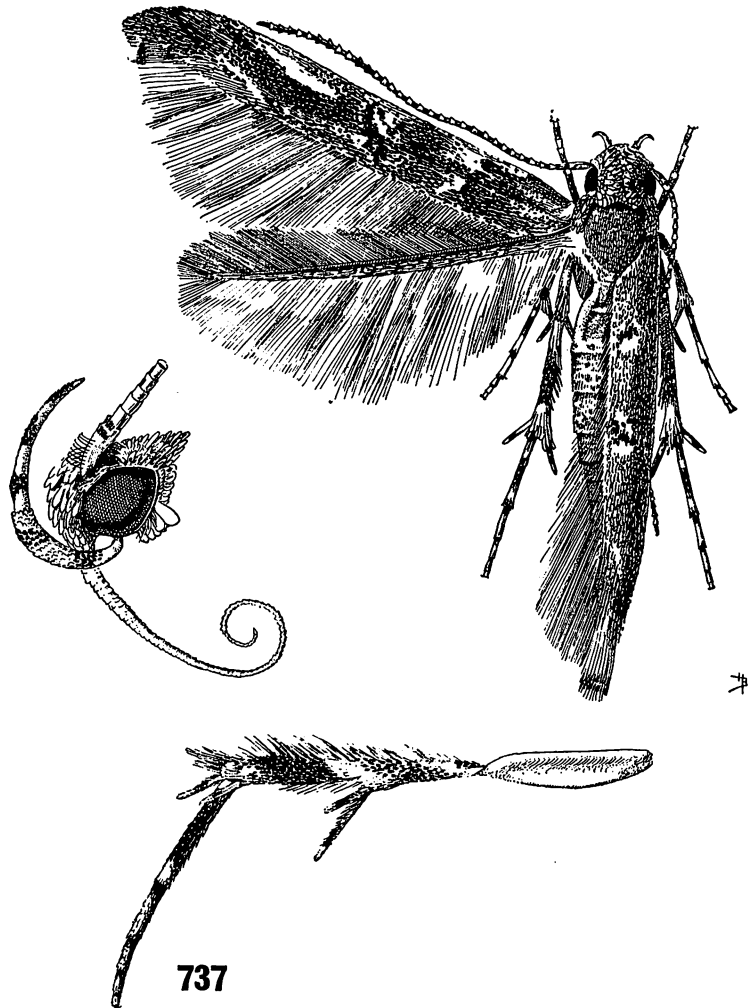


Figure 737—*Anatrachyntis badia* (Hodges), with lateral views of head and a hind leg. This was incorrectly determined as *rileyi* by Busck. (The figures are from Busck, 1917.)

Hostplants: It is a general feeder in vegetable trash. It has been found in many kinds of old leguminous pods, aloe, banana, coffee beans, coffee cherries, castor oil beans and pods, cotton bolls, eggplant, milo maize grain, old maize silk, dead *Panicum torridum*, pineapple (dried parts, fruits, stored seeds), *Rochea*, *Samanea saman*, *Sapindus oahuensis*, tamarind, and other hostplants.

Parasites: *Agathis hawaiiicola* (Ashmead), *Apanteles* species, *Idechthis* species, *Perisierola emigrata* Rohwer, *Pristomerus hawaiiensis* Perkins, *Trathala flavo-orbitalis* (Cameron).

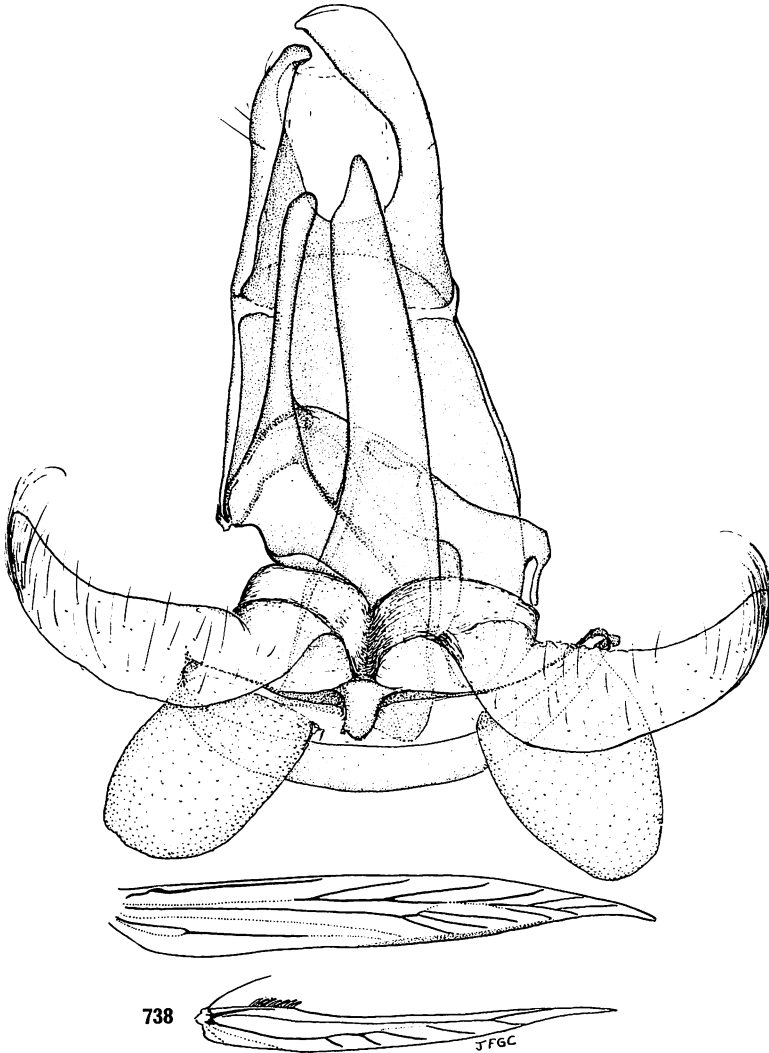


Figure 738—Male genitalia and wing venation of *Pyroderces argyrogrammos* (Zeller), the type-species of *Pyroderces*, to which genus two of the species of *Anatrachyntis* found in Hawaii had for long been referred. (USNM slide 3799 Clarke.)

Predators: *Conocephalus saltator* (Saussure), *Pachodynerus nasidens* (Latreille), *Polistes aurifer* (Saussure), *Polistes olivaceus* (Degeer).

Some of the above data no doubt belong to *Anatrachyntis badia* because of misidentifications. See the details under that species for further information.

The larvae of this common, widely distributed moth normally act as scavengers in dead plant material. They do on occasion, however, damage living plant tissues. They have been found as leaf miners in the aloe and *Rochea* mentioned above; they have heavily infested and damaged milo maize; they have destroyed pineapple seeds and they may feed upon the surface of pineapple fruits or tunnel into the fruits, thus allowing the entrance of rot organisms. The larvae are found frequently in the "eyes" of the pineapple fruit where they feed upon the withered stamens and pistils. The webbing they

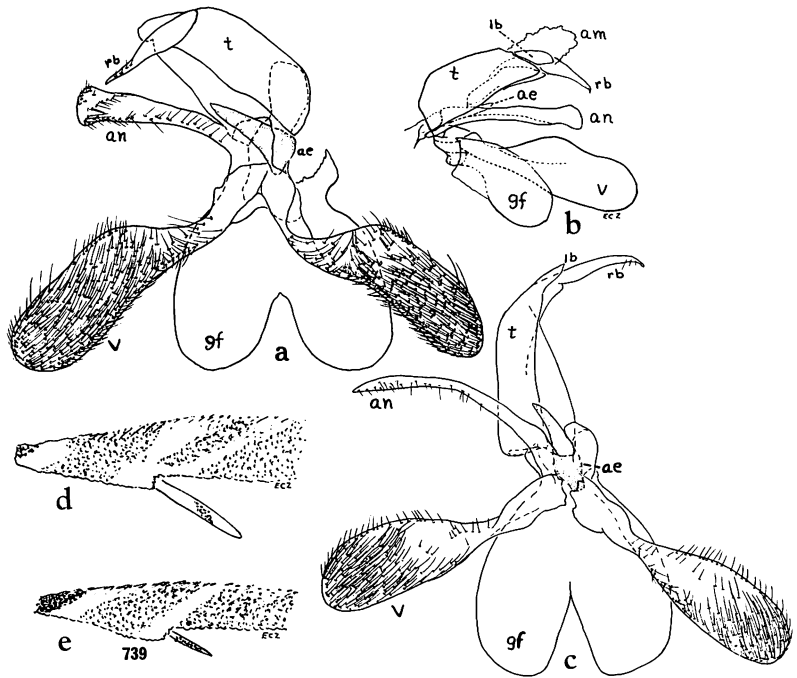


Figure 739—Details of *Anatrachyntis*. *a*, male genitalia of *rileyi* (Walsingham) (Hodges slide 975, Argentina); aedeagus probably drawn too broad; note the broad apex of the anellar lobe. *b*, lateral aspect of the same species in natural position from a specimen from Louisiana; setae omitted and drawn to a smaller scale. *c*, male genitalia of *badia* (Hodges) (Hodges slide 1031, Florida); note the narrow, pointed apex of the anellar lobe and compare with *rileyi*. *d* and *e*, rough sketches of the ectal sides of the basal and submedial parts of the metatibiae of *rileyi* (*d*) and *badia* (*e*) to show the color patterns; dorsal setae omitted. (Drawings for *a* and *c* kindly loaned by Ron Hodges, but the lettering is mine, as are figures *b*, *d*, and *e*.) *ae*, aedeagus; *am*, anal tube membrane; *an*, anellus lobe; *gf*, genital flap; *lb*, left brachium; *rb*, right brachium; *t*, tegumen; *v*, valva.





Figure 740—*Anatrachyntis* genitalia. Top, left and right, male genitalia of *incertulella* (Walker), holotype (BM slide 4391, photographed from the underside of the slide); "Sandwich Islands, Beechy"; originally incorrectly determined as a female. Top right, genitalia of another male from Manoa, Honolulu (Busck slide 174). Middle, ostium of a Manoa, Honolulu specimen (Busck slide 175) of *incertulella*. Bottom left, male genitalia of *rileyi* (Walsingham); Honolulu (Busck slide 95). Bottom right, male genitalia of *falcatella* (Stainton), the type-species of *Anatrachyntis*, for comparison; India (BM slide 5213; photographed from beneath the slide). *ae*, aedeagus; *an*, anellar lobe; *gf*, genital "flap"; *lb*, left brachium; *rb*, right brachium; *t*, tegumen; *v*, valva.

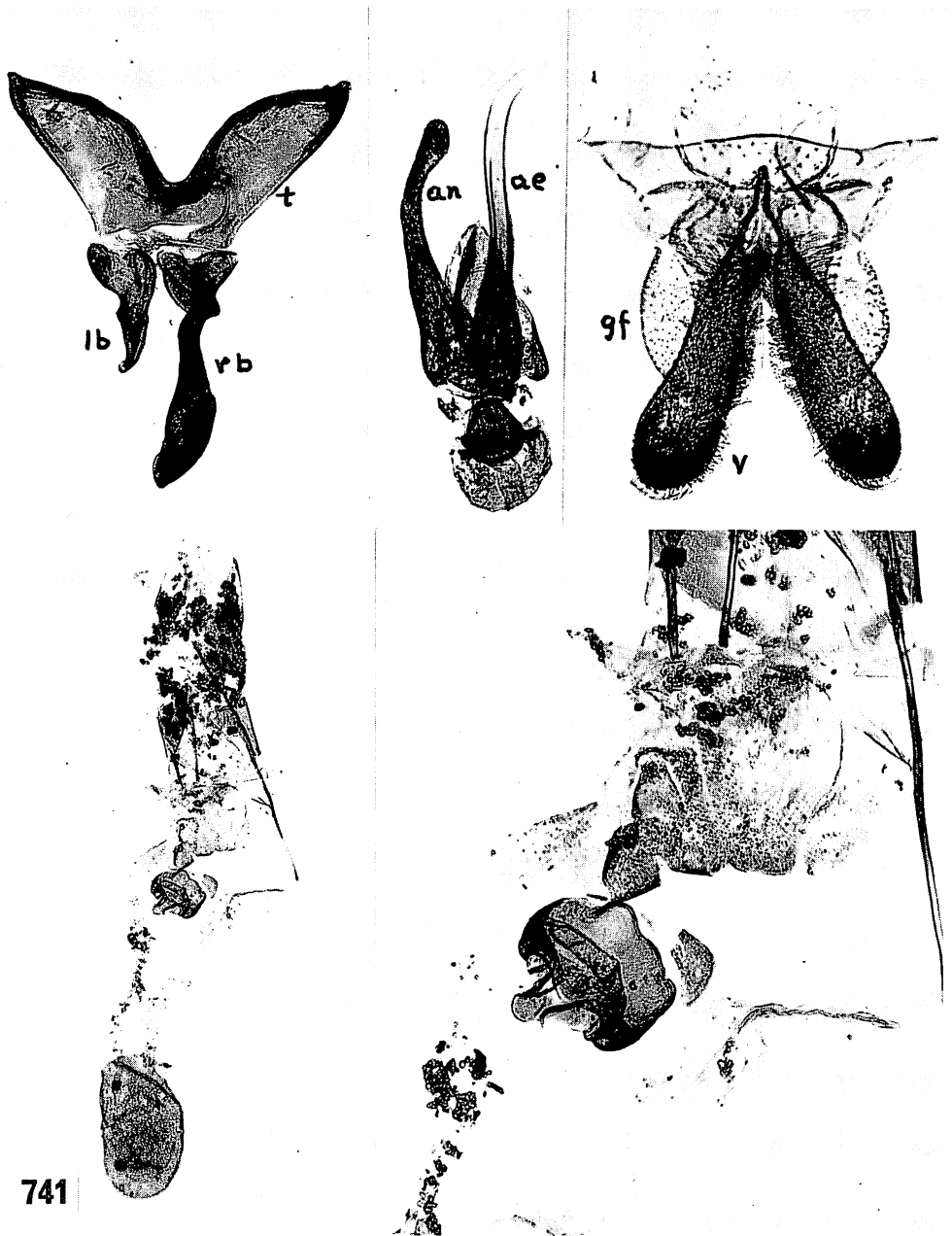


Figure 741—Male and female genitalia of *Anatrachyntis incertulella* (Walker). Top, dismembered male genitalia: left, dorsal aspect of flattened tegumen (*t*), left brachium (*lb*), and right brachium (*rb*); middle, left anellar lobe (*an*) and aedeagus (*ae*); right, valvae (*v*) and genital “flaps” (*gf*) (slide Z-VI-30-61). Bottom, female genitalia (partly decomposed) (slide Z-VI-29-61). Both specimens from Manoa, Honolulu.

spin gives the fruits an objectionable appearance, and the frass may be bothersome. Illingworth, in his paper "Pests of Pineapple in Hawaii" [*Proc. Hawaiian Ent. Soc.* 7(2):254, 1929], considered the "tiny pink caterpillars of this species . . . particularly troublesome on the fruits" of pineapple. He said, "This pest is pretty well controlled by predaceous wasps and beetles. . . ." I do not know to what beetles he referred, and I wonder if he meant to say "grasshoppers" instead of "beetles". He also reported upon this moth in *Pineapple News*, pp. 67-71, 1927. For additional details of damage to pineapple, see Linford, 1940:437. The larvae may feed on the surface of banana fruits and may eat into the fruits on rare occasions. Swezey once bred the moth from an old egg case of an *Argiope* spider, and (1954:100) he found them "very abundant in 'dead heart' of *Panicum torridum* bored by *Acrapex exanimis*."

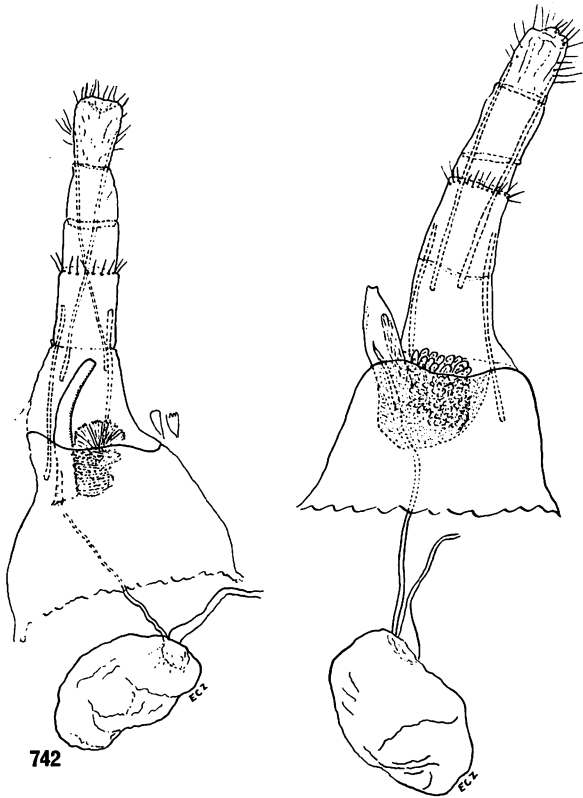


Figure 742—*Anatrachyntis* female genitalia. Left, *badia* (Hodges) from a Honolulu specimen. Two squamae from the mass of squamae that lies at the right of the tubelike ostium are separately enlarged. The one with the dentate apex is of the type that surrounds the main mass. The smooth-tipped squama is of the type that makes up the main bulk of the scale mass and that appears to be deciduous. Right, *rileyi* (Walsingham) from a specimen from Texas. The apical contours of sternite 7 (the caudal sternite) may appear variable in dissections.

The larvae of this tiny little moth, I have found feeding in various situations, most frequently on dead vegetable matter or refuse substances, hence, not particularly injurious. I have found them feeding beneath leaf-sheaths of dead cane, also in bored cane sticks, and in places where the leaves are dirty and sticky from having been attacked by Aphis or leaf-hoppers. I have also found them feeding in the tassels. Once I found them very numerous in sweet corn ears feeding on the "silks," inner husks, the pith, and other parts of the cob. I have also seen them in ears of field corn, eating into the kernels of corn and into the cob. [Probably after having been attracted to the decaying silk.] Another time I observed them numerous on a large woody twining bean vine, feeding on dying leaves and ripening pods, especially where there was an accumulation of debris, webs, frass, etc., on account of infestation by mealy bugs, *Lecanium*, *Tortrix* and *Cryptoblabes* larvae. Similarly, I have found them feeding on lantana infested by *Orthezia*, and on palm leaves infested with mealy bugs and leaf-rollers; also on dead leaves of pandanus, banana and various other plants. On the banana, I have found them feeding in the bunch on the dead or injured fruit, and on the skin of the ripened fruit, which they have penetrated sometimes and eaten into the fruit inside.

Mr. D. T. Fullaway has reported it from cotton infested with mealy bugs. The original description of the species is from specimens bred from rotten cotton-bolls in the United States. It has been present in these Islands for a number of years no doubt, as they were found by Dr. Perkins when he first came (1892), though it is not included in the Fauna Hawaiiensis. . . .

Eggs are deposited mostly singly, occasionally two together; about .5 mm. long, roundish-ovate, flattened below where in contact with surface of object, convex above and coarsely reticulate.

They hatch in a few days. The freshly hatched larvae are about 1 mm. long, pinkish with black head and cervical shield.

The full-grown larva . . . is about 7-8 mm., pinkish except head which is pale brown, and cervical shield which is dark brown; tubercles concolorous, [setae] ii wider apart than i, iii above spiracle, iv + v below.

The larva pupates in a whitish cocoon amongst the frass where it has fed. The pupa . . . is 4-5 mm. uniform, medium brown; wing-cases and antenna-cases extend to apex of sixth abdominal segment; abdominal segments apparently immovable; terminal segment with numerous slender hooked bristles, a few also on the two preceding segments. The pupal period is eleven to thirteen days. (Swezey, 1909d: 23-24.)

When at rest, the moth extends its antennae straight out in front of its head.

This species is closely similar to *Anatrachyntis falcatella* (Stainton, 1859b: 121, *Gracilaria*) Meyrick, 1915a: 325, the type-species of the genus, but there are slight external differences and more obvious specific differences in the genitalia.

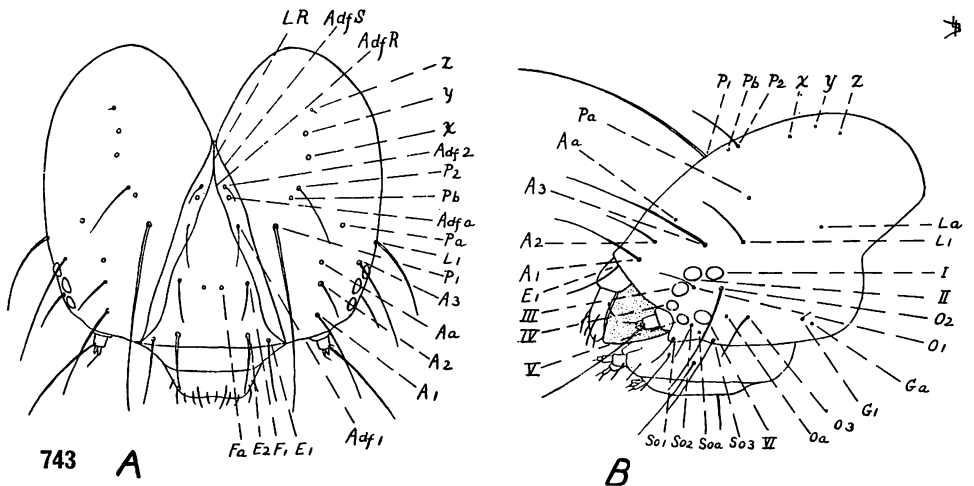
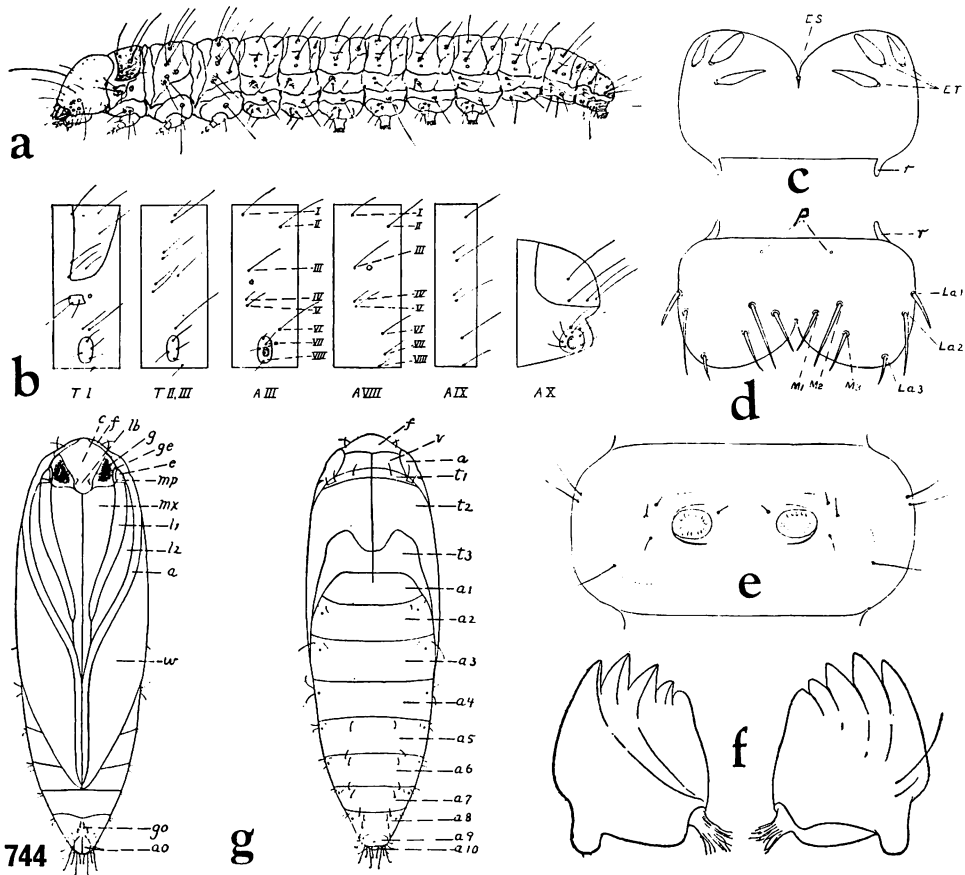


Figure 743—Frontal and lateral aspects of the head capsule of *Anatrachyntis rileyi* (Walsingham), as determined by Busck. The nomenclature is that of Heinrich. See my figure 64 for an explanation of the lettering and its modification into the modern Hinton system. (After Busck, 1917.)

It is also closely similar to other species in the genus.

Busck (1917:365–366) called this species “the scavenger bollworm, an insect mistaken for the pink bollworm” of cotton. He gave an extended discussion of the species, including descriptions of the adult, larva, and pupa which I believe are worthy of inclusion here to assist in the identification of this common moth.

Moth.—Labial palpi light reddish brown; second joint with two ill-defined darker brown annulations; terminal joint with three blackish annulations. Head light chestnut-brown; lower face yellowish iridescent. Antennae whitish with sharply defined, narrow, blackish brown annulations. Forewings chestnut brown with whitish straw-coloured streaks, edged by irregular black scales; an oblique whitish fascia on basal third



744

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Figure 744—*Anatrachyntis* supposedly *rileyi* (Walsingham), as determined by Busck, but possibly *badia* (Hodges). *a*, lateral aspect of a mature larva; *b*, setal map of parts of a larva (*T*, thoracic segments; *A*, abdominal segments); *c*, epipharynx (*ES*, epipharyngeal shield); *ET*, epipharyngeal setae; *r*, epipharyngeal rod); *d*, labrum (*La1*, *La2*, *La3*, lateral labral setae; *M1*, *M2*, *M3*, medial labral setae; *P*, labral punctures; *r*, epipharyngeal rod); *e*, ventral aspect of third abdominal segment; *f*, ventral and dorsal aspects of a right mandible; *g*, ventral and dorsal aspects of pupa (*a*, antenna; *a1* to *a10*, abdominal segments; *ao*, anal opening); *c*, clypeus; *e*, eye; *f*, frons; *g*, gena; *ge*, glazed eye; *go*, genital opening; *mp*, maxillary palpus; *mx*, maxillae or proboscis; *l1*, *l2*, fore and middle legs; *v*, vertex; *w*, wing. (After Busck, 1917.)

edged on the inner side with black; an ill-defined group of black scales in the middle of the wing, edged with white; a subcostal longitudinal white streak at apical third, terminating in black scales; a similar, fainter, subdorsal streak terminating in black scales at apex of the wing; cilia yellowish gray. Hindwings dark fuscous with paler cilia. Abdomen reddish brown. Legs . . . light reddish, with black annulations on tarsi and tibiae. . . .

Alar expanse 9 to 12 mm.

Full-grown larva.—The full-grown larva is 7 to 8 mm. long, cylindrical, deep wine red. Head light brown, with blackish trophi. Thoracic shield broad, undivided, strongly chitinized, dark brown. Anal plate light brown. Tubercles small, whitish, bearing long, light-brown setae. Crotches [crotchets] of abdominal feet 20 to 24 in complete circle. . . .

Pupa.—The pupa . . . is 7 to 8 mm. long, light yellowish brown, smooth, with four short setae on the vertex and six short setae on the first thoracic segment; two short, paired setae near the spiracles and four short hooked setae dorsally on fifth to ninth abdominal segments, two anterior and two posterior on each joint. Anal opening large, slitlike, surrounded by about twelve long, hooked setae; no cremaster developed; tip of abdomen bluntly rounded, armed with four long and four shorter strong, hooked setae. Frontoclypeal suture distinct and abruptly curved upward near median line. Clypeus and pupal eyes distinctly indicated, labrum and mandibles less so; antennae close together at their tip, reaching nearly to the tips of the wings; wings reaching to posterior edge of sixth abdominal segment. Spiracles small, normal.

Unfortunately, Busck's illustration of the male genitalia is inaccurate and misleading, and his figure of a hind leg is that of *badia* instead of *rileyi*. He probably included *badia* in his concept of *rileyi*.

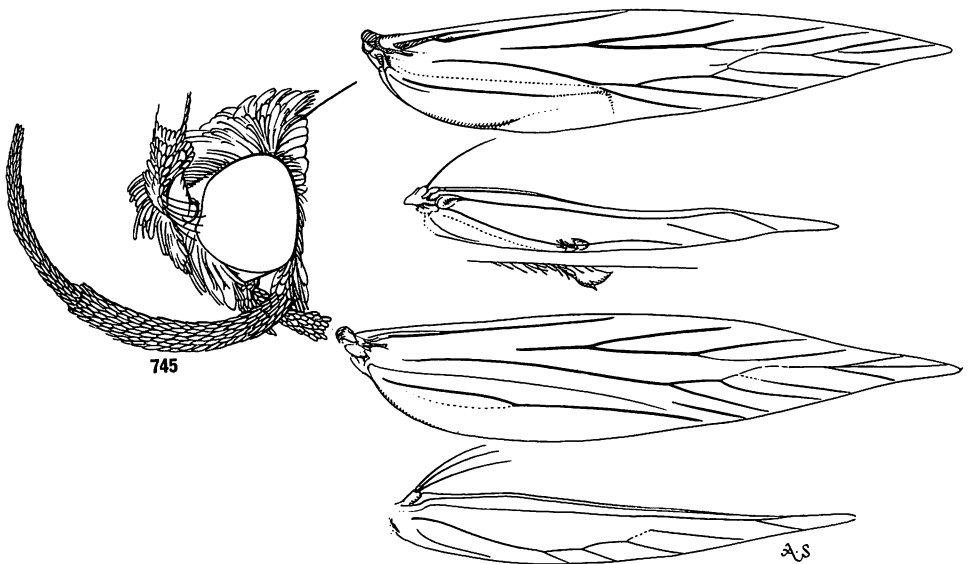


Figure 745—Head and wing venation of *Asymphorodes dimorpha* (Busck). Head from a male from Honolulu. Male wings from a paratype (BM slide 5418) from Honolulu, with a separate enlarged sketch of the peculiar structure on the hindwing viewed from the edge. Female wings (Busck slide 107) from an example from Midway Island. In the forewing of another male example studied, vein 6 rises out of 7, and 7 arises from 8 farther basad; yet another example has veins 2 and 3 in the forewing arising from the same point. Obviously, the venation is variable.

Genus **ASYMPHORODES** Meyrick

*Asymphorodes* Meyrick, 1928a: 498. Type-species: *Asymphorodes velligera* Meyrick by original designation.

The following diagnosis will serve to distinguish the species of *Asymphorodes* now known in Hawaii from the other genera of Cosmopteriginae established in the islands: External facies closely similar to *Hyposmocoma* but venation and genitalia distinctive. Ocelli absent; maxillary palpi small; labial palpi long, slender, strongly upcurved; proboscis well developed; antennae held stretched out directly in front of head in life, length between one-half and two-thirds that of a forewing, the first segment with a pecten of several setae. Legs evidently as in *Hyposmocoma*, without unusual characters. Wing venation unusual, differing between the sexes and between the two species known in Hawaii (see figures 745 and 746); forewing with 12 veins, cell pointed distad because of the great angle of the discocellulars, veins 6, 7, and 8 or 6, 7, 8, and 9 arising from a common stem; in the male, vein 1a + b in the forewing unusual,

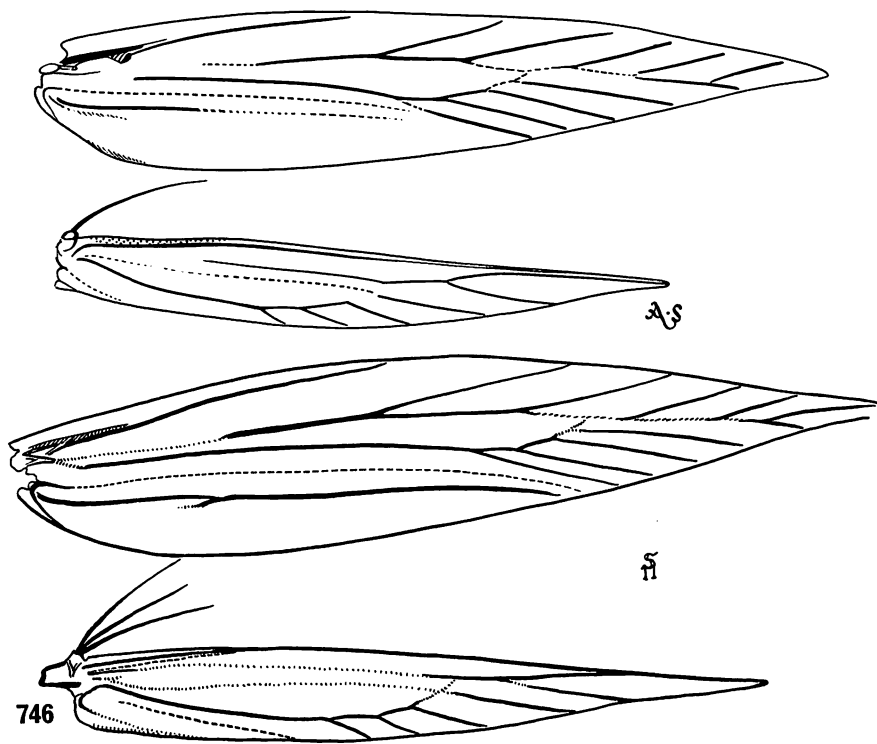


Figure 746—Wing venation of *Asymphorodes triaula* (Meyrick). Male from Wailupe Valley, Oahu (slide Z—V—20—62—2). Female from Ewa, Oahu (slide Z—V—20—61—1).

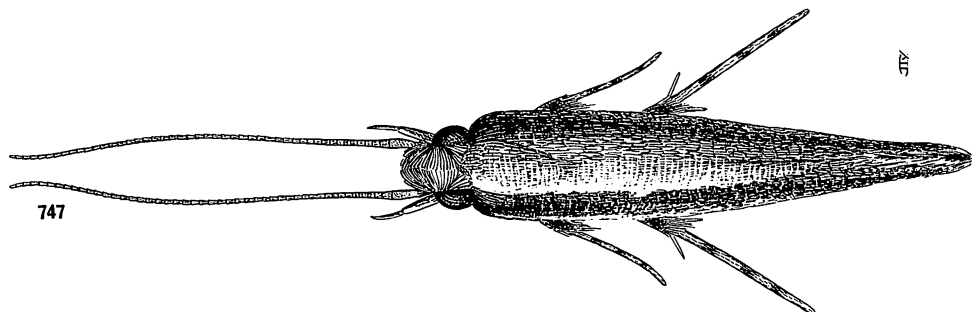


Figure 747—*Asymphorodes dimorpha* (Busck) in resting position. (After Williams, 1931.)

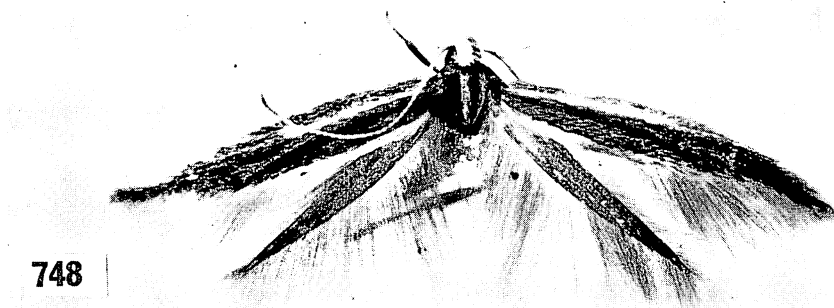
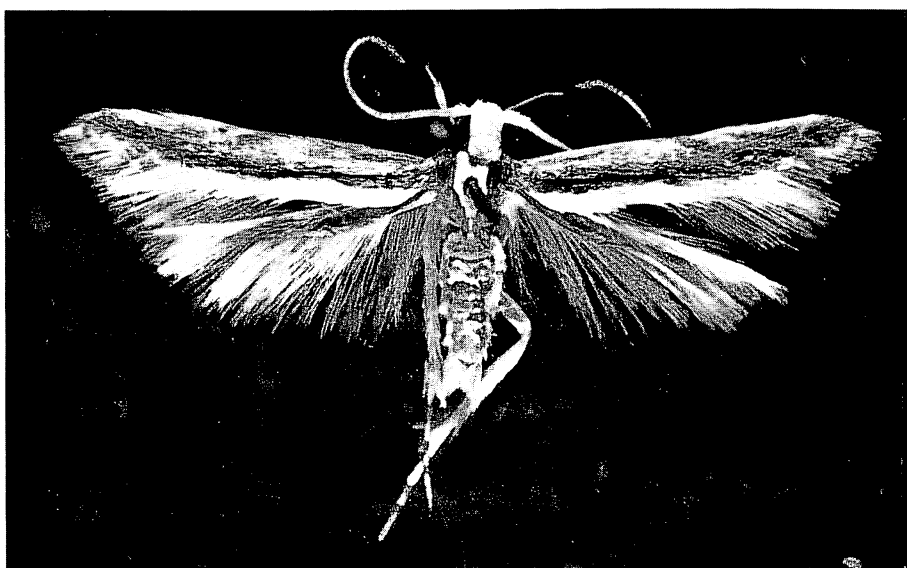


Figure 748—*Asymphorodes* species. Top, *dimorpha* (Busck); Honolulu; forewing 4.0 mm. Bottom, *triaula* (Meyrick); holotype, probably from Honolulu; forewing 4.5 mm (the photograph unfortunately does not reveal the streaked appearance of the apical parts of the forewings).



bent abruptly to approximate a right angle toward posterior wing margin near origin of vein 2, vein 1c evidently joining 2 near or at its origin in male, as figured; hindwing with seven veins in the female and in the male of one of the two Hawaiian species, but the venation greatly reduced and peculiar in the other species. Male genitalia as illustrated, with epiptygmata (genital "flaps") well developed, vinculum well developed and valvae thus articulated far from bases of tegumen; uncus absent; gnathus (?) divided into two brachia; right lobe of anellus obsolete, left lobe closely appressed to aedeagus. Female with ostium sclerotized, protruding; ovipositor long and genitalia otherwise as illustrated (figures 750 and 751).

When Busck described the first of the two species of *Asymphorodes* known in Hawaii, he incorrectly placed it in his genus *Petrochroa* (which I consider a synonym of *Hyposmocoma*). When Meyrick described the second species, he incorrectly assigned it to *Aphthonetus* (which I also place in the synonymy of *Hyposmocoma*), although he had described *Asymphorodes* only a few years previously.

Meyrick stated in his original description that *Asymphorodes* has ocelli, but that is incorrect—the genus lacks ocelli. I had concluded that the species known to me in Hawaii represent a new genus, but Klaus Sattler recently discovered that they belong to Meyrick's genus.

*Asymphorodes* was originally described to receive 16 species from the Marquesas Islands. Meyrick later (1934*b*:349–352) described an additional nine species from the Marquesas and one from Tahiti (1934*c*:109). The genus

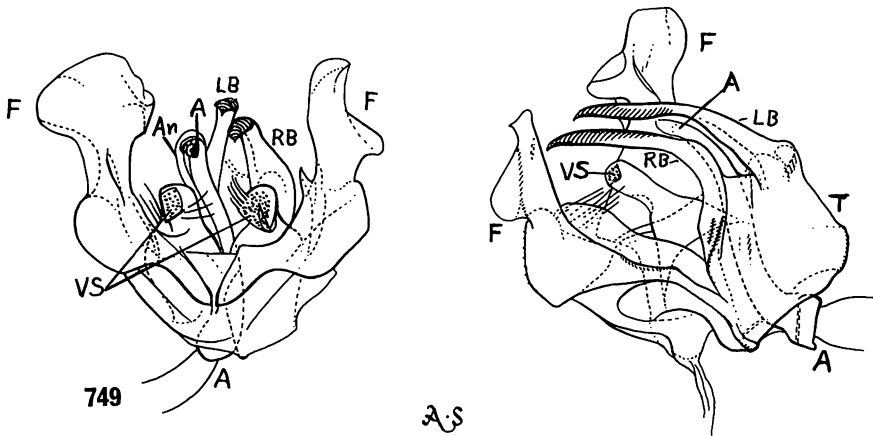


Figure 749—*Asymphorodes dimorpha* (Busck). Damaged male genitalia with the valvae broken off (BM slide 5442). Do not be confused by the absence of the valvae; see figure 750 for the valvae. *A*, aedeagus; *An*, anellus lobe, closely adherent to the aedeagus; *F*, the highly modified, heavily sclerotized genital "flaps"; *LB*, left brachium; *RB*, right brachium; *T*, tegumen; *VS*, stumps of the valvae which have been broken off. The left drawing is in subventral aspect and that on the right in dorsolateral aspect. Compare figure 750.

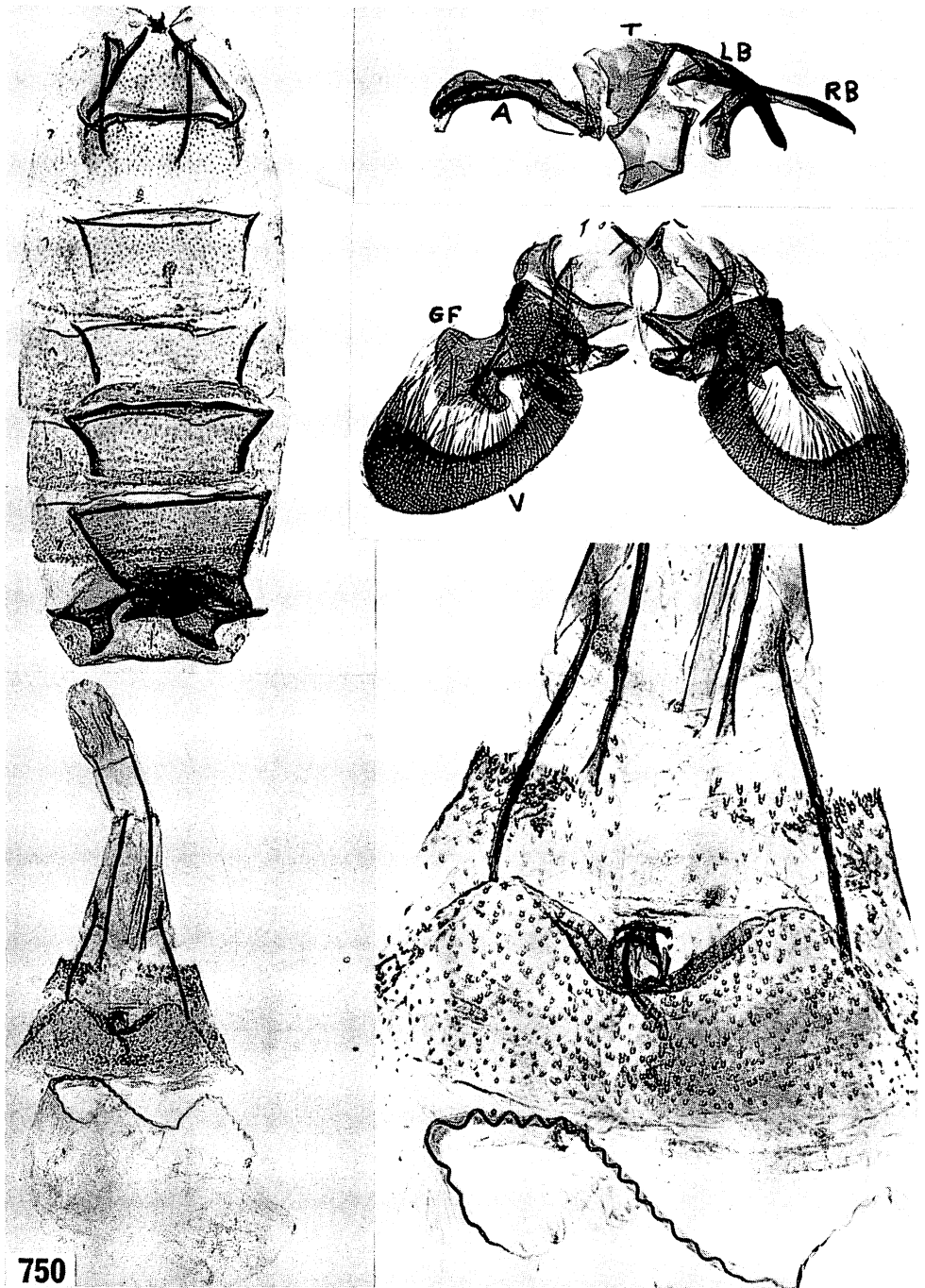


Figure 750—*Asymphorodes dimorpha* (Busck). Top left, male abdominal pelt; note the heavy sclerotizations. Top right, dorsal and ventral parts of the male genitalia (slide Z-V-23-61); Waipio, Oahu. Bottom two figures are of the female genitalia of a specimen from Kaimuki, Honolulu (slide Z-V-31-61). *A*, aedeagus and anellus lobe; *GF*, heavily sclerotized, highly modified genital "flap"; *LB*, left brachium; *RB*, right brachium; *T*, tegumen; *V*, valva. Compare figure 749.

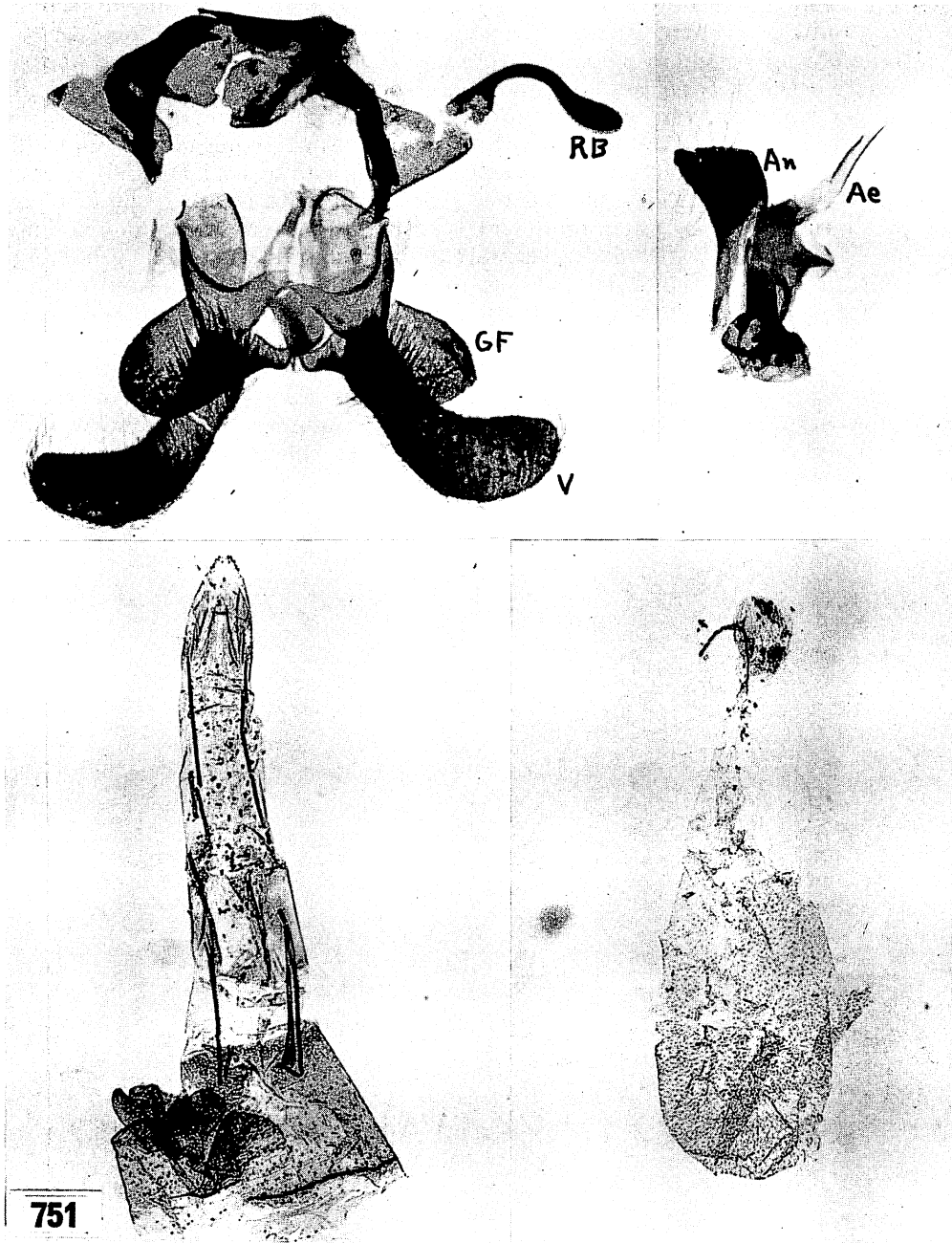


Figure 751—*Asymphorodes triaula* (Meyrick). Top, male genitalia, with the aedeagus and the closely adherent anellar lobe at right; Wailupe Valley, Oahu (slide Z-V-20-61-2). Bottom, female genitalia with the bursa copulatrix separated; Ewa, Oahu (slide Z-V-20-61-1); this abdomen appeared to be partly decomposed, and the preparation is not altogether satisfactory. *Ae*, aedeagus; *An*, anellar lobe; *GF*, genital "flap"; *V*, valva. Compare figure 752.

is, however, much more widely distributed in the Pacific than the published record indicates. There are new species to be described, and some species now assigned to other genera belong to *Asymphorodes*.

Both species of *Asymphorodes* now known to occur in Hawaii have been found in the lowlands, and one of these is also widely distributed through the Leeward Hawaiian Islands and out to various low islands in the northern Pacific outside of Hawaii. The distribution of *dimorpha* may appear to indicate that it is a lowland Hawaiian species that has been carried by man to other islands near Hawaii, but it may be much more widely distributed than is now known. The other species in Hawaii, *triaula*, has more definite characteristics of a relatively recent immigrant species. It is known thus far only from Hawaii and Oahu, where it has been collected commonly around Pearl Harbor in Honolulu and other lowland communities, but it is probably much more widely dispersed in Hawaii. Neither of the species was collected by Dr. Perkins, and this may indicate that both species became established in Hawaii after Perkins' intensive surveys were completed. *Asymphorodes dimorpha* is such a common and widely distributed species in Hawaii that it is difficult to believe that it could have

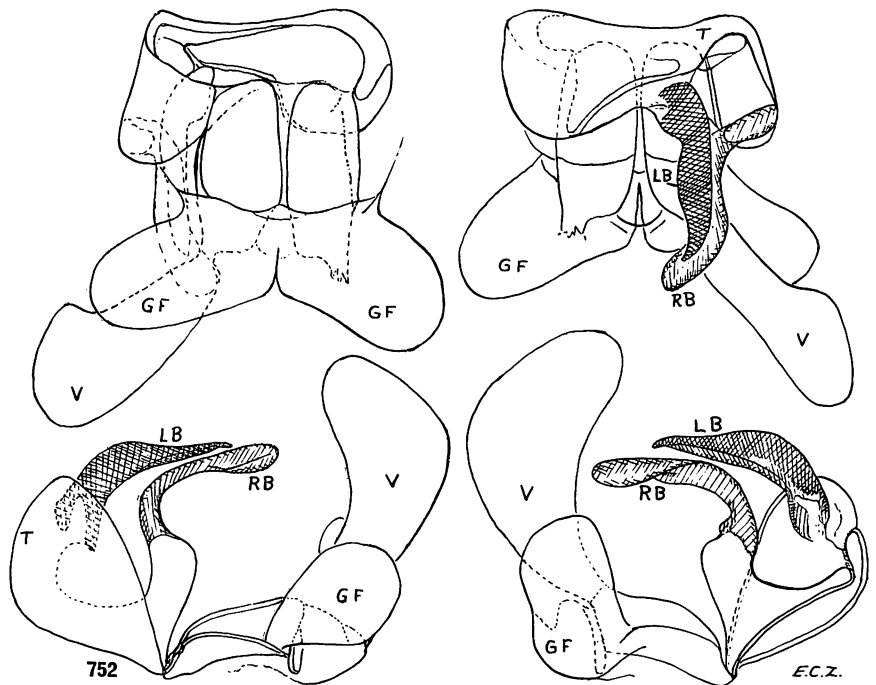


Figure 752—Diagrams of the male genitalia of *Asymphorodes triaula* (Meyrick). Part of the left valva and the aedeagus and anellus lobe have been removed. Top left, ventral aspect. Top right, dorsal aspect. Bottom left, viewed from the left side. Bottom right, viewed from the right side. Note, in the dorsal view, how the brachia are shifted toward the right side. Wailupe Valley, Oahu. GF, genital "flap" (epiptygma); LB, left brachium; RB, right brachium; T, tegumen; V, valva. Compare figure 751.

been overlooked by Dr. Perkins if it were as common during his time as it is now. Similarly, had *triaula* been long established in Hawaii, it, too, surely would have been taken earlier by Dr. Swezey. Hence, I consider both of these species to be immigrants. (Dr. Sattler has recently looked further into the matter, and he has been unable to discover either *dimorpha* or *triaula* resting under any other name in the collections at the British Museum.)

KEY TO THE SPECIES OF ASYMPHORODES IN HAWAII

1. Pronotum concolorous white or creamy; dark scaling mostly fuscous brown, figure 748; metascutum of male with a pair of extraordinary thornlike processes, as in figures 755–757; hindwing of male with greatly reduced venation and with an unusual, small, bladderlike protuberance at about middle of posterior margin of cell which projects distinctly beneath the wing, as in figure 745 . . . . . **dimorpha** (Busck).
2. Pronotum with a brown medial vitta, figure 748; dark scaling on forewings mostly much paler, more yellow brown; metascutum and hindwing of male normal . . . . . **triaula** (Meyrick).

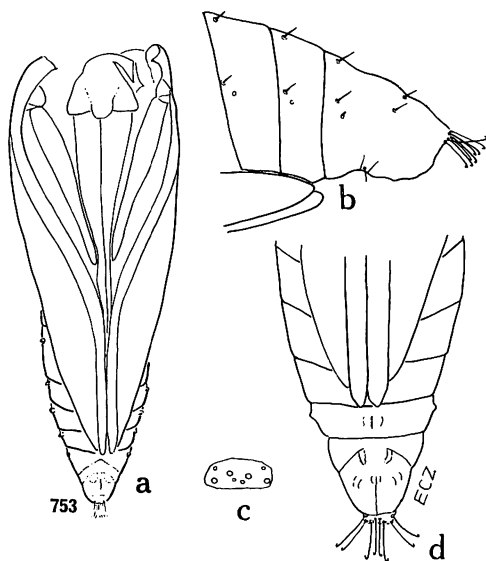


Figure 753—Details of the pupa of *Asymphorodes dimorpha* (Busck). *a*, ventral aspect of the cast skin of a male; length 4.25 mm.; *b*, lateral aspect of the caudal part of the abdomen of a cast skin of a female, with same shown in ventral aspect at *d*; at *c* is shown the pattern of the eight setal sockets of the cremaster in direct caudal aspect. Abdominal segments 5, 6, and 7 are mobile. Both specimens are from *Pandanus* at Honolulu.

***Asymphorodes dimorpha*** (Busck), **new combination** (figs. 745, head, wing venation; 747, 748, moth; 749, male genitalia; 750, male, female genitalia; 753, pupa; 754–757, metascutum and its processes).

*Petrochroa dimorpha* Busck, 1914b: 105. Williams, 1931: 157, fig. 55.

Niihau, Kauai (probable, but I have no record), Oahu (type locality: Honolulu), Molokai, Maui, Lanai, Hawaii, Nihoa, Necker, Pearl and Hermes Reef, Midway, Kure (Ocean), Wake, Canton, Jarvis.

Immigrant. Probably much more widely distributed in the Pacific than our present knowledge indicates.

Hostplants: dead leaves, dead grass, dead plant materials in turf, long eggplant (presumably in dead stems or leaf tissue), in bunch grass.

Parasites: *Chelonus* (*Microchelonus*) *blackburni* (Cameron), *Trathala flavo-orbitalis* (Cameron).

The whitish larvae do not make cases. It is a common and widespread moth of the lowlands, and the adults are often attracted to lights in large numbers. Van Zwaluwenburg (1943:309) found the species to be abundant on Canton Island where he found the larvae feeding in "the dead trash about bunchgrass clumps." The holotype is number 18431 in the U.S. National Museum. The



Figure 754—The denuded metascutum and metascutellum of an adult female of *Asymphorodes dimorpha* (Busck) for comparison with the male as illustrated in figures 755–757. Note that the wing-locking setose areas are not drawn out into thornlike processes in the female as they are in the male. See the text for discussion. Magnification:  $\times 150$ . [Scanning electron microscope photograph by Klaus Sattler, B.M. (N.H.)]

forewings of this small moth (overall length with wings folded at rest is about 5 mm.) are dark brown on about the costal two-thirds from base to apex whereas the area posterior to the brown scaling is pale creamy or whitish. Thus, when the wings are folded at rest, the moth appears brown on the sides with a broad, pale, longitudinal stripe down the middle of the back. On some examples the costal area may also have a pale vitta. Busck evidently called it *dimorpha* because, as he noted, the antennae are "in the females annulated with dark brown through their entire length, in the males annulated with dark brown only on outer two-thirds".

The hindwing of the male is most unusual. Not only is the venation much reduced, but there is a singular, bladderlike, thorn-bearing protuberance near the middle of the hind margin of the cell near the wing margin. Part of this peculiar organ projects above the dorsal wing surface, but the greatest protuberance is from the ventral surface, as shown by the accompanying illustrations. Neither Busck nor anyone else to my knowledge has commented upon the peculiar venation or the unusual process on the hindwing of the male.

The tergites of the five caudal segments of the male are heavily sclerotized. The two caudal tergites are especially distinctive and have unusual sclerotized plates. In life, the terminal segment is telescoped beneath the penultimate, and the genitalia are partially withdrawn beneath these more heavily sclerotized tergites. The structure of the abdomen is demonstrated in figure 750.

Upon first examination, the male genitalia may cause some confusion because the genital "flaps" (epiptygmata) are unique in the Hawaiian fauna. They are heavily sclerotized, irregular, angulate structures that may appear to be the valvae. I have not seen even a tendency toward such modification in any of the other Hawaiian Cosmopteriginae. The valvae are attached to the vinculum by narrow bases and are easily broken off. I was considerably confused by one of the first specimens I studied, because it had lost its valvae, and the sclerotized "flaps" appeared to be the valvae. The illustrations demonstrate the features of the genitalia.

The most extraordinary structural development of this species is, however, the astonishing thornlike processes on the metascutum of the male, as illustrated in figures 755–757. The minutely denticulate wing-locking areas on the metascutum are drawn out to form a pair of caudally directed, prominent, thornlike structures in the male, but these areas are normal in the female. This appears to be a heretofore unreported development in the Lepidoptera, and it appears to have escaped the notice of lepidopterists. I cannot offer an explanation for this remarkable structural modification being confined to the males. Observation of living moths may reveal its function. A study of the accompanying illustrations will be more instructive than additional words here.

When Klaus Sattler discovered that I was about to create a synonym by proposing a new name for this genus in Hawaii, he was led to an examination of the *Asymphorodes* material in the Meyrick collection in the British Museum. He found that the male of *valligera*, the type-species, has a metascutum formed as in *triaula* (that is, without thoracic thorns on the male), and it has a strong

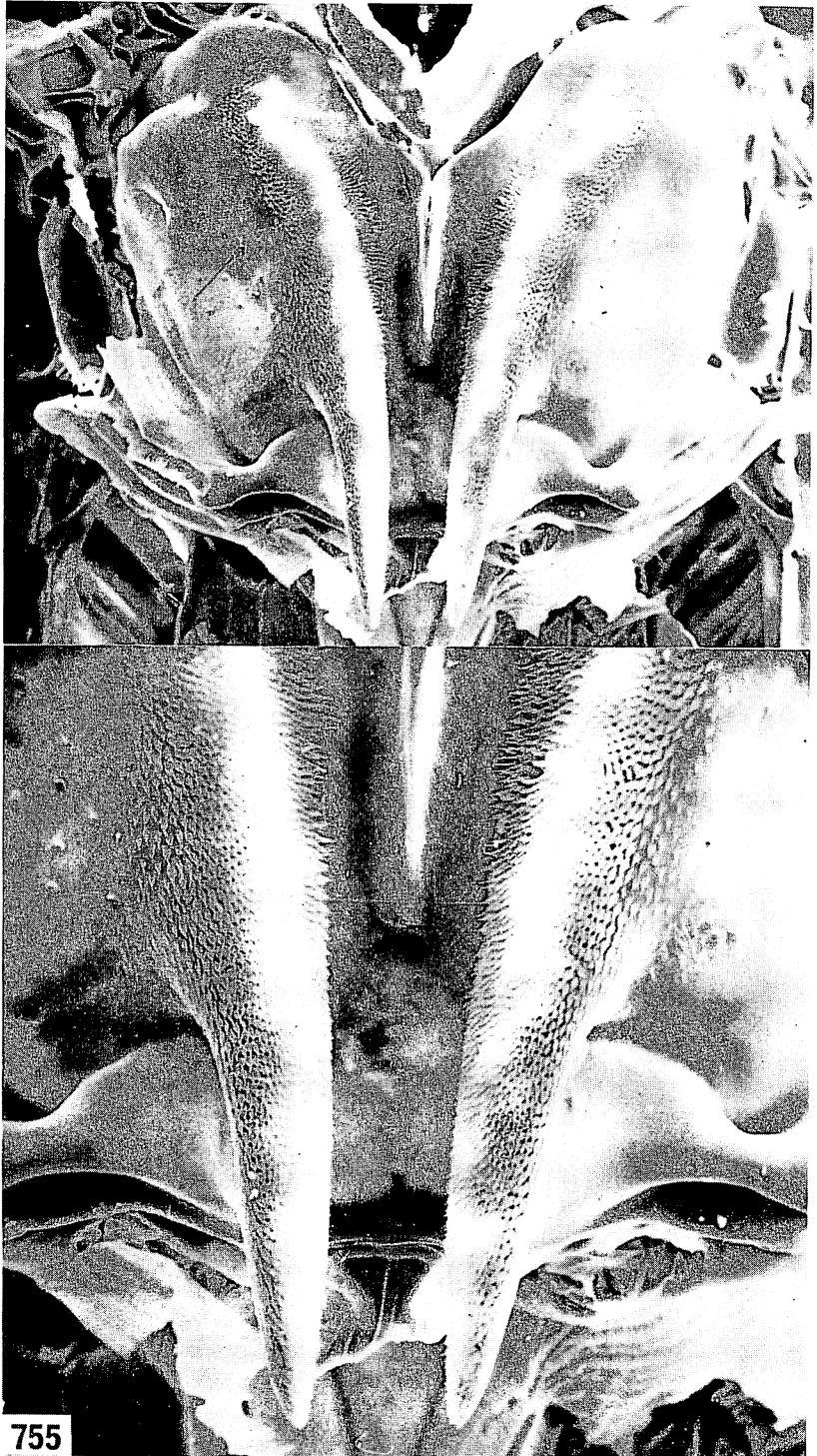


Figure 755—Two different enlargements of the unusual processes on the metascutum of the male of *Asymphorodes dimorpha* (Busck). Note that these thornlike processes are elongations of the wing-holding areas of the metascutum, and compare the different structure of the female as illustrated in figure 754. See the text for discussion. Magnification: top,  $\times 145$ ; bottom,  $\times 290$ . [Scanning electron microscope photographs by Klaus Sattler, B.M. (N.H.).]



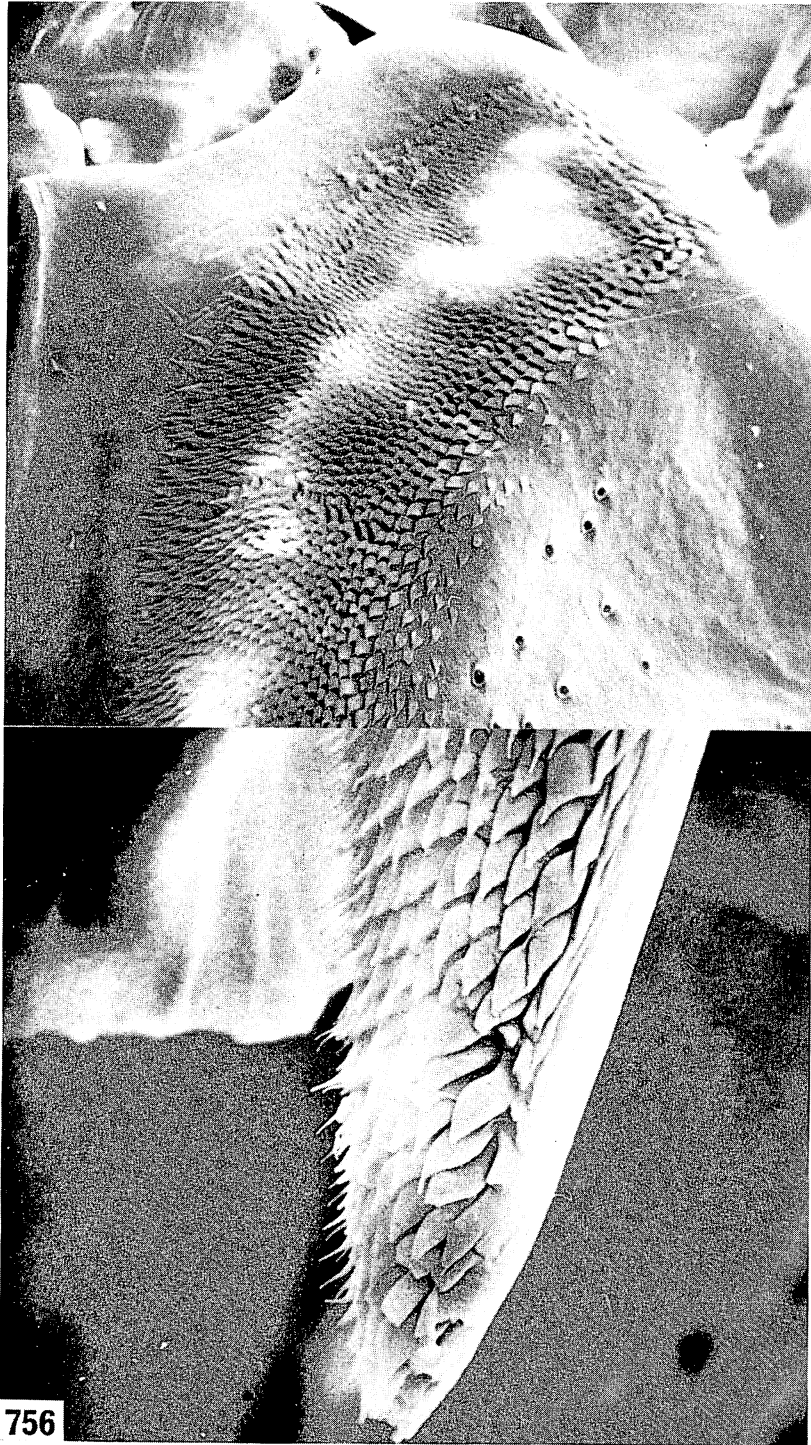


Figure 756—Enlargements of the base and apex of the right thornlike process of the metascutum of the male of *Asymphorodes dimorpha* (Busck) as shown in figure 755. Magnification: top,  $\times 500$ ; bottom,  $\times 1,450$ . [Scanning electron microscope photographs by Klaus Sattler, B.M. (N.H.).]

tuft on the underside of the hindwing as does *dimorpha*. The males of *porphyra*, *cirsodes* and *plectographa* have the strange thorn-like processes on the metascutum as does *dimorpha*, and they also have the "strange tuft" or process on the underside of the hindwing. The male of *circopis* has the thoracic thorns but lacks the hindwing structure. Neither thoracic thorns nor hindwing structures occur on *monoxesta*. Hence, Sattler has rightly concluded that it is possible to demonstrate the development of the thoracic thorns from species that show no sexual dimorphism in this regard to those that have the strange thoracic thorns developed strongly in the males only.

***Asymphorodes triaula*** (Meyrick), **new combination** (figs. 746, wing venation; 748, moth; 751, male, female genitalia; 752, male genitalia).  
*Aphthonetus triaula* Meyrick, 1935a: 63.

Oahu, Hawaii (type locality: Kona).

Immigrant. I believe that this species is an immigrant although it appears not to be known elsewhere. The first examples were collected by Prof. S. Issiki, at Kona, in January, 1923. It was not found by Dr. Perkins, and Dr. Swezey did not collect it until his later years. In recent years it has been collected in

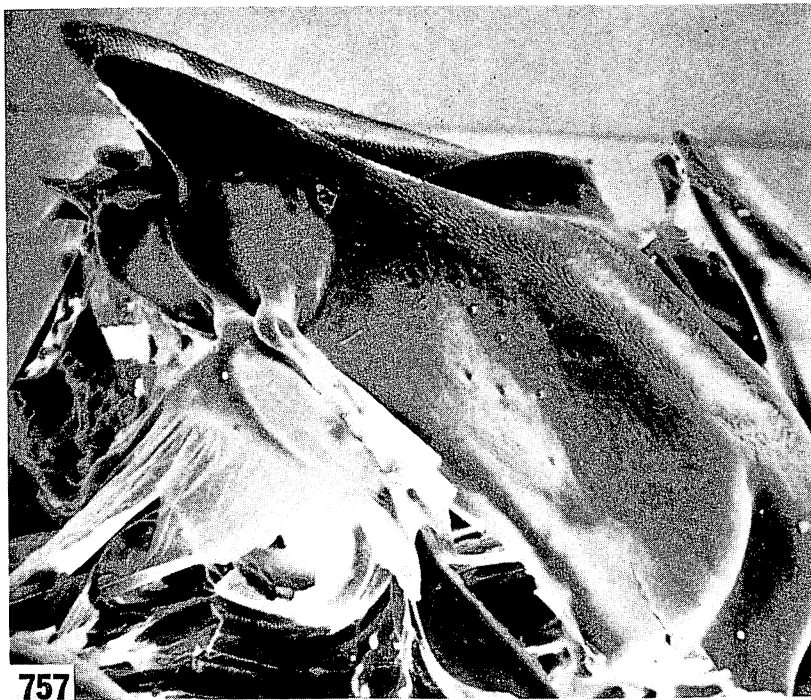


Figure 757—The thornlike processes on the metascutum of the male of *Asymphorodes dimorpha* (Busck) shown on figures 755 and 756 in right lateral aspect. Magnification:  $\times 200$ . [Scanning electron microscope photograph by Klaus Sattler (B.M. (N.H.).)]

numbers at lights in Honolulu, Pearl Harbor, Kaneohe, and elsewhere near the seashore on Oahu. J. W. Beardsley kindly examined collections in Honolulu for me, and he reported that the earliest record he has seen for Oahu is January, 1942.

Hostplant: unknown.

Meyrick failed to note the strong subcostal brush on the hindwing of the male nor did he mention the strong antennal pecten (about five setae). There is also a small brush on the posterior margin of the forewing of the male.

The abdomen of the male of this species lacks the peculiar sclerotizations which are found on *dimorpha*, and the genital flaps are not highly modified. The ostium of the female, however, is more heavily sclerotized and complicated than it is in *dimorpha*. There are no thornlike processes on the metascutum of the males as there are on *dimorpha*. The illustrations demonstrate these features.

### Genus **HYPOSMOCOMA** Butler

*Hypsmochoma* Butler, 1881:399. Type-species: *Hypsmochoma Blackburnii* Butler, 1881:400, monotypic. Walsingham, 1907b:549.

*Hypsmocoma*: Walsingham, 1907b:549, emendation (see p. 1079 below).

For synonymy, see the details under *Hypsmocoma* (*Hypsmocoma*) and *Hypsmocoma* (*Euperissus*) below.

See color plates 5, figures 5–8; 6, figures 1–8; 7, figures 1–8; 8, figures 1–4.

We now come to the greatest assemblage of Hawaiian Lepidoptera—the extraordinary endemic *Hypsmocoma* complex. It is one of the most fascinating and challenging groups of insects I know. It is truly remarkable. It is unusually rich in material for the study of evolution, and the extent of its astonishing developments cannot be adequately appreciated without detailed study. The more one studies the complex the more overwhelming appears the extent of its diversity and the trends and products of its evolution. Most unfortunately,

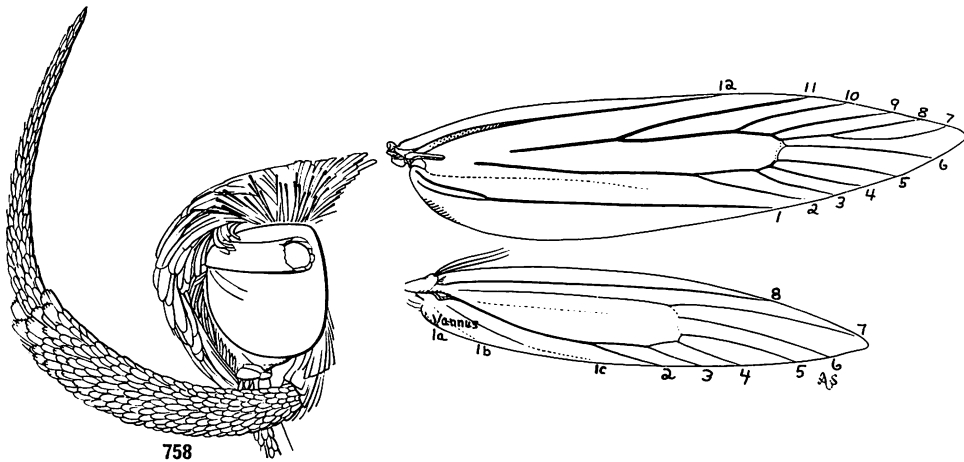


Figure 758—Head and wing venation of *Hypsmocoma* (*Hypsmocoma*) *blackburnii* Butler, female (BM slide 1190); Olinda, 4,000 feet, Maui. This is the type-species of *Hypsmocoma*.

what I have to record here is mostly the result of inadequate observation. I have not been allowed the time nor given the support necessary properly to study and to analyze this group. I should have liked to have had the opportunity to spend several years in the field and laboratory to prepare this chapter. An entire lifetime of profitable and exciting research could be devoted to the study of *Hyposmocoma* without exhausting the possibilities of revealing new and interesting facts. If I could only find a way of doing the work, I would gladly devote the remainder of my life to the study of *Hyposmocoma* alone.

The *Hyposmocoma* complex has not been understood because previous authors have failed to study the all-important and astonishingly varied genitalia. I have, therefore, found it necessary to combine 13 "generic" names under *Hyposmocoma*. This will no doubt appear to be drastic action, but it has not been



Figure 759—Head and wing venation of *Hyposmocoma* (*Euperissus*) *semifuscata* Walsingham, holotype male (BM slide 4140); Kona, 3,000 feet, Hawaii.

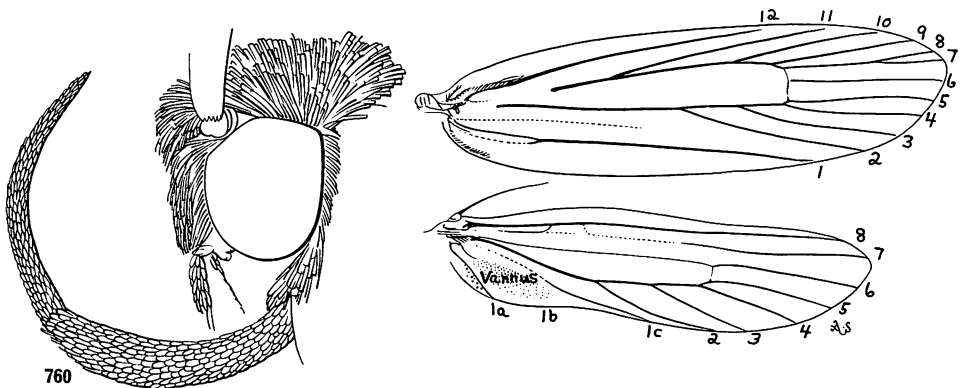


Figure 760—Head and wing venation of *Hyposmocoma* (*E.*) *cristata* (Butler), holotype (BM slide 4390). This is the type-species of *Euperissus*. The dotted area on the vannus of the hindwing indicates the sockets of the hairs of the vannal tuft.

done lightly or quickly. I have reached this conclusion only after study which has convinced me that *Hyposmocoma* is an enormous cluster of species in a remarkable state of explosive speciation and radiation which is diverging in many directions. Its extremes may at first sight appear to represent distinct genera. However, the links which tie the extremes to the center remain, and the blends from one extreme to the other can be demonstrated. Extinction of intermediate forms has not taken place to any noticeable degree.

If one were to select extreme species, or groups of extreme species, it would perhaps be possible to use many of the generic names which I have synonymized. Other new groups could be named, provided that superficial characters were used to separate them and that the intermediate species were ignored or unknown. I have, however, been unable to recognize the groups of other authors as genera. I have been equally unsuccessful in characterizing most of the groups as subgenera because there are intermediate forms which blend most groups into others and interlink the huge number of species in a manner which seems to defy such segregation.

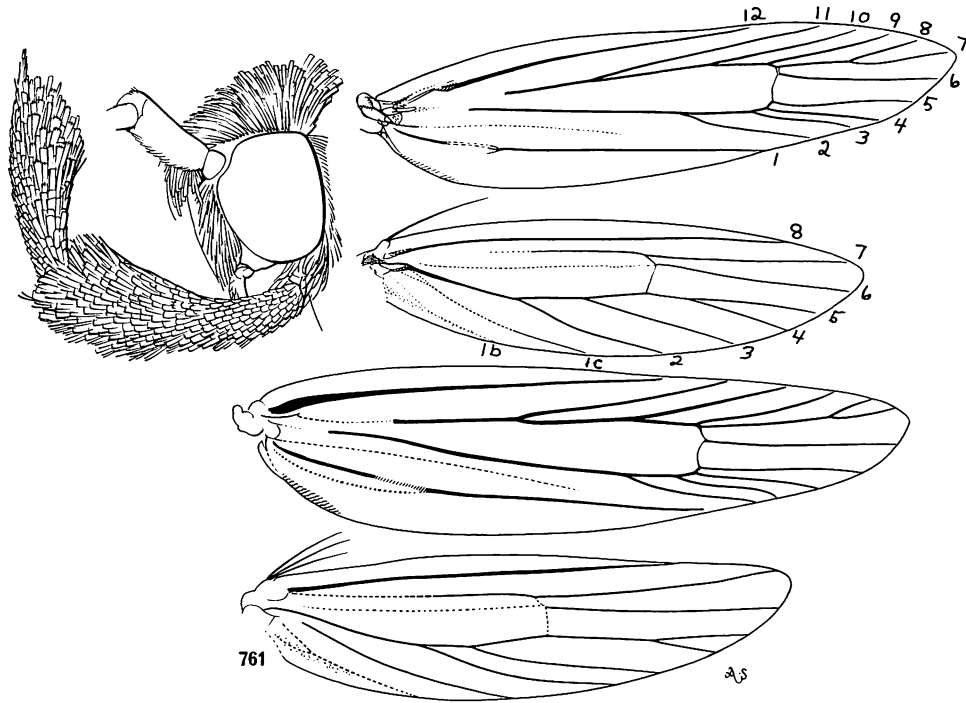


Figure 761—Head and male and female wing venation of *Hyposmocoma* (*H.*) *lignivora* (Butler). This is the type-species of *Diplosara*. Head from the allotype female, Oahu. Male wings from the holotype male (BM slide 9609), Oahu. Female wings from a specimen from Lanihuli, Oahu (slide Z-XII-62-3). This is the only species group of *Hyposmocoma* known to have palpi whose terminal segments are so expanded by the vestiture. Compare the many other palpi illustrated in figures 778 to 787. In the hindwings, veins 4 and 5 vary from being separate to connate, to short stalked, to long stalked. As noted in the main text, this species combines characters of *Euperissus* and *Hyposmocoma*.

Walsingham, who described most of the "genera" and species of the complex, did not prepare any keys. He may have tried to do so but found it impossible. Meyrick, who described one "genus" and a number of species, wrote no keys. Swezey, who described one "genus" and several species and wrote most of what is known about the biology, wrote a key to the "genera" known in 1909 (abstracting details regarding "key characters" from literature), but his key is unworkable. Busck described a "genus", which actually contained representatives of two genera, which cannot be maintained. He tried to make a key to the "genera", based upon Swezey's attempt and augmented by some brief studies of his own, but Busck's key failed in manuscript.

The task confronting Walsingham and his very able and faithful assistant Durrant when they undertook to prepare the *Fauna Hawaiiensis* report on Perkins' wonderful and extensive collections was formidable. It is remarkable that their difficult task was completed. (Durrant should be given great credit for his contribution—it may be that it was largely because of his work that the task was completed. He should have been named coauthor of the *Fauna Hawaiiensis* report on the Microlepidoptera.) Walsingham said (1907b: 743):

It will be recognized by all practical workers that the examination of so large a collection has been no easy task. The specimens, although for the most part in good condition, were merely pinned on blocks of cork with a dated locality label beneath. On each block were insects of various sizes, thus every specimen had to be provisionally registered before they could be relaxed in groups selected according to size, and therefore according to the amount of moisture required, the provisional labels being of course rendered useless after damping, and serving only to preserve a reference to the details in MS. All were repinned and set. The amount of mere manual labour which this involved has been a severe tax upon the time and industry of my assistant Mr. Durrant, but that was after all only the lighter part of his work. He has also undertaken for me a detailed examination of structural characters, and the sorting-out of species and genera preparatory to final arrangement and description.

If anything could have damped the enthusiasm of a specialist devoted to his subject the genera *Hyposmocoma*, *Aphthonetus*, *Neelysia*, and *Heterocrossa* [*Carposina*] would assuredly have done so, but in verifying his work I have found scarcely any errors and these only such as were absolutely unavoidable in dealing with such a mass of material. He examined the neuration and other minute structural characters of every specimen in the collection. Many which were almost absolutely similar in colour and markings were found

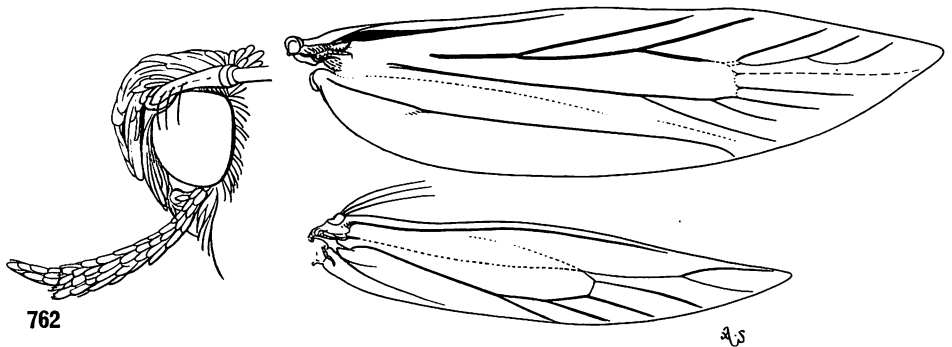


Figure 762—Head and wing venation of *Hyposmocoma* (*H.*) *flavipalpis* (Walsingham), holotype (BM slide 4309); Haleakala, 4,000 feet, Maui. The palpi are normally upturned. This is the type-species of *Agonismus* Walsingham.

to differ in more important respects, and the discovery of one difference invariably led to the recognition of others which had at first sight been overlooked. Generic separation, which at first seemed obvious, had frequently to be discarded as valueless, and the work had thus to be done three or four times over before a satisfactory conclusion could be reached. I cannot sufficiently commend, or acknowledge, the patience and perseverance with which he has relieved me of by far the greater part of this labour and made my task, if not actually easy, yet far less painfully exhausting than his own.

Walsingham stated further (1907*b*: 741):

Mr. Perkins informs me that a very large proportion of the species dealt with in this paper were obtained by searching upon trunks of trees and among dead leaves under forest growth. As might be expected under such circumstances many of them were proved to be case-bearers, and without doubt this habit is characteristic, especially of such genera as are found rich in species. The most commonly known European case-bearing Tineina are those of the genus *Coleophora*, Hb., and it is at least a coincidence that in the perfect state these are also extremely difficult to distinguish from each other without some knowledge of their preliminary stages. Many attempts have been made to recognize characters of generic value among the numerous species of this genus, but *Coleophora*, as now generally accepted, presents a gradation of structure which not only fails to afford satisfactory lines for higher classification, but sometimes increases the difficulty of determining the limits of rightly accepted species. This applies specially to the more or less fugitive hair-scales at the base of the antennae, sometimes well-developed, sometimes weak, and often absent. If all the known species of Holarctic *Coleophorae* (many of them represented by a single specimen) were mixed together in a series of store-boxes it would not be more difficult to identify the species correctly, without any clue to their life-histories, than it has been to work through a correspondingly numerous collection of

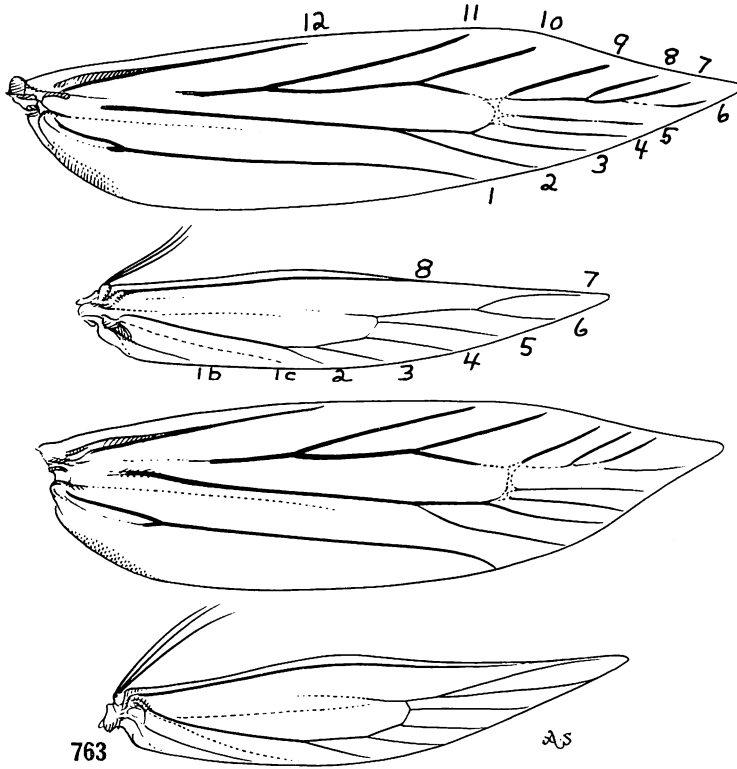


Figure 763—Head and wing venation of *Hyposmocoma* (*H.*) ("Agonismus") species. Top, *argentifera* (Walsingham), paratype (BM slide 5434); Kilauea, Hawaii. Bottom, *coruscans* (Walsingham), paratype (BM slide 5433); Kona, 4,000 feet, Hawaii.

the genus *Hyposmocoma*, Btl., consisting of at least 170 species, and to determine the limits of special variation. Yet it will be obvious to anyone acquainted with the subject that a series of *Coleophorae* selected at random would almost certainly include several consistently distinct species.

If the above illustration may convey some idea of the interminable series of mutations by which the differentiation of species has progressed, a study of generic characters is almost equally confusing.

And on pages 738–739, Walsingham said :

One thing certainly strikes us very forcibly in regard to the close affinity of species and the extreme difficulty of finding reliable and persistent generic characters, viz. that the Hawaiian *Microlepidoptera* are in a condition of progressive, and at present imperfect, differentiation. For, whereas in all other continental collections we find an abundance of distinct and easily recognisable species and genera, intermixed with some few only difficult to identify, the Hawaiian *Microlepidoptera* are in the great majority of instances so closely allied, or so confusingly similar, as to present the utmost difficulty in any attempt at classification and description. Each prevalent form seems to possess representatives in the various islands, but these are scarcely ever absolutely inseparable *in series*, and possess in each case some distinctive peculiarity of colour, or markings, or secondary sexual characters, which seems to entitle them to recognition as at least geographical species. It is not uncommon to find in a long series of specimens, apparently similar at first sight, that a certain proportion of the males possess an expansible subcostal hair-pencil at the base of the hindwings which is wanting in others, and a minute examination usually discloses persistent differences, however slight, which enable the species to be distinguished from each other in either sex. I was at first disposed to regard this sexual character as of generic value, but the idea was ultimately abandoned in view of the varying degree in which it was represented, and of the precise similarity, in all other structural details, of the very numerous specimens under observation. The same plasticity extends to other structural characters, such as the pecten on the basal joint of the antennae, the clothing of the tibiae, the comparative breadth of the fore and hindwings, and the relative length of the palpal joints; the neurulation also is occasionally unstable. . . .

In their final arrangement in *Fauna Hawaïiensis*, Walsingham and Durrant placed 177 species in *Hyposmocoma*, but previously, in the manuscript, they had divided these species into other generic groups. This can be seen from Walsingham's statement in his 1908*b*:109 note renaming one of his species: "When combining tentative MS. genera, abandoned through the occurrence of intermediate forms, the idionym *nebulifera* was inadvertently used twice in the genus *Hyposmocoma*." It is of interest that, except for this lapse, Walsingham never used the same trivial name for more than one species in the entire complex

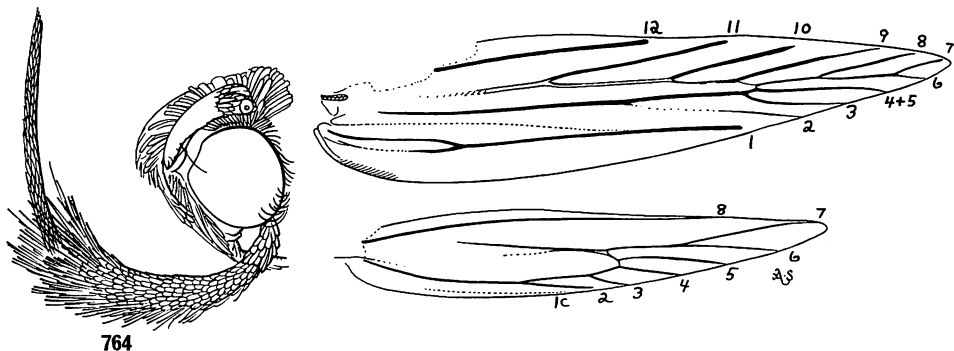


Figure 764—Head and wing venation of *Hyposmocoma* (*E.*) *diffusa* (Walsingham), holotype (BM slide 4423); Olinda, 4,000 feet, Maui. This is the type-species of *Aphthonetus*. There is a great range of variation in the form and vestiture of the labial palpi in the *Aphthonetus* group. The form of this species is characteristic of many, but not all, of the species in this group. For example, the palpi of *kauaiensis* have shorter terminal palpal segments, and there are four spines in the antennal pecten. The labial palpi of *fluctuosa* have widened second palpal segments which appear shorter and broader and which are not hairy.



of about 250 species in the 11 generic names he used. It is possible he anticipated that some of his "genera" might eventually be merged.

As further evidence of Walsingham and Durrant's failure in their attempts to divide *Hyposmocoma*, we find that a number of the types of *Hyposmocoma* bear the unpublished name "*Eccomotria*" instead of *Hyposmocoma*. These species are scattered through the series of *Hyposmocoma* as they were finally arranged and published. I do not know what character or characters Walsingham and Durrant tried to use to separate this supposed group. In any event, such an arrangement is untenable because the list includes unrelated species in both *Hyposmocoma sensu stricto* and subgenus *Euperissus*. The following is a list of the species which I have noted as bearing the "*Eccomotria*" label (the question marks are as used by Walsingham and Durrant):

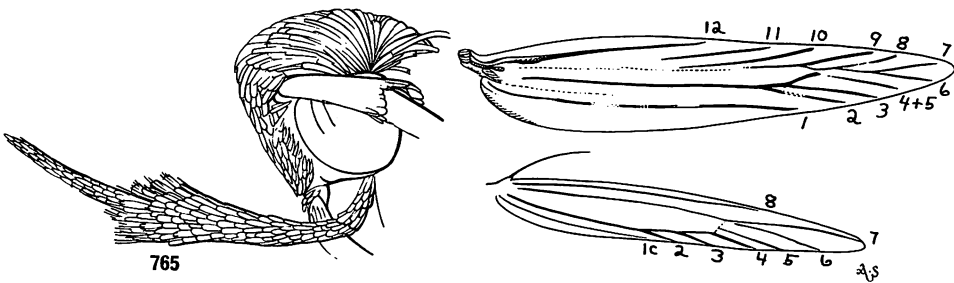


Figure 765—Head and wing venation of *Hyposmocoma (E.) rutilella* (Walsingham), holotype male (BM slide 4422); Kauai, 3,000 to 4,000 feet. This is the type-species of *Rhinomastrum*. Note that the forewing has only 11 veins; 4 and 5 appear fused, a not unusual feature. The hindwing was damaged, and it is not spread flat on the mount. I believe that the drawing may be too narrow from the base to near the middle so that the contour may be incorrect. Compare figure 766.

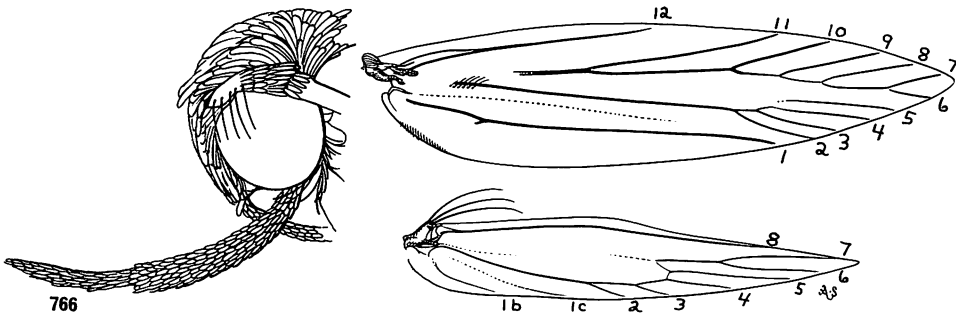


Figure 766—*Hyposmocoma (H.) scapulella* (Walsingham), head and wing venation of the female holotype (BM slide 5290); Oloa, Hawaii. Compare figure 765.

<i>argentea</i>	<i>leporella</i>	? <i>punctiplicata</i>
<i>auroargentea</i>	<i>lineata</i>	<i>quadristriata</i>
<i>commensella</i>	? <i>lucifer</i>	<i>rhabdophora</i>
<i>exornata exornata</i>	<i>maestella</i>	<i>scandens</i>
<i>exornata flavicosta</i>	<i>ocellata</i>	<i>subargentea</i>
<i>fulvocervina</i>	<i>oculifera</i>	<i>tenuipalpis</i>
<i>lacertella</i>	<i>persimilis</i>	? <i>trilunella</i>
<i>lebetella</i>	<i>picticornis</i>	<i>unistriata</i>

In his generic redescription of *Hyposmocoma*, Walsingham (1907b:549) said that it is "a variable genus containing many species in a plastic state of development". He then stated: "Distinctions founded on the relative lengths of the joints of the palpi, the comparative breadths of the wings, the presence or absence of raised scales, and the possession or lack of secondary sexual characters, which at first seemed of morphic value, and to indicate the possibility of subdividing the long series included in this genus, had to be abandoned for intermediate forms rendered it impossible to maintain any subdivision however distinct the subdivision appeared to be when founded on a single species." My figures 778 to 787 of the range of variation in the labial palpi illustrate the futility of any attempt to segregate *Hyposmocoma* into generic groups based upon the labial palpi.

Walsingham and Durrant, furthermore, had difficulty in limiting *Neelysia*. We find that several of the species which they finally described in *Fauna*

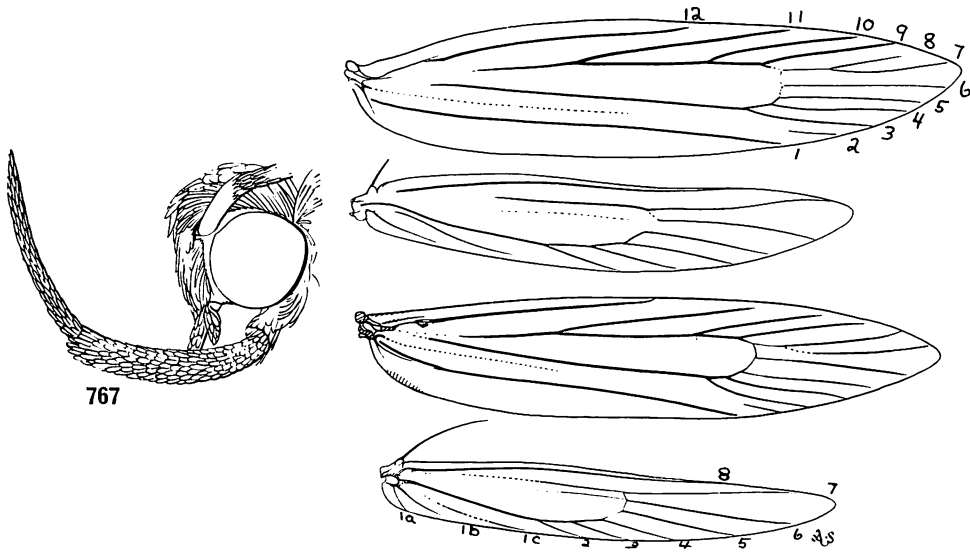


Figure 767—Head and wing venation of *Hyposmocoma* (*Euperissus*) species. Head and upper wings are from the holotype male (BM slide 4392) of ("Neelysia") *lignicolor* (Walsingham); Haleakala, 5,000 feet, Maui. This is the type-species of *Neelysia*. Bottom wings are of ("Neelysia") *tigrina* (Butler); Haleakala, Maui (BM slide 5446).

*Hawaiiensis* as *Neelysia* were included in manuscript as *Hyposmocoma*, and they bear that generic label in the type collection today. The species of *Neelysia* that I have noted that were originally labeled as *Hyposmocoma* are: *argyresthiella*, *nemoricola*, *ningorella*, *poeciloceras*, and *rediviva*.

When Butler (1879, 1881, 1882) described the first members of this group, he was so confused by them that he placed the 12 original species he described from the Reverend Blackburn's collections in six genera (*Scardia*, *Gracillaria*, *Laverna*, *Chrysoclista*, *Hyposmocoma*, and *Euperissus*) which he assigned to four families (Tineidae, Elachistidae, Gracillariidae, and Gelechiidae)! Thus, he described *Hyposmocoma* for *blackburnii* only, and he then incorrectly placed it in the Gelechiidae (instead of in the Cosmopterigidae) and wrongly allied it to the American *Holcocera*, which American lists now include in the Blastobasidae. He also placed *Euperissus* with its then single species *cristatus* in the Gelechiidae and wrongly associated it with the foreign *Taruda* and *Cryptolechia*, a xyloryctid. He wrongly described *auripennis* as a *Gracillaria* in the Gracillariidae. In

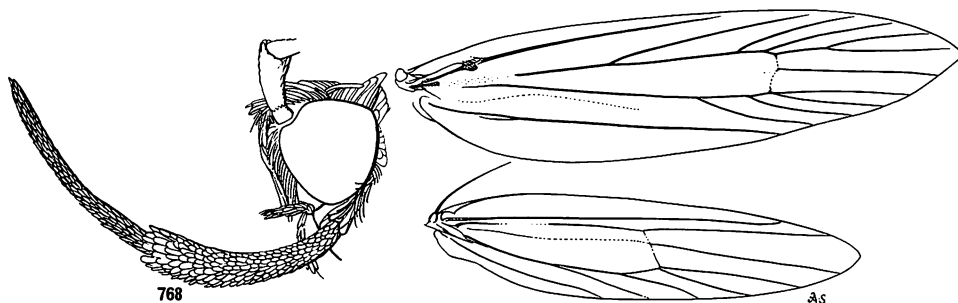


Figure 768—*Hyposmocoma* (*H.*) *semicolon* (Walsingham), holotype male (BM slide 4395); Kaholuamano, 4,000 feet, Kauai. Note the connate veins 4 and 5 in both wings. They are stalked in some specimens, and this character is variable. Note also the short cell in the hindwing. This is the type-species of *Dysphoria*.

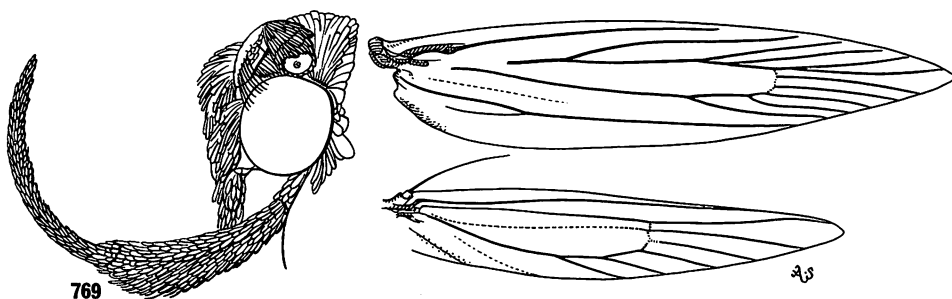


Figure 769—*Hyposmocoma* (*E.*) *subburnea* (Walsingham), head and wing venation of the holotype male (BM slide 4394); Molokai, about 4,000 feet. This is the type-species of *Bupaloceras*. Compare the short stalk of veins 7 and 8 in the forewing with the longer stalk shown in figure 768 and the much longer stalks in figure 770.

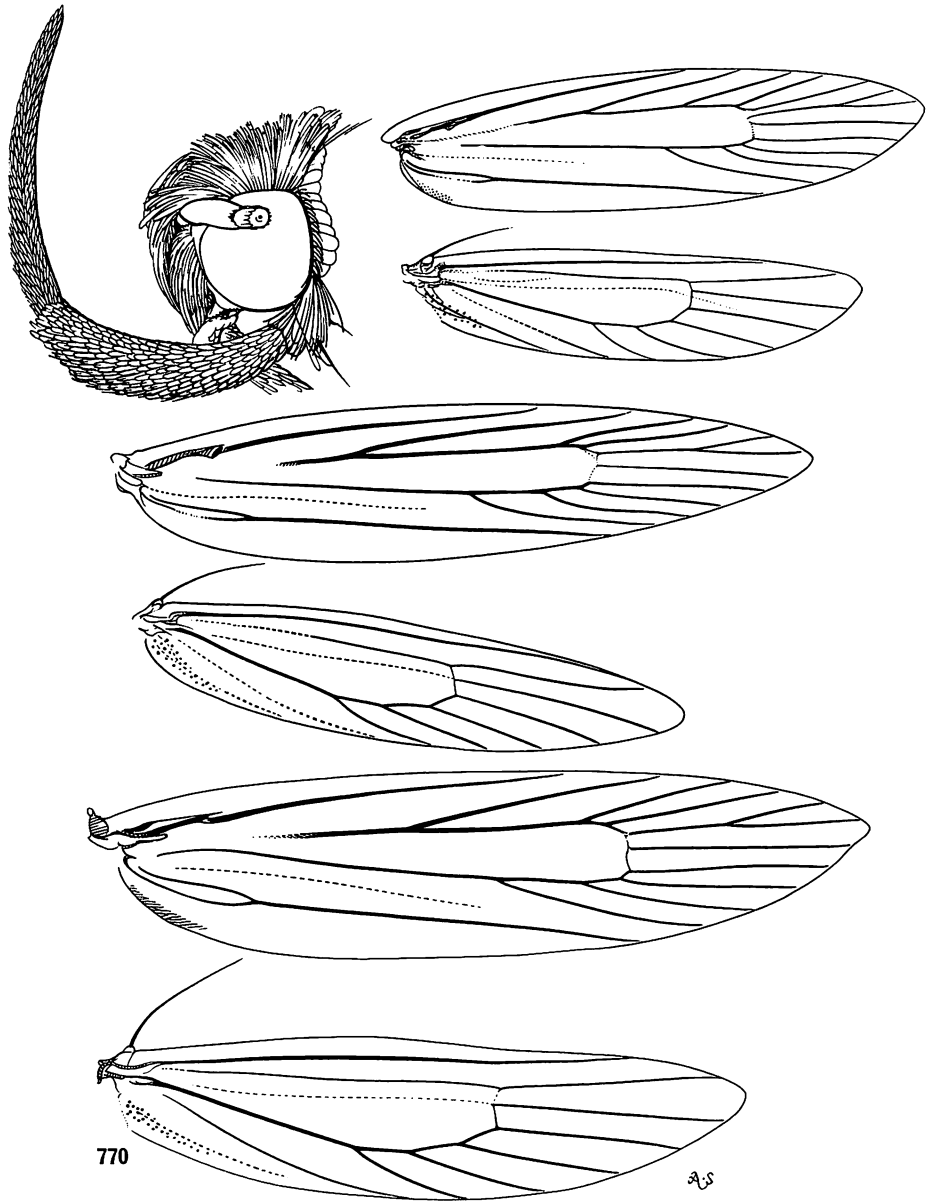


Figure 770—Details of *Hyposmocoma* (*E.*) species originally described in "*Hyperdasyella*". Top, *cryptogamiellus* (Walsingham), holotype male (BM slide 4428); Oloa, Hawaii. The type-species of *Hyperdasyella*. Note that the forewing has an abnormal 13 veins; an extra vein is between veins 10 and 11. Middle, *arundinicolor* (Walsingham), paratype (BM slide 2006; Walsingham 27282); Kauai, 3,000 to 4,000 feet. Bottom, *semiustus* (Walsingham), paratype (BM slide 2005; Walsingham 26741); Kauai, 3,000 to 4,000 feet.

*Laverna*, which he placed in the Elachistidae, he described *abjecta*, *aspersa*, *corvina*, *domicolens*, *montivolans*, and *parda*, and he also placed *tigrina* and *haleakalae* in *Chrysoclista* in the Elachistidae. He described *lignivora* in *Scardia* in the Tineidae.

The foregoing discussion demonstrates the difficulties others have encountered when trying to classify *Hyposmocoma*. All previous workers on the group have attempted to subdivide the group into genera, and they all have failed. It is obvious that the reason that such subdivision has failed is because *Hyposmocoma* is a blend from one extreme to another. It has not divided into genera in nature, although incipient subdivision is clearly evident. There

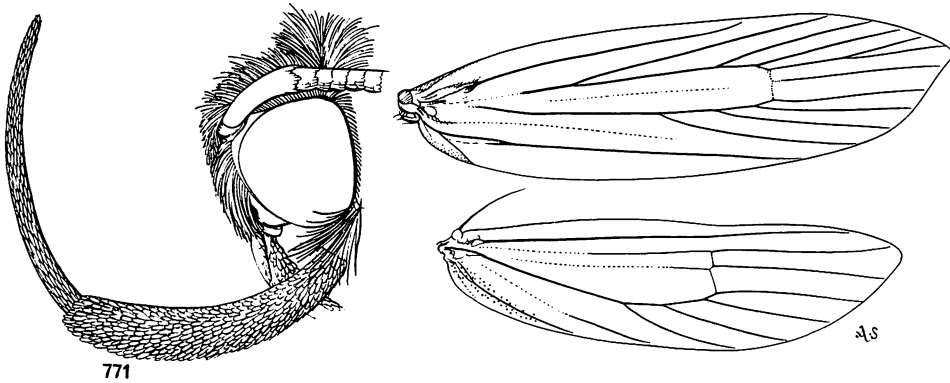


Figure 771—*Hyposmocoma* (*E.*) *fulvogrisea* (Walsingham), head and wing venation of the holotype male (BM slide 4429); Kauai, 3,000 to 4,000 feet. This is the type-species of *Semnoprepia*. Compare these broad wings with the narrow wings on figure 772, and note the differences in the palpal vestiture in the two species.

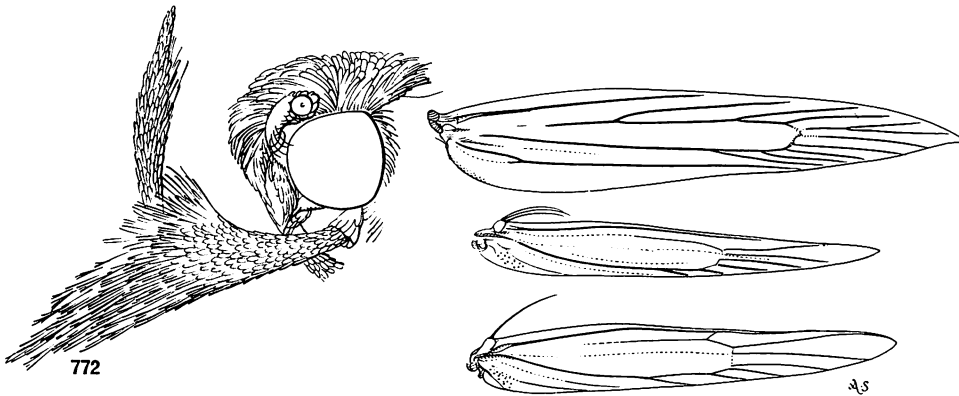


Figure 772—*Hyposmocoma* (*E.*) *ekaha* (Swezey), head and wing venation. The head is from a female, and the female wings are on BM slide 4405; Oahu. The male wings are on Busck slide 162. This is the type-species of *Euhyposmocoma*. The cross-vein between the cell and vein 8 in the hindwing of the male is evidently an abnormality; the forewing is essentially similar to that of the female.

appears to be little doubt that a number of genera could be formed from this complex if accidents of time such as rigorous extinction of intermediate forms or transference of isolated groups to other lands had occurred.

After much study, I have concluded that 13 of the 14 generic names heretofore used in this complex should be suppressed under *Hyposmocoma*. I shall now outline briefly my reasons for not recognizing these supposed genera. I shall not comment upon each detail of the generic descriptions, because when one is familiar with the great specific variability it becomes apparent that much of what has been written before is generically meaningless. An examination of my illustrations of the wing venation and palpi, for example, will clearly demonstrate the great range of specific variation, the intergradation from one extreme to another, and the impossibility of separating the complex into discrete generic units on such characters.

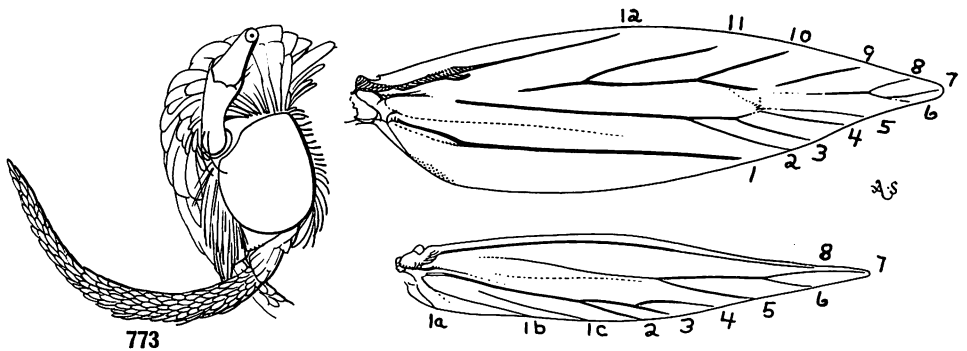


Figure 773—*Hyposmocoma* (*H.*) new species 32. Head and wing venation of a specimen formerly confused with *Petrochroa swezeyi* Busck. Note the unusual venation in which vein 6 comes out of 7 and is subobsolete in the forewing, and 4 and 5 are connate; in the hindwing 5 and 6 come out of 7 and the cell is open. There is probably considerable variation in the venation of this species. Kaimuki, Honolulu (BM slide 5212).

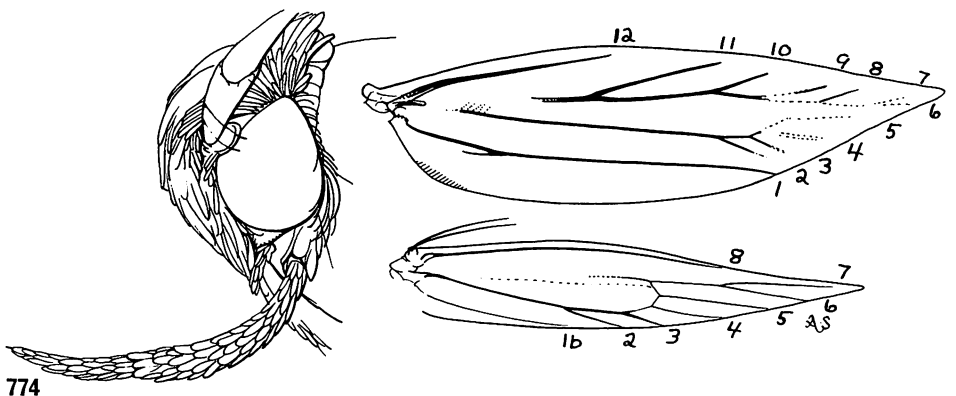


Figure 774—*Hyposmocoma* (*H.*) *longisquamella* (Walsingham), a species originally incorrectly assigned to *Elachista* by Walsingham. Head and wing venation of the female holotype (BM slide 2029); Kona, Hawaii.

**Hyposmochoma** Butler, 1881:399. In *Fauna Hawaiiensis* (1907b:550) Walsingham emended the name to *Hyposmocoma*, and he said, "The generic name was obviously given in reference to the subcostal hair-pencil, 'presumably a scent-fan' (Btl. *l.c.*). *Hyposmochoma* (χωμα = a heap) would be neuter, and it seems advisable to make the slight correction to *Hyposmocoma* (κομη = hair), feminine, which was doubtless intended." I agree with Walsingham regarding the desirability of emending the name to *Hyposmocoma*. The resurrection of the long-forgotten, and possibly erroneous, spelling *Hyposmochoma* would serve no useful purpose, and it would contribute to confusion. I appealed to the International Commission on Zoological Nomenclature to have *Hyposmocoma* placed on the Official List of Generic Names in Zoology (Zimmerman, 1969; Cowan, 1969, 1970). The Commission has now rendered "Opinion 965" which validates the emendation to *Hyposmocoma*. See Melville, 1971:78.

Butler proposed the name *Hyposmochoma* for a single species, and no author has used that spelling for any of the species since 1881. When Walsingham emended the name to *Hyposmocoma* in 1907b, he included 187 species-group names in combination with it. All authors since 1907 have consistently used the emended form. Butler specifically mentioned the subcostal brush of the hindwing in his original description, and it is obvious that he compounded the generic name to refer to it. As Butler spelled the name, Hyp = under + osmo = scent + choma = heap, mound, promontory, it would appear rather meaningless, but Hyp - osmo - coma = under - scent - hair would be meaningful in this instance. It is possible that Butler's *Hyposmochoma* was an erroneous spelling or typographical error for "Hyposmotrichoma", which would have been an appropriate Greek compound. I am indebted to Jasper Griffin, Oxford University, for advice on the Greek.

**Euperissus** Butler, 1881:401, was described in the same paper in which Butler described *Hyposmocoma*, but he did not relate it to *Hyposmocoma*. Butler was impressed principally by a specifically variable feature of the hindwing of the male, and we now know that this is not of generic importance. Butler (1881:402) stated that "the singular development of bristles from the median vein of the secondaries, in order to hold down a long hair-pencil which proceeds from the marginal abdominal furrow, is one of the most singular contrivances which I have ever observed in a Lepidopterous insect." Butler was mistaken when he stated that the hair-pencil came from the "marginal abdominal furrow" because it is what Walsingham referred to as the "limbal hair-pencil". As indicated in my illustration of the wing venation, the "hair-pencil" arises from the wing between veins 1a and 1c. It might better be called the vannal brush.

On *cristatus*, the type-species of *Euperissus*, the conspicuous bristlelike setae along the posterior margin of the cell (along cubitus) of the hindwing of the male extend from near the base to near the origin of vein 2. The setae are represented by a small cluster on the female (although Walsingham said that they were absent on the female), and the vannal brush of the female is much smaller than that of the male. *Euperissus* Butler, in its most restricted sense, represents a cluster of forms which includes the *Semnopropeia* and *Hyperdasylella* groups. Several of these are large species. The members of this section do not

have specialized spurs on the male genital valvae. If *Euperissus* could stand as a distinct genus, then *Semnoprepia* and *Hyperdasyella* would have to be merged with it. This cluster of species represents one of the many divergent lines of *Hyposmocoma*. It cannot be maintained as a genus limited by the characters defined by Walsingham because it blends into other groups of the *Hyposmocoma* complex. *Euperissus* can, however, be separated from *Hyposmocoma sensu stricto* by other characters which I shall discuss below. I have chosen to treat *Euperissus* as a subgenus of *Hyposmocoma*.

**Hyperdasyella** T. B. Fletcher, 1940: 18 (a replacement name for *Hyperdasys* Walsingham, 1907b:640, a homonym) was separated from *Euperissus* by Walsingham on specifically variable or secondary sexual characters of no

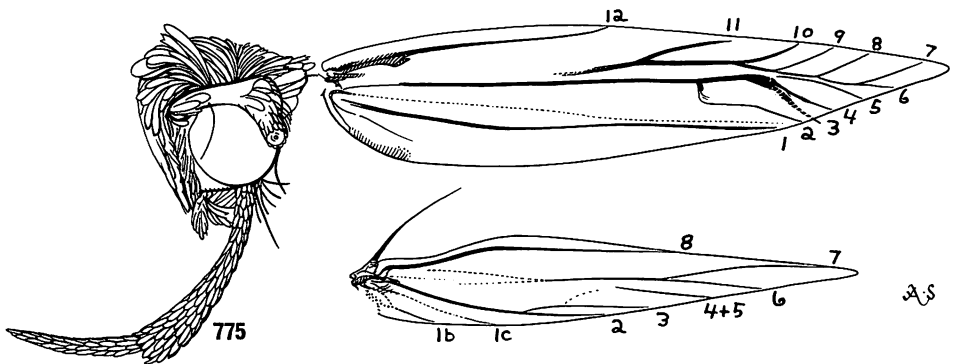


Figure 775—Head and wing venation of *Hyposmocoma (E.) sordidella* (Walsingham), holotype male (BM slide 5232). Note the extraordinary process on the underside of the forewing which is the modified vein 3 (see figure 777 for enlargement). The labial palpi are probably carried erect in life. Compare figure 776 of (*E. mystodoxa*).

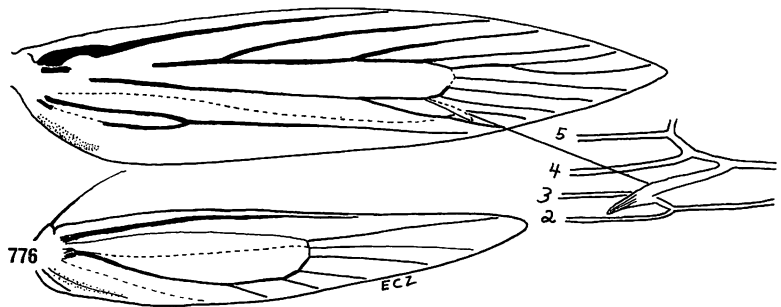


Figure 776—Wing venation of *Hyposmocoma (E.) mystodoxa* Meyrick, paralectotype male (BM slide 16344); Honolulu, Perkins, 1908. At right is an enlarged section of the ventral wing surface to show the development of the third vein into an unusual spur indicating a development parallel to the extreme form found in the remarkable (*E. sordidella* (see figures 775 and 777). It is noteworthy that these extraordinary developments occur on two species which belong to different subgroups and are not closely allied forms.



generic importance, and it cannot be retained. It falls as a synonym of *Euperissus*. Walsingham said, "The generic character of the bold fringe of hair-scales arising from the edge of the costa [of the forewing] beneath is always apparent in the male [of *cryptogamiellus*, the type-species]". He noted that these hairs are shorter on his *semiustus*.

**Semnoprepia** Walsingham, 1907*b*:644, was separated from *Euperissus* by "the absence of the fringe of hair-scales along the lower edge of the cell in the hind wing of the [male]." The name falls as a synonym of *Euperissus*.

Walsingham considered the above three "genera" to be allied to *Orthotaelia* Stephens, but, of course, that was an error. The females lack his "generic" characters, and he had difficulty assigning the females of these "genera" to their proper places. This can be seen from his statements that the female of *Semnoprepia petroptilota* "is at present unknown unless it has been wrongly referred to *Hyperdasys cryptogamiellus*", and that the females of *Euperissus cristatus* "can be distinguished from those of the very similar *Semnoprepia fulvogrisea*, Wlsm. by the grooved appearance of the palpi and by the possession of two spots before the discoidal on the forewings." These are specific, not generic, characters.

**Diplosara** Meyrick, 1883*a*:35. This is the type-genus of the supposed family Diplosaridae. When he described the "genus", Meyrick (1883*a*:35) said, "A remarkable and distinct genus, certainly belonging to the *Gelechidae*. . . ." In 1915, however, he erected his family Diplosaridae upon it. The type-species of *Diplosara*, *Scardia lignivora* Butler, 1879*b*:273, was described in the

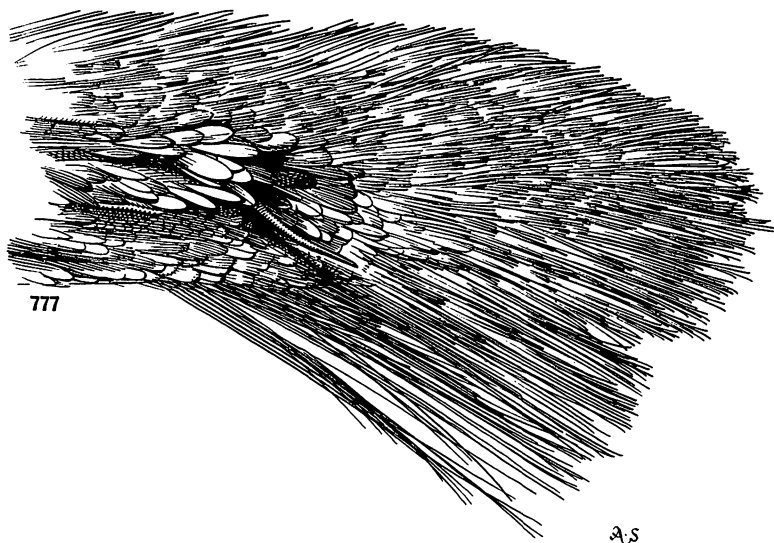


Figure 777—*Hyposmocoma (E.) sordidella* (Walsingham), underside of the distal part of the forewing of the male holotype to show the extraordinary spinelike process developed from the free and highly modified vein 3. Compare figure 775.

Tineidae. It represents one of the extreme species groups of *Hyposmocoma*. It was thought by all previous authors that *Diplosara* contained only one variable species, but I have discovered that this supposed one variable species is really a cluster of species. The characters used to maintain *Diplosara* are not of generic value, and each breaks down and blends with those of other *Hyposmocoma* groups as one examines series of *Hyposmocoma* species. The labial palpi are expanded by scales in a distinctive manner. There is a wide, dense brush of long, specialized, spinelike scales across the posterior part of the seventh abdominal segment that overhangs the base of the genitalia and is found only in this group. The clusters of erect or raised scales on the forewings are more obvious on these species than on many other species. These features are not, however, of generic value, and the genitalia and other features demonstrate that *Diplosara* is only one of the more distinctive species groups of *Hyposmocoma*. As will be explained below, it has characters of both *Hyposmocoma sensu stricto* and *Euperissus*. It thus, strangely, bridges the gap between the two major subdivisions of *Hyposmocoma*.

**Agonismus** Walsingham, 1907b:512, was said to be "intermediate between *Hyposmocoma* and *Batrachedra* Stn."—which is a meaningless statement—and he placed it adjacent to *Batrachedra* in *Fauna Hawaiiensis*. It has, of course, nothing to do with *Batrachedra*. Three unrelated species were assembled under this "generic" name, and there are no characters by which to

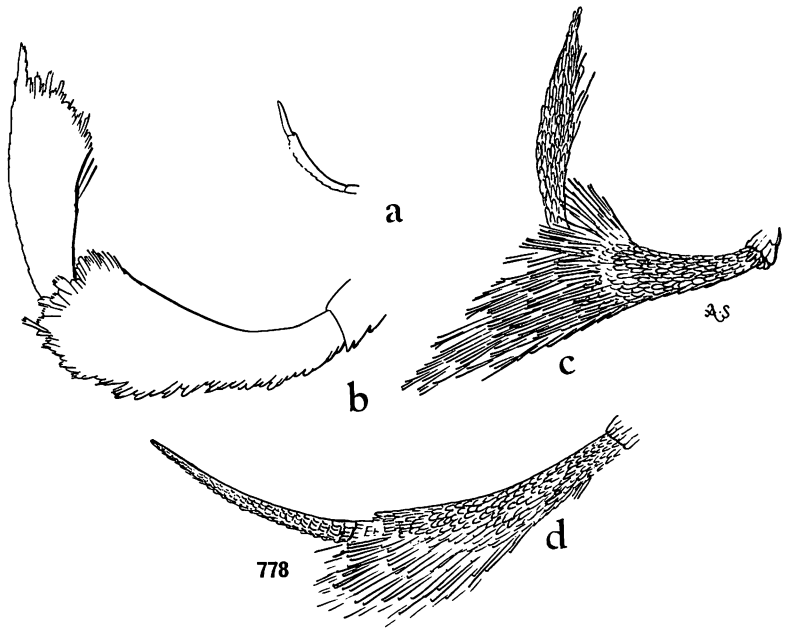
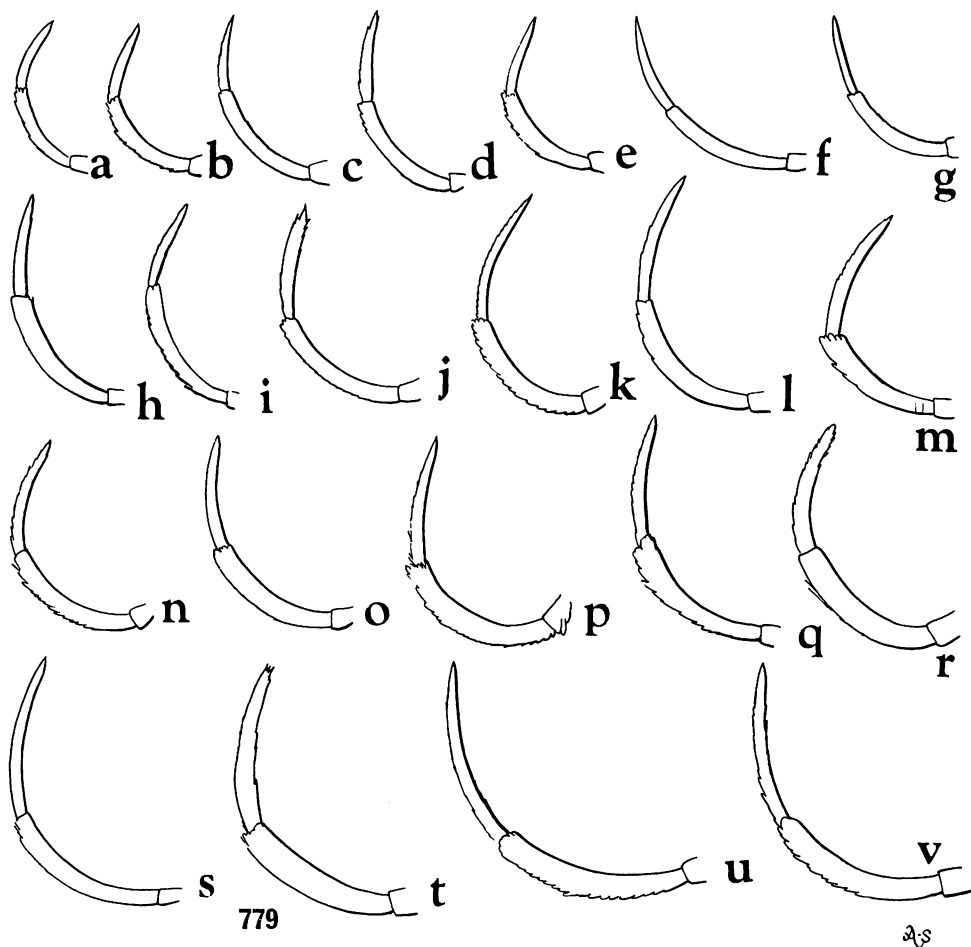


Figure 778—Examples of extremes in the development of the labial palpi in various species of *Hyposmocoma*. a, ("Agonismus") (*H. argentifera* (Walsingham), holotype female; b, ("Diplosara") (*H. lignivora* (Butler), holotype female; c, ("Euhyposmodomq") (*E. ekaha* (Swezey), female; d, (*E. barbata* Walsingham, holotype female.

maintain any of them as a genus distinct from *Hyposmocoma*. The generic description is meaningless, and the name must fall as a synonym of *Hyposmocoma*. The genitalia are typical of *Hyposmocoma sensu stricto*, and the only male I have seen (*coruscans*) has large spurs on the valvae.



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a:s

Figure 779—Sketches of *Hyposmocoma* labial palpi, drawn to same scale. *a*, (*H. saccophora* Walsingham, holotype male; *b*, (*H. triptila* Meyrick, lectotype male; *c*, (*H. auropurpurea* Walsingham, holotype male; *d*, (*H. mimema* Walsingham, holotype male; *e*, (*H. phalacra* Walsingham, holotype male; *f*, (*H. inversella* Walsingham, holotype female; *g*, (*H. pseudolita* Walsingham, holotype male; *h*, (*H. metallica* Walsingham, holotype male; *i*, (*H. trimaculata* Walsingham, holotype male; *j*, (*H. syrrhaptus* Walsingham, holotype male; *k*, (*H. rusius* Walsingham, holotype male; *l*, (*H. subflavidella* Walsingham, holotype male; *m*, (*H. paradoxa* Walsingham, holotype male; *n*, (*H. petrosia* Meyrick, lectotype male; *o*, (*H. lixivilla* Walsingham, holotype male; *p*, (*H. montivolans* (Butler), holotype male; *q*, (*E. inflexa* Walsingham, holotype male; *r*, (*H. ochreocervina* Walsingham, holotype male; *s*, (*E. obliterata* Walsingham, holotype male; *t*, (*H. schismatica* Walsingham, holotype female; *u*, (*H. mesorectis* Meyrick, holotype male; *v*, (*H. parda* (Butler), holotype female.

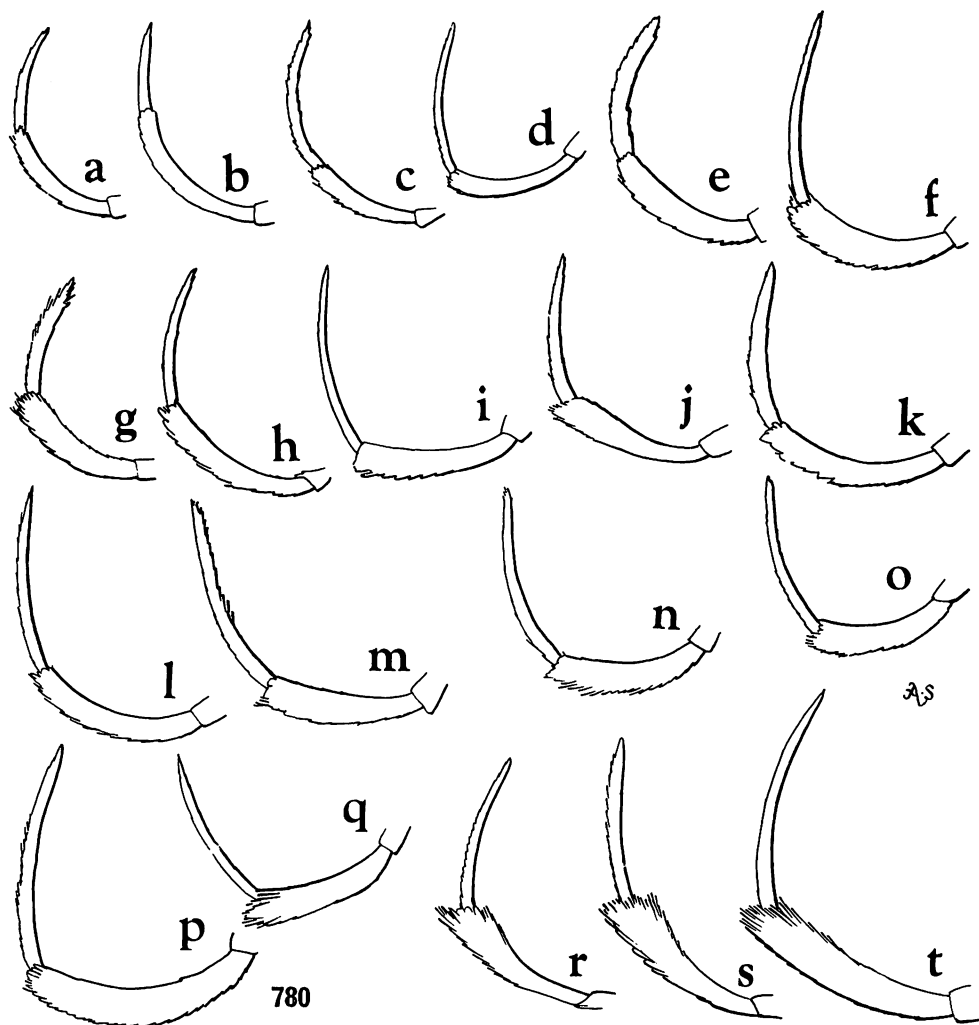


Figure 780—*Hyposmocoma* labial palpi, sketched to the same scale. *a*, (*H.*) *semifusa* (Walsingham), holotype female; *b*, (*H.*) *alveata* (Meyrick), lectotype male; *c*, (*E.*) *tischeriella* (Walsingham), holotype male; *d*, (*E.*) *psaroderma* (Walsingham), holotype male; *e*, (*E.*) *cuprea* (Walsingham), holotype male; *f*, (*E.*) *fusco-dentata* (Walsingham), holotype female; *g*, (*E.*) *complanella* (Walsingham), holotype male; *h*, (*E.*) *incongrua* (Walsingham), holotype male; *i*, (*E.*) *pluviella* (Walsingham), holotype female; *j*, (*E.*) *terminella* (Walsingham), holotype male; *k*, (*E.*) *fuscofusa* (*E.*) (Walsingham), holotype male; *l*, (*E.*) *basivittata* (Walsingham), holotype male; *m*, (*E.*) *cleodorella* (Walsingham), holotype male; *n*, (*E.*) *anthinella* (Walsingham), holotype male; *o*, (*E.*) *tigrina* (Butler), holotype male; *p*, (*E.*) *agnetella* (Walsingham), holotype male; *q*, (*E.*) *rotifer* (Walsingham), holotype female; *r*, (*E.*) *mactella* (Walsingham), holotype male; *s*, (*E.*) *exaltata* (Walsingham), holotype male; *t*, (*E.*) *municeps* (Walsingham), holotype female. All of these species were described originally in *Neelysia*.

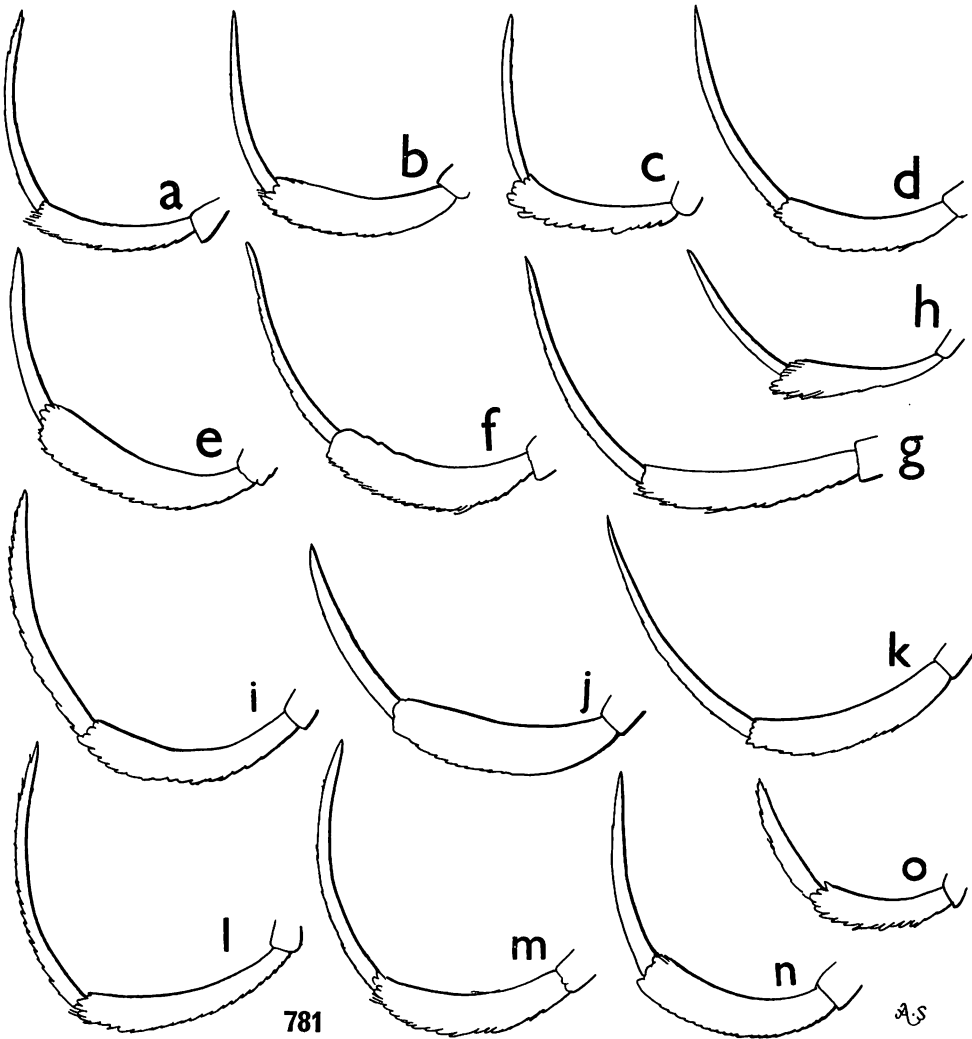


Figure 781—*Hyposmocoma* labial palpi, sketched to the same scale. *a*, (*E.*) *nemoricola* Walsingham, holotype female; *b*, (*H.*) *prophantis* Meyrick, lectotype female; *c*, (*E.*) *discolor* Walsingham, holotype female; *d*, (*E.*) *latistua* Meyrick, holotype male; *e*, (*H.*) *ochreociliata* Walsingham, holotype male; *f*, (*H.*) *quinquemaculata* Walsingham, holotype male; *g*, (*E.*) *scepticella* Walsingham (from the male holotype of *scepticella dubia*); *h*, (*E.*) *argyresthiella* Walsingham, holotype female; *i*, (*E.*) *malacopa* Meyrick, lectotype male; *j*, (*H.*) *corvina* (Butler), holotype male; *k*, (*E.*) *fulvida* Walsingham, holotype male; *l*, (*E.*) *mystodoxa* Meyrick, lectotype male; *m*, (*E.*) *ochreovittella* Walsingham, holotype male; *n*, (*H.*) *empedota* Meyrick, lectotype male; *o*, (*H.*) *turdella* Walsingham, holotype male.

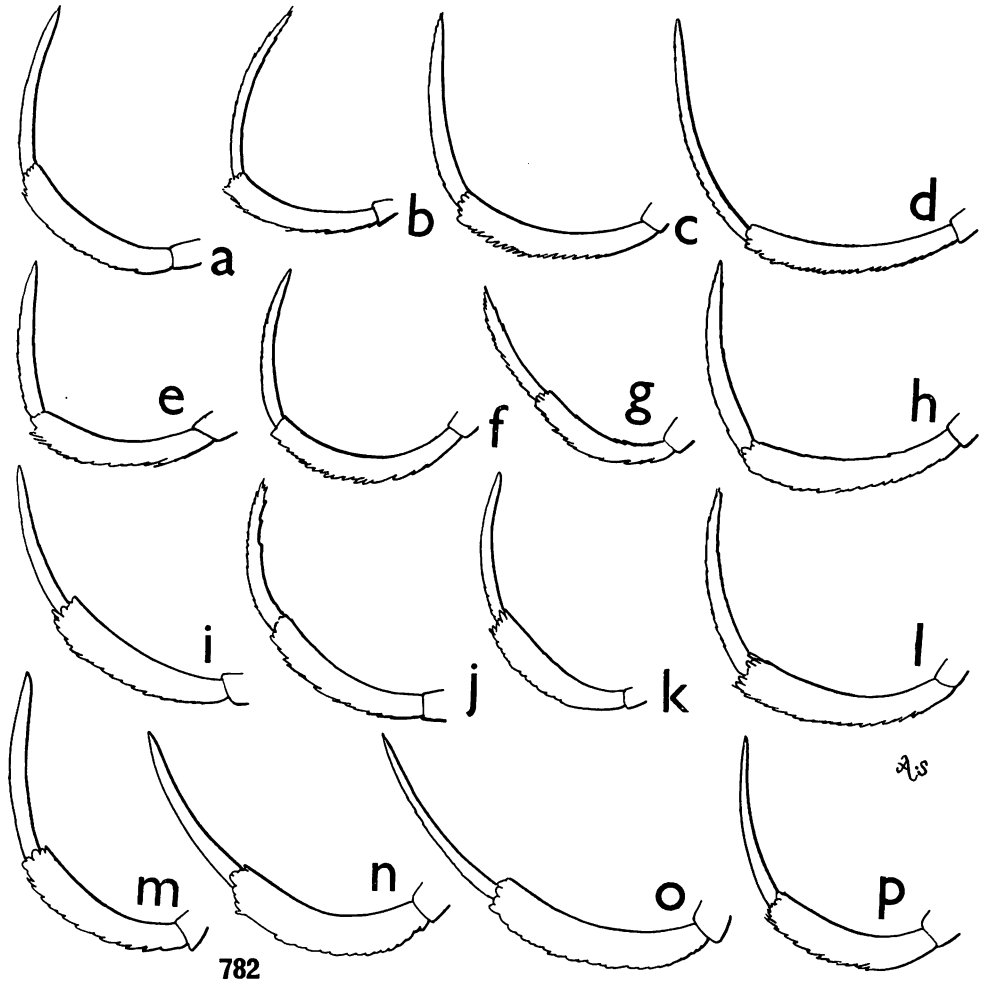


Figure 782—*Hyposmocoma* labial palpi, sketched to the same scale. *a*, (*H. endryas* Meyrick, holotype male; *b*, (*E. ningorella* (Walsingham), holotype male; *c*, (*H. thoracella* Walsingham, holotype male; *d*, (*H. geminella* Walsingham, holotype male; *e*, (*H. rubescens* Walsingham, holotype male; *f*, (*H. evanescens* Walsingham, holotype male; *g*, (*H. saliaris* Walsingham, holotype male; *h*, (*H. nephelodes* Walsingham, holotype male; *i*, (*H. fervida* Walsingham, holotype female; *j*, (*H. arenella* Walsingham, holotype male; *k*, (*H. liturata* Walsingham, holotype male; *l*, (*H. lupella* Walsingham, holotype male; *m*, (*H. irregularis* Walsingham, holotype male; *n*, (*H. conditella* Walsingham, holotype male; *o*, (*H. iodes* Walsingham, holotype male; *p*, (*H. vinicolor* Walsingham, holotype female.

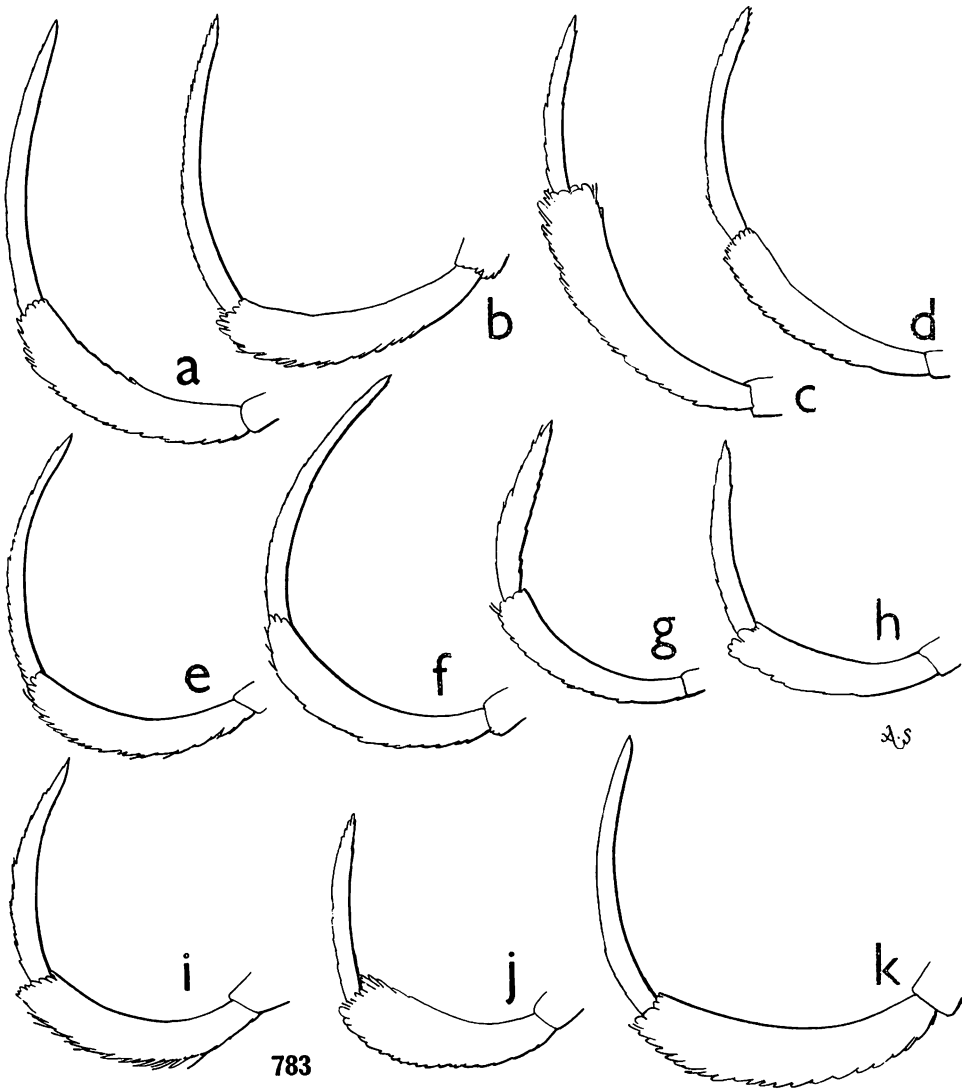


Figure 783—*Hyposmocoma* labial palpi, sketched to the same scale. *a*, (*E.*) *subsericea* Walsingham, holotype male; *b*, (*E.*) *argentea* Walsingham, holotype male; *c*, (*E.*) *dorsella* Walsingham, holotype male; *d*, (*H.*) *sabulella* Walsingham, holotype male; *e*, (*E.*) *philocharis* Meyrick, holotype male; *f*, (*E.*) *arundinicolor* Walsingham, holotype male; *g*, (*E.*) *brevistrigata* Walsingham, holotype male; *h*, (*H.*) *carnea* Walsingham, holotype male; *i*, (*E.*) *thermoxyla* Meyrick, lectotype male; *j*, (*H.*) *divisa* Walsingham, holotype male; *k*, (*E.*) *fulvocervina* Walsingham, holotype male.

**Aphthonetus** Walsingham, 1907*b*:517, in the strict sense, is among the most divergent of *Hyposmocoma*, but I have been unable to find characters to maintain it as a genus. One might be able to separate the males, but the females are less distinctive. Not all of the species assigned to *Aphthonetus* belong to it, as will be demonstrated below.

It is a cluster of mostly small, slender species. Because the wings are slender, there is a consequent alteration of venation which is more extreme in some forms than in others. Walsingham said that the forewings have only 11 veins with "4 and 5 probably coincident". Vein 2 is variable, and it appears to be

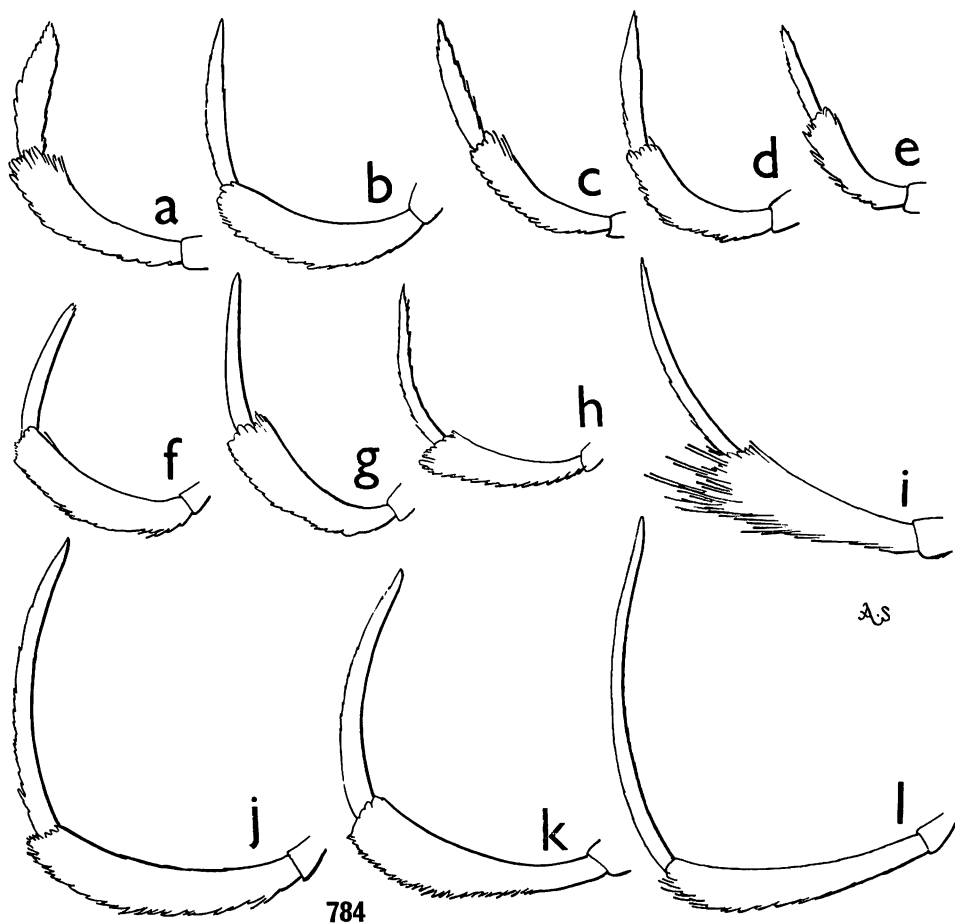


Figure 784—*Hyposmocoma* labial palpi, sketched to the same scale. *a*, (*E.*) *fluctuosa* Walsingham, holotype male; *b*, (*H.*) *tarsimaculata* Walsingham, holotype male; *c*, (*H.*) *torella* Walsingham, holotype male; *d*, (*H.*) *subscolopax* Walsingham, holotype male; *e*, (*H.*) *tetraonella* Walsingham, holotype male; *f*, (*H.*) *metrosiderella* Walsingham, holotype male; *g*, (*H.*) *nebulifera* Walsingham, holotype male; *h*, (*E.*) *poeciloceras* Walsingham, holotype male; *i*, (*E.*)  *barbata* Walsingham, *j*, (*E.*)  *margella* Walsingham, holotype male; *k*, (*H.*)  *fractistriata* Walsingham, holotype male; *l*, (*E.*)  *roseofulva* Walsingham, holotype male.



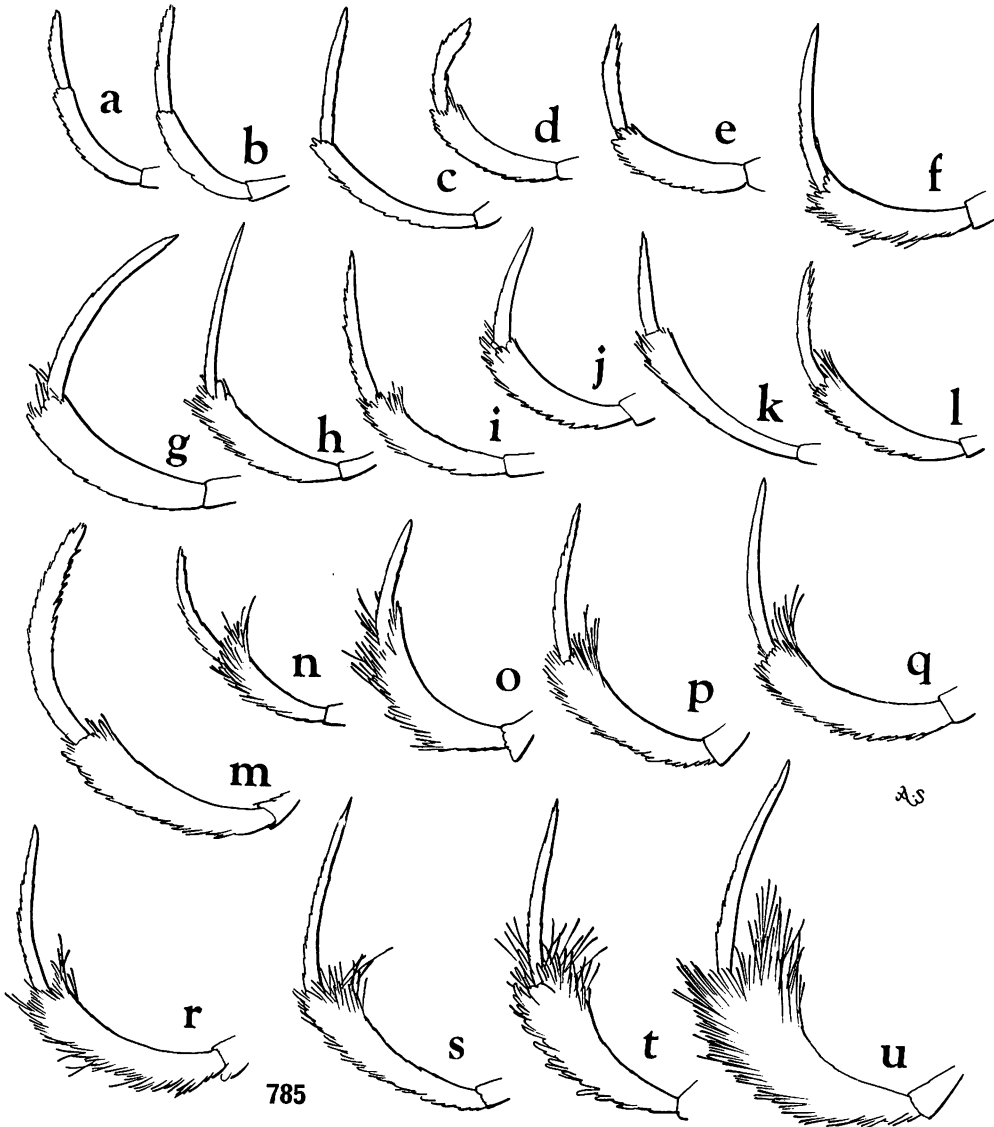


Figure 785—*Hyposmocoma* (*Euperissus*) labial palpi, sketched to the same scale. *a*, *passerella* (Walsingham), holotype male; *b*, *nemo* (Walsingham), holotype male; *c*, *humerella* (Walsingham), holotype male; *d*, *veterella* (Walsingham), holotype female; *e*, *kawaiensis* (Walsingham), holotype male; *f*, *polia* (Walsingham), holotype male; *g*, *puncticiliata* (Walsingham), holotype male; *h*, *spurcata* (Walsingham), holotype male; *i*, *exsul* (Walsingham), holotype female; *j*, *empetra* (Meyrick), lectotype male; *k*, *plumbifer* (Walsingham), holotype male; *l*, *trichophora* (Walsingham), holotype male; *m*, *sagittata* (Walsingham), holotype male; *n*, *eleuthera* (Walsingham), holotype female; *o*, *divergens* (Walsingham), holotype male; *p*, *bitincta* (Walsingham), holotype male; *q*, *aspersa* (Walsingham), holotype female; *r*, *subocellata* (Walsingham), holotype male; *s*, *albocinerea* (Walsingham), holotype male; *t*, *lichenalis* (Walsingham), holotype female; *u*, *hirsuta* (Walsingham), holotype female. All of these species were originally described in *Aphthonetus*.

nearly lost in some examples, weak or abbreviated in others, and fully formed in others. Some examples, therefore, may appear to have only 10 veins in the forewings. In the forewings, vein 6 comes out of 7 and 7 out of 8. These would appear to be usable characters, but they intergrade, as an examination of narrow winged forms that Walsingham himself assigned to *Hyposmocoma* will demonstrate [compare figure 841 of *Hyposmocoma* (*Hyposmocoma*) *lixiviella*, for example]. Similarly, the stalking of veins 6 and 7 in the hindwings, although characteristic of most of the species assigned to *Aphthonetus*, is not constant—the veins may be separate (*exsul*, for example), connate (*columbella*, for example), or variably stalked as figures 816 to 822 demonstrate. On a paratype of *Aphthonetus sideroxyloni* (Busck slide 153 in Bishop Museum), the hindwing

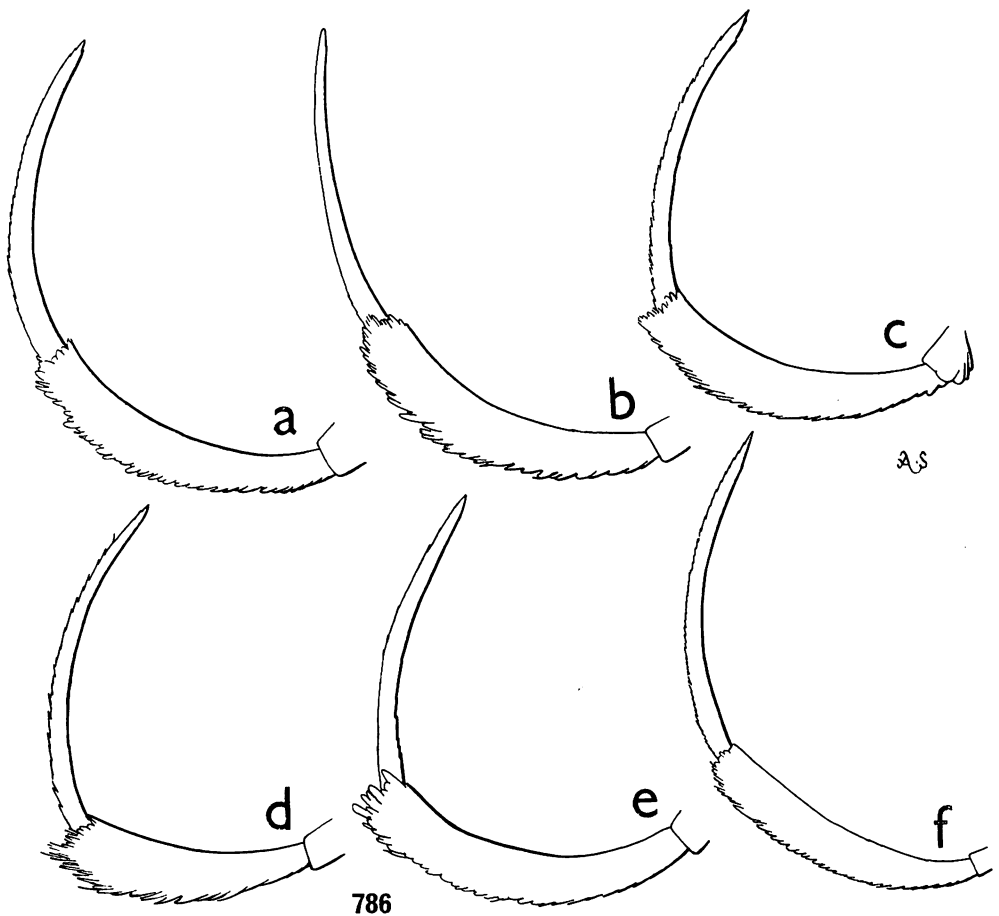


Figure 786—*Hyposmocoma* labial palpi, sketched to the same scale. *a*, (*H.*) *notabilis* Walsingham, holotype male; *b*, (*E.*) *maestella* Walsingham, holotype male; *c*, (*E.*) *petroptilota* (Walsingham), holotype male; *d*, (*E.*) *longitudinalis* Walsingham, holotype male; *e*, (*E.*) *semiusta* (Walsingham), holotype male; *f*, (*H.*) *picticornis* Walsingham, holotype male.

has only seven veins (5 is absent) instead of the usual eight veins, and the cell is partly open (figure 822). A rather similar condition is found in *sordidella* (figure 775).

*Aphthonetus* belongs to subgenus *Euperissus* of *Hyposmocoma*, as will be defined below. Surprisingly and confusingly, however, a number of species of *Hyposmocoma sensu stricto*, have forewing veins 6, 7, and 8 similarly arranged to that of

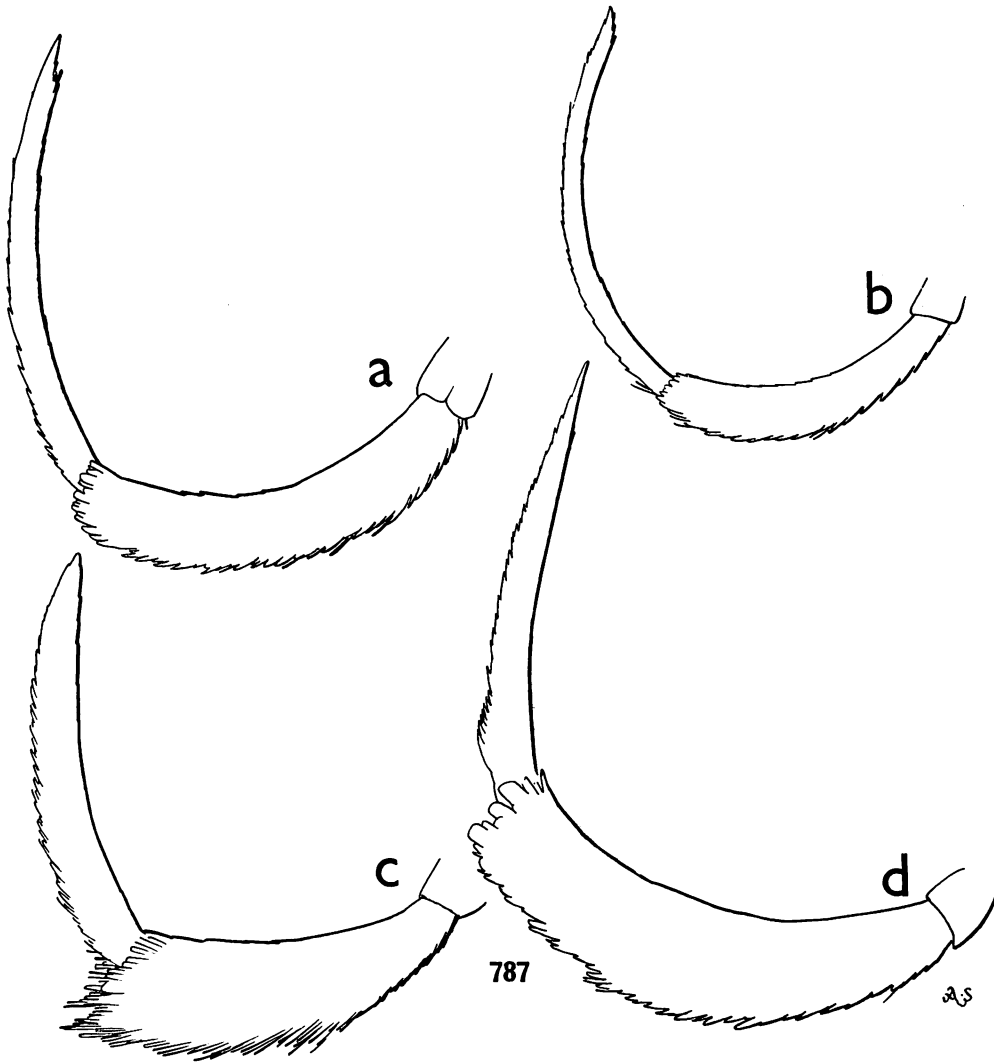


Figure 787—*Hyposmocoma* labial palpi, sketched to the same scale. *a*, (*E.*) *centralis* Walsingham, holotype male; *b*, (*E.*) *subnitida* Walsingham, holotype male; *c*, (*E.*) *chilonella triocellata* Walsingham, holotype male; *d*, (*E.*) *epicharis* Walsingham, holotype female.

*Aphthonetus*. As previously noted, in the forewings of *Aphthonetus* vein 6 arises from 7 and 7 arises from 8. This condition is distinctly different from the majority of the species of this great genus in which most species have vein 6 arising free from the cell. In such species of *Hyposmocoma* (*Hyposmocoma*) as *lixiviella* (figure 841), new species 19 (figure 841), *phalacra* (figure 852), and *pseudolita* (figure 853), the forewing venation is similar to that of *Aphthonetus* with vein 6 arising from 7 and 7 arising from 8. On *canella* (figure 829), *mimema* (figure 845), *mimica* (figure 845), and *petroschia* (figure 852), vein 6 arises from 8 basad of the origin of 7. On *schismatica* (figure 856), vein 6 emerges from the base of 8.

On none of these *Hyposmocoma sensu stricto* species, however, are veins 4 and 5 fused into one vein in the forewings as they are on *Aphthonetus*. If we would use the combination of veins 4 and 5 fused and vein 6 out of 7 and 7 out of 8 in the forewing for maintaining *Aphthonetus* as a group name, then we would have to use it only for the species that are closely associated with the type-species *diffusa*. Another group name would have to be applied to *exsul* and its allies which represent a species group distinct from true *Aphthonetus* although until now they have wrongly been placed in *Aphthonetus*. *Aphthonetus* can only be applied to those species having the venational arrangements as described above in combination with the male caudal abdominal structures as described below.

The male genital valvae appear to be in a process of simplification in certain atypical members of *Aphthonetus* (in the wide sense of Walsingham), and none, of course, have spurs on the valvae (that is a character confined to *Hyposmocoma sensu stricto*). The simplification of the valvae is, however, not a unique feature of the species heretofore placed in *Aphthonetus*, but it is shared with other

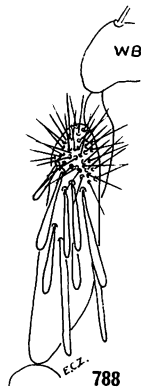


Figure 788—Sketch of the anterior edge of the metapleuron of a possible subspecies of *Hyposmocoma* (*H. picticornis* Walsingham (Olinda, 4,000 feet, Maui) to show the spinose sensory organ which is conspicuously developed on some species of *Hyposmocoma* (including the *Aphthonetus* and *Neelysia* groups). It is often obscured or damaged by pinning or abrasion. A similar organ has also been seen in Hawaii on *Choropleca* (Tineidae), *Carposina* (Carposinidae), *Cryptophlebia*, and *Crociosema* of the Tortricidae, and it may occur on other genera. I have not made a general survey to search for the organ on many species. On some species of *Hyposmocoma* a long brush or cluster of long squamae arises from the area just beneath the organ. A modest cluster of squamae is shown here. (WB = wing base.)

species groups such as various atypical *Neelysia*. Strangely, there is not much diversity in the genitalia of the true *Aphthonetus* group. True *Aphthonetus* is only one species cluster within *Euperisus*. As indicated above, there are two subgroups confused within Walsingham's *Aphthonetus*, as an examination of the genitalia will reveal. More will be said regarding these subgroups in the discussion below.

The discs of the tergites of the three basal abdominal segments of both sexes of the *Aphthonetus* group are clothed with peculiar, modified, depressed, dense, sharply lanceolate or bilanceolate, almost spinelike, golden squamae (see figure 1015). A somewhat similar-appearing vestiture is found on *Trisodoris*, but there it is much more extensive. Walsingham described these areas as "naked patches", but they are definitely densely squamose. Although these areas have more or less modified squamae in other species groups of *Hyposmocoma*, in none of them is it similar to *Aphthonetus*. This feature can be used to separate this group from all others. The squamae on some of the other species groups that I have examined have denticulate apices.

Perhaps the most distinctive structures of true *Aphthonetus* that I have noted are the unusual sclerotizations and processes of the seventh abdominal tergites of the males (figure 1017, for example). I have not seen such developments elsewhere in the *Hyposmocoma* complex. I presume that they are scent-dispersing organs. They are normally hidden from view by the usual scaling of the abdomen. There is normally no conspicuous surface indication of this structure although one would expect to find some unusual differentiation in the arrangement of the squamae over the area. They can be exposed by denuding the squamae from the tergite, and they are, of course, conspicuous in slide preparations.

There are long, persistent, modified scales forming brushes at the apices of the two longer mesal arms of the structures (see figure 1024, of *mediocris*, for example). When well developed, the inner arms extend over the base of the genitalia (see also figure 1019 of *diffusa*, for example). The development of these structures varies in the species thus far assigned to *Aphthonetus*—they are absent in some and strongly developed in others. I have not seen the abdomens of the males of *aspersa*, *eleuthera*, *hirsuta*, *lichenalis*, *prae fracta*, or *veterella*, and I cannot give a complete report on these peculiar caudal appendages. I have, however, examined males of most of the species, and I can say that the structures are absent from *corticicolor*, *empetra*, *exsul*, *fluctuosa*, *humerella*, *kawaiensis*, *nemo*, *passerella*, *plumbifer*, and *sideroxyloini*. They are present, and sometimes strongly developed, on *albocinerea*, *bitincta*, *columbella*, *confusa*, *diffusa* (the type-species of *Aphthonetus*), *digressa*, *divergens*, *elegans*, *fugitiva*, *mediocris*, *polia*, *puncticiliata*, *sagittata*, *spurcata*, *subocellata*, and *trichophora*. This is one of the most peculiar divergent features of the *Hyposmocoma* complex, and it deserves further detailed investigation. It is noteworthy that such an unusual structure is present or absent in what may appear to be rather closely similar forms. With the apparent exception of *corticicolor*, the genital valvae of the members of the subgroup which lack the caudal processes appear to be more subtriangular and have shorter, broader basal "stalks" than the valvae of the species which have the caudal processes. If *Aphthonetus* were to be retained as a subgenus of *Hyposmocoma*,

then the members of this *exsul* subgroup would have to be separated from *Aphthonetus*, and the name *Rhinomactrum* (Walsingham) might be applied to them.

If one examined the hindwing venation of only one of the typical members of the *Aphthonetus* group such as *digressa*, which has caudal abdominal processes, and compared it with only one of the subgroup which lacks caudal processes, such as *exsul*, one would note that veins 6 and 7 are not stalked in *exsul* but are long-stalked in *digressa* (see figure 819). This might appear to be a character that could be used to segregate the subgroups, but when one examined *corticicolor* (see also figure 819), which also lacks abdominal caudal processes, it would be seen that these veins are stalked. Also, the veins are not stalked in the figured specimen of *columbella* (figure 818) which has caudal processes. Such features are confusing, and they serve further to demonstrate the complex, variable nature of *Hyposmocoma*.

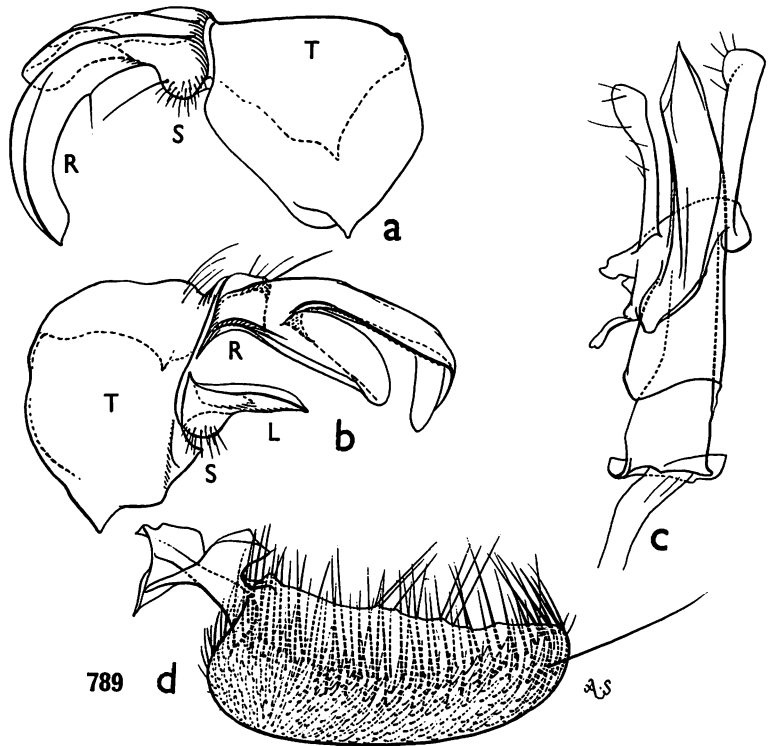


Figure 789—Male genitalia of *Hyposmocoma* (*E.*), new species 21 (BM slide 5436), formerly confused as a paratype of *longitudinalis* Walsingham; Molokai, above 3,000 feet. This is a member of subgenus *Euperissus* in which group the right and left valvae are similar on each specimen. *a* and *b*, right lateral and left dorso-lateral aspects of the tegumen and the uncuslike brachia; note the socii-like setose areas and the strong sutures between the tegumen and the brachia. *c*, the aedeagus with the anellus torn free and adhering to it and bearing the two processes or lobes of the anellus. *d*, the right valva. *L*, left brachium; *R*, right brachium; *S*, socii-like structure; *T*, tegumen. Compare figures 790 and 791.

The metapleura of neither the typical nor the atypical *Aphthonetus* (or *Rhinomactrum* group) have the long brushes of hairs which are conspicuously developed on the atypical *Neelysia*.

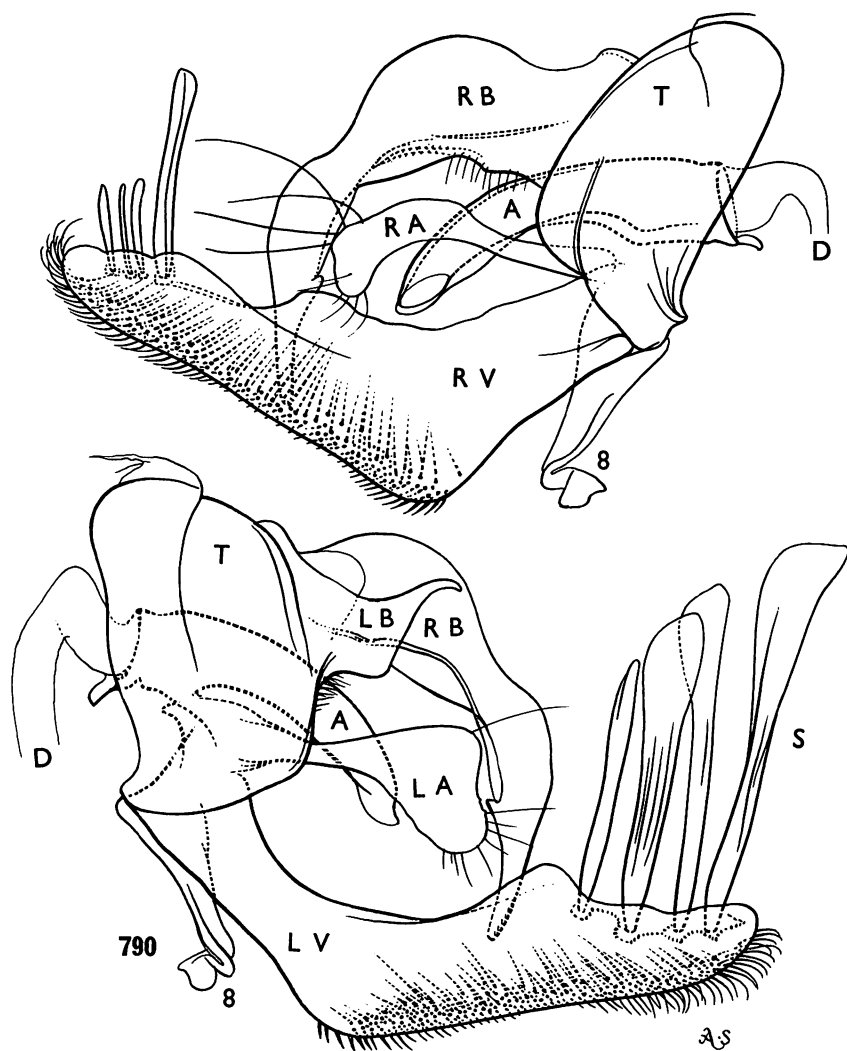


Figure 790—Male genitalia of *Hyposmocoma* (*H.*) new species 20 (BM slide 5437), formerly confused as a paratype of *longitudinalis* Walsingham; "Waialua (beach)", Oahu; eighth abdominal sternum and genital "flaps" removed. Top, right lateral aspect. Bottom, left lateral aspect. *A*, aedeagus; *D*, ductus ejaculatorius; *LA*, left anellus lobe; *LB*, left brachium; *LV*, left valva; *RA*, right anellus lobe; *RB*, right brachium; *S*, spurlike specialized setae of the valva; *T*, tegumen; *8*, torn part of the eighth sternum. Compare figures 789 and 791.

**Rhinomactrum** Walsingham, 1907*b*:531, was erected for two specimens representing two species. Walsingham said that the genus was "intermediate between *Neelysia* and *Aphthonetus*." The two included species are not closely allied, and they belong to the two major sections or subgenera of *Hyposmocoma*. Walsingham considered that the discovery of a male of his *scapulellum* "would probably justify the description of a new genus" to separate it from *rutilellum*, the type-species of *Rhinomactrum*. There are some discrepancies in the original generic description, as my figures of *rutilellum* and *scapulellum* will demonstrate if they are compared with the descriptions. There is nothing to justify the name *Rhinomactrum* as a full genus. *Rhinomactrum* was based upon a confused concept to include species representing two distinct groups. It falls as a synonym of *Hyposmocoma* subgenus *Euperissus*. It might in the future be applied to the group of "atypical" *Aphthonetus* species mentioned above which is typified by *exsul* should more species-group names be found convenient. Having seen only the female holotype of *scapulellum*, which has lost its abdomen, I cannot place it within a species group of subgenus *Hyposmocoma* to which it belongs.

**Neelysia** Walsingham, 1907*b*:533, is quite similar to *Aphthonetus* in general appearance and consists mostly of narrow-winged forms, although the wings of most species are not as narrow as those of *Aphthonetus*. It, also, is a confused assemblage. Walsingham said that the forewings have only 11 veins with 4 and 5 fused as in *Aphthonetus*. But, in fact, veins 4 and 5 are developed, and it is vein 2 which is weak or absent. Thus, the forewings may have either 11 or 12 veins depending upon whether vein 2 is or is not distinguishable. It is not always possible to ascertain the nature of the development of vein 2 unless a

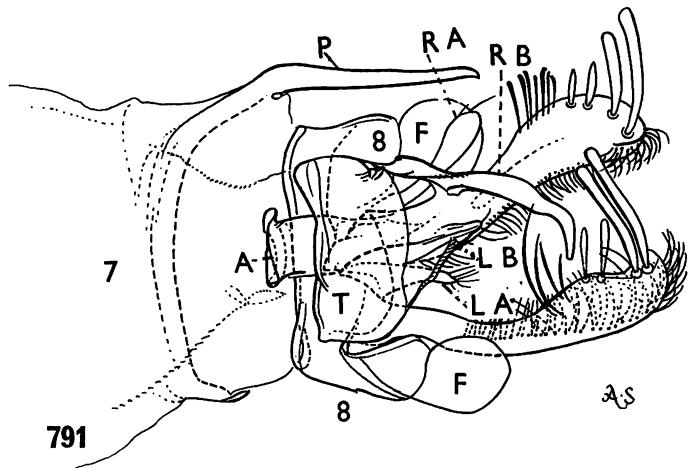


Figure 791—*Hyposmocoma* (*H.*) *tetraonella* Walsingham; holotype (BM slide 5489); Kona, Hawaii; left dorso-lateral aspect of the male genitalia. *A*, aedeagus; *F*, genital "flaps" (epitygmata); *LA*, left anellus lobe; *LB*, left brachium; *P*, pseuduncus; *RA*, right anellus lobe; *RB*, right brachium; *T*, tegumen; *7*, seventh abdominal segment; *8*, eighth abdominal sternum. Note the strongly developed pseuduncus. Compare figures 789 and 790.



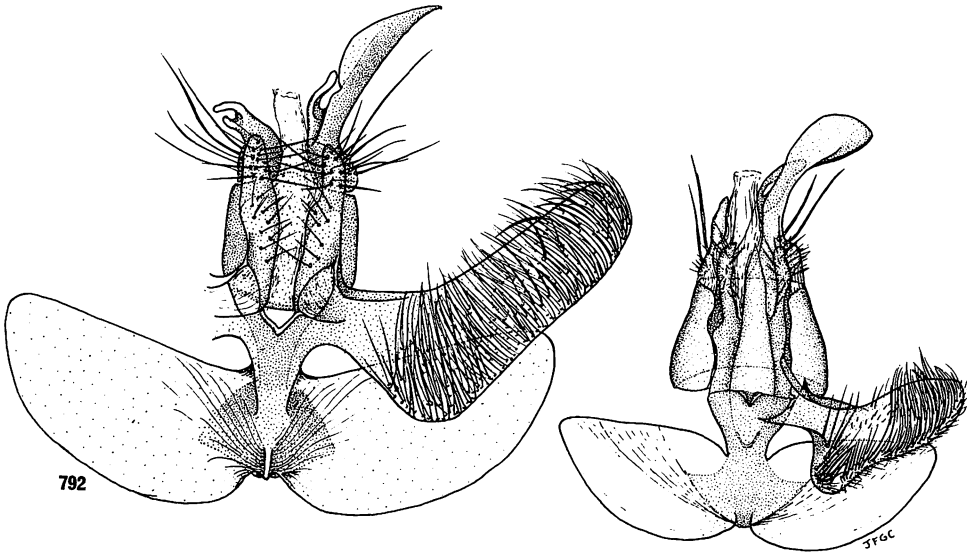


Figure 792—Male genitalia of two species of *Hyposmocoma* (*Euperissus*) originally placed in two different "genera". Left, ("*Hyperdasyella*") *cryptogamiella* (Walsingham) (Busck slide 60). Right, (*Euperissus*) *cristata* (Butler). Left valvae not drawn.

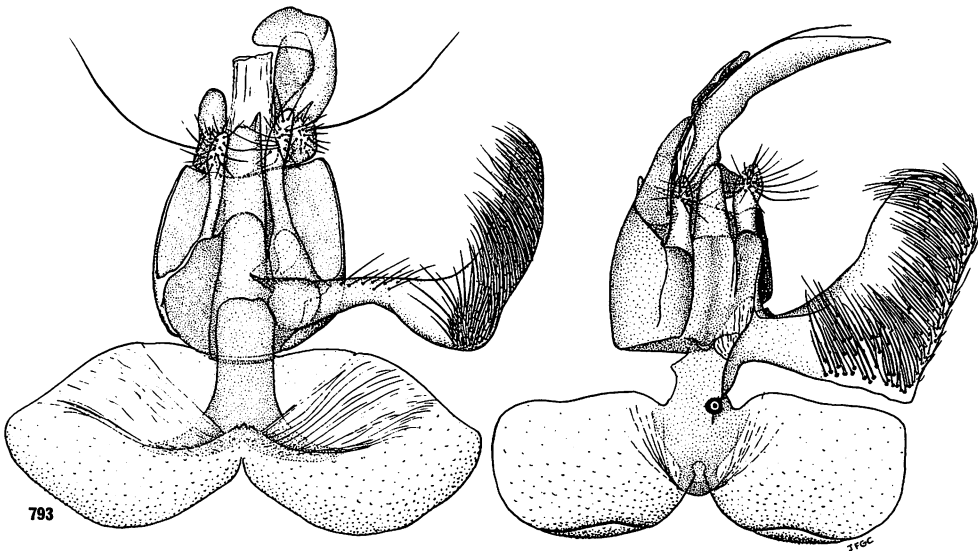


Figure 793—Male genitalia of two species of *Hyposmocoma* (*Euperissus*) heretofore placed in two different genera. Left, ("*Neelysia*") *lignicolor* (Walsingham) (USNM slide 3772, Clarke). Right, ("*Sennoprepia*") *fulvogrisea* (Walsingham) (Busck slide 57). Left valvae not drawn.



Figure 793A—See legend on page 1099.

descaled wing preparation is made. For example, in figure 809, vein 2 is complete on *alveata*, a species which does not belong to *Neelysia*, whereas only the distal ends are distinct on *agnatella* and *anthinella*, both of which are typical *Neelysia*. On *argyresthiella*, a member of a different species group, vein 2 is absent (figure 810). On *alveata*, vein 6 is so weak that Meyrick could not see it on the uncleared wing. Believing that there were only 11 veins in the forewing, he placed that species in *Neelysia* in spite of the fact that its male genitalia (which he never studied, of course) show that it is a typical "strong" member of *Hyposmocoma sensu stricto* with long spurs on the valvae. *Neelysia*, on the other hand, belongs to subgenus *Euperissus*. In the hindwing of *Neelysia*, veins 6 and 7 are usually separate, sometimes connate, but I have seen no specimens with these veins stalked as they are in *Aphthonetus*.

Walsingham at first described some *Neelysia* in his manuscript as *Hyposmocoma*, but he transferred them to *Neelysia* in his published text. The original "*Hyposmocoma*" labels remain on his types of these species; see the list of these species in the text above (p. 1075). Some atypical *Neelysia* of the *exaltata* group show a "degenerating" tendency in the male genitalia, as do the atypical *Aphthonetus* of the *nemo* group (see figures 1004, 1009, 1013 for example). The valvae lack heavy setae or spurs in *Neelysia*. The characteristic form of *Neelysia* male genitalia is exemplified by figures 1006 of *complanella*, *cuprea*, and *fuscofusa* and 1008 of *incongrua* and *lignicolor* (the type-species of *Neelysia*). A comparison of these figures with figure 1003 of *alveata*, *agnatella*, and *anthinella* and 1012 of *rediviva*, for example, will demonstrate quickly the compound nature of *Neelysia* as it has heretofore been constituted.

I cannot find any characters to maintain *Neelysia* as a distinct genus. When the group is reduced to those species which agree in basic characters with its

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Figure 793A—Evolutionary sequence of armature development of the male genital valvae of *Hyposmocoma*. The varied development of the setae is a reflection of the extraordinary sexual selection active in *Hyposmocoma*. The processes are intimately coupled with copulation.

Only the distal parts of the valvae are shown in the sketches, and the fine vestiture has been omitted from most of the drawings. On figures *a* and *b* a small area of vestiture is shown to indicate the types of coverings that clothe most of the internal surfaces of the valvae on those species and their associates. On *a* there is a fine fur-like covering. On *b* there is a mixture of fine and coarser hairs. On *c* and *d* there is marked differentiation of a few marginal setae. On *e*, *f* and *g* the specialized setae have become thickened, further modified and with modifications of articulations. *g* through *l* show marked development of the digitate setae. On *m* another form of modification, that of reduction in number, is shown, and here only an extraordinary, long, single dactyl is developed. At *n* is displayed an early tendency toward broadening of the modified hairs to form paddle-like dactyls that is carried to the known extremes of development on *o* and *p*. Also on *o* and *p* there are modifications of the dorsal margins of the valvae to produce protuberant bases for the dactyls.

If one knew only the remarkable palmate process of *p* it might be difficult to understand what the organ represents or how, or from what, it was developed. When a series of examples of the extraordinary species swarm is examined, however, it becomes clearly evident that the evolutionary modification of simple hairs on the valvae has led to the development of an astounding array of male genital embellishment.

Most of the species with strong dactyl formation display asymmetrical development with the strongest, or only, armature on the left valva. One wonders why it should be that the emphasis has been placed upon the left valvae.

All of the sketches are drawn to the same scale.

*a*, *b*, *c* and *d* are species of the subgenus *Euperissus*, and all of the other species belong to *Hyposmocoma sensu stricto*.

*a*, *ossea* Walsingham; *b*, *subsericea* Walsingham; *c*, *punctifumella* Walsingham; *d*, *niveiceps* Walsingham; *e*, *illuminata* Walsingham; *f*, a species of the *malornata* group; *g*, *persimilis* Walsingham; *h*, *leporella* Walsingham; *i*, *literata* Walsingham; *j*, *ludificata* Walsingham; *k*, *humerovitella* Walsingham; *l*, *genitalis* Walsingham; *m*, *bacillella* Walsingham; *n*, *phalacra* Walsingham; *o*, new species 23; *p*, *triptila* Meyrick.

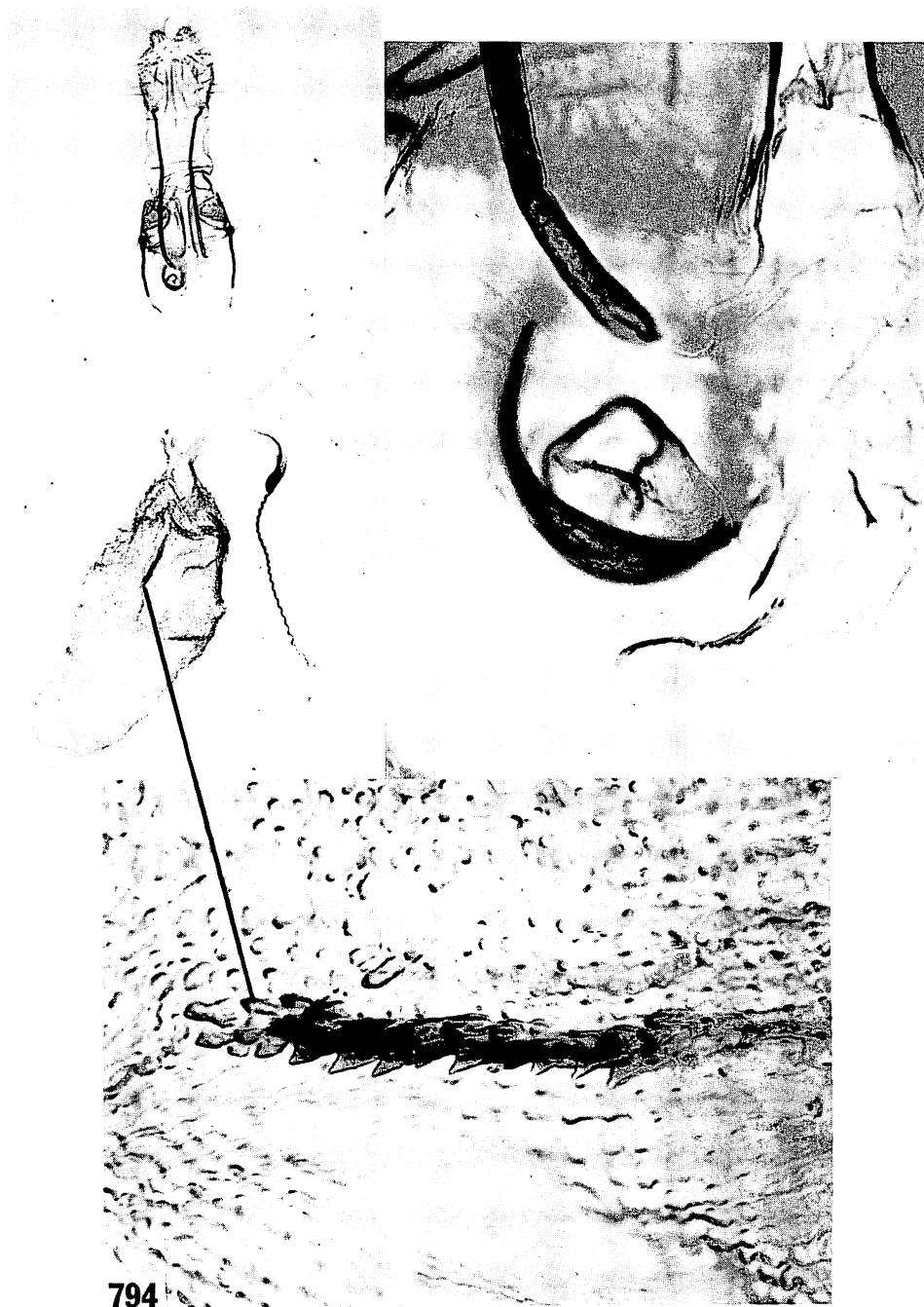


Figure 794—Female genitalia of *Hyposmocoma (Euperissus) centronoma* Meyrick; Kawaihapai, Oahu; holotype (slide Z-70-5). Compare the elongate signum of this species with the double signa of *hemicasis* in figure 795.

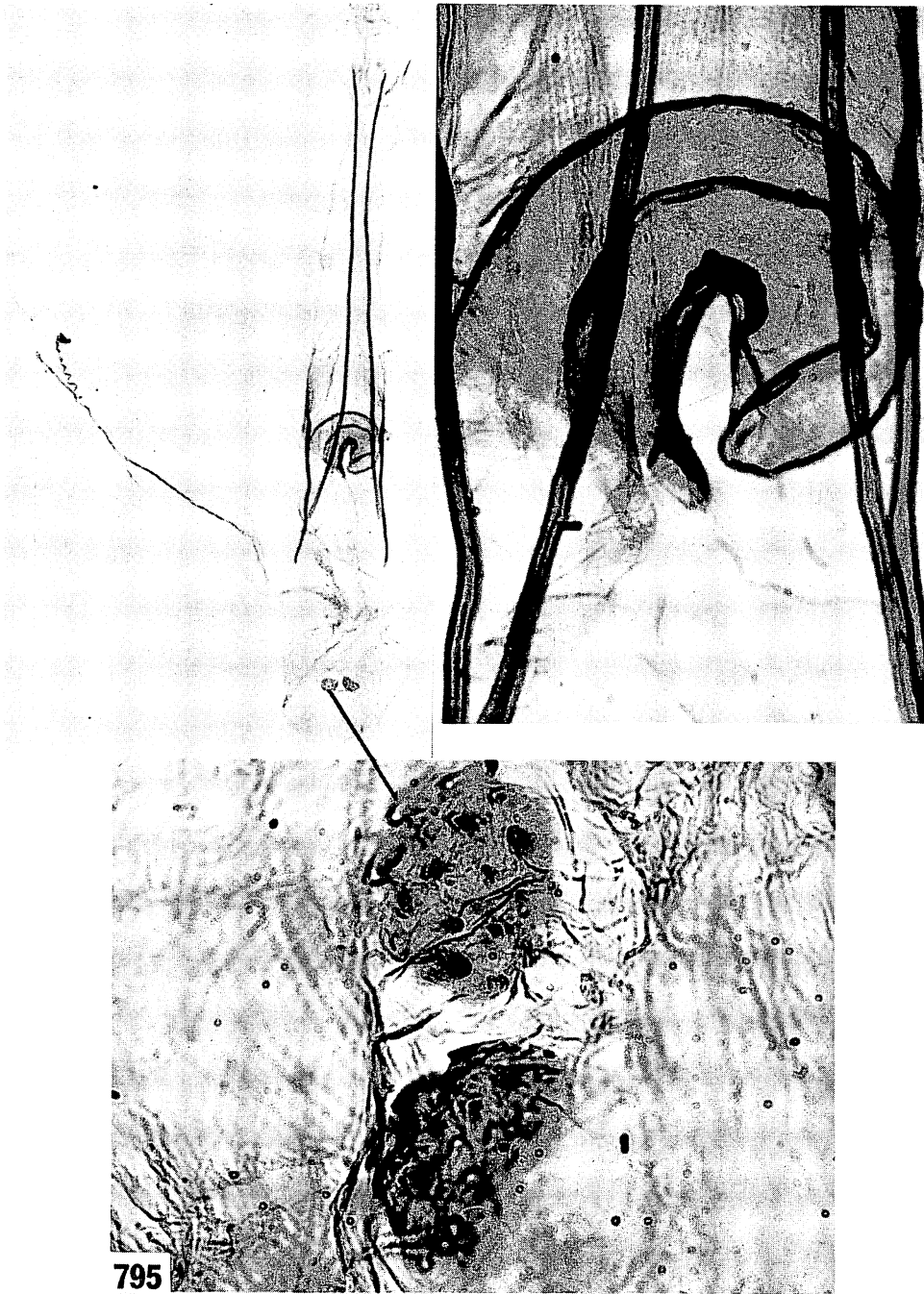


Figure 795—Female genitalia of *Hyposmocoma (Hyposmocoma) hemicasis* Meyrick; Mt. Kaala, Oahu; paratype (slide Z-70-10). Compare the double signa of this species with the single elongate signum of *centronoma* in figure 794. Compare the elongate ovipositor of this species with the short ovipositor of *persimilis* in figure 798.

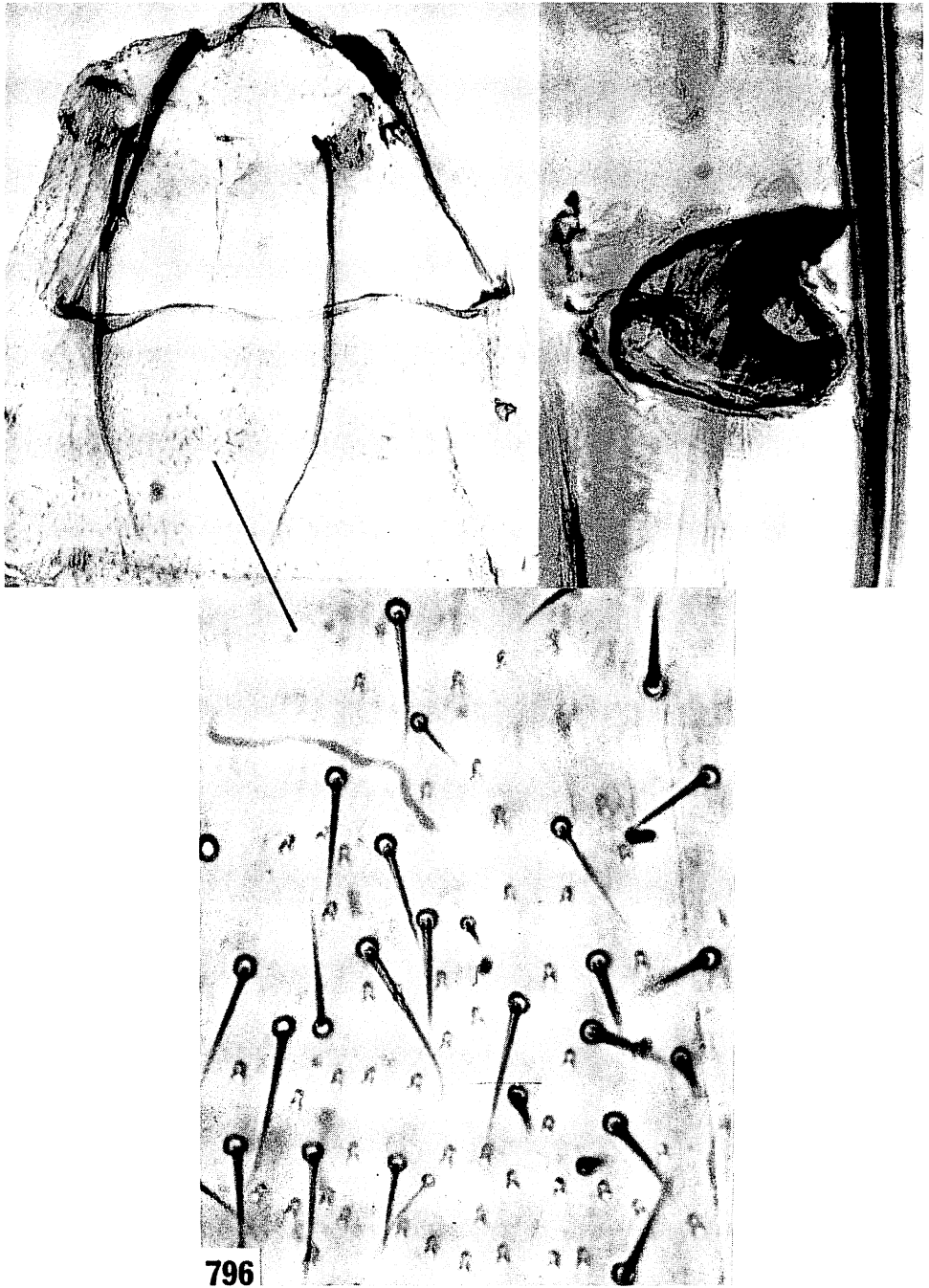
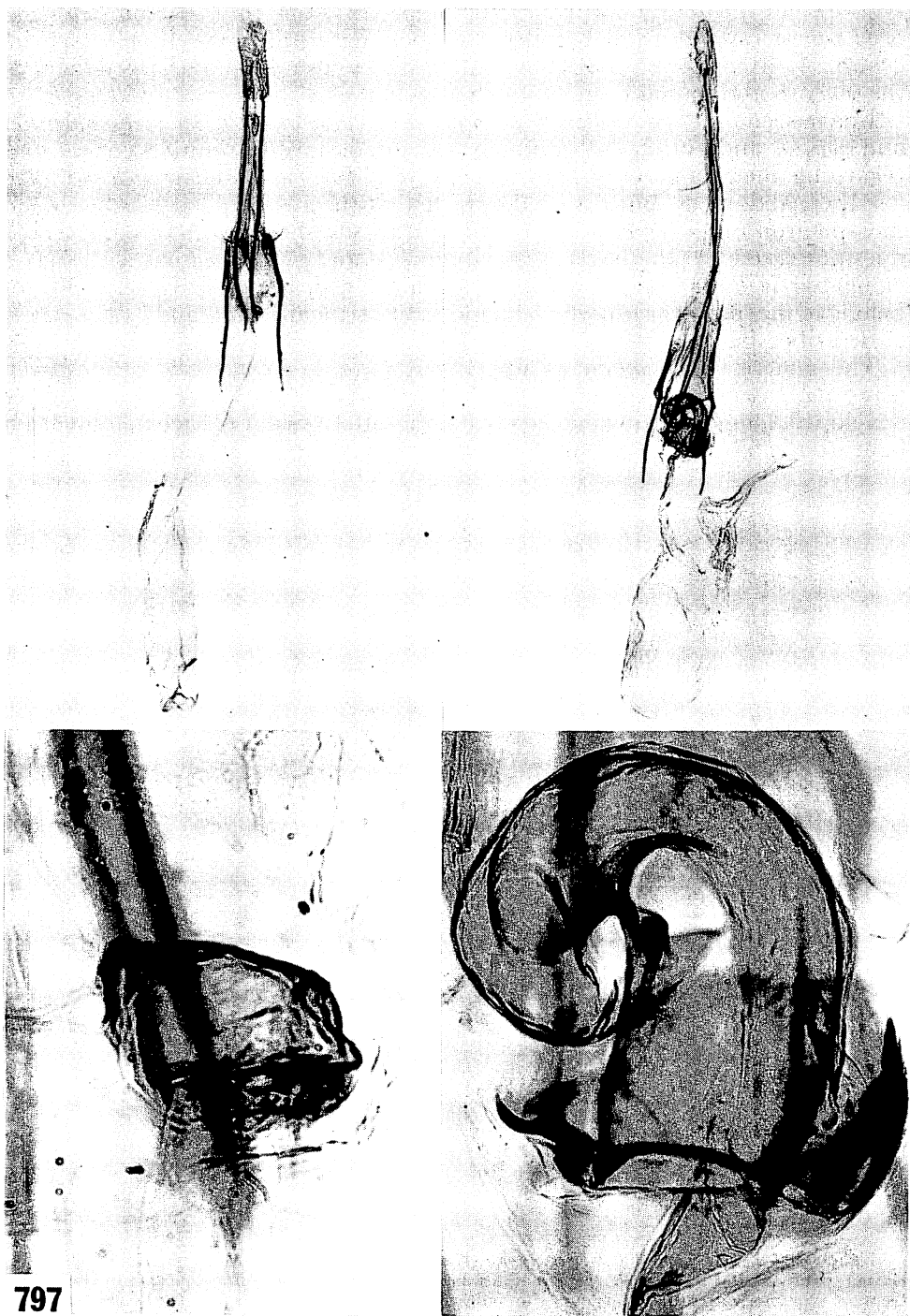


Figure 796—Details of the female abdomen of *Hyposmocoma (Euperissus) argomacha* (Meyrick). Top left, base of abdomen. Top right, ostium. Bottom, sensory setae at the middle of the second abdominal sternite. Kilauea, Hawaii; holotype (slide Z-70-4).



797

Figure 797—Female genitalia representing the two subgenera of *Hypsmocoma*. Left figures, (*Euperissus*) *caecinervis* Meyrick; Mt. Kaala, Oahu; paratype (slide Z-70-13). Right figures, (*Hypsmocoma*) *calva* Walsingham; Kona, 4,000 feet, Hawaii; from the *Fauna Hawaiiensis* collection and named by Durrant but not designated as a paratype (BM slide 15849). Note especially the different developments of the ostia in these representatives of the two subgenera of *Hypsmocoma*.

type-species, *lignicolor*, it forms a cluster of species within the subgenus *Euperissus* of *Hyposmocoma*. They might collectively be referred to as the *lignicolor* species group. *Neelysia* does not, of course, have the unusual caudal appendages of the seventh abdominal tergites which are characteristic of true *Aphthonetus*.

I have seen only females of *Neelysia fuscidentata*, *mormopica*, *municeps*, *pluviella*, and *rotifer*, and, most unfortunately, I cannot form definitive conclusions regarding them. The only known males of *erebogramma* and *psaroderma* have lost their abdomens, but it would appear that they are typical *Neelysia*. Each metapleuron on *erebogramma* has a comparatively short brush of hairs which does not extend to the back of the abdomen, and *psaroderma* has a cluster of elongated squamae on each metapleuron. Hence, these two species do not belong to the species group which includes the atypical *exaltata* and its associates, as described below.

The males of the *exaltata* group (*argyresthiella*, *exaltata*, *mactella*, *nemoricola*, *ningorella*, *poeciloceras*, *rediviva*, *subaurata*, *tischeriella*, *terminella*) all have strongly developed, long brushes which arise from the anterior edge of each metapleuron beneath the hindwing base and extend back over the dorsum of the abdomen.

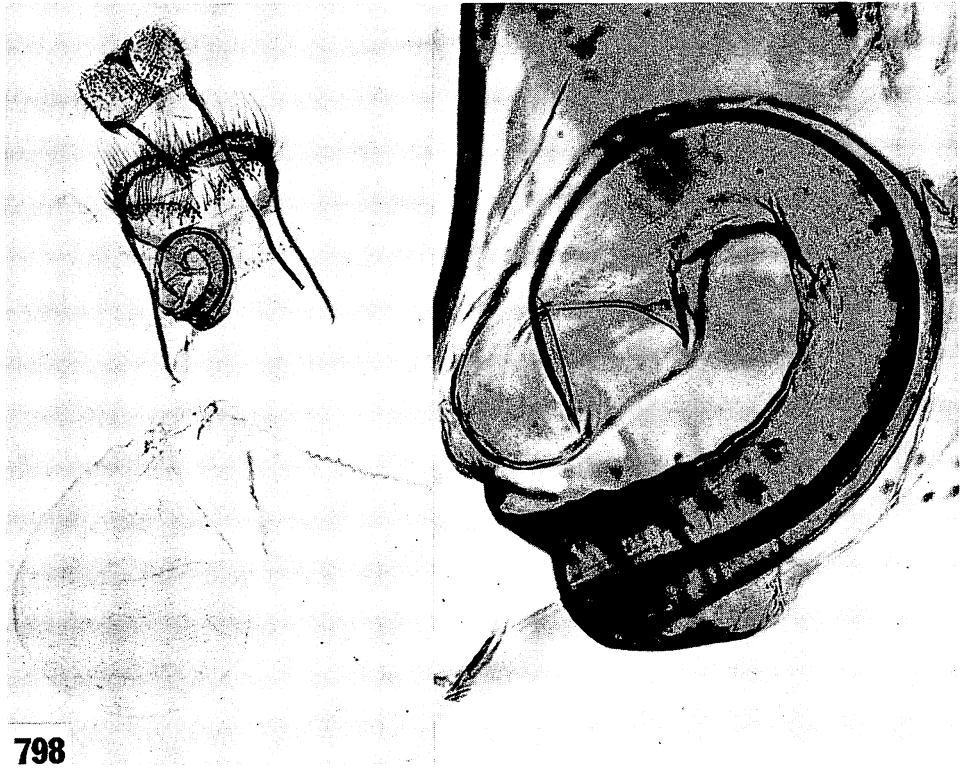


Figure 798—Female genitalia of *Hyposmocoma (Hyposmocoma) persimilis* Walsingham; Kona, 3,500 feet, Hawaii; paratype (BM slide 15880). Note that this species lacks signa in the bursa copulatrix, and compare the short ovipositor with the elongate ovipositor of *hemicasis* (figure 795), for example. The ovipositor lengths reflect differences in the egg-laying habits of the species. Compare the intermediate length of the ovipositor of *centronoma* (figure 794).



When at rest, these conspicuous masses of hair are held in place on the top of the middle of the abdomen by a number of comparatively huge squamae which arise on each side of the medial line of the abdomen. Because of the way the ends of the hairs in the brushes are enclosed by these large squamae, it may appear that the hairs end in enormously expanded tips. The females of these species all appear to have different ostia from typical *Neelysia* (on which the ostia are *not* protuberant). I have not seen the female genitalia of *terminella*, but the ostia of *argyresthiella*, *exaltata*, *nemoricola*, *ningorella*, *rediviva*, and *tischeriella* are all protuberant and thus differ from typical *Neelysia*. The slide of the female genitalia of *mactella* (BM slide 7723) is not satisfactory, and I cannot be certain of the nature of the ostium, but it appears to be protuberant. Slide BM 7716 of the female genitalia of the aberrant *subaurata* is also unsatisfactory. I cannot ascertain its true condition, but it appears not to be protuberant.

If we were to use *Neelysia* as a subgenus for the *lignicolor* species group, then we would have to propose a new subgeneric name for the *exaltata* species group. Thus, it is demonstrated that *Neelysia* was proposed for a compound group, and it falls as a synonym of *Euperissus* within *Hyposmocoma*.

**Dysphoria** Walsingham, 1907b:547, was described to receive one species. Evidently Walsingham was led to establish this genus because veins 4 and 5 in the forewings are "connate or short-stalked". This is a variable character, and it is also true of at least two other species, *fractivitella* and *nigralbida*, which he placed in *Hyposmocoma*. Walsingham's statement that "6 approximated to 7" in the forewing is certainly not true of the type specimen of *Dysphoria semicolon* which I have illustrated. *Dysphoria* cannot be maintained. Its genitalia are clearly like those of *Hyposmocoma sensu stricto* with heavy spurs on the valvae, and there is a strong pseuduncus.

**Bubaloceras** Walsingham, 1907b:548, was described for one male example of a single species. Swezey later included a second species. The "genus" was based upon the shape of the basal antennal segment which was described as "strongly curved, flattened and dilated, with well-developed pecten". This is only a specific character, because the size and shape of the first antennal segment and the development of the pecten are subjects of wide specific ranges of variation in *Hyposmocoma*. The name *Bubaloceras* falls to *Euperissus*.

**Euhyposmocoma** Swezey, 1913f:277, was erected for two species (after Swezey had described one of them in *Hyposmocoma*). His generic description reads: "Has the characters of *Hyposmocoma*, except that the labial palpi have a large spreading tuft extending from the median segment. The male has no subcostal hair-pencil on the hindwings." The presence or absence of a subcostal brush on the hindwing is a specifically variable character of the males of *Hyposmocoma sensu stricto*, and I have not seen any member of subgenus *Euperissus*, to which *Euhyposmocoma* belongs, which has subcostal brushes on the hindwings. The most obvious character of this species group is the expansion of the second labial palpal segment by longer than usual scales and hairs. This is only an extreme form of a variable character, and the tendency to such development is found on other species such as *Aphthonetus diffusa*, *Hyposmocoma barbata*, and *exaltata*. The great range of variation in palpal structure can best be understood

by an examination of the accompanying illustrations (figures 778–787). In spite of the distinctive appearance of the two included species, *Euhyposmocoma* represents a subgroup of the subgenus *Euperissus* of *Hyposmocoma*, and it cannot be maintained as a genus. There are no indications of any *Aphthonetus*-like processes on the abdomens of the males.

**Petrochroa** Busck, 1914*b*:104, was established for two species, but I have found them to belong to two different genera. Busck incorrectly placed the “genus” in the family “Cygnodiidae” (properly Cynodiidae) and wrongly allied it to *Coelopoeta*. I have placed one of Busck’s species in *Asymphorodes*. The type-species of *Petrochroa*, *swezeyi* Busck, is a small *Hyposmocoma sensu stricto* with typical large spurs on the male genital valvae, and it also has a pseuduncus. Swezey added five additional small species to this “genus” to form a mixed assemblage of mostly unrelated forms. *Petrochroa* was a compound entity from the beginning, and there is nothing to support its continuance. It falls as a synonym of *Hyposmocoma sensu stricto*.

**Phthoraula** Meyrick, 1935*a*:65, was described from a single female specimen. Meyrick said that it was “a derivative of *Hyposmocoma*, from which it is distinguished by the absence of vein 8 in the forewings, and the exceptionally long terminal joint of the palpi.” The length of the palpi is, as stated before and as my illustrations plainly demonstrate, a highly variable feature and is only a specific character in this group. The forewing does lack a vein, but it may be that vein 7 is fused with 8 instead of 8 being absent. We do not know whether the venational abnormality is or is not a constant character of this species. But in the light of the variability of the venation in *Hyposmocoma*, I do not believe that *Phthoraula* can be maintained even if vein 7 and 8 are fused, and I have merged it with subgenus *Euperissus* of *Hyposmocoma*.

In addition to the foregoing “genera”, Walsingham (*Fauna Hawaiiensis*, pp. 514–515) included “*Elachista*” in the *Hyposmocoma* complex. In “*Elachista*” he described *longisquamella* and *spilota*, but neither of these species belongs to *Elachista*. His *longisquamella* is the same species that Swezey later described as *Petrochroa nigrella*, and it is here transferred to *Hyposmocoma*. His *spilota* belongs to *Philodoria* in the Gracillariidae!

Further collecting, study, and contemplation, following the examination of much more representative material, may eventually enable us to consider a few of the groups discussed above as subgenera. For the present, however, I believe that we know too little of the range of variability and intergradation of characters to enable an adequate evolutionary picture to be drawn, and I prefer to combine them all as a cluster of evolving species groups within the genus *Hyposmocoma*.

Farther in this text I have demonstrated that *Hyposmocoma* may be divided into two major groups which I have called subgenera. Any division of *Hyposmocoma* will have to recognize these groups. These divisions are based upon the nature of the vestiture of the vannal areas of the hindwings which correlates with two basic types of male genitalia. Moreover, these groups also appear to correlate with larval habits because all known case-bearing larvae

belong to *Hyposmocoma sensu stricto* and all known naked stemborers and certain other naked larvae belong to subgenus *Euperissus*. Our knowledge of the larvae is, however, fragmentary. See the additional discussion under the heading "Key to the Subgenera of *Hyposmocoma*" below. To subgenus *Hyposmocoma* belong the species previously assigned to *Diplosara*, *Agonismus*, *Petrochroa*, one of the *Rhinomactrum*, and *Dysphoria*. To subgenus *Euperissus* belong those species assigned to *Hyperdasyella*, *Semnoprepia*, *Aphthonetus*, the type-species of *Rhinomactrum*, *Neelysia* (with the exception of the erroneously included *alveata* Meyrick which is a true *Hyposmocoma*), *Bubaloceras*, *Euhypsmocoma*, and *Phthoraula*.

### RELATIONSHIPS OF HYPSMOCOMA

The foregoing discussion has shown that authors have had difficulty in assigning this great assemblage to a suprageneric category. The comments upon the relationships of this complex which I have read or heard are mostly incorrect and meaningless. What I wrote on the subject in my analysis of the Hawaiian insect fauna in the Introduction to *Insects of Hawaii* (1948:77, 91) was based upon gleanings from other workers; it is wrong and should be deleted. Butler incorrectly thought that *Hyposmocoma* might be similar to *Holcocera*. Walsingham placed it in his expanded idea of the "Hyponomeutidae" where he assigned numerous unrelated groups. Meyrick established the Diplosaridae for it. Brues and Melander called it the Hyposmocomidae. Swezey followed Walsingham, Meyrick, and Busck. Busck's opinion varied, but in the end he decided that it belonged to the Cosmopterigidae. Walsingham thought that *Hyposmocoma* was allied to *Mompha*, *Walshia*, *Limnaecia*, and possibly *Atrémaea*. Most of his remarks are conjecture. It has also been considered to be a possible ally of *Labdia*. It is certainly not allied to *Mompha* or *Walshia* which belong to different subfamilies. Of the genera just named, it most closely approaches *Labdia* and *Limnaecia*.

The genitalia of *Hyposmocoma* are basically similar to those of *Cosmopterix*, and there is no doubt that *Hyposmocoma* is correctly placed in the Cosmopteriginae. To determine the true position of *Hyposmocoma* within the Cosmopteriginae will require a general survey, if not a world revision of the subfamily. This, of course, should be done. I should like to do it, but, unhappily, such a study is impossible at the present time.

In so far as we know now, *Hyposmocoma* is an endemic Hawaiian genus. It does not appear to be represented by close relatives elsewhere in Polynesia. Nothing like it has been found in southern or central Polynesia or Melanesia. The Micronesian faunas remain unrecorded, but it appears that close relatives have not yet been found there. Based upon my present knowledge, I would assign *Hyposmocoma* to the ancient Hawaiian fauna which developed when the now degenerate leeward Hawaiian Islands were at their zenith. Its ancestors were probably Boreal. Related forms may yet be recognized in Japan or eastern Asia. I believe that this enormous complex of perhaps more than 500 species may have arisen from one or two ancestral females which were accidentally carried across the sea and established their race upon an ancient Hawaiian land now eroded away and submerged beneath the waves.

To my knowledge, only two genera outside of Hawaii have been assigned to the "Diplosaridae", as the allies of *Hyposmocoma* were called by Meyrick and some other workers. (Meyrick always referred to the Hawaiian cosmopterigines as Diplosaridae, and I cannot recall his ever using the family name Cosmopterigidae when he discussed the Hawaiian species.) The two extra-Hawaiian genera are *Irenicodes* Meyrick and *Aphanosara* Forbes.

**Irenicodes** Meyrick, 1919*b*:352; type-species: *Irenicodes eurychora* Meyrick, 1919*b*:352; monotypic. Zimmerman, 1971:53, figs. 1, 2.

This genus was described from one male specimen from Paekakariki, New Zealand, and to my knowledge nothing had been written about it until I published my 1971 report. Meyrick said (1919*b*:351-352):

In general characters it approaches the Cosmopterigidae, but is distinguished from that family by the absence of the pronounced costal shoulder with scale-projections at about  $\frac{1}{3}$  of hindwing, the costal edge being quite regularly arched. The family as hitherto known is entirely restricted to the Hawaiian Islands where it constitutes the mass of the Micro-Lepidopterous fauna, the known species approaching 300, and indicating a probable total of quite 500. The following species (quite certainly a characteristic member of the family) is the first discovered elsewhere, and is therefore of very great interest; but it must be observed that the *Tineina* of the Pacific islands are hardly at all known yet (I wish some one would explore them), and some may be found there. The new species would seem, however, to be an extreme straggler from the centre of development.

Meyrick was completely misled by this species. It has nothing to do with the Hawaiian fauna, it does not belong to the "Diplosaridae", and it is not a cosmopterigid. It belongs to the Cynodiidae (= Elachistidae *auctorum*)! If Meyrick had studied the genitalia he would have seen at once that they are so typically cynodiid that the species might have been taken for a possible member of the European fauna. Hence, the genus *Irenicodes* is eliminated from consideration as a possible relative of the Hawaiian cosmopterigines.

**Aphanosara** Forbes, 1931:361; type-species *Aphanosara planistes* Forbes, 1931:362, pl. 42, fig. 10, forewing in color; pl. 43, fig. 5, wing venation; pl. 46, fig. 37, male genitalia; monotypic. Zimmerman, 1972:315.

Forbes (1931:362) said that his species was "the only Diplosarid in the restricted sense known to me outside of Hawaii", but he overlooked *Irenicodes* Meyrick, as mentioned above. Forbes' species was described from a unique male from Puerto Rico. It is not represented in the British Museum, and I have not studied it. However, it is obvious from Forbes' good illustrations that this species is not closely allied to the Hawaiian group. It is an American cosmopterigid; it is not a member of the "Diplosaridae" in the Hawaiian sense. The wing venation and the male genitalia are unlike anything found in Hawaii, and the species is not related to the Hawaiian fauna.

Thus we have eliminated from association from the Hawaiian *Hyposmocoma* complex, or "Diplosaridae" of some authors, these two extra-Hawaiian genera which were supposed by their authors to be allied to it.

### THE NUMBER OF SPECIES OF HYPSMOCOMA

Herein are included details concerning the more than 350 kinds of *Hyposmocoma* I have seen. This is an astonishing number to be assigned to one genus in an area of only about 6,000 square miles, or about  $\frac{1}{4}$  the size of the

small state of Massachusetts, or  $\frac{1}{5}$  the area of Ireland, or  $\frac{1}{470}$  part of the contiguous continental states of the United States. Yet, this is only a part of the species of this remarkable genus. An untold number of new species remain to be described. No species have been recorded from vast areas of the islands. I have not seen any species from all of wonderful West Maui—the equivalent of a large, separate, high, densely forested island—where there should be a large number of locally restricted and perhaps extraordinary species. This is a major gap in the record, and it is surprising that it exists. The lowland faunas are virtually unknown, but, alas, they are now decimated. A vast number of species surely has been exterminated since man has so drastically altered the environment. In spite of the large number of species described, the islands have only been “sampled” here and there for *Hyposmocoma*. No general collection of *Hyposmocoma* had been made since Perkins’ remarkable surveys 75 years and more ago until the Sattlers’ survey was made in 1973 after this text was written. Dr. Swezey collected many species. However, most of his work was devoted to the rearing of selected forms in an attempt to ascertain their hostplants, and he did not make light-trap surveys in the forests or extensive general collections of free adult moths. It is not unreasonable to suppose that as many as 500 or more species of *Hyposmocoma* now exist, and perhaps many more than even that large number may have existed within the past century before the islands were changed so drastically by man and by introduced parasites, predators, and diseases.

### CHARACTERIZATION OF HYPSMOCOMA

Without a detailed revision of the Cosmopteriginae, a task outside the scope of this monograph, it is impossible to formulate a description in succinct terms that will delimit characters to distinguish *Hyposmocoma* from all other genera. We shall have to accept a generalization for the present.

The specific variability of almost all features of *Hyposmocoma* is most bewildering, but it is intensely interesting and highly significant to the evolutionist. It is difficult to convey in words the astonishing morphological variation in *Hyposmocoma*. It must be seen and studied in detail to be appreciated fully. I have included a number of illustrations to demonstrate some of the variation, but these limited figures cannot tell the whole story. It would appear that almost all structures are subject to great specific differentiation and divergence. As the multitude of species is studied, one never knows what to expect when one examines species not seen before. It is impossible to foretell what unusual features may be displayed when new species are discovered.

The wing expanse of the moths ranges from less than 7 mm. to 35 mm. The head and thorax are smoothly scaled in most species, but on some the scales on the head may be somewhat raised. Ocelli are absent. The proboscis is well developed, variable, and squamose. Maxillary palpi are variable in length, although they are usually quite small.

The labial palpi are extraordinarily variable in size, shape, and vestiture, and the form and variation can best be appreciated by examining figures 778–787. Normally, they are carried upright and curve up in front of the head,

and on some species they are so long that they curve up far over the head. They may be long or short, smoothly scaled or hairy. The terminal (third) segment may be shorter or longer than the second, it may be slender to rather stout, and it may be variously expanded by hairs and scales. The second (penultimate) segment may be only a little broader or it may be much broader than the third and may be expanded by its vestiture to varying degrees; the expansion of the vestiture on the second segment reaches its maximum on *ekaha* and *trivitel* (*Euhyposmocoma*, figures 772, 778). Intermediate between the "normal" *Hyposmocoma* type and the extreme development of *Euhyposmocoma* is *Hyposmocoma barbata* (figures 778, 784), which Walsingham labeled "*Hyposmocoma* (?)". The greatest expansion of the third labial palpal segment is found on *lignivora* and its allies (*Diplosara*, figures 761, 778).

The *antennae* are shorter than the forewings. The basal segment is specifically variable in size and shape, and a *pecten* (a comb of setae) may or may not be present. When the antennal pecten is present, it may consist of one or two or more setae, or there may be an entire row of strongly developed setae. The structure of the antennal segments and their vestiture is subject to specific variation, and characters useful in separating some species may be found in the antennae.

Some species (and perhaps only the males in some species) have an *expansible hairbrush* on the metathorax beneath the anterior corner of the wing or in the posterior axil of the hindwing. This may vary from small to large and conspicuous, and, where it is present in both sexes, it may be larger on the male than on the female.

There is a well-developed *chaetosemalike organ* (see figure 788) on some species between the base of the anterior metathoracic brush and the insertion of the wing; this varies from being weakly to strongly developed.

The *legs* vary considerably in clothing, and there is also specific variation in the proportionate lengths of the *spurs*. These features are useful for the separation of some species.

The *wings* vary greatly in shape and comparative size; some are narrow and others are comparatively broad, as the many accompanying illustrations demonstrate. Some species, such as ("*Petrochroa*") *neckerensis* and ("*Rhinomacrum*") *scapulella*, have definite indications of wing reduction which, if carried further, might lead eventually to flightlessness. This is a significant evolutionary trend. Many species have patches of *raised squamae* on the forewings—"*Diplosara*" *lignivora*, many species of the "*Aphthonetus*" group, and various otherwise conservative species of *Hyposmocoma* display such raised patches, but others show no trace of raised squamae. The *vannal areas* of the forewings may be adorned with various arrangements of hairs and squamae and may have conspicuous brushes of long hairs. On the undersides of the forewings there may or may not be a fringe of specialized hairs or squamae on vein 12 in the males.

The hindwings of the males of the members of *Hyposmocoma sensu stricto* may or may not have an *expansible subcostal brush*, and, when present, it may vary from modest to large, long, and heavy. See the accompanying tabulation of the species according to the presence or absence of the subcostal brush. All members of subgenus *Euperissus* lack subcostal brushes. The clothing of the

posterior margin of the cell in the hindwings varies specifically.

The *vannal areas* of the hindwings call for special attention because differences in the vestiture divide the genus *Hyposmocoma* into two major divisions. On subgenus *Euperissus*, the dorsal surface of the vannal area along or between veins 1b and 1a bears some, and may have many, long hairs, and some species bear conspicuous brushes on these areas (when well developed, they were called "limbal hair-pencils" by Walsingham). On the other major division, subgenus *Hyposmocoma sensu stricto*, the dorsal surface of the vannal area of the hindwing is clothed entirely with squamae.

## PRESENCE OR ABSENCE OF SUBCOSTAL BRUSHES ON THE HINDWINGS OF HYPSMOCOMA SENSU STRICTO MALES

### SUBCOSTAL BRUSH PRESENT

<i>abjecta</i>	<i>fractistriata</i>	<i>nividorsella</i>
<i>admirationis</i>	new species 13	<i>notabilis</i>
<i>alliterata</i>	<i>geminella</i>	<i>ochreociliata</i>
<i>alveata</i>	<i>genitalis</i>	<i>partita</i>
<i>atrovittella</i>	<i>haleakalae</i>	<i>phalacra</i>
<i>bacillella</i>	<i>hygroscopta</i>	<i>propinqua</i>
<i>bella</i>	<i>impunctata</i>	<i>pseudolita</i>
<i>blackburnii</i>	<i>iodes</i>	<i>sabulella</i>
new species 1	<i>irregularis</i>	<i>saccophora</i>
new species 2	<i>lactea</i>	new species 27
new species 4	<i>lignivora</i>	<i>scolopax</i>
new species 5	new species 15	<i>semicolon</i>
new species 7	<i>liturata</i>	<i>sideritis</i>
<i>butalidella</i>	new species 18	<i>similis</i>
<i>calva</i>	<i>lixiviella</i>	<i>straminella</i>
<i>candidella</i>	new species 19	<i>subcitrella</i>
new species 8	<i>ludificata</i>	<i>subscolopax</i>
new species 9	<i>lupella</i>	<i>suffusa</i>
new species 10	<i>malornata</i>	<i>suffusella</i>
<i>conditella</i>	new species 22	new species 30
new species 11	<i>marginenotata</i>	new species 31
<i>corvina</i>	<i>mediella</i>	<i>tarsimaculata</i>
new species 12	<i>mediospurcata</i>	<i>tenuipalpis</i>
<i>discella</i>	<i>mesorectis</i>	<i>thoracella</i>
<i>divisa</i>	<i>metrosiderella</i>	<i>torella</i>
<i>domicolens</i>	<i>mimema</i>	<i>trimaculata</i>
<i>empedota</i>	new species 23	<i>tripartita</i>
<i>endryas</i>	<i>montivolans</i>	<i>triptila</i>
<i>fallacella</i>	<i>nebulifera</i>	<i>trossulella</i>
<i>fractinubella</i>	<i>nigralbida</i>	

**SUBCOSTAL BRUSH ABSENT**

new species 3	new species 20	<i>thiatma</i>
new species 16	<i>metallica</i>	new species 33
new species 17	<i>mimica</i>	new species 34
new species 26	<i>modesta</i>	<i>torquata</i>
<i>albifrontella</i>	<i>neckerensis</i>	<i>trimelanota</i>
<i>albonivea</i>	<i>nephelodes</i>	<i>turdella</i>
<i>anisoplecta</i>	<i>niger</i>	<i>unistriata</i>
<i>arenella</i>	<i>nigrescens</i>	<i>vermiculata</i>
<i>auripennis</i>	<i>numida</i>	<i>virgata</i>
<i>auropurpurea</i>	<i>ochreocervina</i>	
<i>belophora</i>	<i>paradoxa</i>	
<i>canella</i>	new species 24	
<i>carnea</i>	<i>parda</i>	
<i>cinereosparsa</i>	<i>patriciella</i>	
<i>commensella</i>	<i>persimilis</i>	
<i>communis</i>	<i>petrosica</i>	
<i>coruscans</i>	<i>pharsotoma</i>	
<i>costimaculata</i>	<i>picticornis</i>	
<i>elegantula</i>	<i>prophantis</i>	
<i>evanescens</i>	<i>quinguemaculata</i>	
<i>fervida</i>	<i>rhabdophora</i>	
<i>filicivora</i>	<i>rubescens</i>	
<i>fuscopurpurea</i>	<i>saliaris</i>	
<i>hemicasis</i>	<i>schismatica</i>	
<i>humero vittella</i>	<i>somatodes</i>	
<i>illuminata</i>	<i>subflavidella</i>	
<i>indicella</i>	new species 28	
<i>lacertella</i>	<i>swezeyi</i>	
<i>lebetella</i>	new species 32	
<i>leporella</i>	<i>syrrhaptēs</i>	
<i>lineata</i>	<i>tetraonella</i>	

**MALES NOT SEEN**

new species 6	<i>cupreomaculata</i>	<i>oxypetra</i>
new species 25	<i>ferricolor</i>	<i>progressa</i>
<i>adjacens</i>	<i>flavipalpis</i>	<i>punctiplicata</i>
<i>advena</i>	<i>fuscotogata</i>	<i>scapulella</i>
<i>argentifera</i>	<i>intermixta</i>	<i>semifusa</i>
<i>bilineata</i>	<i>inversella</i>	<i>tomentosa</i>
<i>cincta</i>	<i>lacti retella</i>	<i>trifasciata</i>
<i>continuella</i>	<i>longisquamella</i>	<i>vinicolor</i>
<i>crossotis</i>	<i>lucifer</i>	



The *wing venation* is subject to great and confusing specific variation. It may also vary between individuals of the same species, and it may differ in the wings of opposite sides of the same individual. Abnormalities occur on many specimens. The basic number of veins in the forewing is 12, but one vein—2, 4, 5, or some other vein—may be weak or absent, thus leaving only 11 veins. I have seen 13 veins in the forewings of a female paratype of *palmivora* and in the male holotype of *cryptogamiella* (see figure 770) where an extra vein occurs between veins 8 and 12. The basic, conservative, broad forewing has all 12 veins present; vein 2 strong and complete; 3 leaving cell before its apex; 4, 5, and 6 free and strong, the cell wide throughout its length; 7 normally arising as a branch from 8 and running to costa anterior to wing apex; 8 always free from 9; 9 to 12 all free and distinct.

From this basic and simple pattern of venation a multitude of variations have developed. Rarely, 7 may arise free from the cell, as it does in *commensella* (figure 830). [On an abnormal paratype of *vinicolor* (see figure 865) the course of 7 is unusual, because it is stalked with 6 from the cell (the stem is free from 8), and it runs to termen instead of anterior to apex. On the opposite side of this paratype, the vein is normal as it is on both sides of the type of the species.] In many species, vein 6 arises as a branch of the stem of 7 + 8. In most species the apical veins run strongly and boldly to the wing margins but are apically weak in some species, and in others they are weak near the cell. In species in which the wings are narrower the veins become closer together, 2 may become weak or lost, 3 migrates to the end of the cell, 4 and 5 may fuse, and 6 may become a branch of 7.

The shape of the *hindwing* is subject to much variation. Basically, there are 8 veins; the discocellular space may be wide or narrow; vein 6 may arise from the cell and be well separated from 7, or it may be connate or short-stalked with 7 (this condition exists in species which Walsingham placed in *Aphthonetus* as well as in *Hyposmocoma*); veins 4 and 5 may be widely separated at their origins, connate, short- or long-stalked (in *Diplosara lignivora* all of these conditions may be found in the one species, and the left wing may have a different arrangement from the right wing!). The wing may be broad or narrow, and some species that were originally assigned to *Hyposmocoma sensu stricto* have narrow hindwings similar to those narrow-winged species originally assigned to *Aphthonetus* and *Neelysia* (see figure 852 of *petroscia* and figure 855 of new species 26, formerly confused as a paratype of *saccophora*, for example).

The *color* and *pattern* spreads over an extraordinary range—there appears to be no end to the arrangements. Some species are dull and nondescript, but the colors and patterns range to highly colorful, bright, and strikingly marked species. Some species are nearly concolorous, others are extraordinarily maculated; some species are mostly white and others are black; some are yellow and others are orange, pinkish, brown, beautiful green, bluish, or iridescent; some are vittate and others are fasciate; some appear jewel studded. Many are truly beautiful organisms. I refer the reader to the many accompanying illustrations for further explanation of the wing patterns and their venation. We should not forget that there is a protective reason in nature for the colors and color patterns of the moths and what we see on a spread specimen

mounted on a pin in the museum bears little resemblance to the effect given by the moth when it sits with its wings closed in repose on its chosen substrate. Many species are so effectively camouflaged that they are extremely difficult to see when they are sitting quietly on vegetation. Even those whose markings appear in the laboratory to be bold and contrasting may in nature be beautifully camouflaged. Some species closely resemble the lichen-covered tree trunks or branches upon which they rest. Others have sharply defined markings which serve as disruptive camouflage.

The *genitalia*, especially those of the male, are truly astonishing. The *female genitalia* usually do not have signa on the bursa copulatrix, but in some there is a minute signum, some have a well-developed signum, and others have a pair of signa. I have illustrated the signa of some species on figures 1207 to 1210. Signa occur on species of both *Hyposmocoma sensu stricto* and subgenus *Euperissus*. In subgenus *Euperissus*, I have noted signa on such species as *argentea*, *arundinicolor*, *fulvida*, *longitudinalis*, *radiatella*, *roseofulva*, *vicina*, and *pritchardiae* (which species appears to have an unusual signum). In subgenus *Hyposmocoma*, there are signa on such species as *canella*, *indicella*, *lixiviella*, *mimica*, *parda*, *saliaris*, *schismatica*, and *subflavidella*. The most remarkable feature of the female genitalia is the *ostium*. In the "strong" *Hyposmocoma sensu stricto* types, the ostium is developed as a heavy, sclerotized, protruding, subhelicoid or more or less question-mark-shaped structure. From this extreme development there is a gradual merging to those species that have only a simple, faint, or even obscure, nonprotruding sclerotization (see the illustrations). One wonders how copulation is effected in those species with the extreme development of the heliciform, heavily sclerotized, externally protruding ostium, but we must remember that it is by use of the membranous internal sac, or endophallus, of the aedeagus that sperm transfer is accomplished. The sclerotized aedeagus itself could never be inserted, and it can only be used to bring its orifice in contact with the apex of the female's ostium. I have not had time to give adequate attention to the study of the female genitalia of *Hyposmocoma*, but, in addition to the differences in the details of the ostia as illustrated, I have noted differences in the comparative lengths, shapes, and textures of the bursae and their ducts; short and long ovipositors; differences in lengths of the segments of the ovipositors, their sclerotization, and their setae. Most species have very long ovipositors, but some species, such as *lacticretella*, *persimilis*, *tricincta*, and *trimaculata*, have very short ovipositors. These differences reflect the way in which the eggs are deposited and the kinds of places in which they are deposited. Some females have more heavily sclerotized seventh abdominal segments, and the shape of the seventh sternite is subject to variation.

The *male genitalia* of *Hyposmocoma* call for special comment. I have never found a more remarkable assemblage of astonishing morphological features in any group of insects that I have studied. The structural diversity is incredible; it must be seen to be believed. It is an exciting experience to dissect *Hyposmocoma* male genitalia because one cannot guess what remarkably different structural variation each different species may display. Most male genitalia cannot be adequately illustrated by photographs of slide-mounted dissections alone, although some very good photographs can be made of some species if great care is taken with dissections and their mounting. Models would be necessary properly to illustrate the genitalia.

The male genitalia of *Hyposmocoma* incorporate the following features: From the ventrolateral parts of the eighth abdominal sternum, which is variously developed and variously attached to the sides of the tegumen, with the strongest attachment usually mesad at the bases of the saccus or saccuslike sclerotization, there arise a pair of broad, thin, hinged, flaplike structures bearing dense, long vestiture (see figures 791, 792, for example). These structures vary greatly in size and shape, and with their long vestiture (on the outer surface, that is; the vestiture is fine and furlike internally) they enclose the genitalia proper. After treatment in potash they are revealed as hollow structures whose sclerotization appears similar to that of the abdominal segments. In want of a name, I call them simply the “genital flaps” and suggest that they be known by the new technical term *epiptygma* (plural *epiptygmata*). Kuroko, 1957, called similar structures on Japanese *Cosmopterix* “lobed projections”. It may be thought that they have a scent-spreading function, and thus they may be analagous in function to coremata. However, they are not eversible sacs as are typical coremata, and I doubt that they are equivalent to coremata. It is the long hairs and scales on these flaps which conceal the main parts of the genitalia, and it is more probable that they act to protect the genitalia.

The *tegumen* is usually strongly developed, but it varies greatly in size, shape, and degree of sclerotization. The *vinculum* is reduced or obsolete.

The *valvae* assume so many shapes and are so variably developed and ornamented that a simple description is impossible, and the reader is referred to the illustrations. They present the most remarkable evolutionary sequences that I have witnessed (figure 793A). There seems no end to the variation because of the infinite combinations of characters possible. It would appear at first that there are two basic types of valvae, and this might lead one to consider that two genera were involved if he had only a limited representation of the species. At one extreme is the simple, smooth-contoured, finely haired valva. From this there is a complete gradation to heavy structures bearing setae that have developed from simple, slender setae to enormous articulated spurs of various sizes, shapes, and number. Frequently they are conspicuously different on the two sides of the same individual. Variform expansions and processes may be developed from the costal margins of the valvae themselves, and these may also differ on the two sides of the same individual.

Many years ago, when I first examined a few species of this complex, I supposed that the simple types of valvae which are typical of the *Euperissus*, *Neelysia*, and *Aphthonetus* assemblages, for example, represented a generic grouping distinct from the strong *Hyposmocoma* types whose valvae are ornamented with spurs. Then, as I studied more species, the complete gradation from one extreme to the other in a most beautiful example of evolutionary change emerged before me, and I found that there is no break from the beginning of one extreme to the end of the other. Almost every evolutionary intergrade from fine setae to huge spurs can be demonstrated when enough species are studied.

To add to the confusion, species representing the two major divisions of valvular development were sometimes placed in the same “generic” group by Walsingham. Walsingham described *Hyposmocoma longitudinalis* from a

series of seven specimens from the islands of Oahu, Molokai and Hawaii, but I have found that the type series contains not one but three species. Unfortunately, the type from Hawaii has lost its abdomen, but upon dissection I found that the Molokai species has simple valvae with no spurs, and the Oahu species has enormous spurs on the valvae. Thus, Walsingham placed together under one specific name these different species whose genitalia are so strikingly distinct and which belong to different subgenera. I have illustrated the genitalia of these species to prove this point (see figures 1105 and 1106). This is an example of how independent of most external characters these two types of genitalia are.

The *Neelysia* and *Aphthonetus* groups are in some ways degenerative, and their genitalia are evolving toward reduction and simplification instead of diversity and ornamentation. In *Neelysia subaurata* (figure 1013), for example, there is an extraordinary reduction of the valvae—they have been reduced to resemble somewhat the long, slender lobes of the anellus. A revelation in evolution!

Without studying the animals themselves, the diversity of structural variation and armature of the valvae can only be appreciated by a detailed study of the illustrations (which, unfortunately, give only a partially satisfactory picture of the structures). The two valvae may be symmetrical or asymmetrical, and the processes they bear may be equally or unequally developed in number, size, and shape. One can only wonder why it is always the left valva which is most highly developed and ornamented when it differs from the right valva.

The *aedeagus* is specifically variable but not remarkable. It ranges from short and stout to rather long and attenuated, and it may be nearly straight to strongly arcuate. The *anellus* has two long lobes which show much interspecific variation in size and shape, and they are often asymmetrical. The lobes are mistakenly called "costae of the valvae" or "costal projections" by some authors.

The *uncus* is absent—what appears to be a divided uncus is actually other structures which have been highly modified. For a long while I was confused and misled by this feature because these structures appear to represent the uncus. It was not until I studied *Trissodoris* in detail that I was able to ascertain that the structures do not represent the uncus. *Trissodoris* appears to have retained its uncus (unless it has developed a new structure), and it also has highly modified gnathuslike structures basically similar to those of *Hyposmocoma*. I once accepted the opinions of various workers who call the structures arms of the *gnathus*, but I am forced to question that opinion. At the bases of the arms of the structures in question on most species there are obviously setae or setose areas which appear to be remnants of the *socii*. Also, the arms themselves often bear conspicuous setae. We know that the normal position of the *socii* is *dorsad* of the arms of the *gnathus*. If we were to conclude that the structures in question in *Hyposmocoma* represent arms of the *gnathus*, then we must assume that in *Hyposmocoma* and other cosmopterigines the arms of the *gnathus* have been rotated in relation to the *socii* so that they have in some way moved *dorsad* from their normal positions *ventrad* of the *socii* and have now confusingly come to lie above the *socii* in abnormal positions. If the uncus is lost, and if the *gnathus* is also lost, there can be little doubt that these structures are modified *socii* unless they are new structures in the Cosmop-

teriginæ. [Since these studies were made, I have found that Eyer (1926*b*:243) considered that the gnathus is "usually absent" in the Cosmopteriginæ, and he concluded that the uncus was replaced by the socii.] These questions demand detailed study. I have concluded that we may avoid confusion if we call the structures simply "*brachia*" (arms) and avoid the use of gnathus or socii in this group until we learn more about them. Riedl (1969) has also been unable to determine their exact nature, and he has called them "arms of the tenth segment".

It is noted above that when the valvæ have asymmetrical developments it is the left valva that bears the greatest elaboration. The brachia, however, reverse this situation, and the right brachium is usually much more developed than the left brachium. It is usually developed into a strong unculuslike organ. The left brachium is normally much reduced. The right brachium is divided into a more or less "thumb and finger" arrangement in many species, especially those of *Euperissus*. The structure of the brachia is almost as varied as the structure of the valvæ. It is difficult to illustrate adequately the brachia because of their curvatures and arrangement. An adequate portrayal would demand a model or a number of drawings from different aspects. They are usually distorted during the slide mounting process. Consequently, most of my illustrations are inadequate. The brachia should be drawn separately before the genitalia are placed on slide mounts.

On some species, an astonishing, curved, sclerotized hook or "*pseuduncus*" (figures 791, 1050) arises from the seventh abdominal segment. This, when strongly developed, can be curved over the genitalia to engage the female during copulation. It can sometimes be seen projecting from the scaling above the genitalia on dried specimens of species in which it is highly developed. In using the term "*pseuduncus*" I realize that the structure to which I here append the name is not the same as other structures dorsad or cephalad of the true uncus in some other groups (see, for example, figure 27 which shows a different structure called pseuduncus). It is a new structure that has arisen in *Hyposmocoma*, and "*pseuduncus*" is simply a convenient term to apply to a structure that appears to function as an uncus when it is fully developed. It is thus a false uncus or pseuduncus. Its use should not cause any confusion in these cases where a convenient term is required to designate a structure that otherwise might be called "the sclerotized unculuslike process arising from the right side of the seventh abdominal segment". There is no reason why there should not be various kinds of pseudunci. On many species it is in a primitive stage of development and cannot really be considered a pseuduncus, but, for simplicity, I have called it pseuduncus regardless of the degree of development it has reached.

This structure may arise as a sclerotized ring on the anterior or posterior margin of the seventh abdominal sternum, or on a combination of both margins, and curve around the pleurum to give rise to the free pseuduncus at the dorsal edge of the sternum (usually only on the right side). The pseuduncus can be traced in development from a minute indication on some species (figure 1054 of *carnea*, for example) through an entire series of diverse forms to those in which it has become very large and very heavy. It often forms a

prominent C-shaped sclerite which forms a ventral and lateral ring around the sternum and curves freely up over the dorsum. Some species have developed another process on the left side, but if two hooks are present, the left one is always smaller than the right one.

*Hyposmocoma nigralbida* (figure 1138) not only has a process from both right and left sides of the seventh abdominal segment, but it also has another pair of pseuduncus-type lobes on the sixth segment! A group of species typified by *malornata* and its associates has a large, semicircular, heavily sclerotized lobe on the seventh tergite in addition to a heavy pseuduncus arising from the sternum (figures 1119, 1120, 1121). On *domicolens*, sternites five, six, and seven have their posterior margins formed into sclerotized arcs (figure 1066). In addition to these structures, the abdomen may have various kinds of other specific developments. On *lignivora*, and some undescribed closely allied forms making up the *lignivora* species group, the apex of the seventh abdominal tergum has a wide, dense brush of modified setaelike squamae. In so far as I now know, no similar structure is found on any other species in this great genus (see figure 1097). *Hyposmocoma fractistriata* (figure 1076) has an unusual transverse comb of spines on the fourth visible tergum; I have seen nothing similar to it on any other species. I have discussed the unusual structure of the apex of the abdomen on the *Aphthonetus* group on page 1093, and there is nothing similar to that development in any other group.

The *eighth abdominal segment* is usually mostly membranous, but it varies. On some species the sternum is decidedly more heavily sclerotized (figures 1032, 1044, 1115, for example) to form an encompassing hull around the ventral and ventrolateral parts of the tegumen (this more strongly sclerotized structure bears the epiptygmata or "genital flaps"), and its degree of sclerotization may approach that of the tegumen. This more strongly sclerotized area, when present, is specifically variable and is of value in identification. The nature of its dorsocaudal area where it attaches to the tegumen varies in degree of sclerotization and extension on the tegumen.

I refer my readers to the many accompanying illustrations for extended study of these fascinating structures and urge them to reflect upon the marvels of evolution as they are displayed so vividly in this astonishing and wonderful swarm of species.

Many of the microscope preparations of the genitalia made for this study are inadequate. Not a few of the moths had partly decomposed before they were dried following capture, and some were damaged by mold. This is not surprising when the difficult conditions under which many of them were captured and prepared in the wet Hawaiian forests are considered. Good microscope slide preparations cannot be made from such material. In some cases we have only unique specimens to study, and it is not always possible to get a good microscope mount from a single specimen no matter how much care is taken. A large number of microscope slide mounts of this group were made while I was engaged in other work, before I began my detailed study of *Hyposmocoma*, and before a proper technique for dissection and mounting was evolved. As a result, many of the dissections were mounted in inferior positions, and it has not been possible to obtain good photographs of them. Some of the slide mounts were remounted, but it was not possible to obtain satisfactory

mounts of a number of species. Even many of the slide preparations made by experts, such as August Busck, proved unsatisfactory for proper illustration. Comparing figure 1140 with figure 1120, for example, it can clearly be seen how important it is to have the dissections made and displayed on the slide mounts in the most appropriate positions possible. The preparation of slide mounts is slow, tedious, hard work, and one should not have to rush the process. It would be best to make drawings of various parts such as the brachia, anellar lobes and aedeagus from various aspects during the dissection process *before* the specimens are mounted because important shapes and features are often obscured in the slide mounts. Cleaned, potash-treated specimens preserved in glycerin are also of great assistance to the studies.

After most of the microscope slides of dissections were prepared, and after I had begun to study the group in final detail, I devised the following method for preparing the male genitalia to ensure the best possible views of the various structures when they are mounted on microscope slides:

1. After treatment in 10% KOH, followed by glacial acetic acid, the entire abdomen is given a preliminary cleaning in water and stained in Mercurochrome (see p. 87 above for detailed discussion).

2. A second cleaning is made of the entire abdomen in water after staining. The genitalia, with the genital flaps, are removed and cleaned.

3. The cleaned abdomen is transferred to clean 70% alcohol and flattened. The genitalia are transferred to the clean alcohol, cleaned further and spread.

4. The genital flaps are carefully detached from the genitalia, cleaned further, spread open and flattened.

5. The tegumen is cut or torn away on each side from the bases of the valvae, removed, and flattened. Special care is taken to remove all the anal tube membrane so that it will not obscure or distort the view of the brachia. An attempt is made to manipulate the brachia into good positions for illustration; but this is not always easy or possible.

6. If the operation is successful at this point, the aedeagus and anellar lobes will remain adhering to the valvae. The valvae are then opened and spread, and their appendages, together with the aedeagus and anellar lobes, are arranged for the best possible view. On occasion, it may be advisable to separate one or both valvae, and sometimes the anellar lobes, to obtain satisfactory views of the parts.

7. All parts are transferred to 95%–100% alcohol and each is held down for a few moments, as required, to assist in their hardening in the best position possible, and they are given a final cleaning as required. The parts are then ready to transfer to clearing agent and mounting medium, or they may be mounted directly from 95% or absolute alcohol to Euparal. I have found this later method completely satisfactory.

Usually three photographs will enable the genitalia to be illustrated to best advantage, that is: one of the valvae with the attached aedeagus and associated anellar lobes, one of the tegumen and brachia, and one of the genital flaps. Sometimes all of these parts can be taken on one or two photographs. Supplementary drawings may have to be made of some parts from aspects different from those that can be shown in the usual photographs.

(I deeply regret that I have not been allowed the opportunity to prepare many such drawings for this text.) If the abdomen bears a pseuduncus or other feature, a fourth, and perhaps a fifth photograph will be required to record adequately the details.

If dismemberment as suggested above is not employed, it is usually impossible to obtain good views of the features of the genitalia, and most photographs will be inadequate or poor. The natural arrangement of the parts of the genitalia of many species renders them poor subjects for illustration if they are not dismembered, although many species of subgenus *Euperissus* can be mounted entire.

In spite of all the care one takes, it is often impossible to obtain an excellent slide preparation. It is frequently difficult to descale the abdomens of many of the species, and, not infrequently, moldy or partly decomposed specimens add to the difficulties of preparation. The accompanying illustrations demonstrate the full range of excellent to poor preparations.

One may frequently have reason not to wish to make a microscope slide preparation of the genitalia—when one is checking details for identification or using the specimen for the preparation of drawings, for example. In such instances, one may preserve the cleaned abdomens, with genitalia attached or detached, in glycerin in microvials placed on the pin on which the moth is mounted. For such preparations one may proceed as above for slide mounting, but when the final 70% alcohol stage is reached, the specimen is placed in glycerin for a few minutes. Then the specimen is placed carefully into the bottom of a microvial (being careful not to touch the sides of the tube near the cork end) with only the amount of glycerin which adheres to the specimen or only a drop more. There is no need to use more glycerin in the microvial. If much more is used, or the cork end is wetted with glycerin, it may creep around the cork and cause corrosion of the pin. Glycerin exposed to air may absorb moisture.

### **DESCRIBED HYPOSMOCOMA SPECIES WHOSE MALE GENITALIA ARE NOT ILLUSTRATED**

About two-thirds of the following 65 species are known only from females. Males are known from the remaining third, but they have all lost their abdomens. It will be difficult, and perhaps impossible for some species, to arrange them in a proper scheme of classification until males are collected. Most unfortunately, almost half of the nearly 40 species of *Hyposmocoma* described by Meyrick are represented by males whose abdomens have been lost or by females.

Where the genus in which these species were originally described was other than *Hyposmocoma*, I have noted the original generic assignments in parentheses.

#### Subgenus **EUPERISSUS**

*argomacha*  
*aspersa* (*Aphthonetus*)  
*barbata*  
*catapyrrha* (*Euperissus*)

#### Subgenus **HYPOSMOCOMA**

*adjacens*  
*advena*  
*argentifera* (*Agonismus*)  
*atrovittella*



<i>centronoma</i>	<i>bilineata</i>
<i>discolor</i>	<i>calva</i>
<i>eleuthera</i> ( <i>Aphthonetus</i> )	<i>cincta</i>
<i>epicharis</i>	<i>continuella</i>
<i>erebogramma</i> ( <i>Neelysia</i> )	<i>crossotis</i>
<i>fractivittella</i>	<i>cupreomaculata</i>
<i>fuscodentata</i> ( <i>Neelysia</i> )	<i>endryas</i>
<i>hirsuta</i> ( <i>Aphthonetus</i> )	<i>ferricolor</i>
<i>homopyrrha</i> ( <i>Phthoraula</i> )	<i>fervida</i>
<i>lichenalis</i> ( <i>Aphthonetus</i> )	<i>flicivora</i>
<i>longitudinalis</i>	<i>flavipalpis</i> ( <i>Agonismus</i> )
<i>lunifer</i>	<i>fuscotogata</i>
<i>mormopica</i> ( <i>Neelysia</i> )	<i>intermixta</i>
<i>municeps</i> ( <i>Neelysia</i> )	<i>inversella</i>
<i>nipholoncha</i>	<i>lacticretella</i>
<i>pallidipalpis</i>	<i>longisquamella</i> ( <i>Elachista</i> )
<i>palmivora</i>	<i>lucifer</i>
<i>phantasmatella</i>	<i>oxypetra</i>
<i>pluviella</i> ( <i>Neelysia</i> )	<i>progressa</i>
<i>prae fracta</i> ( <i>Aphthonetus</i> )	<i>prophantis</i>
<i>psaroderma</i> ( <i>Neelysia</i> )	<i>punctiplicata</i>
<i>quadripunctata</i>	<i>rhabdophora</i>
<i>quadristriata</i>	<i>scapulella</i> ( <i>Rhinomactrum</i> )
<i>rotifer</i> ( <i>Neelysia</i> )	<i>semifusa</i> ( <i>Neelysia</i> )
<i>sublimata</i>	<i>thoracella</i>
<i>trilunella</i>	<i>tomentosa</i>
<i>veterella</i> ( <i>Aphthonetus</i> )	<i>torquata</i>
	<i>trifasciata</i> ( <i>Petrochroa</i> )
	<i>trimelanota</i>
	<i>vinicolor</i>

### HABITS OF HYPOSMOCOMA

Until the field studies of Dr. Swezey demonstrated otherwise, it had been assumed that all of the larvae were case-makers. We know now that the habits of the species are diverse, and although the larvae of many are case-makers, many species do not make cases. The kinds of cases made are almost as varied as the many species which make them. An extremely interesting study could be made of the cases alone, and one of the great regrets of this preliminary study is that I have not had opportunity to devote adequate time to the study of the larval cases. It was my intention to include illustrations of all of the known larval cases, but I have been able to include only a few examples. As I have stated above, it appears that the species of *Hyposmocoma sensu stricto* are case-makers and the larvae of subgenus *Euperissus* do not construct cases.

A study of the methods employed by *Hyposmocoma* in constructing their larval cases would be fascinating and instructive. There are remarkable differences in the larval cases. The last larval skin and the pupal skin are to be found in the larval cases after the moths have emerged. To retrieve the

skins for study, one may open the the larval cases by cutting along their lateral sutures. The moth must push open the slitlike exit, or the operculum where one is formed, and force its way out of the larval case to emerge. In doing so it appears that most specimens lose a number of squamae which can be found adhering to the inside of the case if one forces it open. The pupal skin remains attached near the caudal end of the larval case after the moth emerges, and it does not protrude from the case.

We know little about the habits and food of the group, but we do know that the habits of the larvae are remarkably diverse. Many are to be found on rocks; some on the bark of trees and shrubs; others on, in, or under dead bark; others in dead stems or in dead logs; some feed among lichens; some feed among vegetable trash on the ground; others form silken tunnels in moss; some bore in living wood, stems, or pith; some feed on the fronds or bore in living ferns; some feed on living leaves; some feed on the tomentum of palm fronds. Some species are host-specific, others are not. Some of those which appear not to be host-specific may actually be so—feeding upon algae, fungi, or lichens on the plants from which they have been reared. Many case-makers live on nearly bare rocks where they evidently feed upon minute lichens, algae, or fungi. Some case-makers may be found in barren areas on comparatively new lava far from forests where there is little other insect life. None are known to be leaf miners.

To summarize what is known about the larval habits of *Hyposmocoma*, I have listed under several categories the species whose habits have been recorded and have listed them under the “generic” names in which they were described.

### I. CASE-MAKING LARVAE

#### *Hyposmocoma*

*abjecta*: on dead *Freycinetia* and dead limbs.

*alliterata*: feeds on lichens on the trunks of many trees, native and foreign.

*bacillella*: on *Metrosideros*.

*blackburnii*: in dead *Acacia koa*.

*candidella*: on or under dead bark of *Acacia koa*.

*canella*: on rocks.

*discella*: on bark of *Cheirodendron* and *Metrosideros*.

*empedota*: on bark of various trees.

*filicivora*: lives in hollows in dead stems of tree ferns.

*hygroscopta*: on bark of *Eucalyptus* and on *Pandanus* leaves.

*liturata*: on rocks and on *Pipturus*.

*lupella*: on *Freycinetia*.

*metrosiderella*: on *Metrosideros*.

*montivolans*: on lichens on rocks.

*notabilis*: at base of palm fronds.

*oxypetra*: habit unknown to me.

*saccophora*: on lichens on rocks.

*subcitrella*: on bark of *Cheirodendron* and *Metrosideros*.

*suffusella*: on dead *Pipturus*.

*trimaculata*: on and beneath bark of *Acacia koa* and *Aleurites*.

*Petrochroa*

- swezeyi*: on rocks.  
*trifasciata*: on rocks.

*Diplosara lignivora*: in rotten wood or under dead bark of various trees.

**II. NAKED STEM- OR WOOD-BORERS, OR FEEDERS IN BARK***Euperissus*

- catapyrrha*: bores in pith of dead *Rubus*.  
*cristatus*: bores in pith of dead *Freycinetia*.

*Semnoprepia*

- coprosmae*: bores in living trunks and branches of *Coprosma*.  
*ferruginea*: bores in dead twigs and branches of *Cheirodendron*.  
*petroptilota*: bores in dead wood of *Metrosideros* and *Pelea*.  
*pittospori*: bores in dead wood of *Pittosporum*.

*Hyperdasyella*

- cryptogamiella*: bores in dead stems of many trees and shrubs.  
*semiusta*: bores in rotten wood of *Acacia koa*.  
*unicolor*: bores in dead wood of many trees.

*Hyposmocoma*

- argomacha*: bores in dead stems of *Smilax*.  
*caecinervis*: has similar habits.  
*centronoma*: bores in bark of *Metrosideros*.  
*chilonella chilonella*: bores in dead pith or dead wood of many trees and shrubs.  
*chilonella triocellata*: has similar habits.  
*chilonella venosa*: bores in dead *Wikstroemia* wood.  
*chloraula*: bores in dead stems of *Astelia*.  
*erismatias*: bores in dead *Euphorbia* stems.  
*insinuatrix*: bores in dead *Smilax* stems.  
*jugifera*: bores in dead wood of *Acacia koa* and *Pelea*.  
*nipholoncha*: bores in dead *Euphorbia* stems.

*Phthoraula homopyrrha*: bred from dead *Metrosideros* wood.

*Neelysia palmifera*: bores in dead parts of several trees.

*Aphthonetus*

- bitincta*: in (or on?) dead *Acacia koa* bark.  
*praefracta*: in (or on?) *Pipturus* bark.  
 new species 35: in (or on?) *Sapindus* bark.

**III. NAKED LARVAE IN SILKEN TUNNELS IN MOSS***Neelysia*

- argyresthiella*.  
*mactella*.

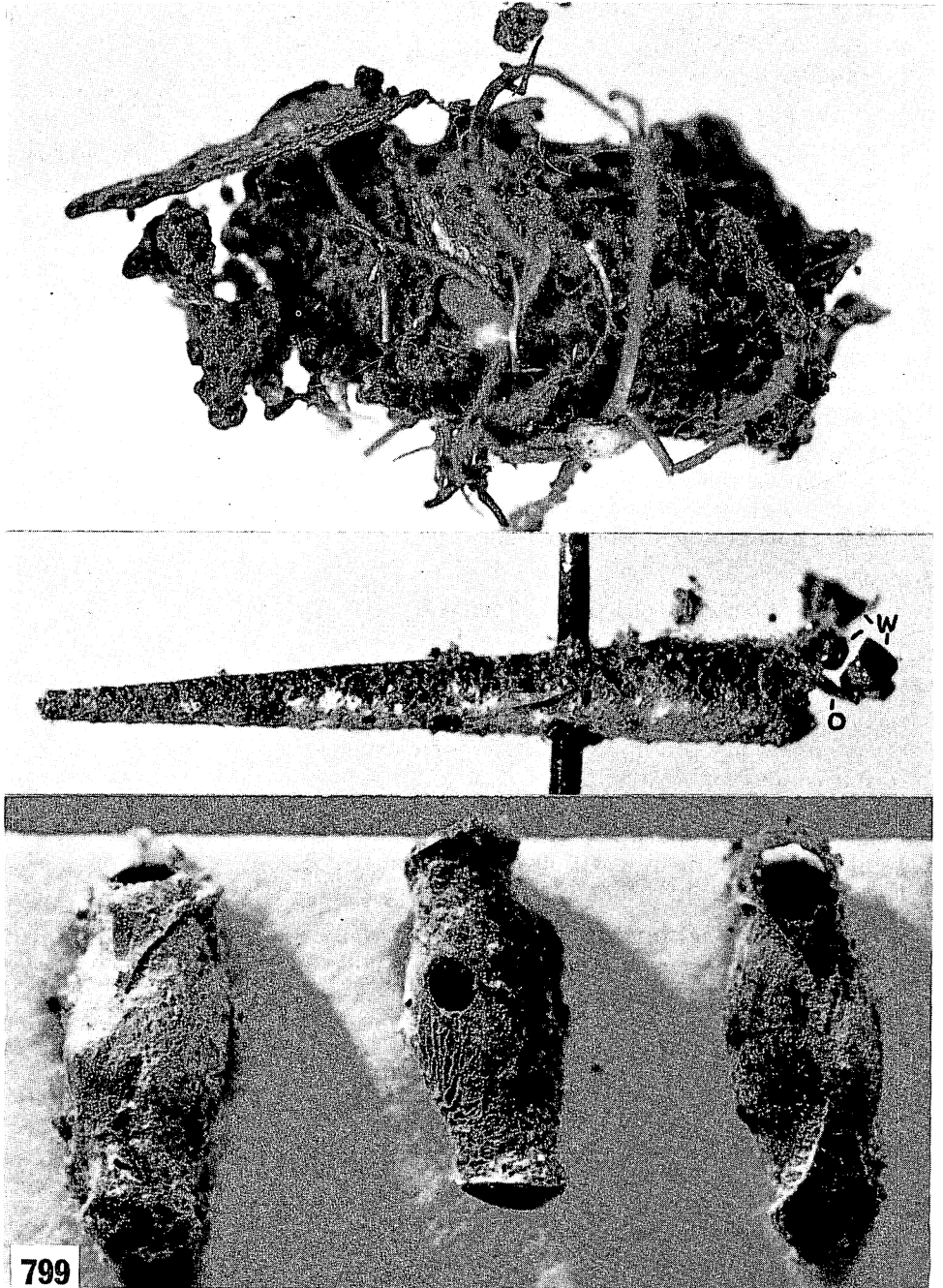
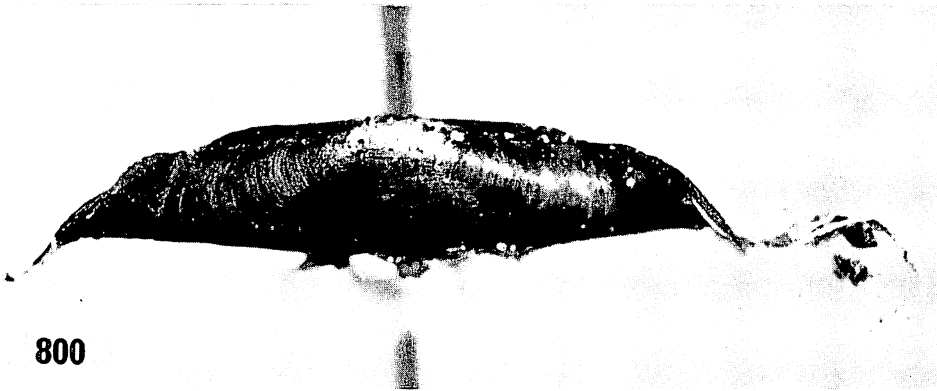


Figure 799—*Hyposmocoma*, larval cases. Top, *discella* Walsingham, paratype; Kaholuamano, Kauai; on *Cheirodendron* or *Metrosideros*, “lichenivorous”; length 10 mm.; male genitalia on slide BM 7873. Middle, *saccophora* Walsingham, holotype; Mt. Kaala, 3,000 feet, Oahu; on rocks, “lichenivorous”; length 9mm. Compare *bacillella* in figure 800. *O*, operculum; *W*, sand grain weights fastened by silk. See text for discussion. Bottom, *trimaculata* Walsingham?, as determined by Dr. Swezey; Waianae, Oahu; on bark of *Aleurites moluccana*; length of case at right, 4.5 mm. Note the parasite emergence hole in the case at middle.



800

Figure 800—Larval cases of *Hyposmocoma*. Top, *bacillella* Walsingham; Halemanu and Kaholuamano, 4,000 feet, Kauai; on underside of a *Metrosideros* leaf; length 9 mm. Note the operculum at the right. The pale side of the case is ventral when the larva is active. Compare *saccophora* in figure 799. Middle and bottom, ventral and lateral aspects of a species possibly in the *blackburnii* complex—this was identified by Dr. Swezey as *blackburnii*, but I consider it a different species; Kalihi, Oahu; length 9 mm.

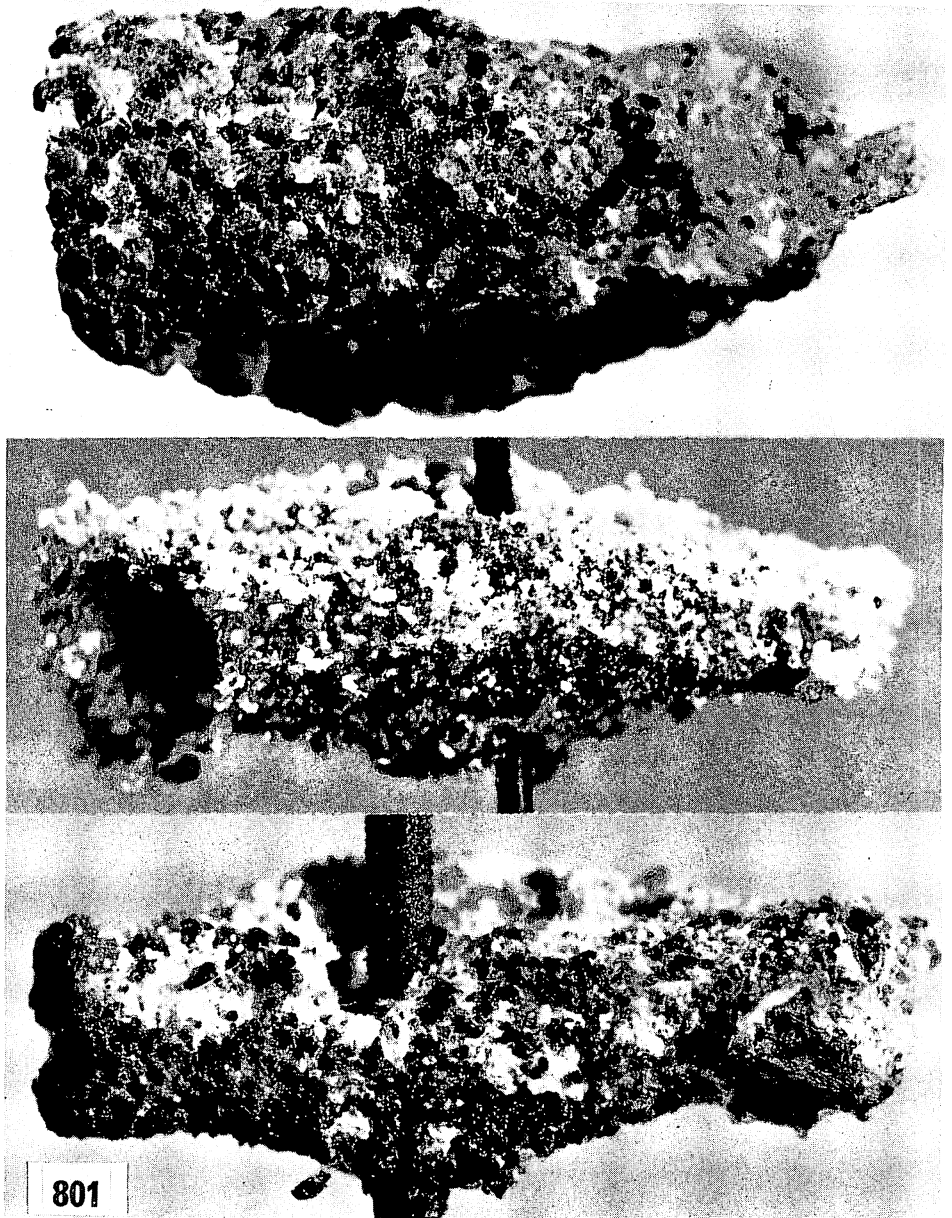
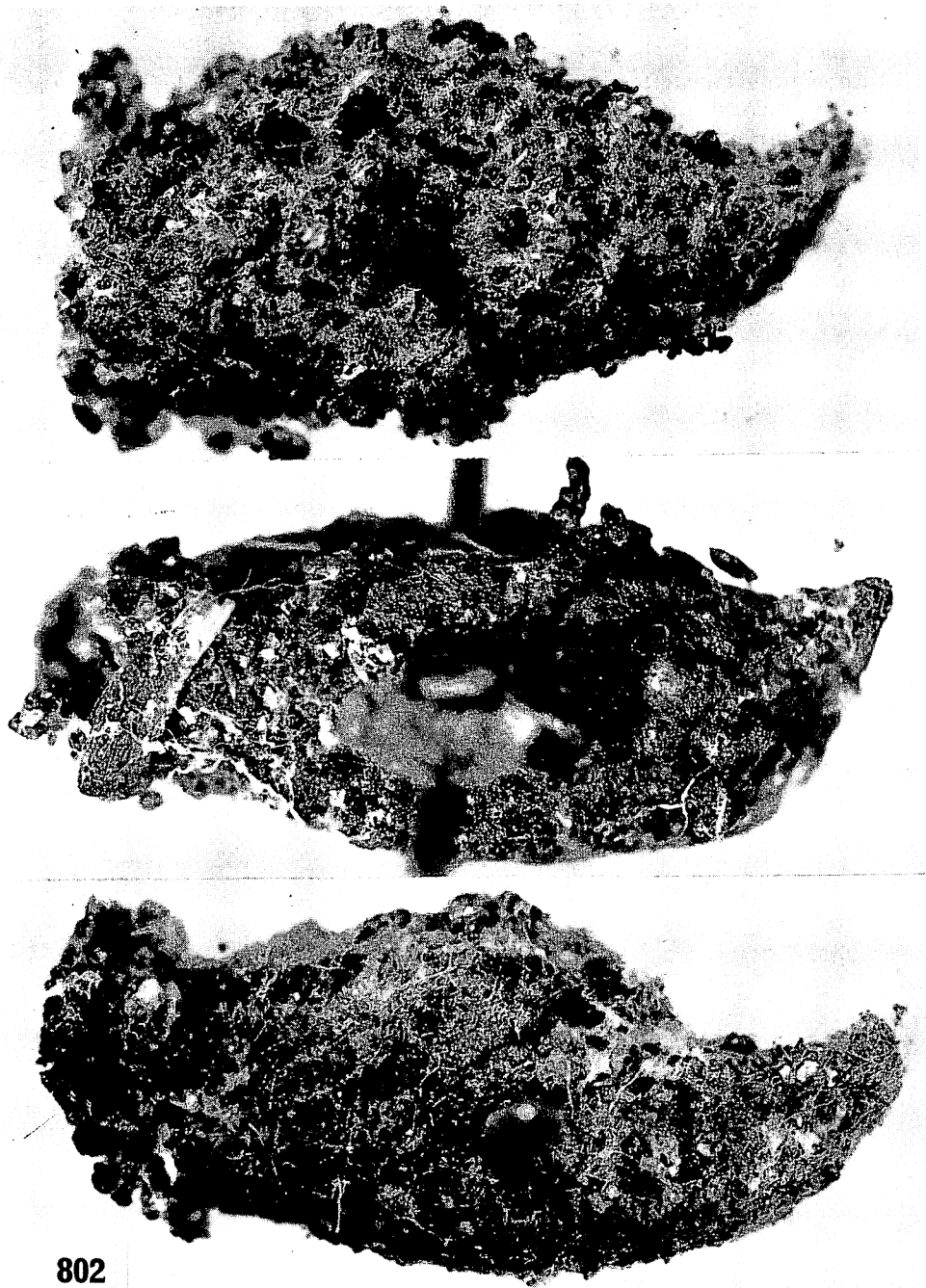


Figure 801—*Hyposmocoma*, larval cases. Top, *alliterata* Walsingham, as determined by Dr. Swezey; Lanihuli, Oahu; length 7 mm. Middle, *literata* Walsingham, as determined by Dr. Swezey; Kalihi, Oahu; length 9.5 mm. Bottom, *subcitrella* Walsingham, holotype male; Kaholuamano, 4,000 feet, Kauai; on *Cheirodendron* or *Metrosideros*; "lichenivorous"; length 5 mm.



802

Figure 802—Larval cases of *Hyposmocoma*. Top, *montivolans* (Butler); Waianae Mts., Oahu; on rocks; "lichenivorous"; length 8 mm. Middle, *metrosiderella* Walsingham; Kaholuamano, Kauai; paratype, reared from *Metrosideros*; length 6 mm. Bottom, the holotype male of *metrosiderella* Walsingham, Halemanu and Kaholuamano, 4,000 feet, Kauai; reared from *Metrosideros*; length 6 mm.

#### IV. NAKED FERN-EATERS AND BORERS

##### *Euhyposmocoma*

*ekaha*: young larvae feed on the under surfaces of fronds; older larvae also bore in fronds of *Asplenium nidus*.

*trivitella*: larvae bore in *Elaphoglossum reticulatum* and *gorgoneum* fronds.

#### V. NAKED LARVAE WITH VARIOUS HABITS

##### *Hyposmocoma*

*latiflua*: feeds under webs on undersides of leaves of *Pittosporum cauliflorum*.

*palmivora*: feeds on cottony tomentum on undersides of the leaves of the endemic palm *Pritchardia eriophora*.

##### *Bubaloceras*

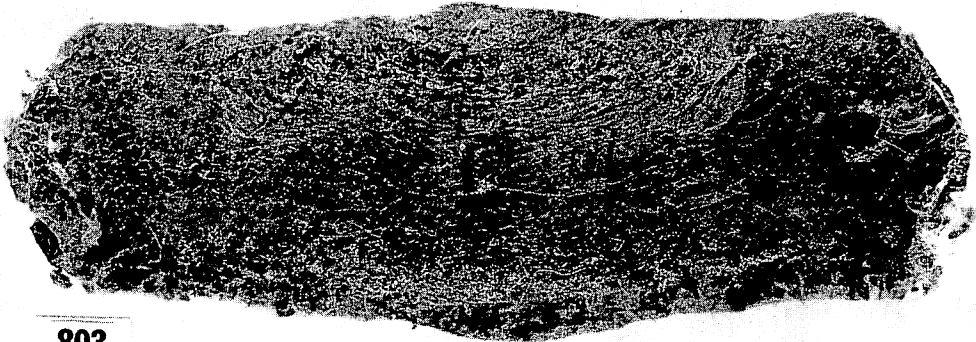
*pritchardiae*: feeds in cottony tomentum on spathe and inflorescence of *Pritchardia eriophora*.

##### *Aphthonetus*

new species 14: feeds in apical folds on upper surfaces of leaves of *Acacia koa*.

*sideroxyloini*: feeds beneath a web on the under surfaces of leaves of *Pouteria sandwicensis*.

In addition to the above-listed species, other larvae have been reared from various hostplants, but I do not know anything about the habits of the larvae. A number of reared species remain unidentified. The hostplants of about 80% of the species of *Hyposmocoma* are unknown. I have notes on the following groups of plants as hostplants for *Hyposmocoma*:



803

Figure 803—The larval case of *Hyposmocoma* ("Diplosara") *lignivora* (Butler), as determined by Dr. Swezey; Oahu. This case appears to differ from that shown in figure 1097. For more larval cases see figures 799–802, 905, 977.



“Algae?”	Euphorbiaceae
“Fungi?”	<i>Aleurites</i>
“Mosses”	<i>Euphorbia</i>
“Lichens”	<i>Manihot</i>
Ferns	Sapindaceae
<i>Asplenium</i>	<i>Alectryon</i>
<i>Cibotium</i>	<i>Sapindus</i>
<i>Elaphoglossum</i>	Tiliaceae
Pandanaceae	<i>Elaeocarpus</i>
<i>Freycinetia</i>	Malvaceae
<i>Pandanus</i>	<i>Hibiscus</i>
Graminae	Thymeleaceae
<i>Bambusa</i>	<i>Wikstroemia</i>
Palmae	Myrtaceae
<i>Pritchardia</i>	<i>Eucalyptus</i>
Liliaceae	<i>Metrosideros</i>
<i>Astelia</i>	Araliaceae
<i>Smilax</i>	<i>Cheirodendron</i>
Urticaceae	<i>Tetraplasandra</i>
<i>Boehmeria</i>	Sapotaceae
<i>Hesperomannia</i>	<i>Pouteria (Sideroxylon)</i>
<i>Pipturus</i>	Ebenaceae
Nyctaginaceae	<i>Diospyros (Maba)</i>
<i>Pisonia</i>	Apocynaceae
Pittosporaceae	<i>Pteralyxia</i>
<i>Pittosporum</i>	Verbenaceae
Rosaceae	<i>Lantana</i>
<i>Rubus</i>	Rubiaceae
Leguminosae	<i>Coprosma</i>
<i>Acacia</i>	Campanulaceae
<i>Prosopis</i>	<i>Clermontia</i>
<i>Sophora</i>	Compositae
Rutaceae	<i>Bidens</i>
<i>Pelea</i>	

From the foregoing account, which records the habits of comparatively few species, it is obvious that the variability of habit within *Hypsmocoma* is great. The foodplant range is from algae(?), lichens, mosses, and ferns all the way through most of the plant families in Hawaii. I expect that almost all suitable plants in the islands may serve as food for some species of *Hypsmocoma*. It is, however, significant that no species has yet been reared from a grass (although one or more species may be found “grazing” on the surface of bamboo, they probably feed upon lower forms of plant life which grow on the bamboo), or a sedge, and none is known as a leaf miner. How exciting it would be to make a detailed study of the larval habits of this group.

It will be noted that I have used the original group (“generic”) names for the *Hypsmocoma* in the foregoing list. I have done this in an attempt to find

if there is any correlation between group and habit. It should be noted that all of the species listed above which have naked larvae are members of the subgenus *Euperissus*. It is significant that, with the exceptions of two "*Petrochroa*" and "*Diplosara*", all of the case-makers have been described in *Hyposmocoma*. "*Petrochroa*" *swezeyi* really is a "strong" *Hyposmocoma* with prominent spurs on its male genital valvae. The genitalia of "*Petrochroa*" *trifasciata* are unknown—the unique holotype has lost its abdomen—but it also belongs to *Hyposmocoma sensu stricto*. Other *Hyposmocoma* fall into larval categories II and V, but these all belong to subgenus *Euperissus*. *Euperissus* (in the original sense), *Semnoprepia*, and *Hyperdasylella* are closely allied groups, and their species have similar habits. *Euhypsmocoma* species, *Semnoprepia coprosmae*, and others bore in living tissues.

We may conclude that at this time we know too little about the diverse larval habits of *Hyposmocoma* to draw any fundamental conclusions other than it appears that most, if not all, of subgenus *Hyposmocoma* are case-makers, and that all members of subgenus *Euperissus* have naked larvae.

Many of the moths are extremely common, resting by day on rough tree-trunks, from which some readily take flight on the approach of the collector. Others are disturbed in quantities from amongst dead fern-fronds, or dry limbs of trees, or from dense bushy trees or shrubs, especially certain varieties of the Ohia tree (*Metrosideros*). Many are readily attracted by lights. A group of yellow or orange-coloured species are very conspicuous objects on the intermediate islands of Maui and Molokai. Some of the species exhibit much variation in colour, and when series of individuals have been collected from a great number of stations

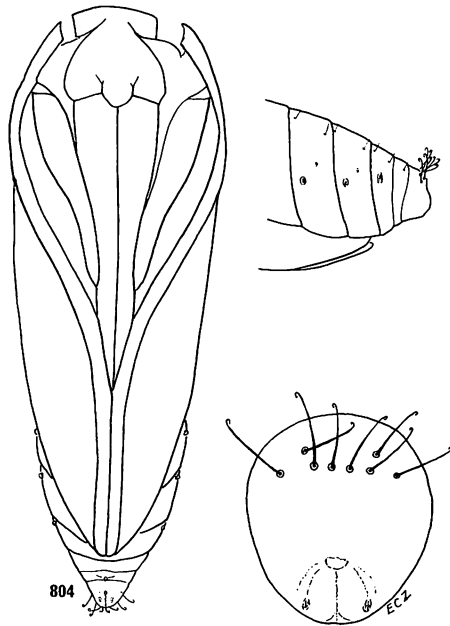


Figure 804—Pupal skin of *Hyposmocoma (Euperissus) latiflua* Meyrick, in ventral aspect, with a left lateral view of the caudal end of the body (drawn to same scale), and a greater enlargement of the tenth abdominal segment in caudal aspect. Puu Kalena, Oahu; length 5.5 mm.

it is probable that the discrimination of the species will become a very difficult matter. Some of the caterpillars feed in dead wood or bark of trees and are quite naked, while others form cases of silk mixed with frass or *débris*. These cases exhibit much variety of form and appearance. Some are acute and spiniform, while others are broadly oval; some are dilated at each extremity, or pointed at one end and broadly rounded at the other, others are dilated in the middle. Some, found on lichen-covered trees, greatly resemble the surface on which they rest. Of several species almost incredible numbers may be found attached to rocks or bare vertical surfaces of decomposing lava, where the larvae no doubt feed on the microscopic vegetable growths. . . . The moths are often caught by the little fan-tailed flycatchers (*Chasiempis*) and by the native dragonflies. Though the chief home of *Hyposmocoma* is in the true forest-belt, some occur both below and above this belt. Even in the dry lowlands a few kinds are found, their larvae feeding on the low forms of vegetable life, growing on rocks and tree-trunks . . . [A] once numerous lowland fauna has been no doubt, well-nigh exterminated by the ant *Pheidole*. . . . *Dysphoria* [semicolon] . . . comes freely to light at night. *Euperissus cristatus* . . . is very common in the larval state in the dead stems of *Freycinetia*. *Hyperdasys* . . . and *Semnoprepia* . . . are found hiding amongst masses of dead fern-fronds or are attracted by light. . . . *Diplosara lignivora* is a very common insect in the larval state, the cases sometimes being found by scores or hundreds beneath the bark of dead and fallen trees. The moth is freely attracted by light. (Perkins, 1913: clxv-clxvi.)

The larvae of *Hyposmocoma* are morphologically almost unknown, and no modern or adequate description of any of the species exists. I have found major differences between the few larvae and cast larval skins I have examined. For example, the "*Diplosara*" *lignivora* group have much larger prothoracic spiracles than do those of the *Hyposmocoma* (*H.*) *saccophora* group, and the arrangements of the ocelli differ as does the chaetotaxy. There are, of course, conspicuous adaptive differences between the case-makers and the naked larvae and between those species that are internal feeders and those which are exposed feeders. Dr. Swezey described superficially the larvae of the two species (*ekaha* and *trivittella*) which he placed in "*Euhypsococoma*", and I have included the meager details under those species headings farther on in this text. I had hoped to include here descriptions, with detailed illustrations, of a representative series of larvae, but, most regrettably, I have been allowed neither the time required to accomplish the task, nor the opportunity for the required fieldwork.

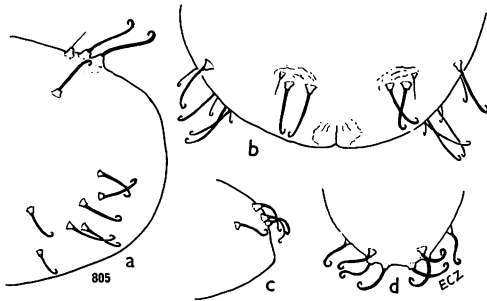


Figure 805—Details of the caudal abdominal segments of *Hyposmocoma* pupae in left lateral and dorsal aspects, not to same scale. *a, b*, *Hyposmocoma* ("*Diplosara*") determined as *lignivora* (Butler) by Walsingham; Molokai, 4,000 feet (Walsingham specimen number 28700); the antennae extend to or a little beyond the apex of the abdomen, and the wings are slightly shorter. *c, d*, *Hyposmocoma* (*Hyposmocoma*) *montivolans* (Butler); Waianae Mts., Oahu, Walsingham specimen number 25142; larvae "lichenivorous", on rocks. The wings and antennae extend caudad equal distances, reaching the ninth abdominal segment. The abdominal spiracles are protuberant, and caudo-mesad of each spiracle there is a sharply pointed denticle. These pupal skins were removed from cases made by their larvae.

## PARASITES AND PREDATORS OF HYPOSMOCOMA

We know little about the parasites and predators of this great group because no special study of them has ever been attempted. I have no records of predators except the statement quoted just above from Perkins regarding predation by *Chasiempis* flycatchers, Odonata, and the voracious ant *Pheidole*. The only records of parasites which I have assembled are all Hymenoptera, and they as follows:

### BRACONIDAE

*Agathis hawaiiicola* (Ashmead), in *Hyposmocoma* species.  
*Apanteles carpatus* (Say), in *Hyposmocoma* species.

### ICHNEUMONIDAE

*Atrometus tarsatus* Ashmead, in *trimaculata*.  
*Coccygomimus punicipes* (Cresson), in *ekaha* and *litrata*.  
*Echthromorpha agrestoria fuscator* (Fabricius), in *trivitella*.  
*Gelis tenellus* (Say), in *empedota* and *literata*.  
*Pycnophion fuscipennis* Perkins, in *chilonella*.

### EULOPHIDAE

*Euderus metallicus* (Ashmead), in *empedota* and *literata*.  
*Ophelinus mauiensis* Ashmead, in *chilonella*.  
*Pnigalio externa* (Timberlake), in *trivitella*.

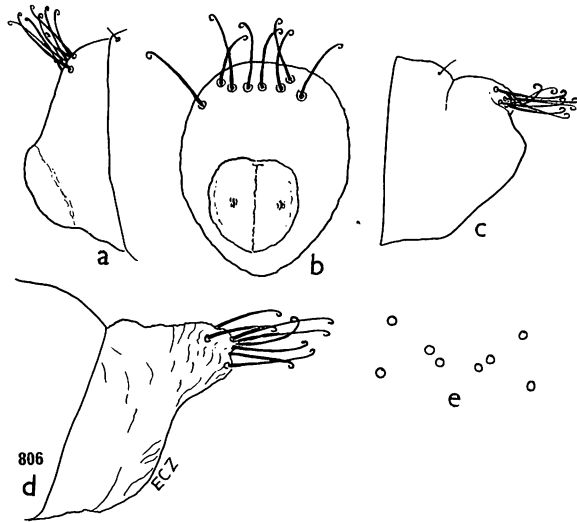


Figure 806—Details of the caudal segments of the pupae of three species of *Hyposmocoma* (*Euperissus*). *a*, right lateral, and *b*, caudal aspects of *latiflua* Meyrick; Puu Kalena, Oahu. *c*, left lateral aspect of *caecinerivis* Meyrick, Mt. Kaala, Oahu, paratype. *d*, left lateral aspect of *chilonella* Walsingham, Olinda, Maui, determined by Meyrick. *e*, the setal socket pattern of the cremasteral setae as seen in direct caudal view of the same. The larvae of these species do not make cases. Many species of *Euperissus* have similar clusters of eight cremasteral setae.

## EUELMIDAE

*Eupelmus* species, in *chilonella*.

*Lepideupelmus setiger* (Perkins), in *empedota* and *trimaculata*.

## BETHYLIDAE

*Scleroderma chilonellae* Bridwell, in *chilonella*.

*Scleroderma semnoprepiae* Bridwell, in *coprosmae* and *pittospori*.

*Scleroderma* species, in *triocellata*.

It will be noted that these records pertain to only ten or eleven species of *Hyposmocoma*. Three species of parasites are recorded from *chilonella* and from *literata*. Two parasites are recorded from *empedota*, *trimaculata*, and *trivitella*. Most of the information on parasitism was assembled by Dr. Swezey incidental to his rearing a few species of these moths.

It is most interesting that not one species of the huge genus *Sierola* (Bethylidae), which probably contains more than 200 Hawaiian species, has yet been reared from *Hyposmocoma*. *Sierola* is known to parasitize a number of other Hawaiian moths.

We know nothing of introduced diseases that may now be widespread among Hawaiian Microlepidoptera.

This brief and inadequate account of the parasites and predators of *Hyposmocoma* reflects lack of observation and our enormous ignorance of the fauna.

**THE ORIGINAL GENERIC ASSIGNMENTS OF HYPOSMOCOMA**

I believe that it will be useful to list the species under the various "generic" names to which they have been assigned from the time of the publishing of Walsingham's monograph in *Fauna Hawaiiensis* in 1907 onward. The Walsingham arrangement of supposed "subspecies" is also followed in this list. This will summarize the opinions of various workers and will provide the reader with an easily consulted tabulation of the species as they were formerly classified. I shall list the genera and species alphabetically to render the lists more readily used. A phylogenetic arrangement is impossible at this stage of our inadequate knowledge. After each species name I indicate to which subgenus of *Hyposmocoma* I now assign the species: (E) = *Euperissus*; (H) = *Hyposmocoma sensu stricto*.

*Agonismus* Walsingham, 3 species.

*argentiferus* Walsingham (H)

*coruscans* Walsingham (H)

*flavipalpis* Walsingham (H)

*Aphthonetus* Walsingham, 33 species.

*albocinerea* Walsingham (E)

*aspersa* (Butler) Walsingham (E)

*bitincta* Walsingham (E)

*columbella* Walsingham (E)

*confusa* Walsingham (E)

*corticicolor* Walsingham (E)

*diffusa* Walsingham (E)  
*digressa* Walsingham (E)  
*divergens* Walsingham (E)  
*elegans* Walsingham (E)  
*eleuthera* Walsingham (E)  
*empetra* Meyrick (E)  
*exsul* Walsingham (E)  
*fluctuosa* Walsingham (E)  
*fugitiva* Walsingham (E)  
*hirsuta* Walsingham (E)  
*humerella* Walsingham (E)  
*kauaiensis* Walsingham (E)  
*lichenalis* Walsingham (E)  
*mediocris* Walsingham (E)  
*nemo* Walsingham (E)  
*passerella* Walsingham (E)  
*plumbifer* Walsingham (E)  
*polia* Walsingham (E)  
*prae fracta* Meyrick (E)  
*puncticiliata* Walsingham (E)  
*sagittata* Walsingham (E)  
*sideroxyloni* Swezey (E)  
*spurcata* Walsingham (E)  
*subocellata* Walsingham (E)  
*triaula* Meyrick (now in *Asymphorodes*)  
*trichophora* Walsingham (E)  
*veterella* Walsingham (E)

*Bubaloceras* Walsingham, 2 species.

*pritchardiae* Swezey (E)  
*subburneum* Walsingham (E)

*Diplosara* Meyrick, 1 species.

*lignivora* (Butler) Meyrick (H)

*Dysphoria* Walsingham, 1 species.

*semicolon* Walsingham (H)

“*Elachista*”, *sensu* Walsingham, 1907, not of Treitschke, 1 species.

*longisquamella* Walsingham (H)

*Euhypsmocoma* Swezey, 2 species.

*ekaha* (Swezey) Swezey (E)  
*trivitella* Swezey (E)

*Euperissus* Butler, 2 species.

*catapyrrha* Meyrick (E)  
*cristatus* Butler (E)

*Hyperdasylella* Fletcher ( = *Hyperdasys* Walsingham), 5 species.

- arundinicolor* (Walsingham) Fletcher (E)
- cryptogamiella* (Walsingham) Fletcher (E)
- philocharis* (Meyrick) Fletcher (E)
- semiusta* (Walsingham) Fletcher (E)
- unicolor* (Walsingham) Fletcher (E)

*Hyposmocoma* Butler, 214 species.

- abjecta* (Butler) Walsingham (H)
- adelphella* Walsingham (E)
- admirationis* Walsingham (H)
- adolescens* Walsingham (E)
- advena* Walsingham (H)
- albifrontella* Walsingham (H)
- albonivea* Walsingham (H)
- alliterata* Walsingham (H)
- alticola* Meyrick (E)
- anisoplecta* Meyrick (H)
- arenella* Walsingham (H)
- argentea* Walsingham (E)
- argomacha* Meyrick (E)
- atrovittella* Walsingham (H)
- auripennis* (Butler) Walsingham (H)
- auroargentea* Walsingham (E)
- auropurpurea* Walsingham (H)
- bacillella* Walsingham (H)
- barbata* Walsingham (E)
- bella* Walsingham (H)
- belophora* Walsingham (H)
- bilineata* Walsingham (H)
- blackburnii* Butler (H)
- brevistrigata* Walsingham (E)
- butalidella* Walsingham (H)
- caecinervis* Meyrick (E)
- calva* Walsingham (H)
- canella* Walsingham (H)
- carbonenotata* Walsingham (H)
- carnea* Walsingham (H)
- centralis* Walsingham (E)
- centronoma* Meyrick (E)
- chilonella chilonella* Walsingham (E)
- chilonella percondita* Walsingham (E)
- chilonella triocellata* Walsingham (E)
- chilonella venosa* Walsingham (E)
- chloraula* Meyrick (E)
- cincta cincta* Walsingham (H)
- cincta adjacens* Walsingham (H)

*cinerosparsa* Walsingham (H)  
*commensella* Walsingham (H)  
*conditella* Walsingham (H)  
*continuella* Walsingham (H)  
*corvina* (Butler) Walsingham (H)  
*costimaculata* Walsingham (H)  
*crossotis* Meyrick (H)  
*cupreomaculata* Walsingham (H)  
*discella* Walsingham (H)  
*discolor* Walsingham (E)  
*divisa* Walsingham (H)  
*domicolens domicolens* (Butler) Walsingham (H)  
*domicolens suffusa* Walsingham (H)  
*dorsella* Walsingham (E)  
*emendata* Walsingham (E)  
*empedota* Meyrick (H)  
*endryas* Meyrick (H)  
*enixa* Walsingham (E)  
*ensifer* Walsingham (E)  
*epicharis* Walsingham (E)  
*erismatias* Meyrick (E)  
*evanescens* Walsingham (H)  
*exornata exornata* Walsingham (E)  
*exornata flavicosta* Walsingham (E)  
*fallacella* Walsingham (H)  
*falsimella* Walsingham (E)  
*ferricolor* Walsingham (H)  
*fervida* Walsingham (H)  
*filicivora* Meyrick (H)  
*fractinubella* Walsingham (H)  
*fractistriata* Walsingham (H)  
*fractivittella* Walsingham (E)  
*fulvida* Walsingham (E)  
*fulvocervina* Walsingham (E)  
*fuscopurpurea* Walsingham (H)  
*fuscotogata* Walsingham (H)  
*geminella* Walsingham (H)  
*genitalis* Walsingham (H)  
*haleakalae* (Butler) Walsingham (H)  
*hemicasis* Meyrick (H)  
*humerovittella* Walsingham (H)  
*hygroscopa* Meyrick (H)  
*illuminata* Walsingham (H)  
*impunctata* Walsingham (H)  
*indicella* Walsingham (H)  
*inflexa* Walsingham (E)  
*insinuatix* Meyrick (E)



*intermixta* Walsingham (H)  
*inversella* Walsingham (H)  
*iodes* Walsingham (H)  
*irregularis* Walsingham (H)  
*jugifera* Meyrick (E)  
*lacertella* Walsingham (H)  
*lactea* Walsingham (H)  
*lacticretella* Walsingham (H)  
*latiflua* Meyrick (E)  
*lebetella* Walsingham (H)  
*leporella* Walsingham (H)  
*limata* Walsingham (E)  
*lineata* Walsingham (H)  
*liturata* Walsingham (H)  
*lixiviella* Walsingham (H)  
*longitudinalis* Walsingham (E)  
*lucifer* Walsingham (H)  
*ludificata* Walsingham (H)  
*lugens* Walsingham (E)  
*lunifer* Walsingham (E)  
*lupella lupella* Walsingham (H)  
*lupella candidella* Walsingham (H)  
*lupella suffusella* Walsingham (H)  
*maestella* Walsingham (E)  
*malacopa* Meyrick (E)  
*malornata* Walsingham (H)  
*marginenotata* Walsingham (H)  
*mediella* Walsingham (H)  
*mediospurcata* Walsingham (H)  
*mesorectis* Meyrick (H)  
*metallica* Walsingham (H)  
*metrosiderella* Walsingham (H)  
*mimema* Walsingham (H)  
*mimica* Walsingham (H)  
*modesta* Walsingham (H)  
*montivolans* (Butler) Walsingham (H)  
*mystodoxa* Meyrick (E)  
*nebulifera* Walsingham (H)  
*nephelodes* Walsingham (H)  
*niger* Walsingham (H)  
*nigralbida* Walsingham (H)  
*nigrescens* Walsingham (H)  
*nigrodentata* Walsingham (E)  
*nipholoncha* Walsingham (E)  
*niveiceps* Walsingham (E)  
*nividorSELLa* Walsingham (H)  
*notabilis* Walsingham (H)

*numida* Walsingham (H)  
*obliterata* Walsingham (E)  
*obscura* Walsingham (E)  
*ocellata* Walsingham (E)  
*ochreocervina* Walsingham (H)  
*ochreociliata* Walsingham (H)  
*ochreovittella* Walsingham (E)  
*oculifera* Walsingham (E)  
*ossea* Walsingham (E)  
*oxypetra* Meyrick (H)  
*pallidipalpis* Walsingham (E)  
*palmivora* Meyrick (E)  
*paradoxa* Walsingham (H)  
*parda* (Butler) Walsingham (H)  
*partita* Walsingham (H)  
*patriciella* Walsingham (H)  
*persimilis* Walsingham (H)  
*petroscia* Meyrick (H)  
*phalacra* Walsingham (H)  
*phantasmatella* Walsingham (E)  
*pharsotoma* Meyrick (H)  
*picticornis* Walsingham (H)  
*progressa* Walsingham (H)  
*prophantis* Meyrick (H)  
*propinqua* Walsingham (H)  
*pseudolita* Walsingham (H)  
*pucciniella* Walsingham (E)  
*punctifumella* Walsingham (E)  
*punctiplicata* Walsingham (H)  
*quadripunctata* Walsingham (E)  
*quadristriata* Walsingham (E)  
*quinquemaculata* Walsingham (H)  
*radiatella* Walsingham (E)  
*rhabdophora* Walsingham (H)  
*roseofulva* Walsingham (E)  
*rubescens* Walsingham (H)  
*rusius* Walsingham (E)  
*sabutella* Walsingham (H)  
*saccophora* Walsingham (H)  
*saliaris* Walsingham (H)  
*scandens* Walsingham (E)  
*scepticella* *scepticella* Walsingham (E)  
*scepticella dubia* Walsingham (now a synonym of *scepticella*)  
*schismatica* Walsingham (H)  
*scolopax* Walsingham (H)  
*semifuscata* Walsingham (E)  
*sideritis* Walsingham (H)  
*similis* Walsingham (H)

*somatodes* Walsingham (H)  
*stigmatella* Walsingham (E)  
*straminella* Walsingham (H)  
*subargentea* Walsingham (E)  
*subcitrella* Walsingham (H)  
*subflavidella* Walsingham (H)  
*sublimata* Walsingham (E)  
*subnitida* Walsingham (E)  
*subscolopax* Walsingham (H)  
*subsericea* Walsingham (E)  
*sudorella* Walsingham (E)  
*syrrhaptēs* Walsingham (H)  
*tarsimaculata* Walsingham (H)  
*tenuipalpis* Walsingham (H)  
*tetraonella* Walsingham (H)  
*thermoxyla* Meyrick (E)  
*thiatma* Meyrick (H)  
*thoracella* Walsingham (H)  
*tomentosa* Walsingham (H)  
*torella* Walsingham (H)  
*torquata* Walsingham (H)  
*tricincta* Walsingham (E)  
*trilunella* Walsingham (E)  
*trimaculata* Walsingham (H)  
*trimelanota* Meyrick (H)  
*tripartita* Walsingham (H)  
*triptila* Meyrick (H)  
*trossulella* Walsingham (H)  
*turdella* Walsingham (H)  
*unistriata* Walsingham (H)  
*vermiculata* Walsingham (H)  
*vicina* Walsingham (E)  
*vinicolor* Walsingham (H)  
*virgata* Walsingham (H)

*Neelysia* Walsingham, 35 species.

*agnetella* Walsingham (E)  
*alveata* Meyrick (H)  
*anthinella* Walsingham (E)  
*argyresthiella* Walsingham (E)  
*basivittata* Walsingham (E)  
*cleodorella* Walsingham (E)  
*complanella* Walsingham (E)  
*cuprea* Walsingham (E)  
*erebogramma* Meyrick (E)  
*exaltata* Walsingham (E)  
*fuscodentata* Walsingham (E)  
*fuscofusa* Walsingham (E)

- incongrua* Walsingham (E)  
*lignicolor* Walsingham (E)  
*mactella* Walsingham (E)  
*mormopica* Meyrick (E)  
*municeps* Walsingham (E)  
*nemoricola* Walsingham (E)  
*ningorella* Walsingham (E)  
*ningorifera* Walsingham (E)  
*palmifera* Meyrick (E)  
*paltodorella* Walsingham (E)  
*petalifera* Walsingham (E)  
*pluviella* Walsingham (E)  
*poeciloceras* Walsingham (E)  
*psaroderma* Walsingham (E)  
*rediviva* Walsingham (E)  
*rebandella* Walsingham (E)  
*rotifer* Walsingham (E)  
*sciurella* Walsingham (E)  
*semifusa* Walsingham (H)  
*subaurata* Walsingham (E)  
*terminella* Walsingham (E)  
*tigrina* (Butler) Walsingham (E)  
*tischeriella* Walsingham (E)
- Petrochroa* Busck, 7 species.
- communis* Swezey (H)  
*dimorpha* Busck (now in *Asymphorodes*)  
*elegantula* Swezey (H)  
*neckerensis* Swezey (H)  
*nigrella* Swezey (now a synonym of *longisquamella*) (H)  
*swezeyi* Busck (H)  
*trifasciata* Swezey (H)
- Phthoraula* Meyrick, 1 species.
- homopyrrha* Meyrick (E)
- Rhinomactrum* Walsingham, 2 species.
- rutilellum* Walsingham (E)  
*scapulellum* Walsingham (H)
- Semnoprepia* Walsingham, 7 species.
- coprosmae* Swezey (E)  
*ferruginea* Swezey (E)  
*fulvogrisea* Walsingham (E)  
*fuscopurpurea* Swezey (now *fuscopurpurata*) (E)  
*margella* Walsingham (E)  
*petroptilota* Walsingham (E)  
*pittospori* Swezey (E)

### DISTRIBUTION OF HYPOSMOCOMA SPECIES

We may state at the beginning that we know little about the distribution of most species of *Hypsmocoma*. No collections have been made from vast areas of the islands. (See the discussion on p. 1147 where I have listed the few localities from which the type specimens were collected). Many records of species which are supposed to inhabit two or more islands or different localities on one island are in error. I have found as many as seven or eight different species from different localities confused under one specific name. It is possible, also, that some species which are not limited to single islands are listed by different names on different islands, but, if this is true, the number is not great. Distribution ranges from species which are restricted to very small areas on single islands to those which range widely over the main islands. Most species are restricted to single islands, and many species are confined to very small areas on single mountain masses. It is probable that some species occupy such limited areas that their ranges can be expressed in hectares rather than in square kilometers.

Species of *Hypsmocoma* are found from the sea shores, across the lowlands, through the lower and upper forests to above the tree line in the high mountains. Species are found from desert areas to the densest rain forests, from hot lowlands to cold highlands. A few species maintain themselves in the drastically altered environments of cities and in plantation fields. I am not aware of any area that supports plant life in Hawaii where at least a few *Hypsmocoma* may not be found. Of course, the lowlands, and other vast areas of the islands, which have been changed so violently from their original conditions by man, his cultivations, his fires, his destructions, and by the plants and animals he has introduced, now support only a small fraction of the species which once existed there. The area now occupied by diverse and thriving complexes of *Hypsmocoma* is now much less than half of what it was before man destroyed so much of the native ecosystem.

*Hypsmocoma* is one of the marvels of creation. How sad it is to reflect upon what we have exterminated. What we have lost we shall never know. How fortunate we are that the foresight of British institutions, and the devotion, diligence, and perseverance of R. C. L. Perkins rescued representatives of a large number of these wonderful creatures for posterity. How unfortunate it is that for many years administrators of various Hawaiian institutions never realized fully what was, and is, being lost before their eyes. They have not appreciated how future generations will regret that they have not properly carried out their duties to collect, to study, and to preserve examples and information—some of which may still be obtained—of these and other marvellous products of Hawaii. They continue to neglect their Hawaiian heritage and to ignore those who are to follow.

This discussion of distribution may be divided into two parts: (I) the Leeward Islands northwest of Kauai, which are now really only the "grave-stones" of once extensive, high, forested islands, and (II) the main islands from Kauai and Niihau to Hawaii, where active volcanism continues today.

## I. HYPOSMOCOMA OF THE LEEWARD HAWAIIAN ISLANDS

The Leeward Islands, which are islets and reefs, have been inadequately explored, and only a few naturalists have set foot on any of them except Midway. The first collections of any consequence were made during the Tanager Expedition of 1923 (Bryan, 1926). Most of the specimens were collected by E. H. Bryan, Jr., but a few were taken by Ball. Most of the specimens returned to Bishop Museum in such poor condition, because of lack of care in collecting and because of abrasion and mashing, that they were mostly inadequate for determination and description by Dr. Swezey. However, from the specimens collected, Dr. Swezey recorded several *Hyposmocoma*, and he described one as new (as a *Petrochroa*). He identified three species as being the same as species that occur on the main islands, but his determinations were erroneous. In 1964, J. W. Beardsley collected specimens of three of the species from Nihoa and Necker Islands.

To my knowledge, the only records we have of *Hyposmocoma* from the Leeward Islands are from Nihoa, Necker, Gardner, and Laysan. I have not had the time nor the opportunity to study all of the material, and I cannot discuss the Leeward Island species with much authority. My preliminary, fragmentary notes on the species follow.

### **Hyposmocoma neckerensis** (Swezey).

Necker: "3 specimens collected on rocks." Gardner: "1 specimen."

"The specimens are too much abraded for proper description." (Swezey, 1926b:78.) Do all four specimens belong to the same species? See further details on p. 1412.

### **Hyposmocoma malornata** Walsingham.

*Hyposmocoma quinque maculata*, as a misidentification by Swezey, 1926b:76.

Nihoa: "11 poor specimens collected at lights." Necker: "29 poor specimens." (Swezey, 1926:76.)

I have examined one of the above-mentioned specimens from Nihoa and one from Necker, and they are *malornata* and obviously not *quinque maculata* which is known only from Kona, Hawaii. Additional specimens were collected by J. W. Beardsley on Nihoa and Necker during September, 1964. I cannot distinguish this material from specimens of *malornata* from the lowlands of Oahu. See the illustrations of the genitalia.

### **Hyposmocoma**, Leeward Island species 3 (new species 23).

Nihoa. J. W. Beardsley collected representatives of an apparently new species at light during September, 1964. The left male genital valva has two very large, extraordinary, squamiform, subapical spurs and an even larger squamiform spur arises from a very strong, flangelike protuberance from about the middle of the dorsal margin of the left valva. The right valva bears three stout spurs. The right anellar lobe is longer than the left; usually the left one is longest. The male abdomen has a strong pseuduncus, and the male has a pale subcostal brush on the hindwing. See figure 1131 for an illustration of the male genitalia.

**Hyposmocoma**, Leeward Island species 4 (new species 28).

*Hyposmocoma mimica*, as a misidentification by Swezey, 1926b:76.

Nihoa, Necker ("36 poor specimens, some collected on rocks and some at lights." Swezey, 1926b:76).

I have examined the male genitalia of one of the above-mentioned examples identified by Swezey, and they are obviously distinct from *mimica* which is known only from the mountains of Molokai. This species was also collected at lights on both Nihoa and Necker during September, 1964, by J. W. Beardsley. It appears to belong to the *saccophora* group, and it lacks a subcostal brush on the hindwing of the male. See figure 1167 for the male genitalia.

**Hyposmocoma**, Leeward Island species 5.

*Hyposmocoma arenella*, as a misidentification by Swezey, 1926b:75.

Nihoa: "4 poor specimens collected at lights." (Swezey, 1926b:75.) These specimens do not belong to *arenella* Walsingham, which is known only from Kona, Hawaii.

In addition to the above species, Swezey (1926b:76) listed a "*Hyposmocoma* sp." from "Nihoa Island, June 11-14, 1923 (Bryan): 14 poor specimens collected at lights. Necker Island, June 20, 1923 (Bryan): 8 poor specimens collected at lights. These specimens represent a different species from the others, but they are too imperfect for determination or description." He also listed two species from "Gardner Rock, May 22, 1923 (Ball): 3 specimens of one species and one of another, too much abraded for determination." I have not studied these specimens. They may or may not include the five species listed above. If they do not represent the same species, then they are Leeward Island species 6, 7, and 8.

In addition to the above-mentioned species, Fullaway (1914b:20) erroneously listed *Hyposmocoma notabilis* Walsingham, a species described from Molokai, as occurring on Laysan. He based his record on a single larval case! In addition to the records based upon *moths* from the Leeward Islands, Dr. Swezey (1926b:76) reported that "several kinds of larval cases were collected in different places and situations. Undoubtedly they belong to the species enumerated, but it is hardly possible to associate them properly. At least three kinds of these cases were found on Nihoa Island; two kinds on Necker Island; one similar to *H. notabilis* quite numerous on Laysan Island, April 25, 1923 (Ball). One kind (thorn-shaped) attached to under surface of rocks by hundreds, Gardner Rock, May 22, 1923 (Ball)."

The foregoing details demonstrate that a number of species of *Hyposmocoma* live on the remnants of the Leeward Islands and that we are mostly ignorant of the fauna. What awaits the careful collector there?

## II. HYPOSMOCOMA OF THE MAIN ISLANDS

Below are listed the species of *Hyposmocoma* according to their supposed distributions on the islands from Kauai to Hawaii. I have listed the species in the so-called "genera" in which they were described, and the "genera" are arranged in alphabetical order for convenience of reference. (I have not included the meaningless "*Elachista*" in which Walsingham incorrectly

included *Hyposmocoma longisquamella*.) The species are arranged according to the Walsingham-Meyrick-Swezey system to allow them to be studied according to their groupings into so-called "genera". I have found nothing significant in the recorded distribution of the supposed groups to support the contentions that they are genera.

For the purpose of study and discussion only, if we assume that we cannot now be positive of any of the distribution records except the type locality of each form, and thus *to tabulate the described species according to their type localities only*, the following table results:

GROUP	Kauai	Oahu	Molokai	Maui	Lanai	Hawaii	Totals
<i>Agonismus</i>					1	2	3
<i>Aphthonetus</i>	12	3	2	11	1	3	32
<i>Bubaloceras</i>	1		1				2
<i>Diplosara</i>		1					1
<i>Dysphoria</i>	1						1
<i>Euhyposmocoma</i>	1	1					2
<i>Euperissus</i>		1	1				2
<i>Hyperdasyella</i>	2	1	1			1	5
<i>Hyposmocoma</i>	53	42	38	38	2	41	214
<i>Neelysia</i>	8	6	6	11	1	3	35
<i>Petrochroa</i>		3				2	5
<i>Phthoraula</i>		1					1
<i>Rhinomactrum</i>	1					1	2
<i>Semnoprèpia</i>	1	4				2	7
Totals	80	63	49	60	5	55	312

Table showing the distribution of the *described* Main Island species of *Hyposmocoma* according to type localities only and using the original "generic" name assignments.



The table will be misleading unless it is used with caution and with the understanding that *it is based upon type localities only* and that it does not take into consideration distributions outside the islands where the types were found. It is based upon incomplete records and not upon true situations in nature. Much of what it may appear to indicate is erroneous. For example, only one species of *Diplosara* from Oahu appears in the table, but *Diplosara* represents a species cluster which is widely distributed in the islands and its other forms remain undescribed. If *Euperissus*, *Hyperdasyella*, and *Semnoproepia* were united, it would be more significant, as would be the merging of the smaller "genera" under *Hyposmocoma*. But, if merging begins, it cannot logically be stopped until all of the groups are merged with *Hyposmocoma*.

The table is restricted to type localities and does not include the records of the species which occur on two or more islands. The total number of forms, narrow endemics plus widespread forms, recorded from each island (and tabulated under each island in the lists which follow), plus 34 new species recorded in the main text are: Kauai, 101; Oahu, 81; Molokai, 63; Maui, 70; Lanai, 11; Hawaii, 69. These figures will be greatly increased as more material is studied, and they surely represent only a substantial fraction of the existing species.

Kauai (555 square miles; maximum elevation 5,170 feet) has the richest known fauna, and this reflects its great age and isolation—73 miles from Oahu. Many other groups of insects have a particularly rich fauna on Kauai.

Oahu (604 square miles; elevation 4,025 feet) has a larger proportion of its species recorded than do the other islands because much more collecting has been done on Oahu. The number of recorded species on Oahu has been doubled since the publication of *Fauna Hawaiiensis* in 1907, thanks to the efforts of Dr. Swezey.

Molokai (260 square miles; elevation 4,970 feet) has little more than one-third the area of Maui, it is less than one-half as high as Maui, its remaining forest area is very much smaller than that of Maui, and comparatively little collecting has been done there since Perkins' survey. Yet there are 48 species whose type localities are on Molokai compared with 62 for the large island of Maui, and the total number of recorded species from Molokai is 63 compared with 70 from Maui. Many wonderful species remain to be described from Molokai.

Maui (728 square miles; elevation 10,025 feet) surely is much richer in species than the total of 62 whose types come from Maui would indicate. I do not recall seeing any record of a *Hyposmocoma* from West Maui, which by itself is almost a separate, high, extensively forested island with a rich flora. This is an astonishing fact. West Maui is in many ways a distinctive region, and we can accept that many unusual species of *Hyposmocoma* have developed there.

The table shows only five species with Lanai (141 square miles; elevation 3,370 feet) as the type locality. This is because of three things: (1) the great deforestation and consequent reduction of the fauna of Lanai, (2) its comparatively small size, and (3) inadequate collecting on the island.

Hawaii (elevation 13,784 feet) is nearly twice as large as all the other main islands combined (4,030:2,405 square miles), but it is the type locality of

only 55 species. A total of 69 species has been recorded from it. This reflects its youth and the inadequate collecting that has been done there.

No species have been described from Niihau (72 square miles; elevation 1,281 feet) or from Kahoolawe (45 square miles; elevation 1,415 feet) because of lack of collecting and deforestation. Whatever endemic insect faunas those small islands had were mostly exterminated long ago by the influence of man.

The table above shows a distorted and inaccurate picture of the true distribution and development of *Hyposmocoma*. Careful surveys of the genus over vast areas of the islands remain to be done. But, because of deforestation, predation, parasitism, and extermination, it is unfortunately too late to obtain much information that could have been obtained by earlier study. Each year that passes without intensive field studies exacerbates the sad situation. It is obvious that large numbers of unknown species remain to be discovered. When one reflects upon the fact that the number of species recorded from the better-known island of Oahu has doubled since the great Perkins' surveys, it becomes obvious how little we really know about the fauna and how much collecting remains to be done on all the islands. Since the publication of *Fauna Hawaiiensis* in 1907, the following numbers of described new species of *Hyposmocoma* have been added to the faunal lists: Necker, 1; Kauai, 6; Oahu, 38; Molokai, 1; Maui, 3; Lanai, 0; and Hawaii, 3—a total of 52 species. The largest number of new species has been described from Oahu because Honolulu is on that island, and most collecting is done on Oahu. This is mostly a reflection of the weekend field work of Dr. Swezey. These figures demonstrate how little attention has been given this great group during a period of about 75 years since Dr. Perkins completed his remarkable field surveys.

The floras and faunas of the lowlands and drier parts of the islands were decimated and drastically altered by the activities of man and by organisms purposely or accidentally introduced by man long before any biological surveys of those areas had been made. Hence, we know almost nothing of the original lowland endemic insect faunas which undoubtedly were rich ones. The numbers of endemic species exterminated since man arrived in Hawaii is very large, but we have no way of estimating what has been lost. It is a well-documented fact that many of the drier areas of Hawaii were occupied by the greatest diversity of endemic trees, and no doubt there were associated rich and diversified floras of shrubs and herbs. We know that most of the endemic plants had species of *Hyposmocoma* associated with them, and we can now only wonder how many species and what kinds of lowland and dryland *Hyposmocoma* have become extinct. When the flora is exterminated the fauna is exterminated.

My friend Harold St. John has interested himself in the nearly extinct lowland flora, and he has recently (1969) monographed the Hawaiian species of the genus *Gouania* (Rhamnaceae) whose members favored the Hawaiian lowlands. They have been almost totally exterminated. St. John said (1969: 508) that

The Hawaiian species of *Gouania* are native to the dryland scrub or the lower dry forest zone. This is the region most drastically affected by human settlement and by the eating and trampling by introduced grazing animals. The vegetation of these lowlands was largely destroyed before it was observed or collected by scientists. The result of the same wholesale destruction was observed by the writer in his revision of the

Hawaiian species of *Isodendron* (1952, p. 216). Most of the recent Hawaiian botanists have never found a living specimen of *Gouania*, and of the 14 [known] species only 3 have been found and collected since 1886. . . .

Like *Isodendron*, this genus *Gouania* evidences what has happened to the native flora of the dry lowland regions; it has suffered an almost complete extinction. How many other native plants of the lowland region were exterminated before they were collected and recognized, we cannot even guess.

In his monograph of the violaceous genus of shrubs *Isodendron* (1952), Professor St. John noted that the Hawaiian lowlands were overrun by cattle soon after 1782. He said that as a result the majority of the 14 known species of *Isodendron* are extinct and that two-thirds of the species have not been collected since 1871. *Isodendron* species were also members of that lowland flora. Surely, the extinct *Gouania* and *Isodendron* had an associated fauna of endemic moths, but I have no record of either of these plant genera as a host of any Hawaiian moth.

I have made a brief survey of the localities, as listed by the collectors, from which the types of the species of *Hyposmocoma* were obtained, and it is astonishing to me to learn that the species have been collected from so very few localities. In spite of the fact that more than 350 species of this great genus have been collected (but not all of these are described), most of Hawaii remains *terra incognita* in so far as *Hyposmocoma* is concerned. With the exception of one Leeward Island species collected by E. H. Bryan, Jr., and three main island species taken by J. C. Bridwell, the species have, astonishingly, been named from the collections of only three persons: Blackburn, Perkins, and Swezey. We cannot guess what kinds of remarkable forms remain to be discovered or have recently been exterminated. How little we really know!

The types of *Hyposmocoma* were collected in the following localities:

Necker Island.

Kauai (most collecting has been done in what is known today as the Kokee region and its nearby surroundings):

Mountains, 3,000 to 4,000 feet (probably meaning the Waimea District, or western Kauai).

Halemanu, 4,000 feet.

Halemanu and Kaholuamano, 4,000 feet.

Kaholuamano, 4,000 feet.

Kumuwela.

Summit Camp.

Behind Lihue, 4,000 feet.

Near head of Grove Farm Ditch.

Oahu:

Waianae Mountains, 1,700 feet, 2,000 to 3,000 feet.

Mt. Kaala.

Koolau Mountains.

Koolau Mountains near Honolulu.

Mt. Tantalus.

Honolulu.

Nuuanu.

Palolo.

Kaimuki.  
 Koko Head.  
 Pauoa Flats.  
 Mt. Olympus.  
 Konahuanui.  
 Malamalama, Konahuanui.  
 Ridge above Peahinaia.  
 Halawa Valley.  
 Kawaihapai, 3,000 feet.  
 Kuliouou.  
 Punaluu.  
 Kahuku.  
 Head of Kawailoa Gulch.

Molokai:

Various localities between 3,000 and 4,500 feet.  
 Forest above Pelekunu.  
 Kainalu, 2,000 to 3,000 feet.

Maui:

Makawao, about 2,000 feet.  
 Olinda.  
 Olinda, 4,000 feet.  
 Haleakala, various places between 4,000 feet and 7,000 feet.

Lanai:

2,000 to 3,000 feet.

Hawaii:

Hilo, 2,000 feet.  
 Olaa.  
 Kilauea.  
 Laupahoehoe.  
 Kona, various stations between 2,000 feet and 4,000 feet.  
 Kaawaloa, Kona, above 2,000 feet.  
 Hualalai, 5,000 feet.

It should be of assistance to future workers if lists of the species of *Hyposmoma* are given according to their distributions island by island. These lists may assist in identification and in working with local faunas, but it must be remembered that the lists are incomplete and are based upon tentative and fragmentary information. In the following lists, I have retained the Walsingham system of arrangement for purposes of interest and study. Where no other island name or names follow the species names, the species in question are recorded only from the one island under which they are listed. I have indicated the type island where it is different from that of the island heading each list. Thus, under Kauai, immediately below, *Aphthonetus diffusa* is recorded with uncertainty from Kauai, and it is known elsewhere from its type island of Maui.

**HYOSMOCOMA OF KAUAI** (101 species)

- Aphthonetus albocinerea* Walsingham  
*diffusa* Walsingham?, Maui (type)  
*fluctuosa* Walsingham  
*fugitiva* Walsingham  
*hirsuta* Walsingham  
*kauaiensis* Walsingham  
*passerella* Walsingham  
*plumbifer* Walsingham  
*polia* Walsingham  
*prae fracta* Meyrick  
*sagittata* Walsingham  
*trichophora* Walsingham  
*veterella* Walsingham
- Bubaloceras pritchardiae* Swezey
- Dysphoria semicolon* Walsingham
- Euhyposmocoma trivitella* Swezey
- Hyperdasyella arundinicolor* (Walsingham) Fletcher  
*cryptogamiella* (Walsingham) Fletcher, Oahu, Molokai, Lanai, Hawaii (type)  
*semiusta* (Walsingham) Fletcher, Oahu  
*unicolor* (Walsingham) Fletcher?, Oahu, Molokai (type)
- Hyposmocoma adjacens* Walsingham  
*bacillella* Walsingham  
*bella* Walsingham  
*brevistrigata* Walsingham  
*canella* Walsingham, Oahu, Molokai (type), Hawaii  
*carbonenotata* Walsingham  
*carnea* Walsingham  
*centralis* Walsingham  
*chilonella chilonella* Walsingham, Oahu, Maui, Hawaii  
*chilonella percondita* Walsingham, Hawaii (type)  
*chilonella triocellata* Walsingham, Oahu, Molokai (type), Hawaii  
*chilonella venosa* Walsingham  
*chloraula* Meyrick  
*cincta* Walsingham  
*cinereosparsa* Walsingham  
*conditella* Walsingham  
*discella* Walsingham  
*divisa* Walsingham  
*enixa* Walsingham  
*fallacella* Walsingham  
*fractivittella* Walsingham  
*fulvida* Walsingham, Molokai (type)  
*fulvocervina* Walsingham

*geminella* Walsingham  
*hygroscopa* Meyrick  
*irregularis* Walsingham  
*lactea* Walsingham  
*leporella* Walsingham  
*lixiviella* Walsingham  
*lupella* Walsingham  
*maestella* Walsingham  
*malornata* Walsingham, Oahu, Molokai, Maui (type), Hawaii, Nihoa,  
 Necker  
*marginenotata* Walsingham  
*metrosiderella* Walsingham  
*modesta* Walsingham  
*nigralbida* Walsingham  
*nigrodentata* Walsingham  
*nividorSELLa* Walsingham  
*obliterata* Walsingham  
*ocellata* Walsingham  
*oculifera* Walsingham  
*palmivora* Meyrick  
*paradoxa* Walsingham  
*phalacra* Walsingham  
*phantasmateLLa* Walsingham  
*quadripunctata* Walsingham  
*radiatella* Walsingham, Oahu, Molokai, Hawaii (type)  
*roseofulva* Walsingham  
*rubescens* Walsingham  
*sabulella* Walsingham  
*scandens* Walsingham  
*schismatica* Walsingham  
*scolopax* Walsingham  
*subargentea* Walsingham  
*subcitrella* Walsingham  
*subsericea* Walsingham?, Molokai (type), Lanai?  
*sudorella* Walsingham  
*syrrhaptEs* Walsingham  
*tarsimaculata* Walsingham  
*torquata* Walsingham  
 new species 1, 2, 3, 8, 15, 19, 22, 26, 29

*Neelysia argyresthiella* Walsingham, Oahu, Molokai, Hawaii (type)

*cuprea* Walsingham  
*fuscifusa* Walsingham  
*mactella* Walsingham  
*municeps* Walsingham  
*paltodorella* Walsingham  
*rediviva* Walsingham  
*subaurata* Walsingham  
*tischeriella* Walsingham

*Rhinomactrum rutilellum* Walsingham

*Semnoprepia fulvogrisea* Walsingham

*petroptilota* Walsingham, Oahu, Maui, Hawaii (type)

**HYPOSMOCOMA OF OAHU** (81 species)

It is noteworthy that in *Fauna Hawaiiensis* Walsingham listed only 36 species from Oahu. The number of Oahu species has been more than doubled, mostly because of collecting by Dr. Swezey. It must be admitted, however, that there never has been an adequate survey made of the moths of Oahu—or of any Hawaiian island. One can only wonder what would result from extensive field surveys and the use of modern equipment such as ultraviolet lights and patient, careful collecting.

*Aphthonetus aspersa* (Butler) Walsingham

*empetra* Meyrick

*sideroxyloni* Swezey

*Diplosara lignivora* (Butler) Meyrick

*Euhyposmocoma ekaha* (Swezey) Swezey

*Euperissus cristatus* Butler, Molokai, Hawaii

*Hyperdasyella cryptogamiella* (Walsingham) Fletcher, Kauai, Molokai, Lanai, Hawaii (type)

*philocharis* (Meyrick) Fletcher

*semiusta* (Walsingham) Fletcher, Kauai (type)

*unicolor* (Walsingham) Fletcher?, Kauai?, Molokai (type)

*Hyposmocoma abjecta* (Butler) Walsingham

*albonivea* Walsingham

*alliterata* Walsingham, Molokai (type), Maui, Hawaii

*alticola* Meyrick

*anisoplecta* Meyrick

*auropurpurea* Walsingham

*belophora* Walsingham

*bilineata* Walsingham

*caecinervis* Meyrick

*canella* Walsingham, Kauai, Molokai (type), Hawaii

*centronoma* Meyrick

*chilonella chilonella* Walsingham, Kauai (type)

*chilonella triocellata* Walsingham, Kauai, Molokai (type), Hawaii

*crossotis* Meyrick

*dorsella* Walsingham

*empedota* Meyrick

*endryas* Meyrick

*erismatias* Meyrick

*filicivora* Meyrick

*fractistriata* Walsingham

*hemicasis* Meyrick

- humerovittella* Walsingham  
*inversella* Walsingham  
*jugifera* Meyrick  
*latiflua* Meyrick  
*malacopa* Meyrick  
*mediella* Walsingham  
*mesorectis* Meyrick  
*montivolans* (Butler) Walsingham  
*mystodoxa* Meyrick  
*nebulifera* Walsingham  
*nephelodes* Walsingham, Maui?  
*nipholoncha* Meyrick  
*ochreocervina* Walsingham  
*oxyetra* Meyrick  
*petroschia* Meyrick  
*pharsotoma* Meyrick  
*prophantis* Meyrick  
*pseudolita* Walsingham, Molokai, Hawaii  
*radiatella* Walsingham, Kauai, Molokai, Hawaii (type)  
*saccophora* Walsingham  
*thermoxyla* Meyrick  
*trimaculata* Walsingham  
*triptila* Meyrick  
*trossulella* Walsingham  
*vicina* Walsingham  
*vinicolor* Walsingham  
 new species 4, 5, 11, 14, 20, 30, 31, 32
- Neelysia alveata* Meyrick  
*argyresthiella* Walsingham, Kauai, Molokai, Hawaii (type)  
*erebogramma* Meyrick  
*lignicolor* Walsingham  
*mormopica* Meyrick  
*palmifera* Meyrick, Hawaii  
*psaroderma* Walsingham
- Petrochroa communis* Swezey, Kauai  
*elegantula* Swezey  
*swezeyi* Busck
- Phthoraula homopyrrha* Meyrick
- Semnoprepia coprosmae* Swezey  
*ferruginea* Swezey  
*fuscopurpurata* Zimmerman ( = *fuscopurpurea* Swezey)  
*petroptilota* Walsingham, Kauai, Maui, Hawaii (type)  
*pittospori* Swezey



**HYPOSMOCOMA OF MOLOKAI** (63 species)

- Aphthonetus columbella* Walsingham  
*divergens* Walsingham
- Bubaloceras subburneum* Walsingham
- Euperissus cristatus* Butler, Oahu (type), Hawaii
- Hyperdasyella cryptogamiella* (Walsingham) Fletcher, Kauai, Oahu, Lanai, Hawaii (type)  
*unicolor* (Walsingham) Fletcher, Kauai?, Oahu?
- Hyposmocoma admirationis* Walsingham  
*advena* Walsingham  
*albifrontella* Walsingham  
*alliterata* Walsingham, Oahu, Maui, Hawaii  
*argentea* Walsingham  
*barbata* Walsingham  
*canella* Walsingham, Kauai, Oahu, Hawaii  
*chilonella triocellata* Walsingham, Kauai, Oahu, Hawaii  
*costimaculata* Walsingham  
*cupreomaculata* Walsingham  
*domicolens* (Butler) Walsingham?, Maui (type), Lanai?, Hawaii?  
*epicharis* Walsingham  
*fervida* Walsingham  
*fulvida* Walsingham, Kauai  
*fuscotogata* Walsingham  
*insinuatix* Meyrick  
*intermixta* Walsingham  
*iodes* Walsingham  
*lucifer* Walsingham  
*malornata* Walsingham, Kauai, Oahu, Maui (type), Hawaii, Nihoa, Necker  
*mimica* Walsingham  
*niger* Walsingham  
*niveiceps* Walsingham, Lanai  
*notabilis* Walsingham  
*pallidipalpis* Walsingham  
*picticornis* Walsingham, Maui  
*propinqua* Walsingham  
*pseudolita* Walsingham, Oahu (type), Hawaii  
*punctiplicata* Walsingham  
*quadristriata* Walsingham  
*radiatella* Walsingham, Kauai, Oahu, Hawaii (type)  
*rhabdophora* Walsingham  
*rusius* Walsingham  
*scolopax* Walsingham?, Kauai (type)  
*stigmatella* Walsingham  
*subsericea* Walsingham, Kauai, Lanai  
*suffusella* Walsingham, Maui

*tenuipalpis* Walsingham  
*torella* Walsingham  
*tripartita* Walsingham  
*unistriata* Walsingham  
*vermiculata* Walsingham?, Hawaii (type)  
*virgata* Walsingham  
 new species 6, 9, 12, 18, 21, 24, 25

*Neelysia argyresthiella* Walsingham, Kauai, Oahu, Hawaii (type)  
*complanella* Walsingham  
*nemoricola* Walsingham  
*pluviella* Walsingham  
*repandella* Walsingham  
*rotifer* Walsingham  
*semifusa* Walsingham

#### **HYPOSMOCOMA OF MAUI (70 species)**

*Agonismus flavipalpis* Walsingham

*Aphthonetus bitincta* Walsingham  
*confusa* Walsingham  
*corticicolor* Walsingham  
*diffusa* Walsingham, Kauai?  
*digressa* Walsingham  
*elegans* Walsingham  
*humerella* Walsingham  
*mediocris* Walsingham  
*nemo* Walsingham  
*spurcata* Walsingham  
*subocellata* Walsingham

*Euperissus catapyrrha* Meyrick

*Hyposmocoma alliterata* Walsingham, Oahu, Molokai (type), Hawaii  
*auripennis* (Butler) Walsingham  
*auroargentea* Walsingham  
*blackburnii* Butler  
*butalidella* Walsingham  
*chilonella chilonella* Walsingham, Kauai (type), Oahu, Hawaii  
*continuella* Walsingham  
*corvina* Walsingham  
*domicolens* Walsingham, Molokai?, Lanai?, Hawaii?  
*emendata* Walsingham  
*evanescens* Walsingham  
*falsimella* Walsingham  
*fractinubella* Walsingham  
*fuscopurpurea* Walsingham  
*genitalis* Walsingham  
*haleakalae* (Butler) Walsingham

*illuminata* Walsingham  
*indicella* Walsingham  
*inflexa* Walsingham  
*lacertella* Walsingham  
*lacticretella* Walsingham  
*lebetella* Walsingham  
*lineata* Walsingham  
*ludificata* Walsingham  
*lugens* Walsingham  
*lunifer* Walsingham  
*malornata* Walsingham, Kauai, Oahu, Molokai, Hawaii, Nihoa, Necker  
*mimema* Walsingham  
*nephelodes* Walsingham?, Oahu (type)  
*numida* Walsingham  
*obscura* Walsingham  
*parda* (Butler) Walsingham, Hawaii  
*patriciella* Walsingham  
*picticornis* Walsingham, Molokai (type)  
*progressa* Walsingham  
*punctifumella* Walsingham  
*scepticella* Walsingham  
*sideritis* Walsingham  
*subflavidella* Walsingham  
*suffusella* Walsingham, Molokai (type)  
*sublimata* Walsingham  
*thiatma* Meyrick  
*trilunella* Walsingham  
 new species 33, 34

*Neelysia agnetella* Walsingham  
*basivittata* Walsingham  
*exaltata* Walsingham  
*incongrua* Walsingham  
*ningorella* Walsingham  
*ningorifera* Walsingham  
*petalifera* Meyrick  
*poeciloceras* Walsingham  
*sciurella* Walsingham  
*terminella* Walsingham  
*tigrina* (Butler) Walsingham

*Semnoprepia petroptilota* Walsingham, Kauai, Oahu, Hawaii (type)

#### **HYOSMOCOMA OF LANAI** (11 species)

*Aphthonetus lichenalis* Walsingham

*Hyperdasyella cryptogamiella* (Walsingham) Fletcher, Kauai, Oahu, Molokai, Hawaii (type)

*Hyposmocoma candidella* Walsingham, Kauai, Molokai, Maui, Hawaii (type)  
*domicolens* (Butler) Walsingham?, Molokai?, Maui (type), Hawaii?  
*niveiceps* Walsingham, Molokai  
*subsericea* Walsingham?, Kauai?, Molokai (type)  
*thoracella* Walsingham  
*turdella* Walsingham  
 new species 10, 13

*Neelysia anthinella* Walsingham

**HYPOSMOCOMA OF HAWAII** (70 species)

*Agonismus argentiferus* Walsingham  
*coruscans* Walsingham

*Aphthonetus eleuthera* Walsingham  
*exsul* Walsingham  
*puncticiliata* Walsingham  
 new species 35

*Euperissus cristatus* Butler, Oahu (type), Molokai

*Hyperdasyella cryptogamiella* (Walsingham) Fletcher, Kauai, Oahu, Molokai,  
 Lanai

*Hyposmocoma adolescens* Walsingham  
*alliterata* Walsingham, Oahu, Molokai (type), Maui  
*arenella* Walsingham  
*argomacha* Meyrick  
*atrovittella* Walsingham  
*calva* Walsingham  
*candidella* Walsingham  
*canella* Walsingham, Kauai, Oahu, Molokai (type)  
*chilonella chilonella* Walsingham, Kauai (type), Oahu, Maui  
*chilonella percondita* Walsingham, Kauai  
*chilonella triocellata* Walsingham, Kauai, Oahu, Molokai (type)  
*commensella* Walsingham  
*discolor* Walsingham  
*domicolens* (Butler) Walsingham?, Molokai?, Maui (type), Lanai?  
*ensifer* Walsingham  
*exornata* Walsingham  
*ferricolor* Walsingham  
*flavicosta* Walsingham  
*impunctata* Walsingham  
*limata* Walsingham  
*liturata* Walsingham, Oahu  
*longitudinalis* Walsingham  
*malornata* Walsingham, Kauai, Oahu, Molokai, Maui (type), Nihoa,  
 Necker  
*mediospurcata* Walsingham  
*metallica* Walsingham

*nigrescens* Walsingham  
*ochreociliata* Walsingham  
*ochreovittella* Walsingham  
*ossea* Walsingham  
*parda* (Butler) Walsingham, Maui (type)  
*partita* Walsingham  
*persimilis* Walsingham  
*pseudolita* Walsingham, Oahu (type), Molokai  
*pucciniella* Walsingham  
*quinquemaculata* Walsingham  
*radiatella* Walsingham, Kauai, Oahu, Molokai  
*saliaris* Walsingham  
*semifuscata* Walsingham  
*similis* Walsingham  
*somatodes* Walsingham  
*straminella* Walsingham  
*subnitida* Walsingham  
*subscolopax* Walsingham  
*suffusa* Walsingham  
*tetraonella* Walsingham  
*tomentosa* Walsingham  
*tricincta* Walsingham  
*trimelanota* Meyrick  
*vermiculata* Walsingham, Molokai?  
 new species 7, 16, 17, 28

*Neelysia argyresthiella* Walsingham, Kauai, Oahu, Molokai  
*cleodorella* Walsingham  
*fuscudentata* Walsingham  
*palmifera* Meyrick?, Oahu (type)

*Petrochroa trifasciata* Swezey  
 ("Elachista") *longisquamella* (Walsingham) (= *Petrochroa nigrella* Swezey)

*Rhinomacrum scapulellum* Walsingham

*Semnoprepia margella* Walsingham  
*petroptilota* Walsingham, Kauai, Oahu, Maui

### **SOME SUGGESTIONS FOR CONSTRUCTING A KEY TO THE SPECIES OF HYPOSMOCOMA**

No key to any of the species of this great complex has been written. A key can be prepared only after long and tedious study, and such a task is a major project in itself. It is a great personal frustration that I have not been allowed the time to prepare a key to the species of this extraordinary genus. The making of an adequate key will be a most difficult, time-consuming task, but it can be done if the required time and facilities are available.

It would be satisfying if a key could be prepared which would use only external and easily observed characters, but perhaps that is nearly impossible

to accomplish. It probably will be necessary to base a key mostly upon male characters, because it is easier to divide *Hyposmocoma* into groups of species based upon male characters. Unhappily, however, the males of many species are not known. Although groups based upon sexual characters might not all represent definitive subdivisions, such subdivisions would assist greatly the task of determination, and the best key will incorporate characters of the genitalia.

Herewith are some suggestions for key characters which may be found useful when an attempt is made to construct a key to the species of *Hyposmocoma*:  
(Text continued on page 1218.)

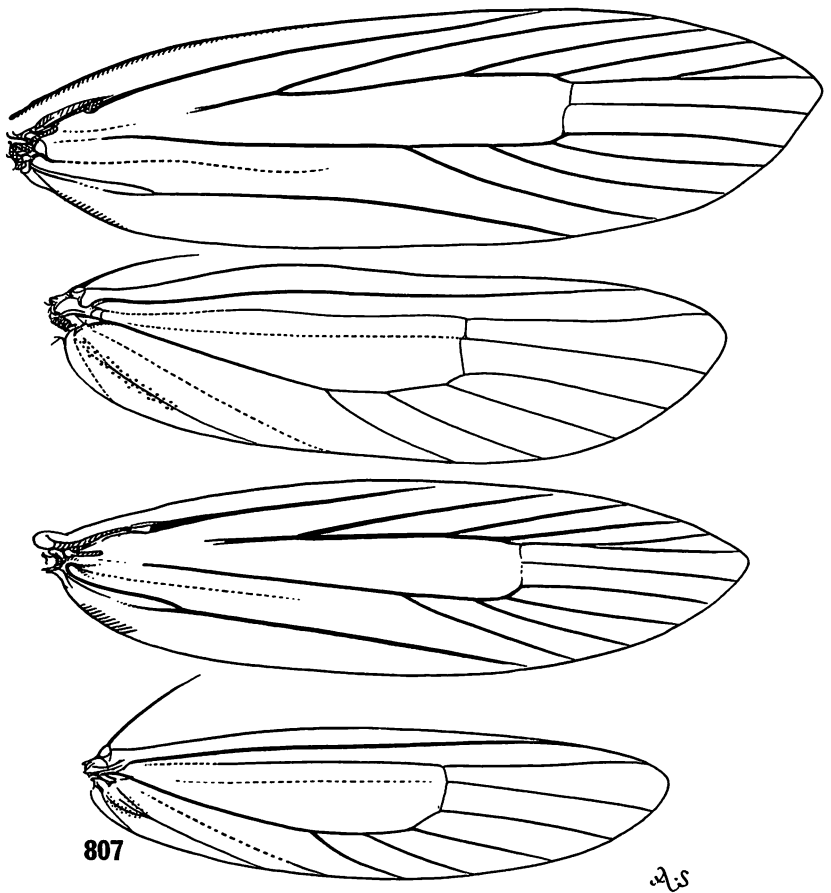


Figure 807—Wing venations of the more generalized types of larger, broad-winged species of *Hyposmocoma* (*Euperissus*). Top, *chilonella chilonella* Walsingham, paratype (BM slide 5438); Kilauea, Hawaii. Bottom, ("*Sennoprepia*") *petroptilota* (Walsingham), paratype (BM slide 5447). These two species were originally placed in two genera, but, as the illustrations demonstrate, the venations are similar.



Figure 808—Wing venations of a group of *Hyposmocoma* (*Hyposmocoma*) species with modified venations which were originally described in *Petrochroa* (which name is here reduced to a synonym of *Hyposmocoma*). Top, *communis* (Swezey) (BM slide 5432); Honolulu. Middle, *neckerensis* (Swezey), Gardner Island (Bishop Museum slide). Bottom, *elegantula* (Swezey), Barber's Point, Oahu (slide now in the Hawaii State Department of Agriculture.)

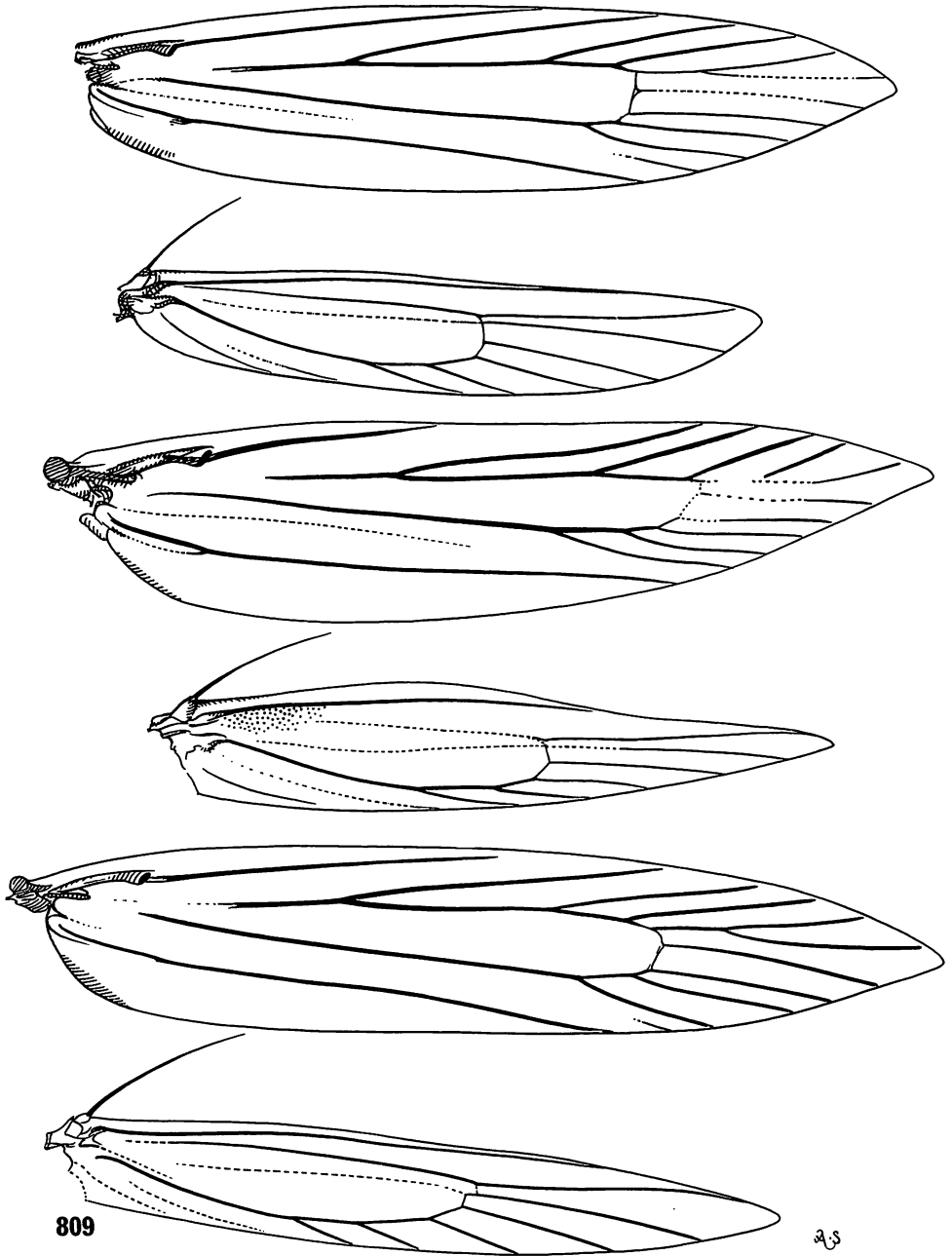
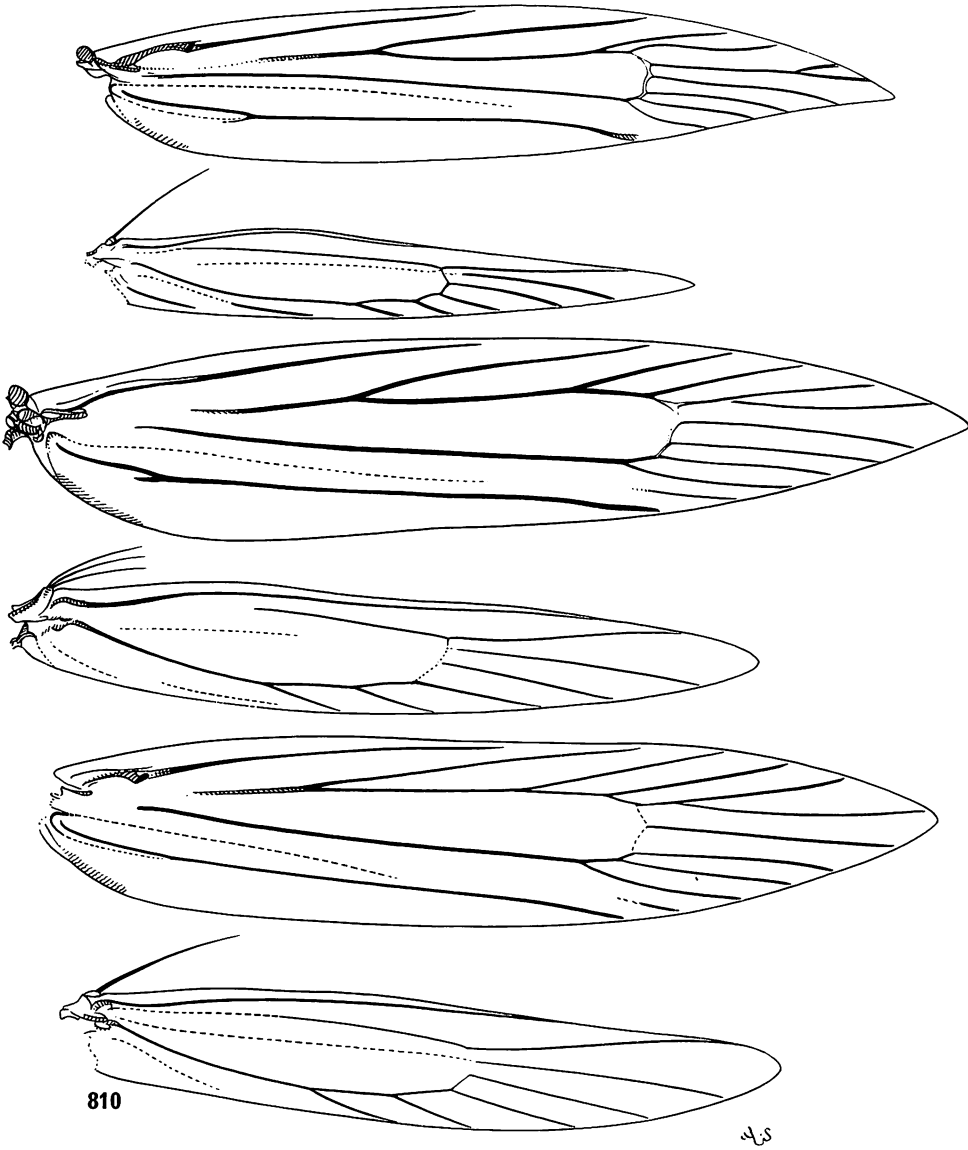


Figure 809—*Hypsmocoma* ("Neelysia"), wing venations. Top, *agnetella* (Walsingham), paratype (BM slide 5444); Haleakala, Maui. Middle, *alveata* (Meyrick), paratype (BM slide 5500); Koolau Mts., Oahu (this species does not belong to the *Neelysia* group—it is a typical *Hypsmocoma*; see the text for discussion). Bottom, *anthinella* (Walsingham), paratype (BM slide 8432); Lanai, 2,000 feet. Note the variable development of vein 2 in the forewings.





810

S. K.

Figure 810—Wing venations of *Hyposmocoma* ("Neelysia"). Top, *argyresthiella* (Walsingham), paratype (BM slide 8428); Kona, 3,000 feet, Hawaii (note that vein 2 in the forewing is lost, and note the long stalk of 7 and 8). Middle, *basivittata* (Walsingham), paratype (BM slide 8433); Olinda, 4,000 feet, Maui. Bottom, *cleodorella* (Walsingham), paratype (BM slide 8431); Kona, 4,000 feet, Hawaii.

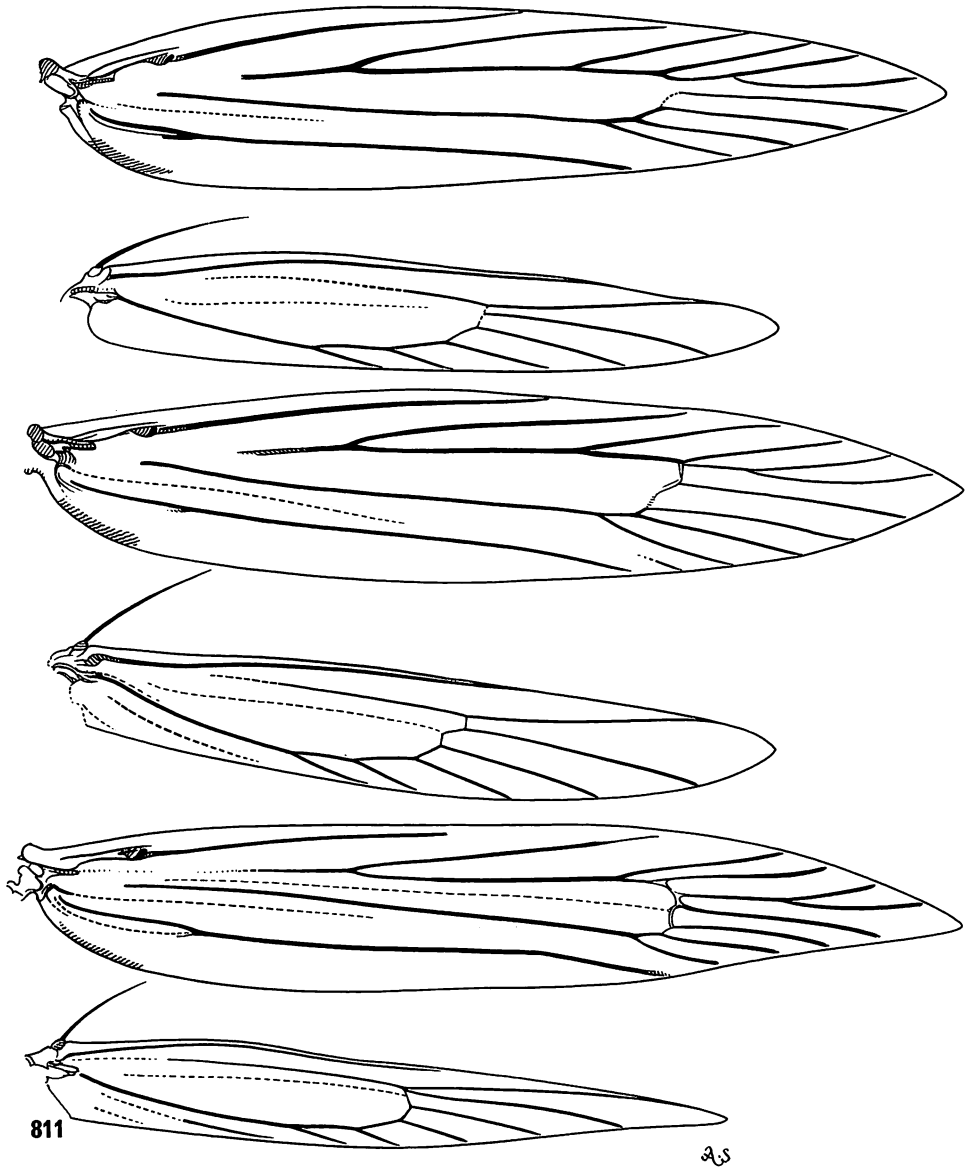


Figure 811—Wing venations of *Hyposmocoma* ("Neelysia"). Top, *complanella* (Walsingham), paratype (BM slide 8430); Molokai, about 4,000 feet. Middle, *cuprea* (Walsingham), paratype (BM slide 8426); Kauai, 3,000 to 4,000 feet. Bottom, *exaltata* (Walsingham), paratype (BM slide 8427); Haleakala, 5,000 feet, Maui. Note the differences in wing shape and the variability of vein 2 in the forewing.

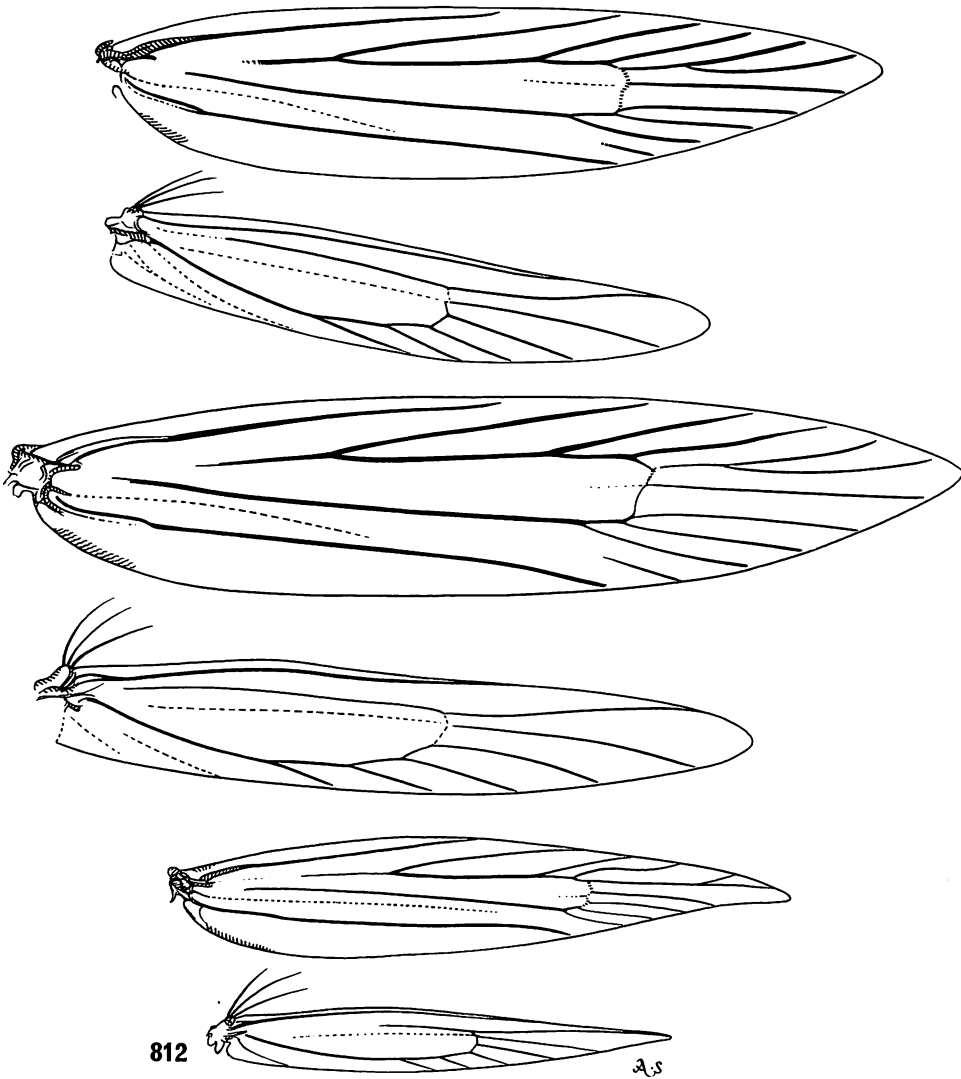


Figure 812—*Hyposmocoma* ("Neelysia"), wing venations. Top, *fuscodentata* (Walsingham), paratype (BM slide 8425); Kilauea, Hawaii. Middle, *fuscifusa* (Walsingham), paratype (BM slide 8197); Kaholuamano, 4,000 feet, Kauai. Bottom, *macella* (Walsingham), paratype (BM slide 5404); Kaholuamano, 4,000 feet Kauai.

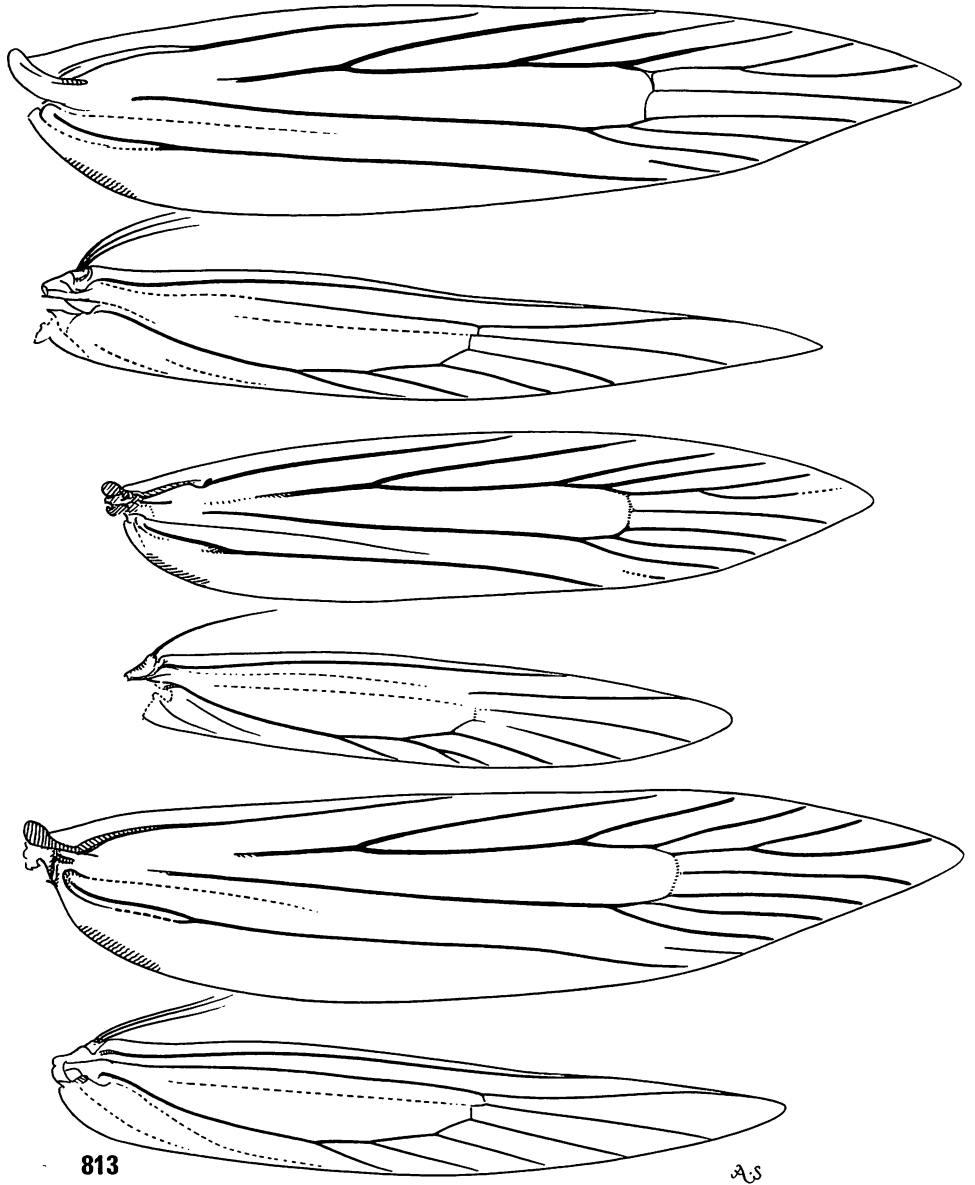


Figure 813—Wing venations of *Hyposmocoma* ("Neelysia"). Top, *ningorifera* (Walsingham), allotype female (BM slide 8199); Haleakala, 5,000 feet, Maui. Middle, *pallodorella* (Walsingham), paratype (BM slide 8435); Kauai, 3,000 to 4,000 feet. Bottom, *petalifera* (Walsingham), allotype female (BM slide 7722); Haleakala, 5,000 feet, Maui.

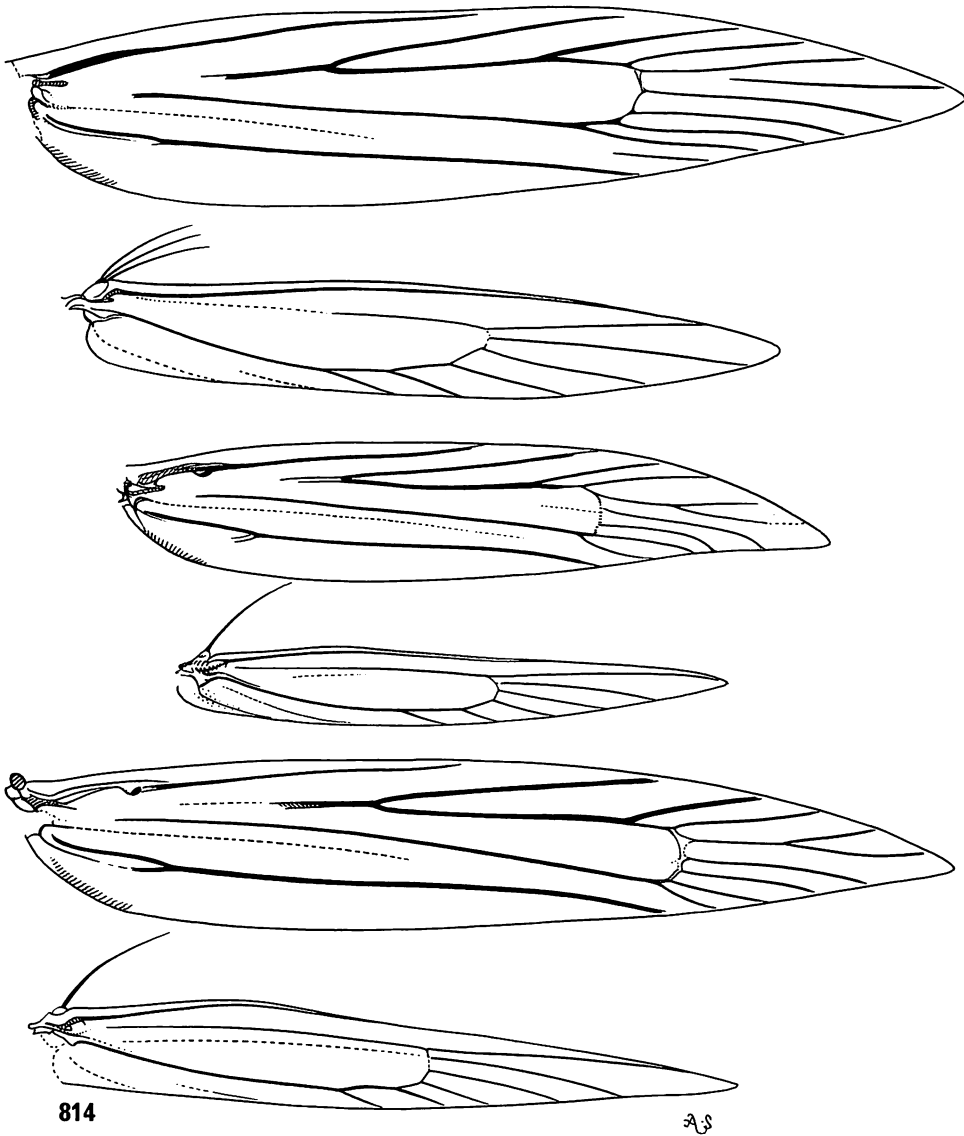


Figure 814—*Hyposmocoma* ("Neelysia"), wing venations. Top, *ptuviella* (Walsingham), paratype (BM slide 8198); Molokai, about 4,000 feet. Middle, *poeciloceras* (Walsingham), paratype (BM slide 5443), Haleakala, 5,000 feet, Maui. Bottom, *rediviva* (Walsingham), paratype (BM slide 6471); Kaholuamano, 4,000 feet, Kauai.

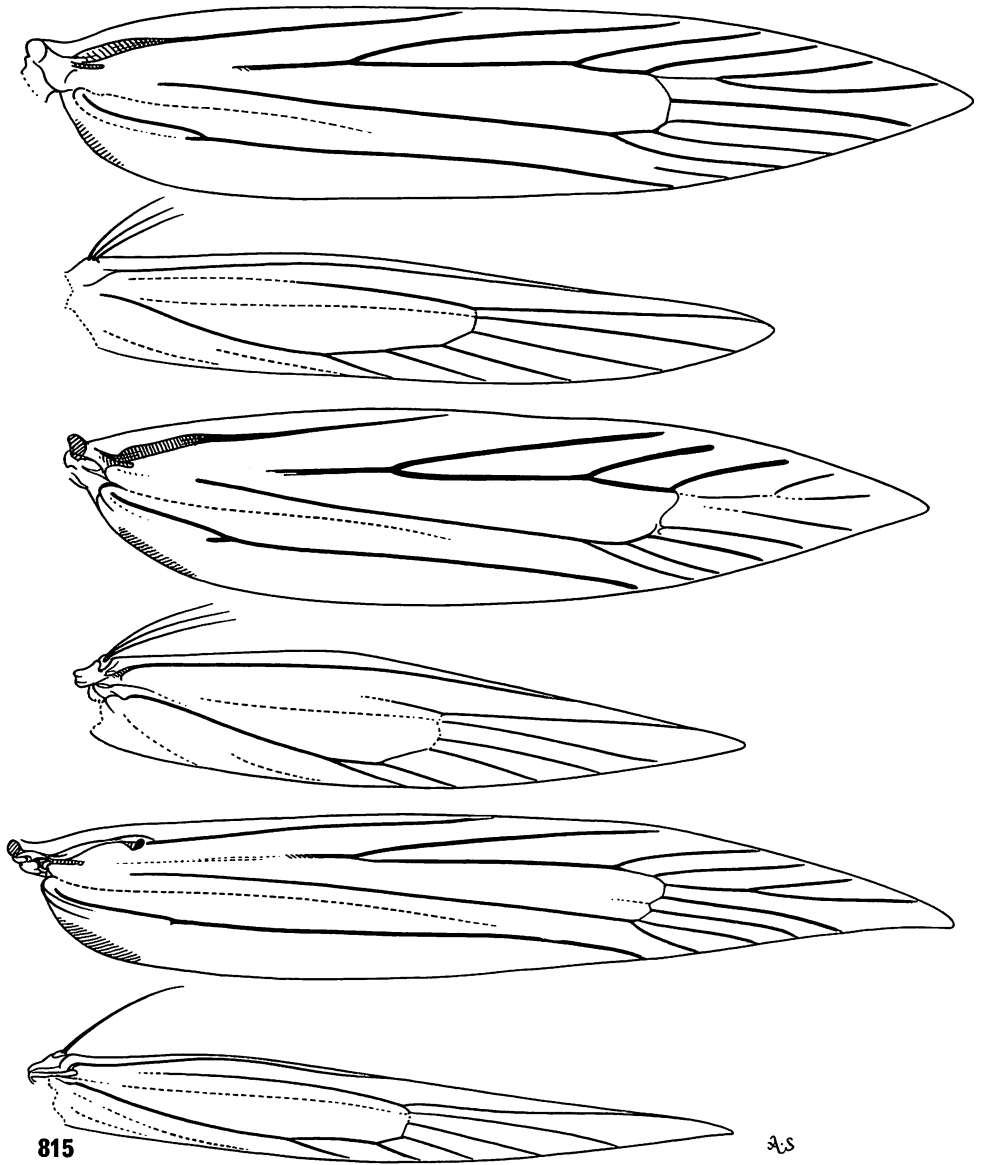


Figure 815—Wing venations of *Hyposmocoma* (“*Neelysia*”). Top, *repandella* (Walsingham), paratype (BM slide 8200); Molokai, above 3,000 feet. Middle, *semifusa* (Walsingham), paratype (BM slide 8196); Molokai, about 4,000 feet. This species was wrongly described as a member of *Neelysia*; it belongs to *Hyposmocoma sensu stricto*. Bottom, *tischeriella* (Walsingham), paratype (BM slide 8429); Kaholuamano, 4,000 feet, Kauai.

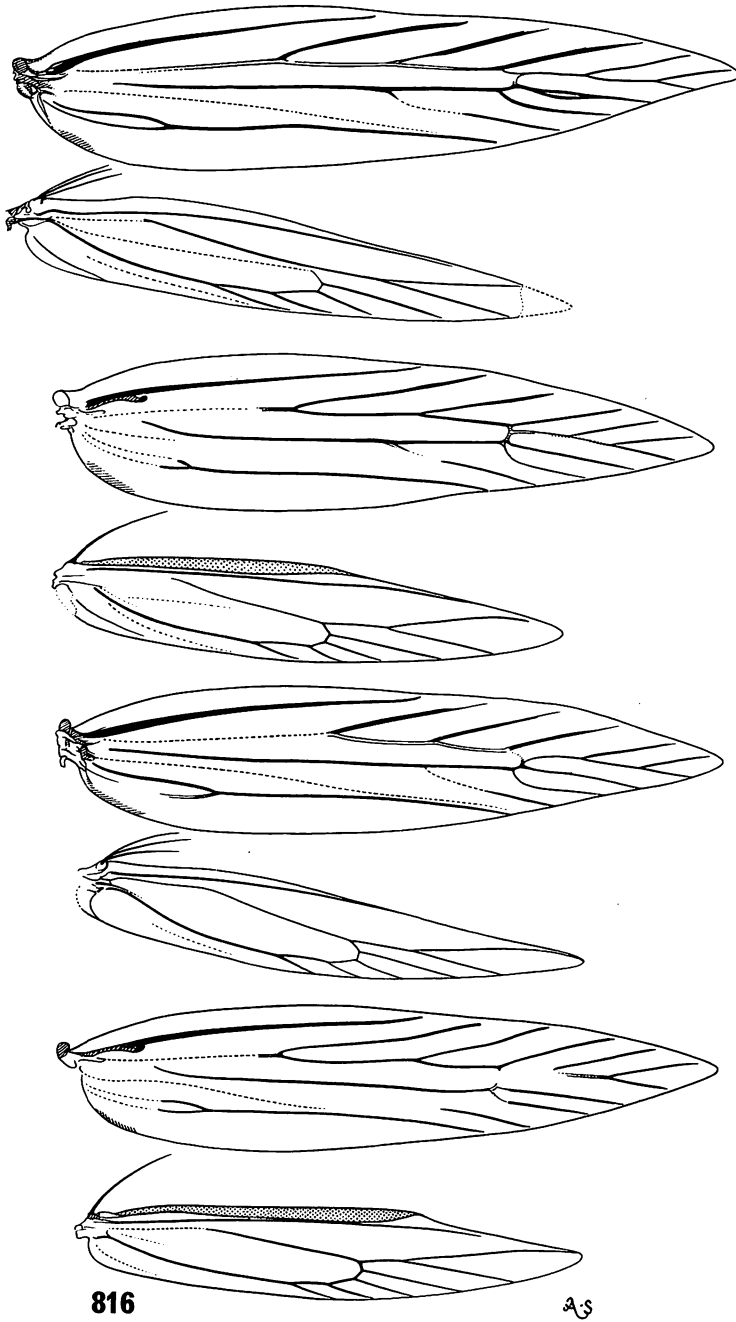


Figure 816—*Hyposmocoma* ("Aphthonetus"), wing venations. Top, *albocinerea* (Walsingham), paratype (BM slide 7561); Kauai, 3,000 to 4,000 feet. Upper middle, *elegans* (Walsingham), paratype (BM slide 7585); Haleakala, 5,000 feet, Maui. Lower middle, *lichenalis* (Walsingham), paratype (BM slide 7559); Lanai, 2,000 feet. Bottom, *punctiplicata*, paratype (BM slide 7584); Kona, 4,000 feet, Hawaii.

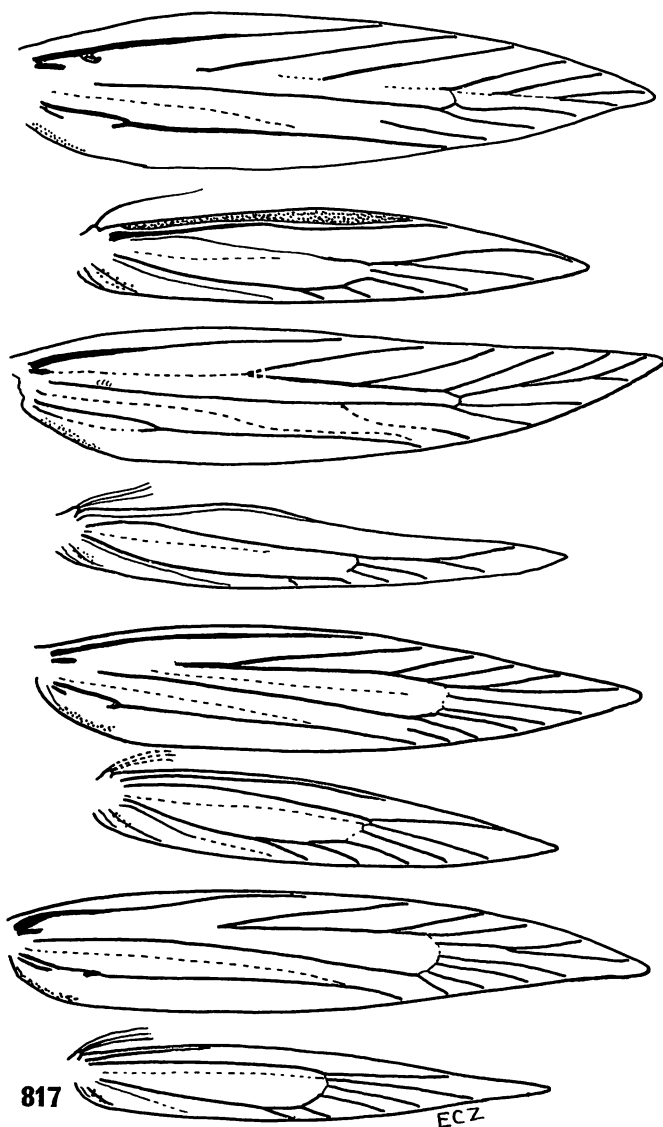


Figure 817—Wing venations of *Hyposmocoma* (*Euperissus*). Top, (“*Aphthonetus*”) *empetra* (Meyrick); Koolau Mts., Oahu; undesignated paratype (BM slide 16349). Upper middle, (“*Aphthonetus*”) *eleuthera* (Walsingham); Hilo, 2,000 feet, Hawaii; paratype (BM slide 16333). Lower middle (“*Neelysia*”) *incongrua* (Walsingham); Haleakala, 5,000 feet, Maui; allotype (BM slide 7725). Bottom, (“*Neelysia*”) *subaurata* (Walsingham); Kaholuamano, 4,000 feet, Kauai; allotype (BM slide 7716); note that there is no trace of vein 2 in the forewing.



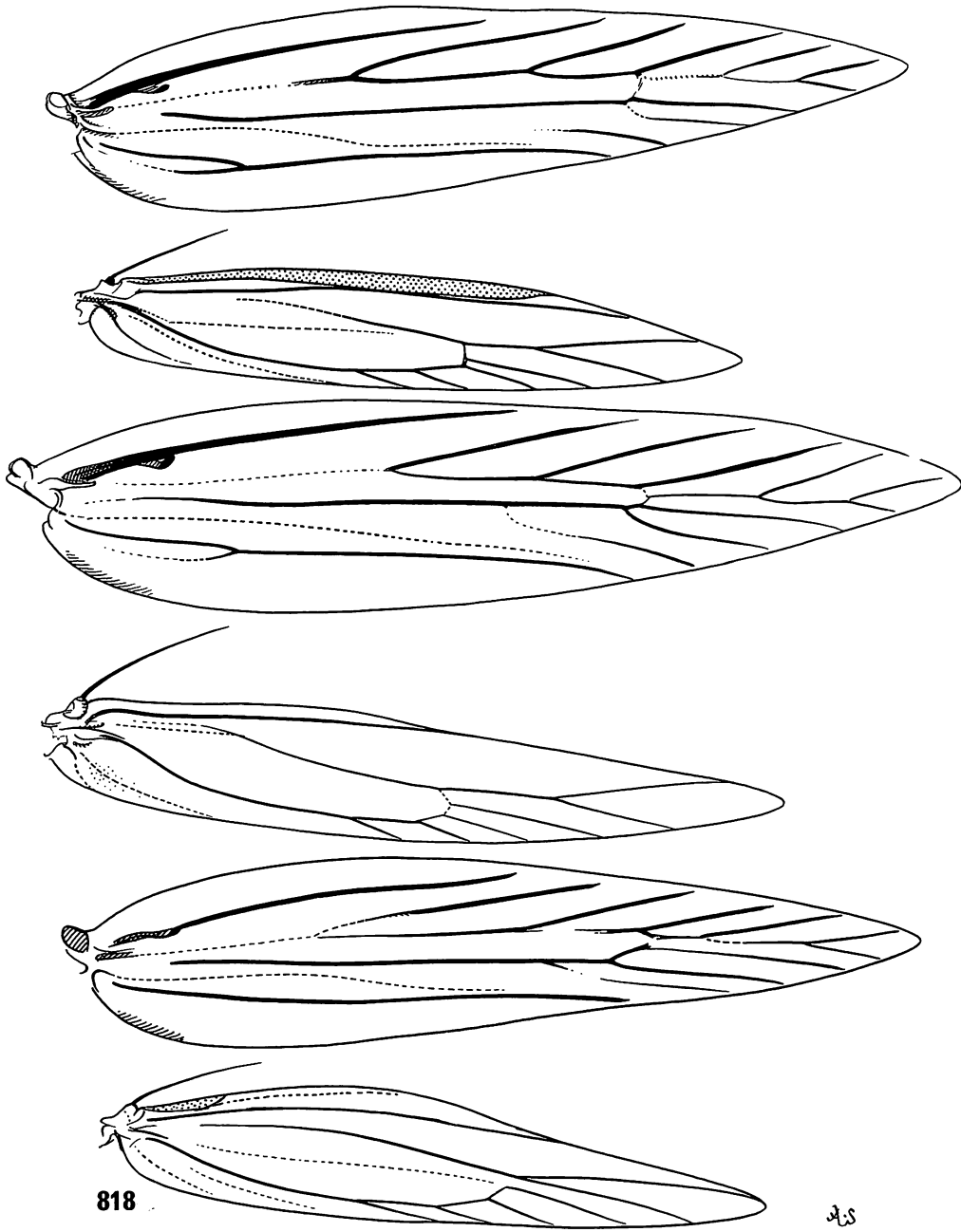


Figure 818—Wing venations of *Hyposmocoma* ("Aphthonetus"). Top, *aspersa* (Butler); Waianae Mts., Oahu (BM slide 7586). Middle, *bitincta* (Walsingham), paratype (BM slide 7581); Haleakala, 5,000 feet, Maui. Bottom, *columbella* (Walsingham), paratype (BM slide 7576); Molokai, above 3,000 to 4,000 feet.

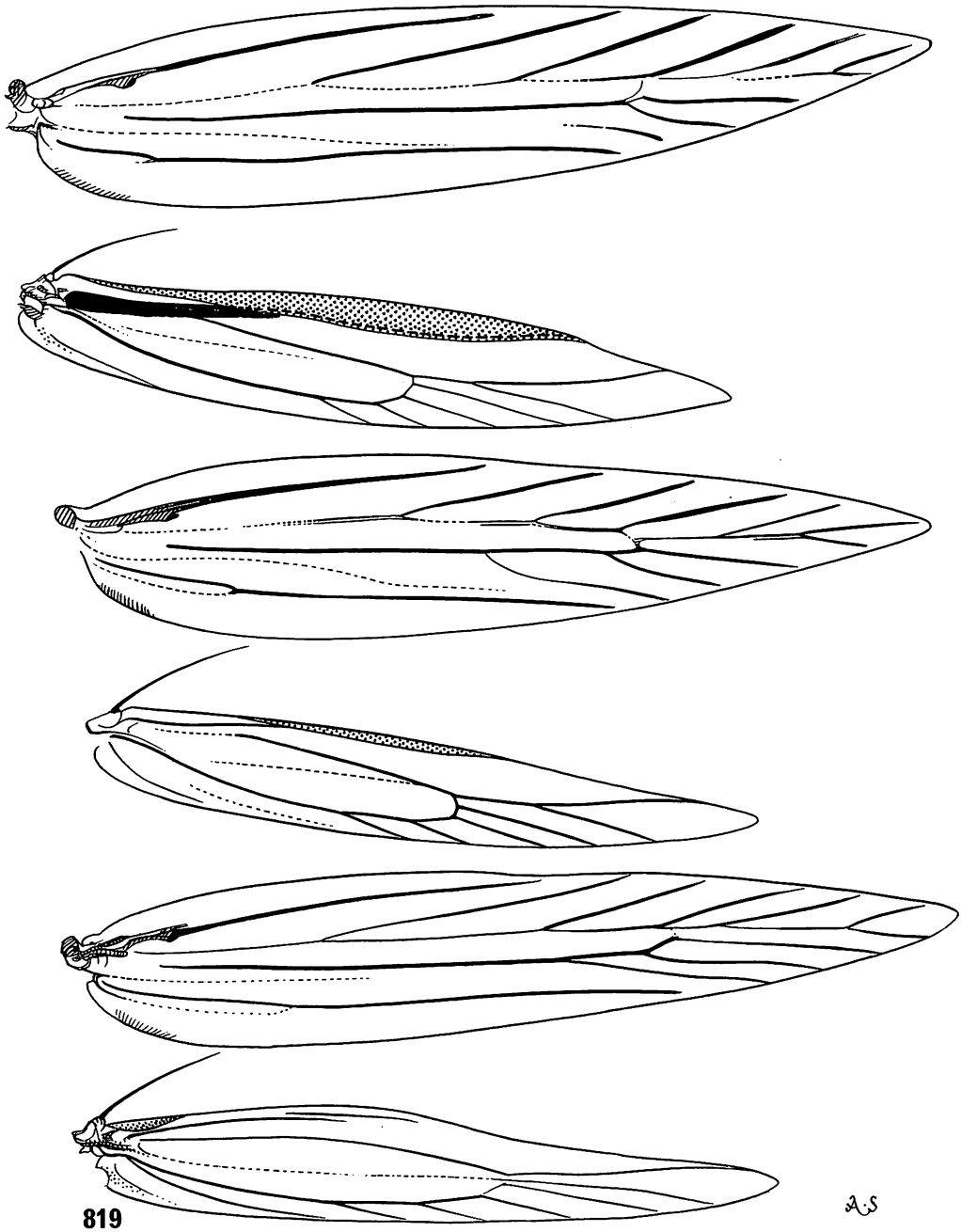


Figure 819—*Hyposmocoma* ("Aphthonetus"), wing venations. Top, *corticolor* (Walsingham), paratype (BM slide 7578); Haleakala, 5,000 feet, Maui. Middle, *digressa* (Walsingham), paratype (BM slide 7579); Haleakala, 5,000 feet, Maui. Bottom, *exsul* (Walsingham), determined by Walsingham, (BM slide 5457); Kilauea, Hawaii. Note that veins 6 and 7 in the hindwing of *exsul* are not stalked; compare this with the other species. Note also the variation in vein 2 in the forewings.

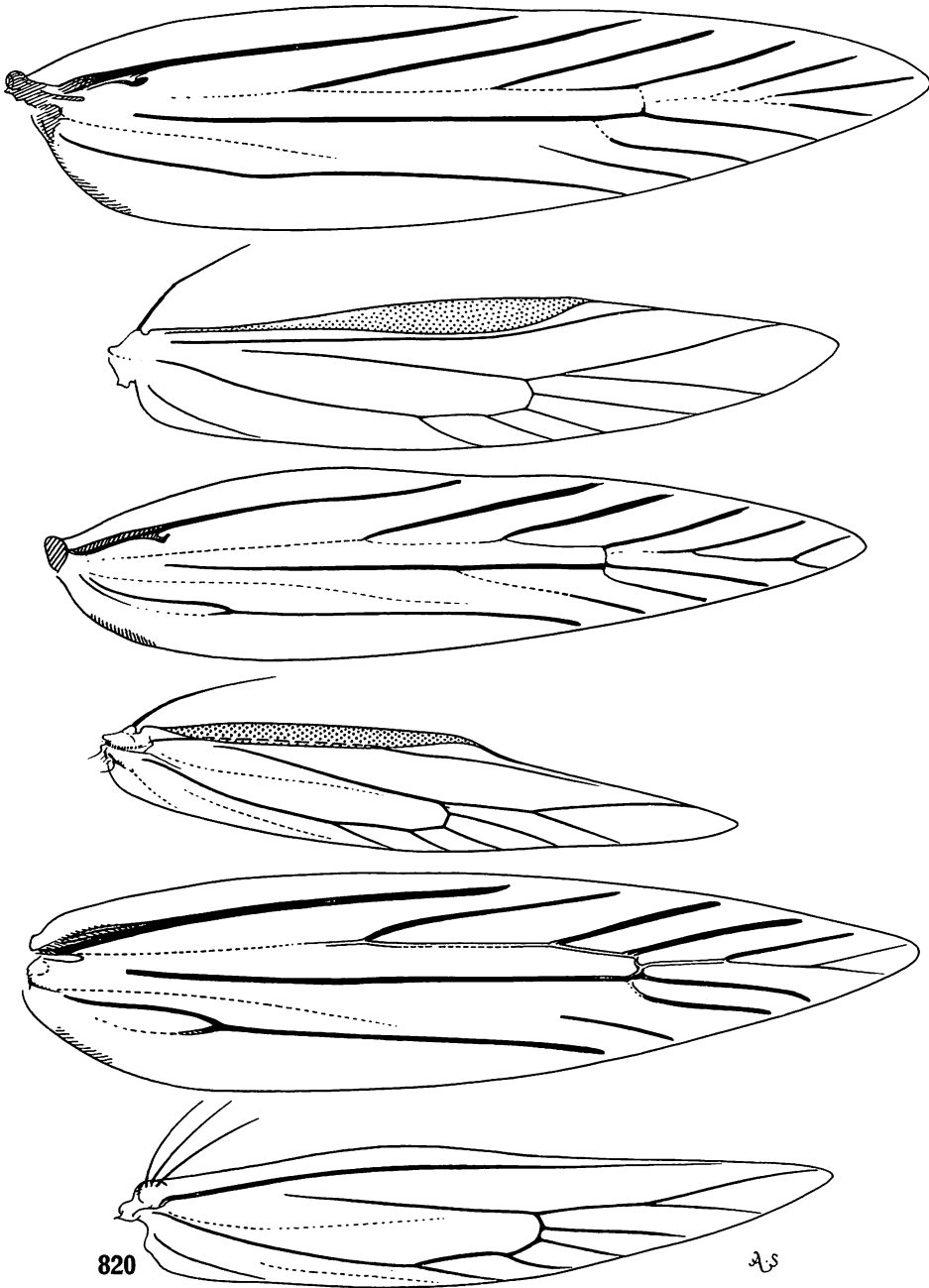


Figure 820—Wing venations of *Hyposmocoma* ("Aphthonetus"). Top, *fluctuosa* (Walsingham), paratype (BM slide 7580); Halemanu, 4,000 feet, Kauai. Middle, *fugitiva* (Walsingham), paratype (BM slide 7577); Kaholuamano, 4,000 feet, Kauai. Bottom, *hirsuta* (Walsingham), paratype (BM slide 7562); Kauai, 3,000 to 4,000 feet.

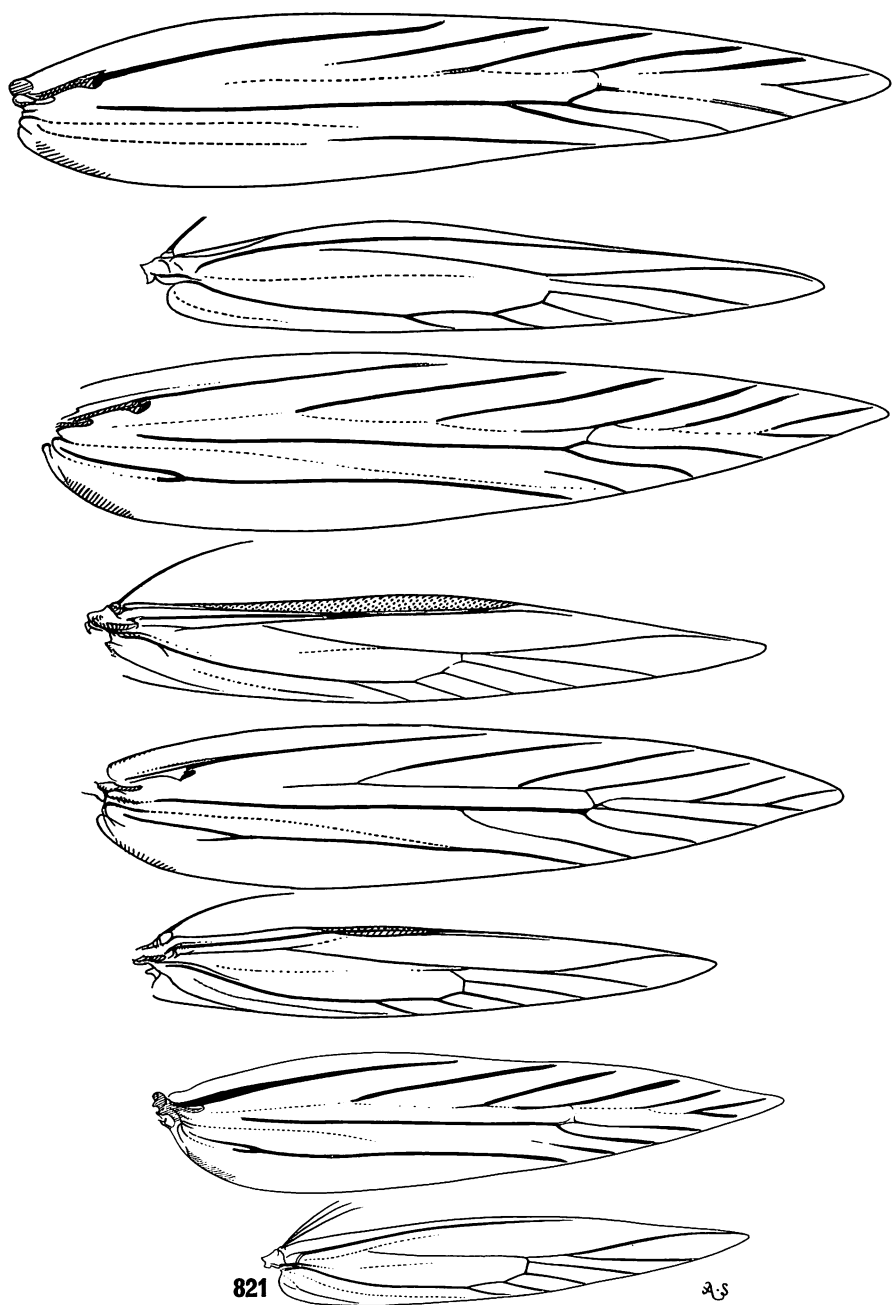


Figure 821—*Hyposmocoma* (“*Aphthonetus*”), wing venations. Top, *humerella* (Walsingham), paratype (BM slide 7563); Haleakala, 5,000 feet, Maui. Upper middle, *kauaiensis* (Walsingham), paratype (BM slide 5456); Halemanu, Kauai. Lower middle, *mediocris* (Walsingham), paratype (BM slide 5455); Olinda, Maui. Bottom, *polia* (Walsingham), allotype (BM slide 7564); Halemanu, 4,000 feet, Kauai.

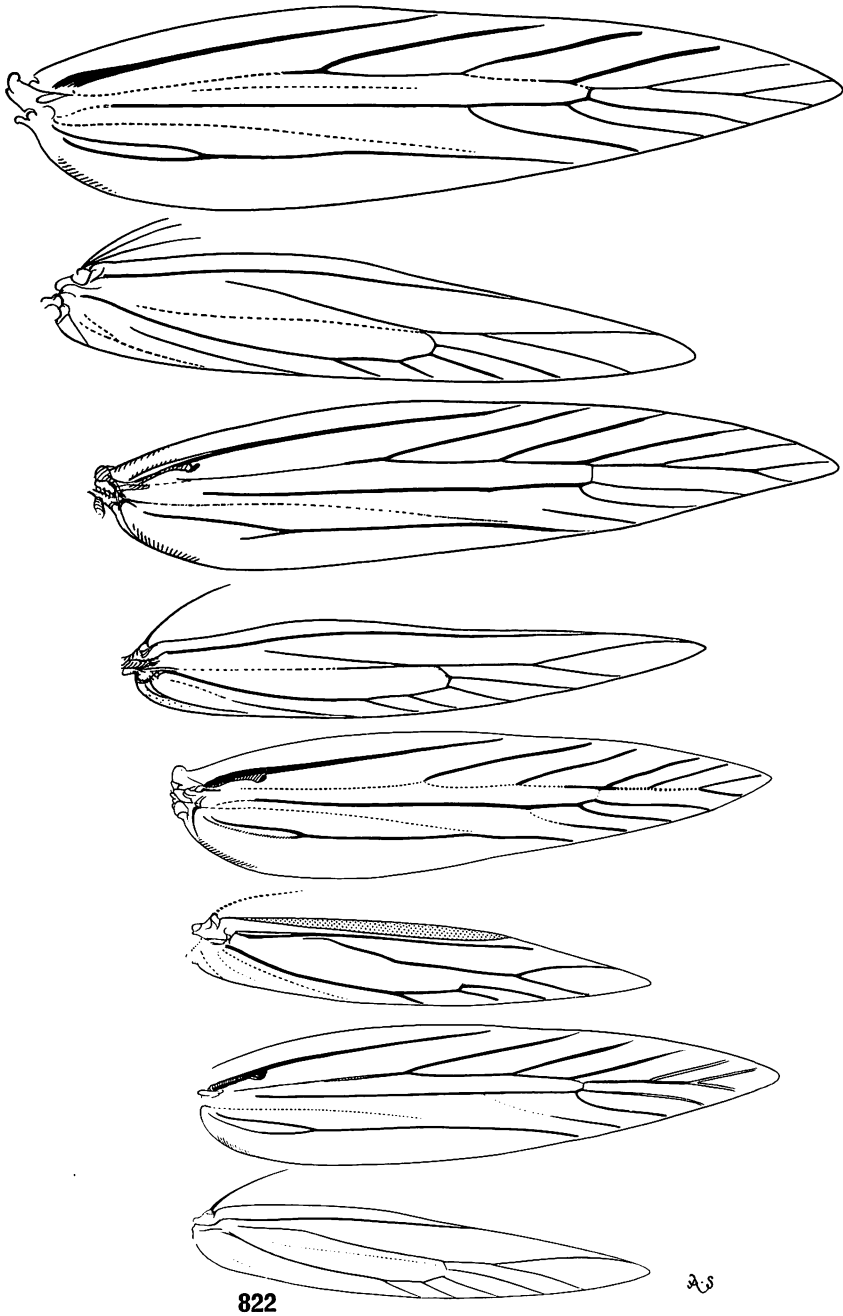


Figure 822—Wing venations of *Hyposmocoma* ("Aphthonetus"). Top, *prae fracta* (Meyrick), paratype (slide Z-XII-62-1); Kumuwela, Kauai. Upper middle, *sagittata* (Walsingham), paratype (BM slide 5454); Kaholuamano, 4,000 feet, Kauai. Lower middle, *sideroxylo ni* (Swezey), Oahu (Busck slide 153); above Puu Peahinaia, Koolau Mts.; note that there are only seven veins in the hindwing. Bottom, *subocellata* (Walsingham), paratype (BM slide 7583); Haleakala, 4,000 to 5,000 feet, Maui.

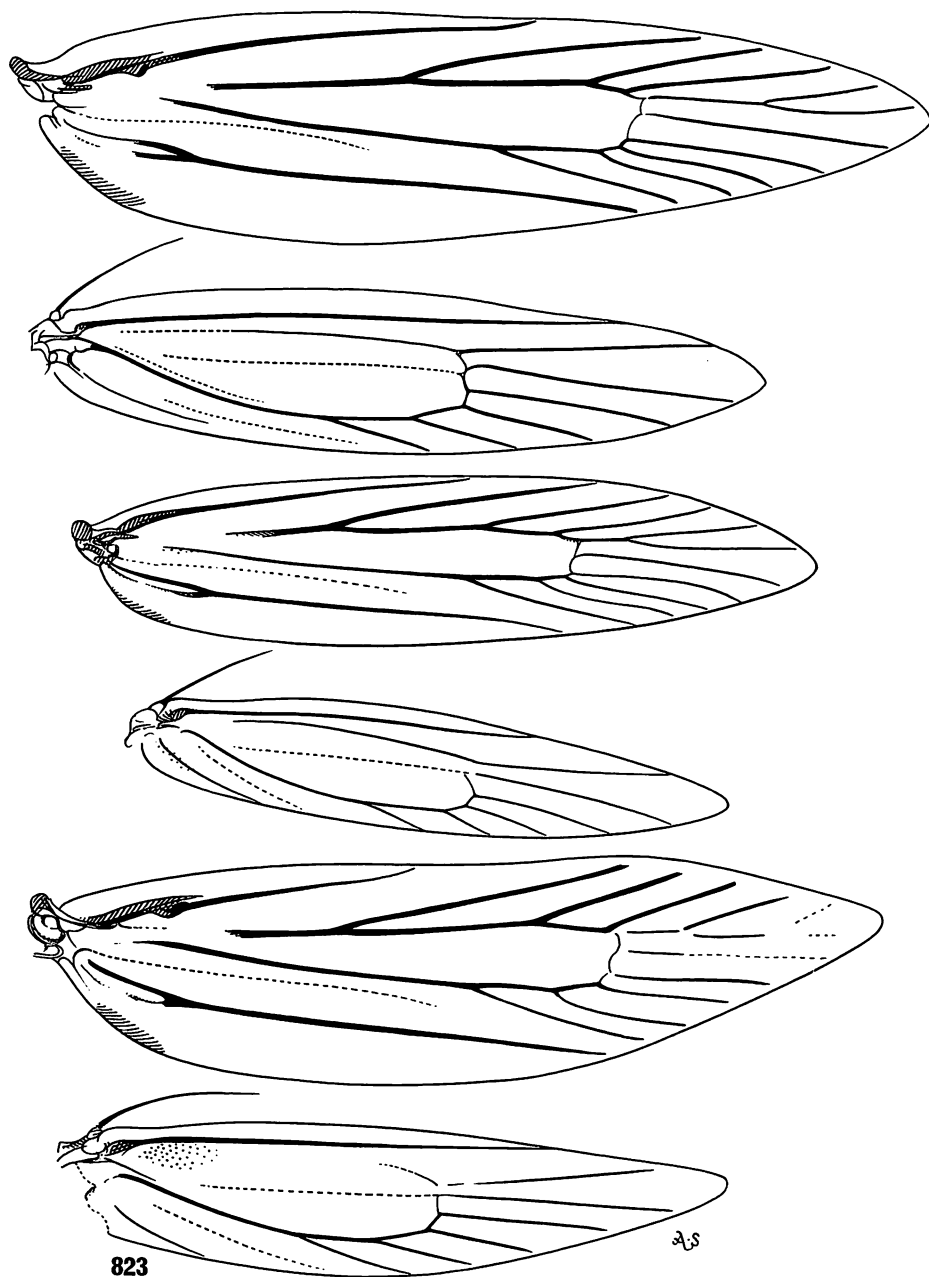


Figure 823—*Hyposmocoma*, wing venations. Top, (*H.*) *abjecta* (Butler); northwest Koolau Mts., Oahu (BM slide 7874); determined by Walsingham. Middle, a species confused with (*E.*) *adelphella* Walsingham, paratype (BM slide 8024); Kauai, 3,000 to 4,000 feet (see the main text for discussion). Bottom, (*H.*) *admirationis* Walsingham, paratype (BM slide 8025); Molokai, over 3,000 feet.

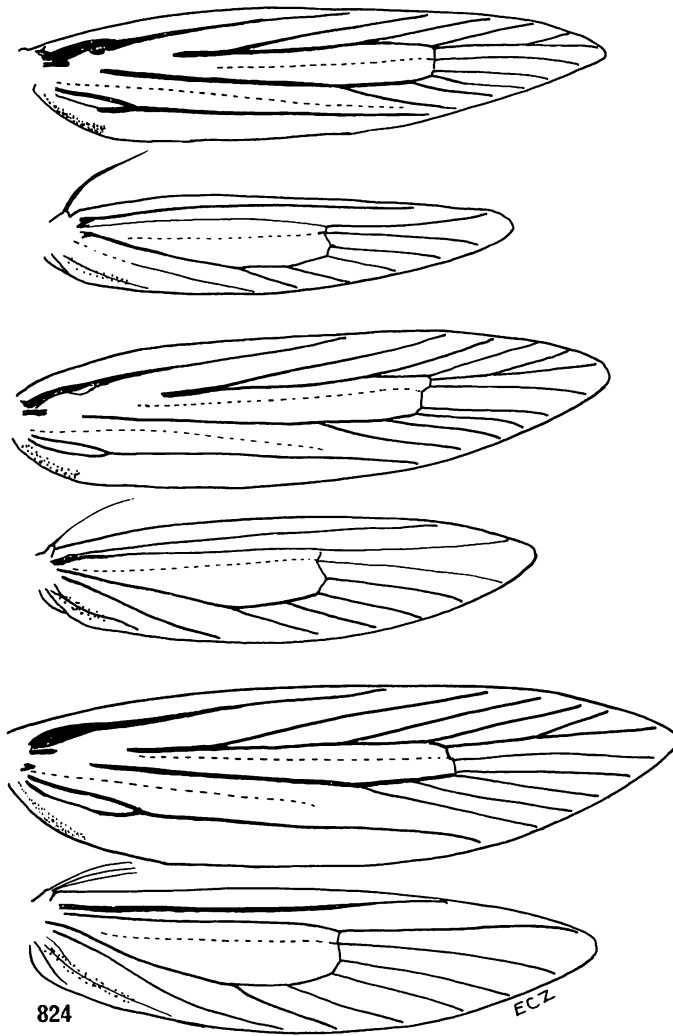


Figure 824—Wing venations of *Hyposmocoma* (*Euperissus*). Top, *alticola* Meyrick; Honolulu (BM slide 16345). Middle, *caecinervis* Meyrick; Mt. Kaala, Oahu (BM slide 5555). Bottom, *chloraula* Meyrick; Summit Camp, Kauai (BM slide 16348). These specimens are evidently all undesignated paratypes.



Figure 825—*Hyposmocoma* (*Hyposmocoma*), wing venations. Top, *albονivea* Walsingham; Koolau Mts., Oahu (BM slide 16341); note that vein 1c in the hindwing is wanting. Middle, *prophantis* Meyrick; Koolau Mts., Oahu (BM slide 16340). Bottom, *triptila* Meyrick; Koolau Mts., Oahu (BM slide 16347).



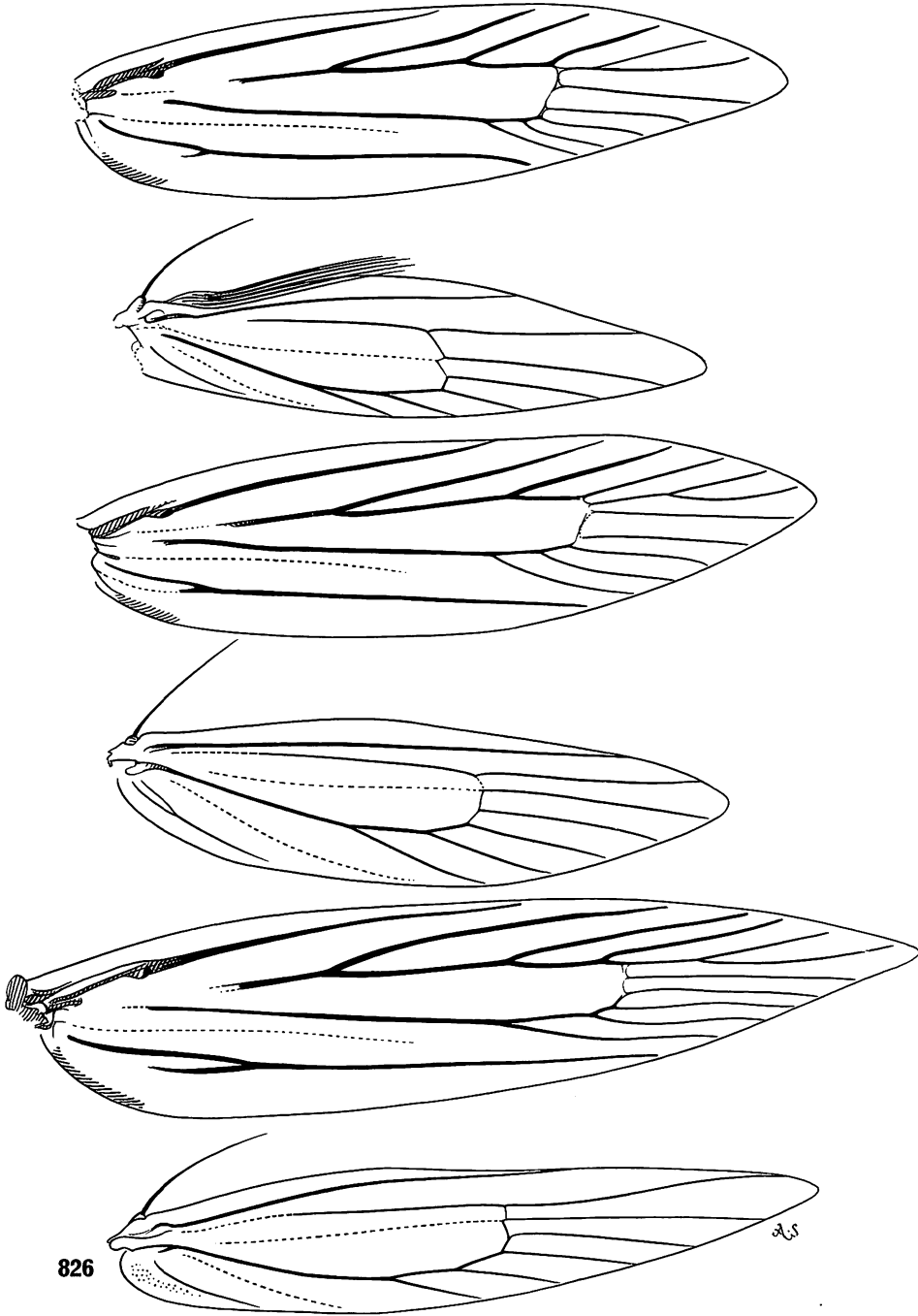


Figure 826—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *alliterata* Walsingham, paratype (BM slide 7331); Kona, about 5,000 feet, Hawaii. Middle, *arenella* Walsingham, paratype (BM slide 8041); Kona, 3,000 feet Hawaii. Bottom, *argentea* Walsingham, paratype (BM slide 8042); Molokai, 4,000 feet.

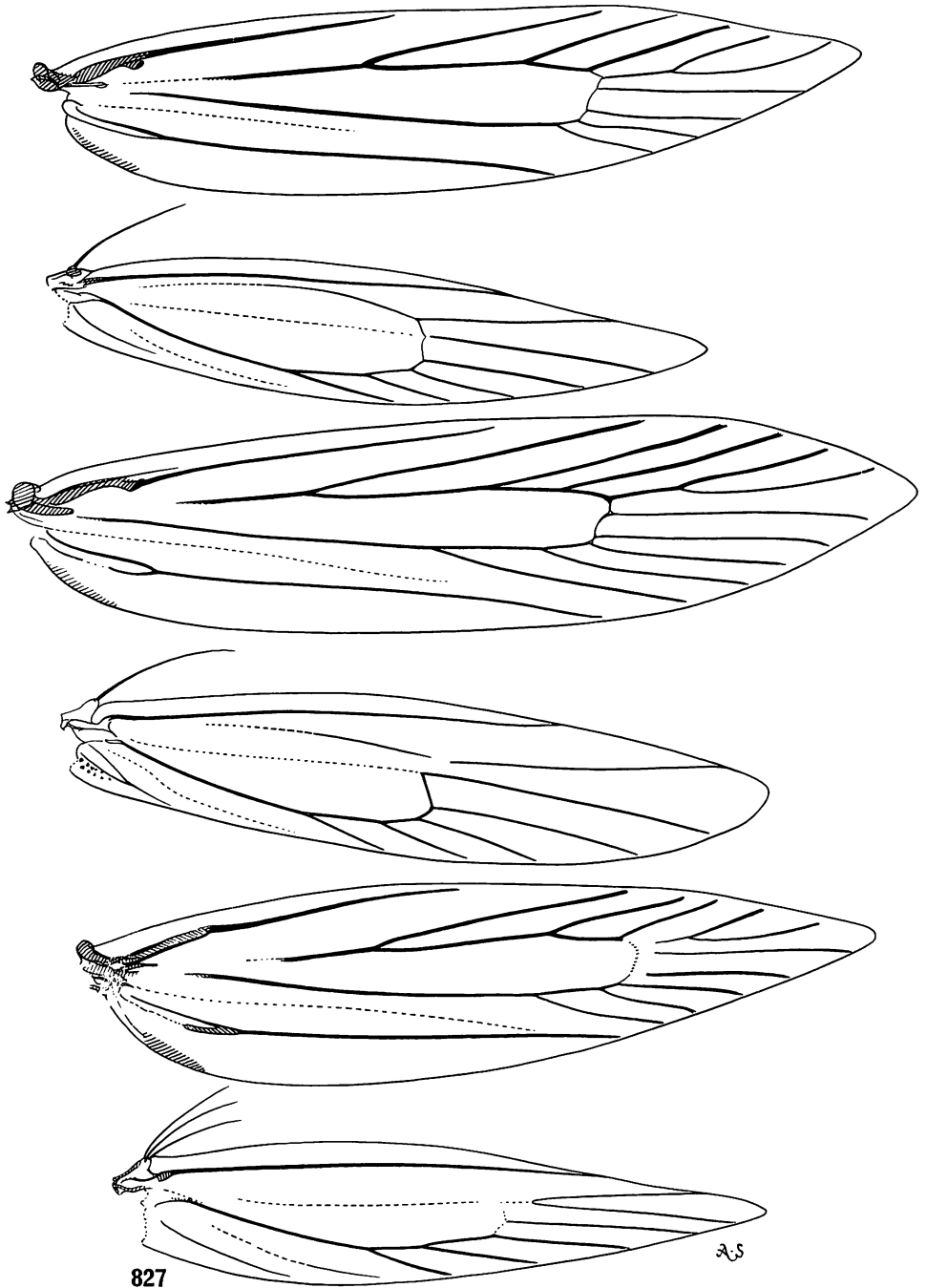


Figure 827—Wing venations of *Hyposmocoma*. Top, (*H.*) *auripennis* (Butler), determined by Walsingham (BM slide 7887); Haleakala, 5,000 feet, Maui. Middle, (*E.*) *auroargentea* Walsingham, paratype (BM slide 7885); Haleakala, over 5,000 feet, Maui. Bottom, (*H.*) *auropurpurea* Walsingham, allotype (BM slide 8469); Waianae Mts., 2,000 feet, Oahu.



Figure 828—*Hyposmocoma*, wing venations. Top, (*H.*) *bacillella* Walsingham, paratype (BM slide 8436); Kauai, 3,000 to 4,000 feet. Middle, (*H.*) *bilineata* (Walsingham), paratype (BM slide 8470); Waianae Mts., 2,000 feet, Oahu. Bottom, (*E.*) *brevistrigata* Walsingham, paratype (BM slide 8437); Kauai, 3,000 to 4,000 feet.

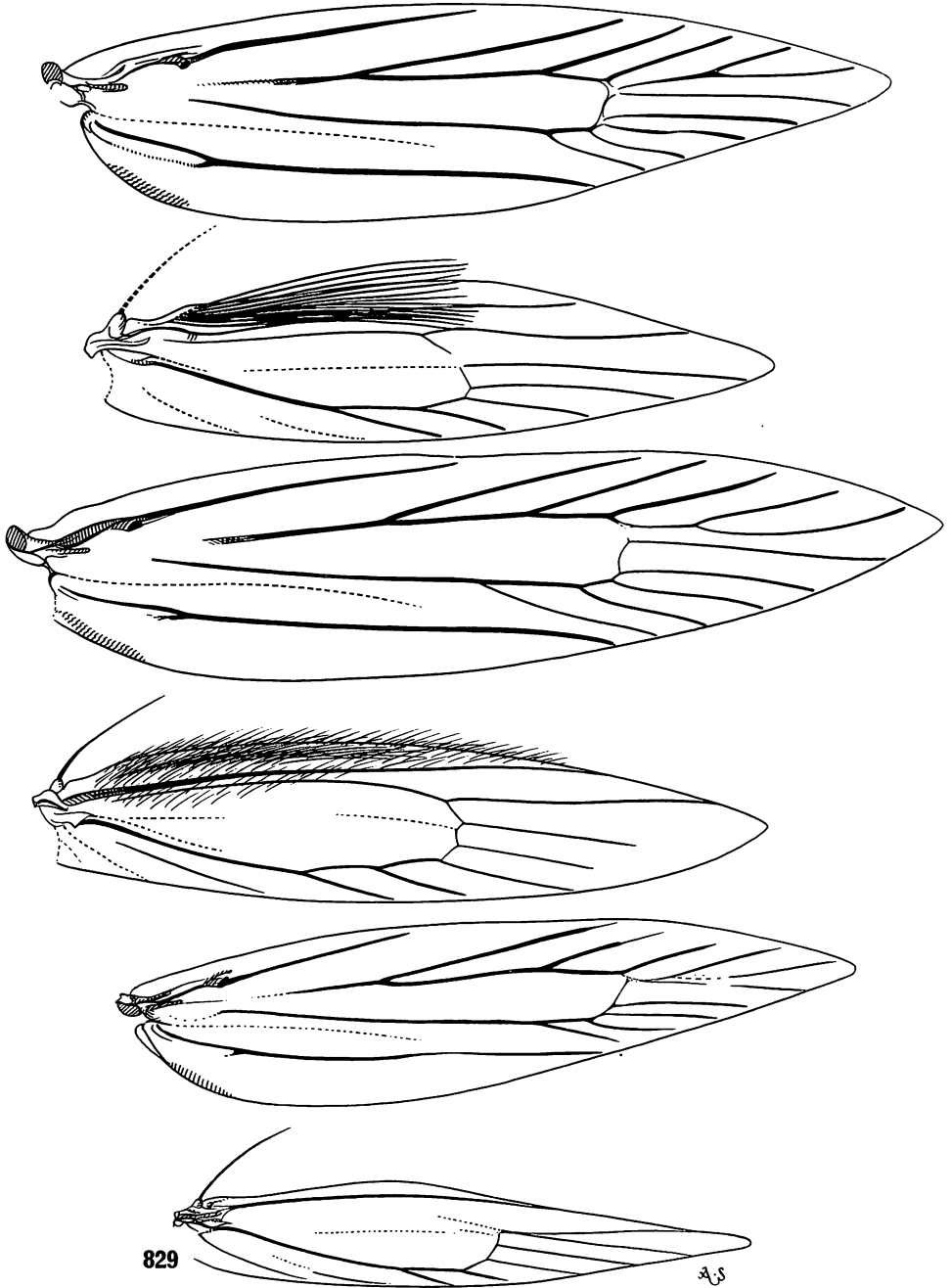


Figure 829—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *butalidella* Walsingham, paratype (BM slide 8442); Haleakala, about 6,000 feet, Maui. Middle, species?, formerly considered as *candidella* Walsingham, paratype (BM slide 7338); Kauai, 3,000 to 4,000 feet. Bottom, *canella* Walsingham, paratype (BM slide 5476); Molokai, above 3,000 feet. Compare the origins of vein 6 in both forewings and hindwings.

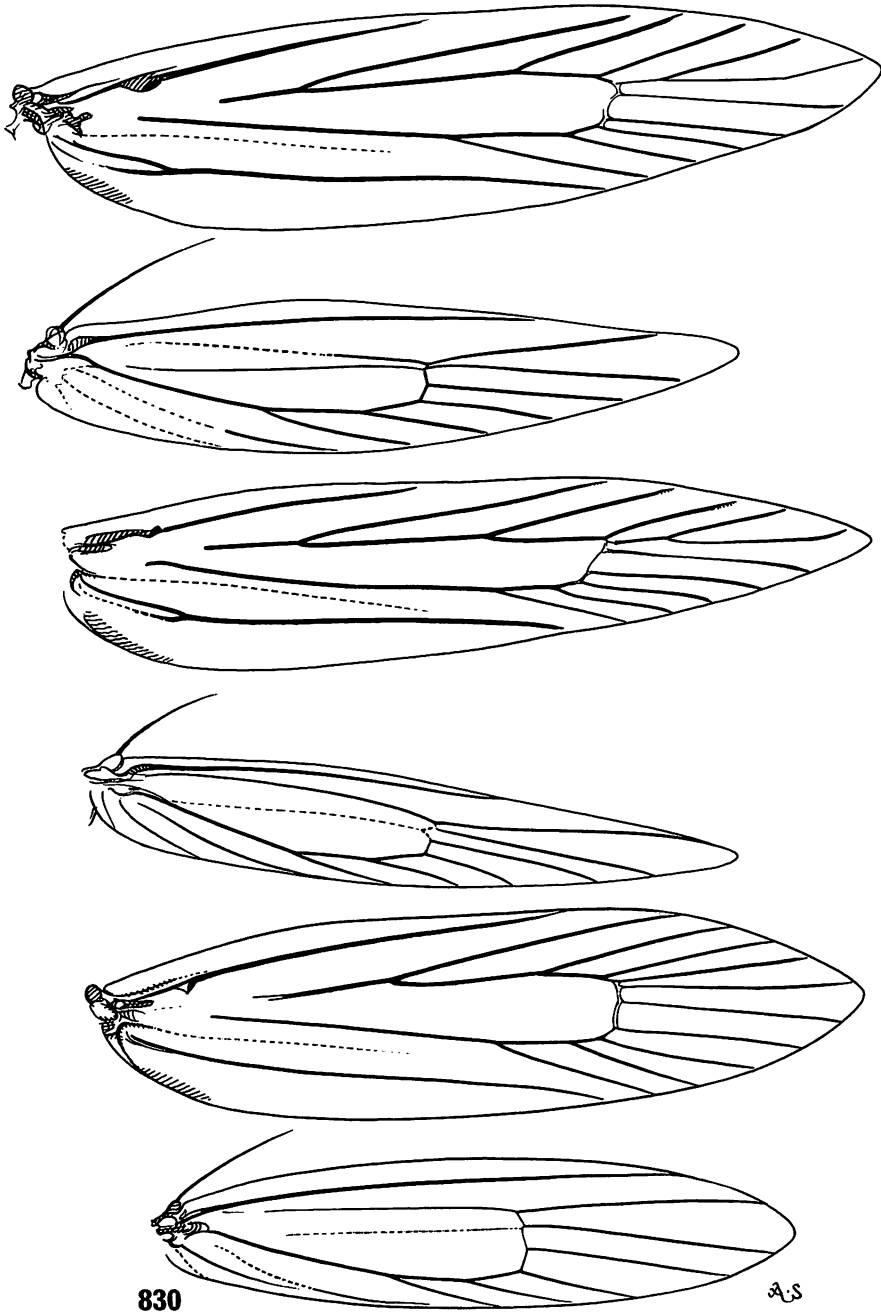


Figure 830—*Hyposmocoma* (*Hyposmocoma*), wing venations. Top, *carbonotata* Walsingham, paratype (BM slide 8443); Kauai, 3,000 to 4,000 feet. Middle, *ctereosparsa* Walsingham, paratype (BM slide 8444); Kauai, 3,000 to 4,000 feet. Bottom, *commensella* Walsingham, paratype (BM slide 5452); Kilauea, Hawaii. Note that 7 and 8 are free veins in the forewing, and compare this with other species. This is not a constant character, however. See the text for details.

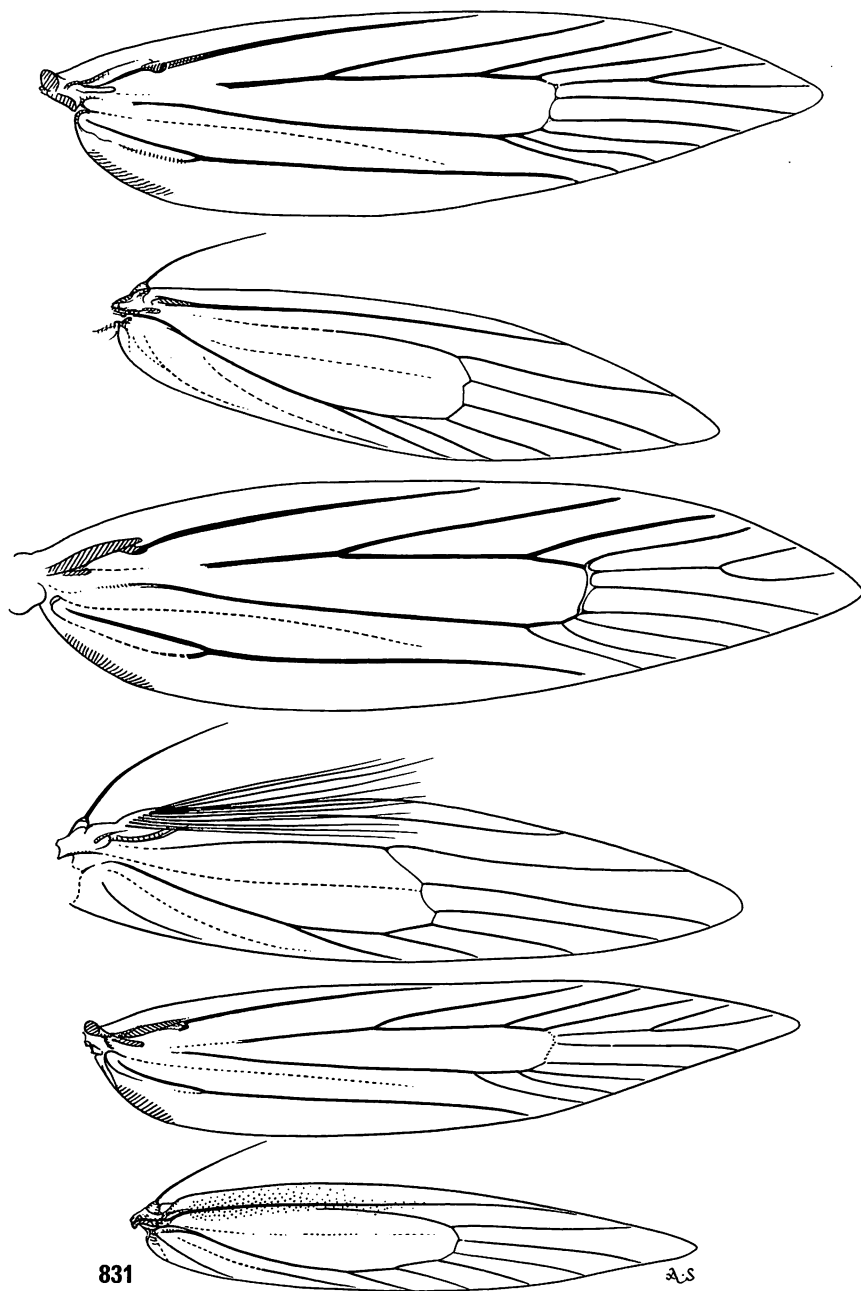


Figure 831—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *conditella* Walsingham, paratype (BM slide 6466); Kauai, 3,000 to 4,000 feet. Middle, *corvina* (Butler), determined by Walsingham (BM slide 7872); Olinda, 4,000 feet, Maui. Bottom, *costimaculata* Walsingham, paratype (BM slide 5463); Molokai, 3,000 feet.

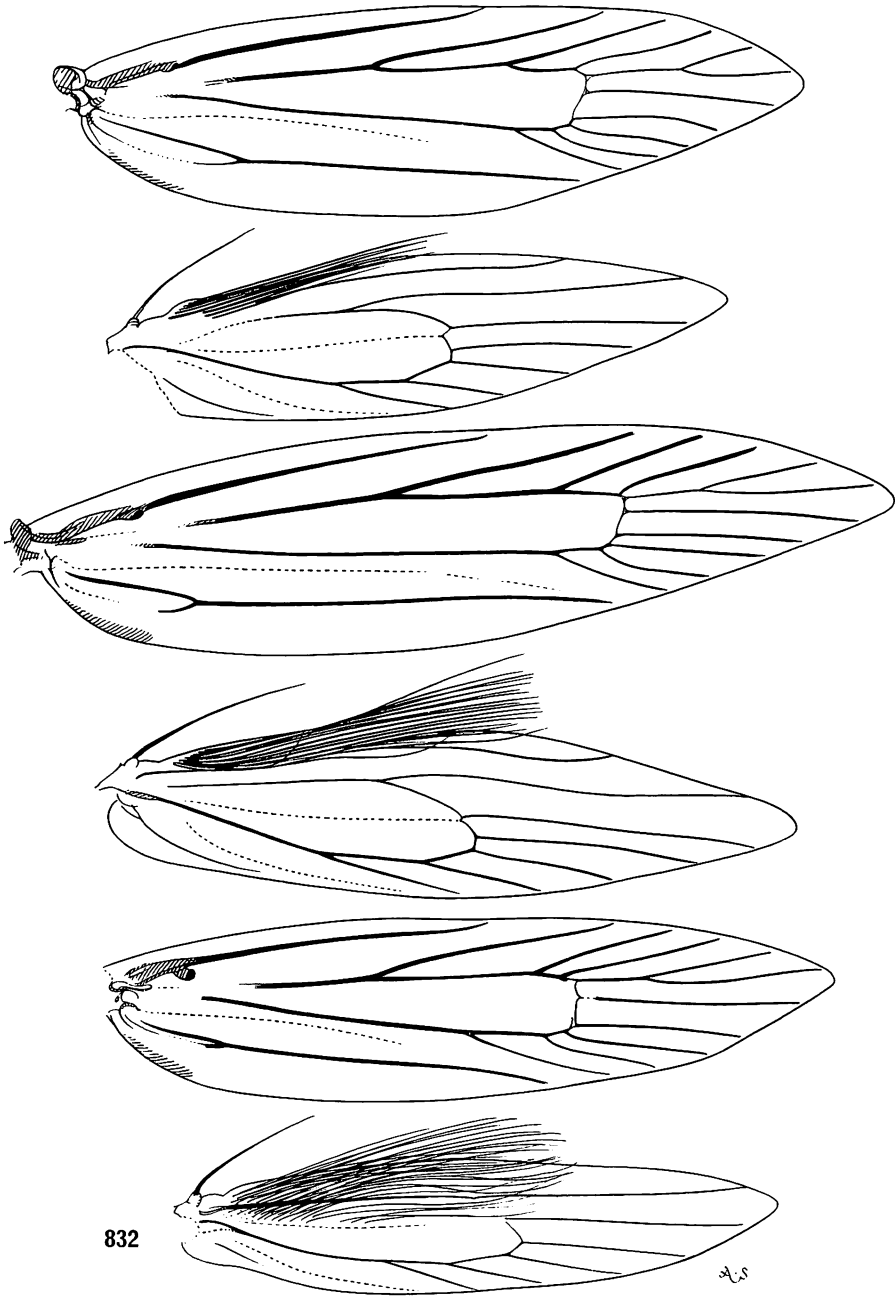


Figure 832—*Hyposmocoma* (*Hyposmocoma*), wing venations. Top, *discella* Walsingham, paratype (BM slide 4873); Kaholuamano, 4,000 feet, Kauai. Middle, *divisa* Walsingham, paratype (BM slide 6465); Kauai, 3,000 to 4,000 feet. Bottom, *domicolens* (Butler), paratype (BM slide 6458); Makawao, Maui.

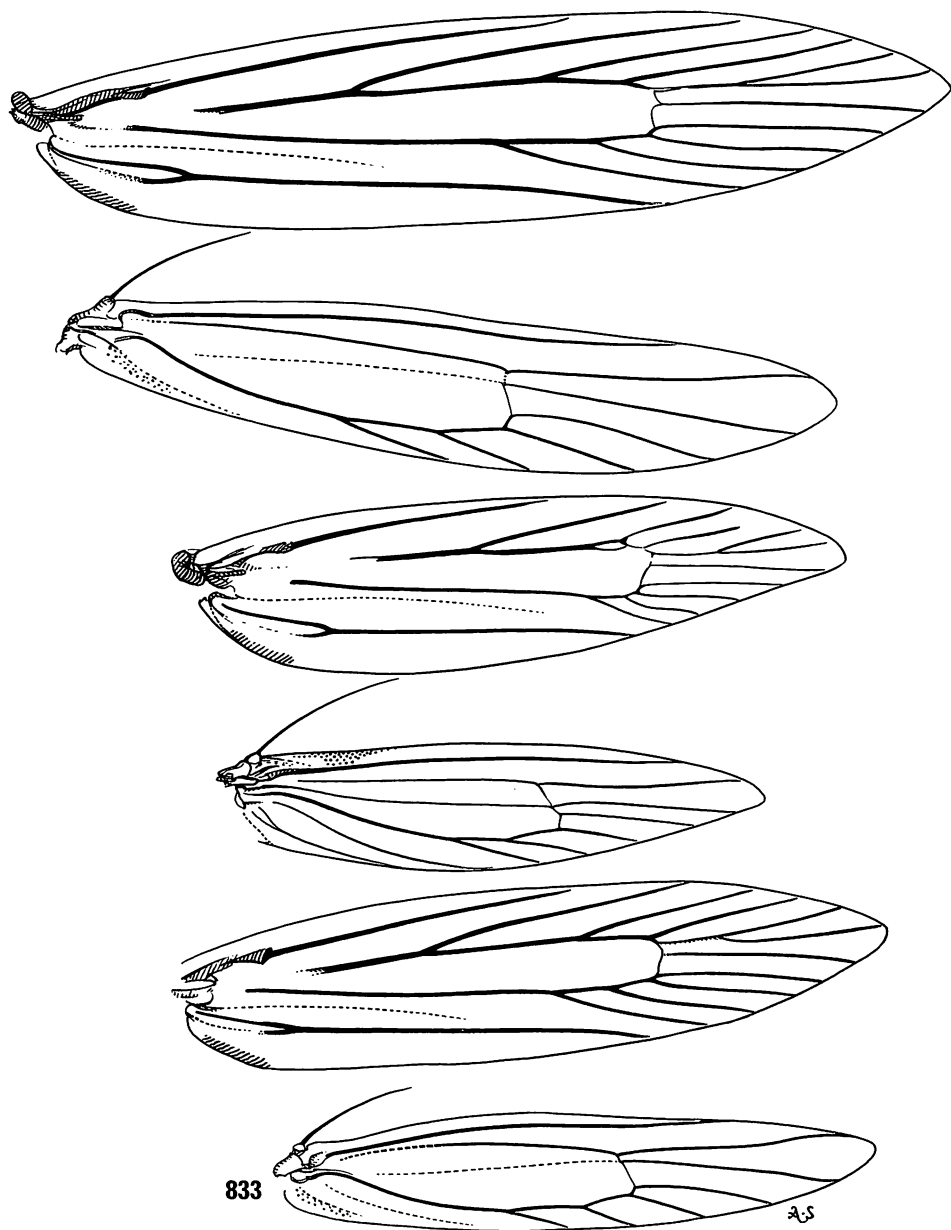


Figure 833—Wing venations of *Hyposmocoma*. Top, (*E.*) *emendata* Walsingham, paratype (BM slide 8445); Haleakala, 5,000 feet, Maui. Middle, (*H.*) *empedota* Meyrick (BM slide 5477); Honolulu, Oahu. Bottom, (*E.*) *enixa* Walsingham, paratype (BM slide 8446); Kaholuamano, 4,000 feet, Kauai.



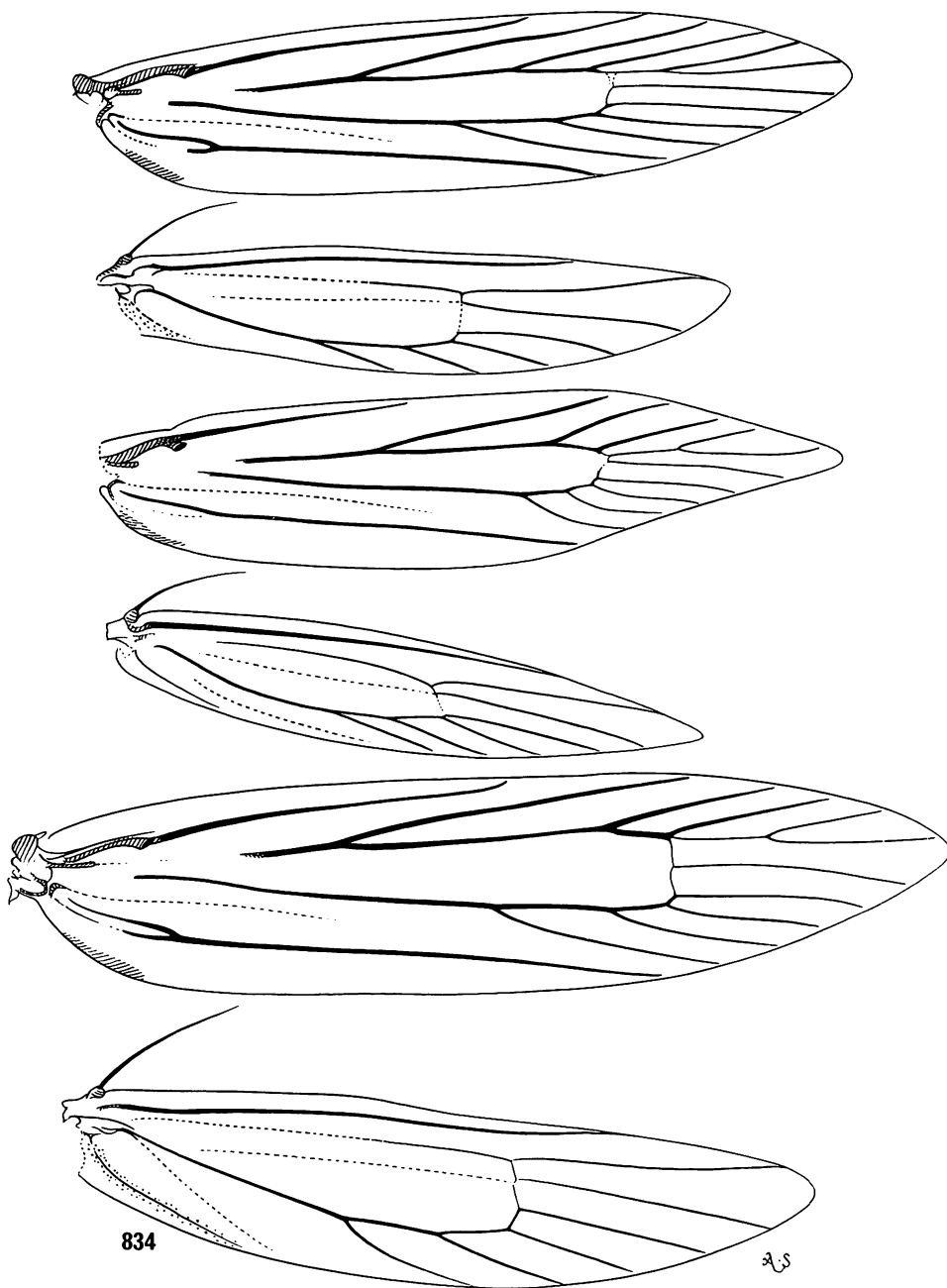


Figure 834—*Hyposmocoma*, wing venations. Top, (*E.*) *ensifer* Meyrick, paratype (BM slide 8448); Kilauea, Hawaii. Middle, (*H.*) *evanescens* Walsingham, paratype (BM slide 7980); Haleakala, 5,000 feet, Maui. Bottom, (*E.*) *exornata* Walsingham, paratype (BM slide 7869); Kona, 4,000 feet, Hawaii.

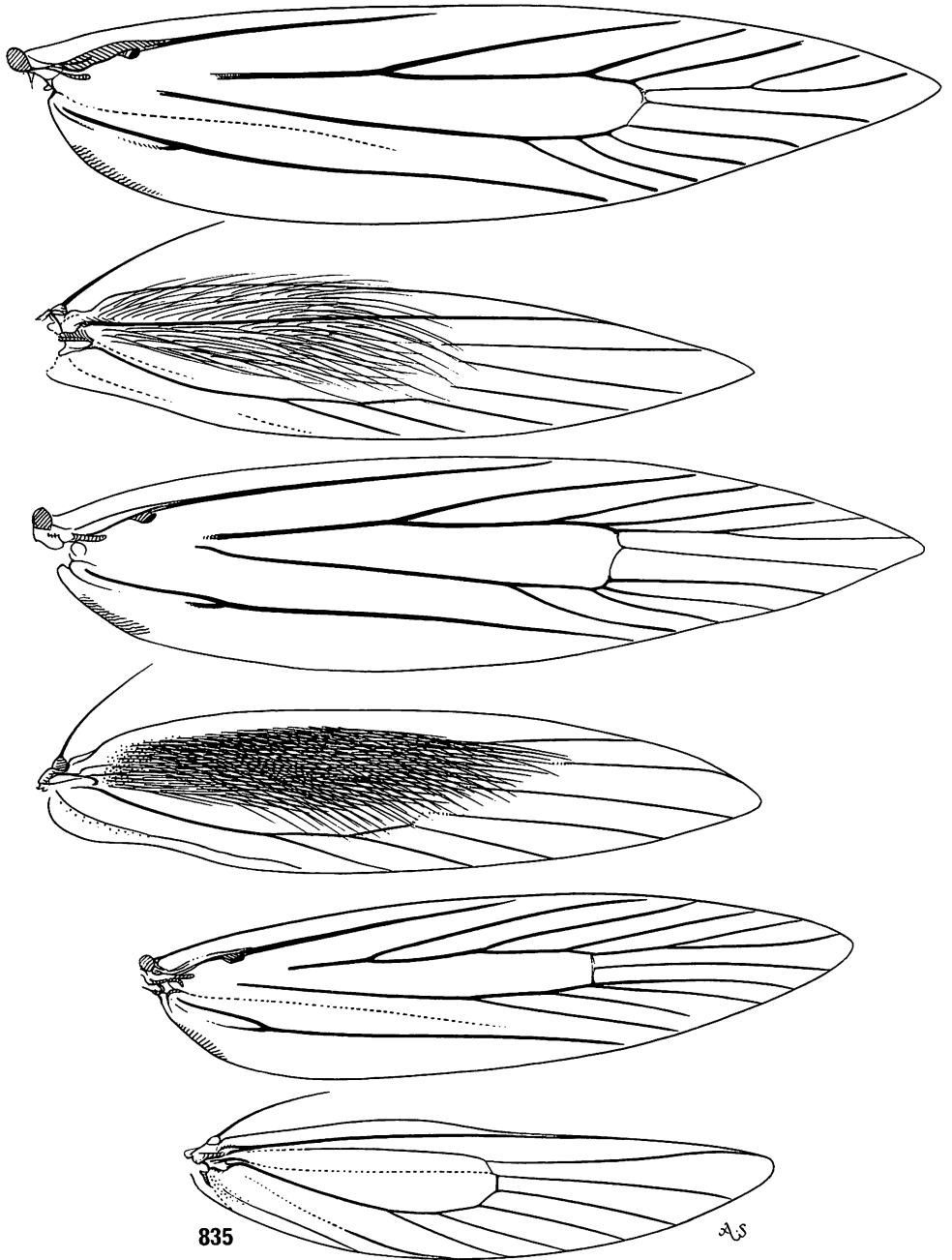


Figure 835—Wing venations of *Hyposmocoma*. Top, (*H.* *fractinubella* Walsingham, paratype (BM slide 8449); Olinda, 4,000 feet, Maui (compare female in figure 1351). Middle, (*H.* *fractistriata* Walsingham, paratype (BM slide 8455); Waianae Mts., Oahu. Bottom, (*E.* *fulvida* Walsingham, paratype (BM slide 5465); Kauai, 3,000 to 4,000 feet.

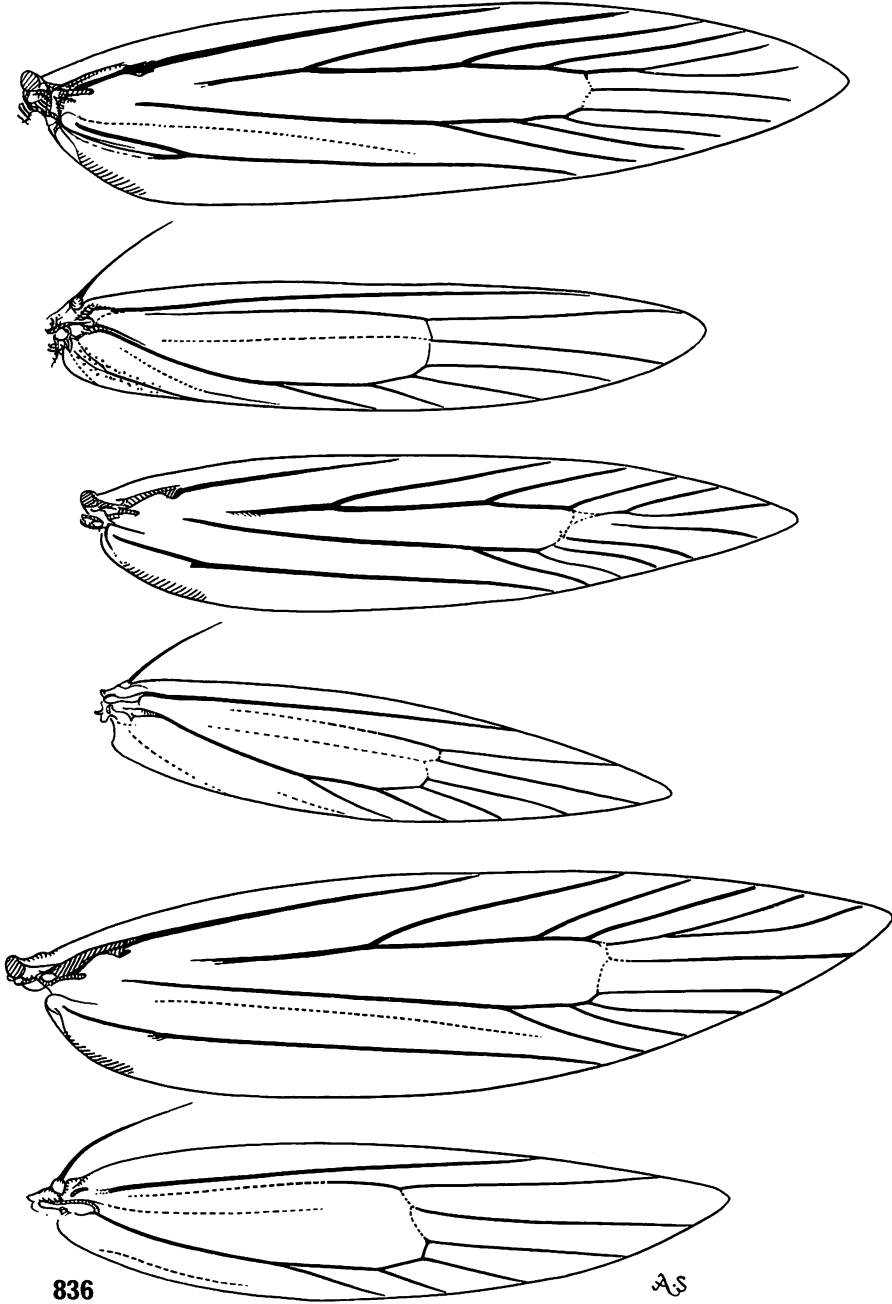


Figure 836—*Hyposmocoma*, wing venations. Top, (*E.*) *fulvocervina* Walsingham, paratype (BM slide 5468); Kauai, 4,000 feet. Middle, (*H.*) *fuscopurpurea* Walsingham, paratype (BM slide 8450); Haleakala, 5,000 feet, Maui. Bottom, (*H.*) *geminella* Walsingham, paratype (BM slide 8454); Halemanu, 4,000 feet, Kauai.

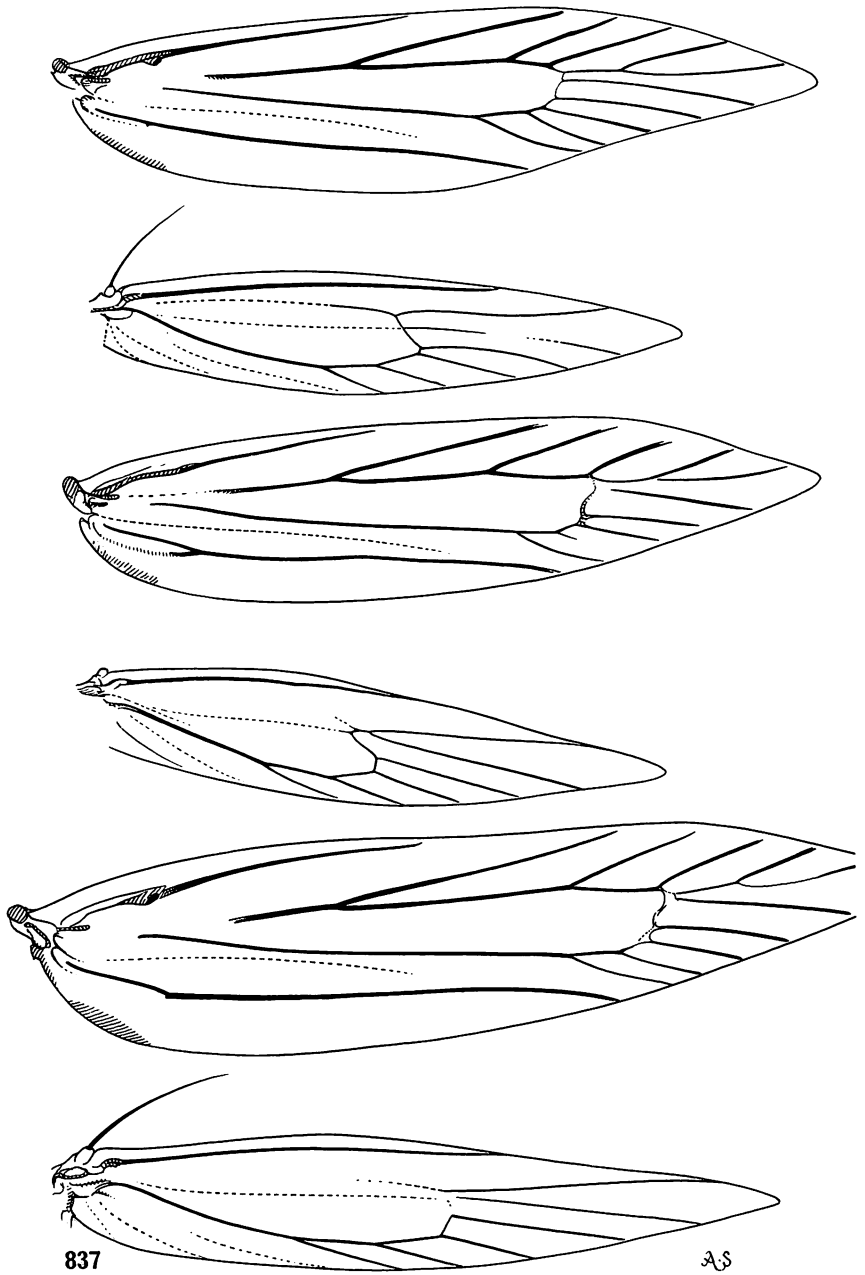


Figure 837—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *haleakalae* (Butler), determined by Walsingham (BM slide 6467); Haleakala, 5,000 feet, Maui. Middle, *illuminata* Walsingham, paratype male (BM slide 7886); Haleakala, 5,000 feet, Maui. Note the weak vein 3 in the forewing. Bottom, *indicella* Walsingham, paratype (BM slide 8459); Haleakala, 5,000 feet, Maui.

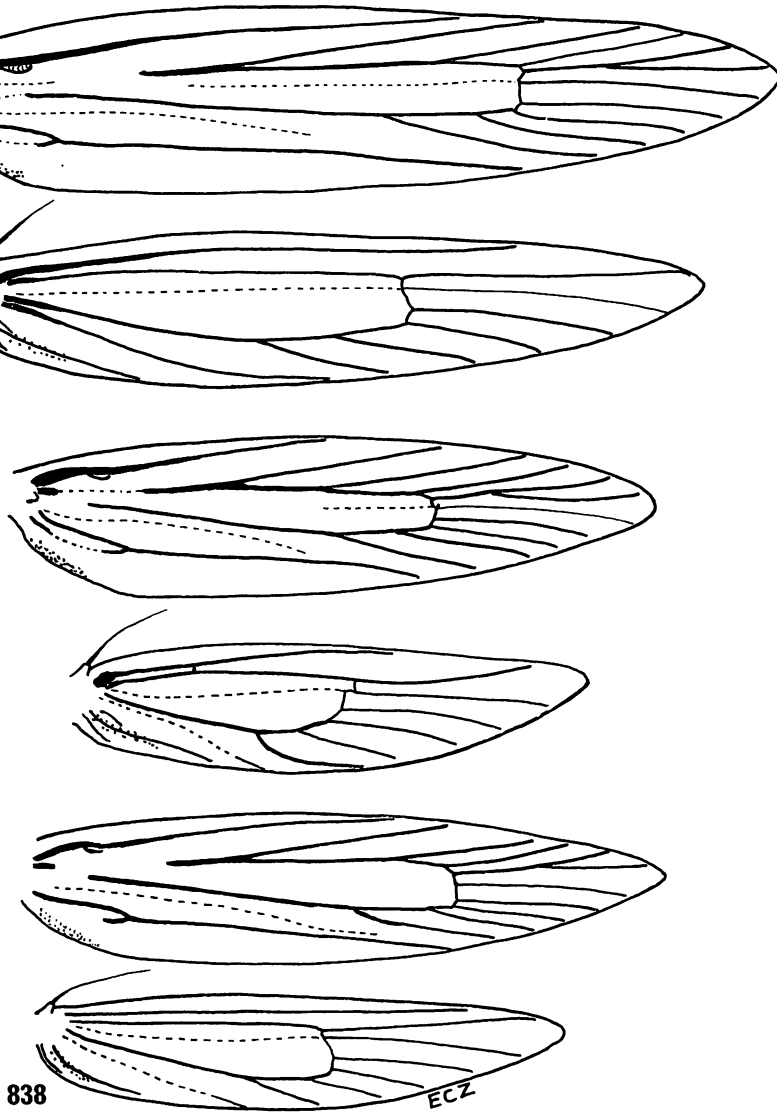


Figure 838—Wing venations of *Hyposmocoma* (*Euperissus*). Top, *insinuatix* Meyrick; Kainalu, Molokai (BM slide 16338). Middle, *latiftua* Meyrick; Puu Kalena, Oahu (slide Z-70-15). Bottom, *malacopa* Meyrick; Koolau Mts., Oahu (BM slide 16334).



Figure 839—*Hyposmocoma* (*Hyposmocoma*), wing venations. Top, *iodes* Meyrick, paratype (BM slide 8465); Molokai, over 3,000 feet. Middle, *lacertella* Walsingham, paratype (BM slide 8460); Haleakala, 5,000 feet, Maui. Bottom, *lactea* Walsingham, paratype (BM slide 8487); Kauai, 3,000 to 4,000 feet. Note the variable developments of the subcostal brushes on the hindwings.



Figure 840—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *lebetella* Walsingham, paratype (BM slide 8047); Haleakala, 5,000 feet, Maui. Middle, *leporella* Walsingham, allotype (BM slide 8546); Lihue, 4,000 feet, Kauai. Bottom, *lineata* Walsingham, paratype (BM slide 8461); Haleakala, 5,000 feet, Maui.



Figure 841—*Hyposmocoma* (*Hyposmocoma*), wing venations. Top, *liturata* Walsingham, paratype (BM slide 5475); Kona, 4,000 feet, Hawaii. Middle, *lixiviella* Walsingham, paratype (BM slide 5517); Kauai, 3,000 to 4,000 feet. Bottom, new species 19, formerly confused as a paratype of *lixiviella* (BM slide 5473); Kauai, 3,000 to 4,000 feet. Note the differences in the wing shapes and venation.





Figure 842—Wing venations of *Hyposmocoma*. Top, new species 20, erroneously included as a paratype of (*E.*) *longitudinalis* Walsingham (BM slide 8490); gulch leading into Opaepala, Halemano, about 2,000 feet, Oahu. Middle, (*H.*) *ludificata* Walsingham, paratype (BM slide 8500); Haleakala, 5,000 feet, Maui. Bottom, (*H.*) *lupella* Walsingham, paratype (BM slide 5466); Kauai, 4,000 feet.

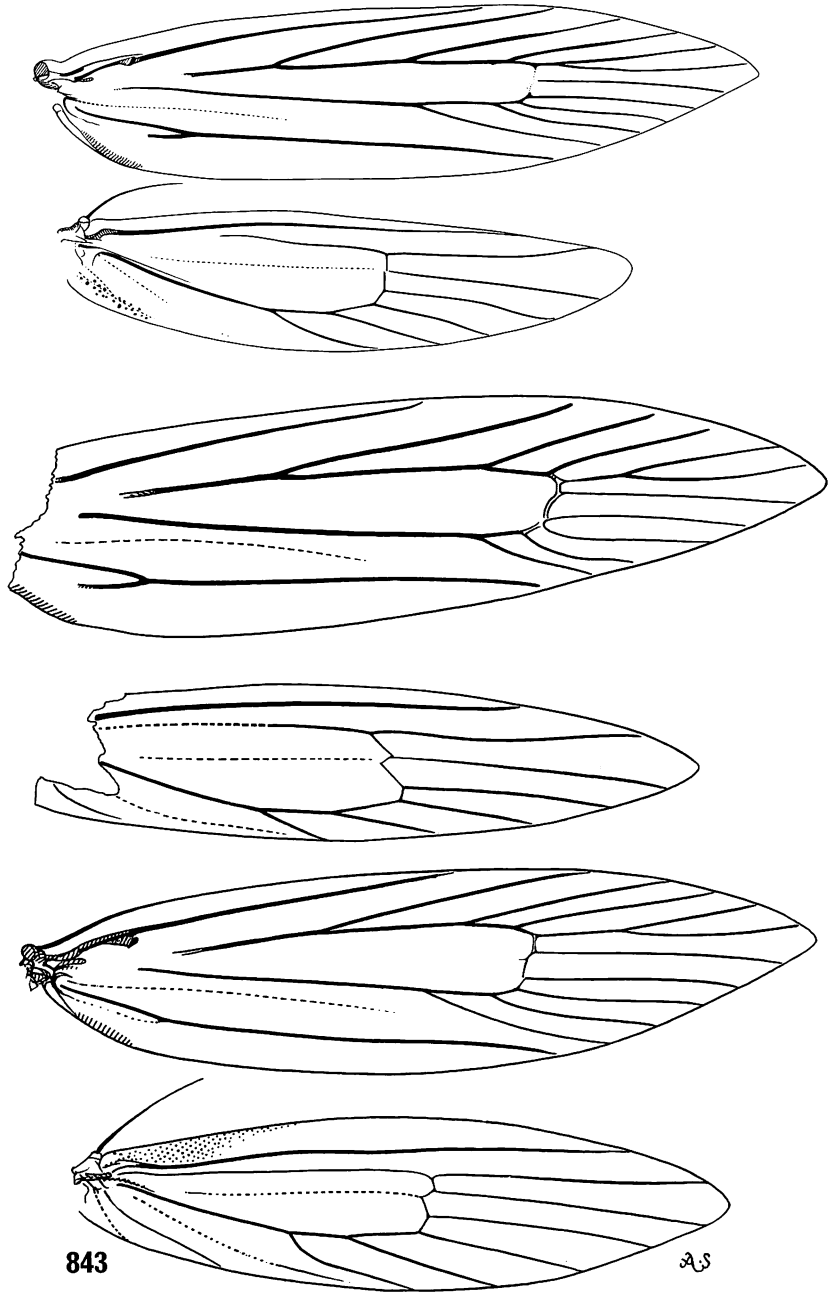
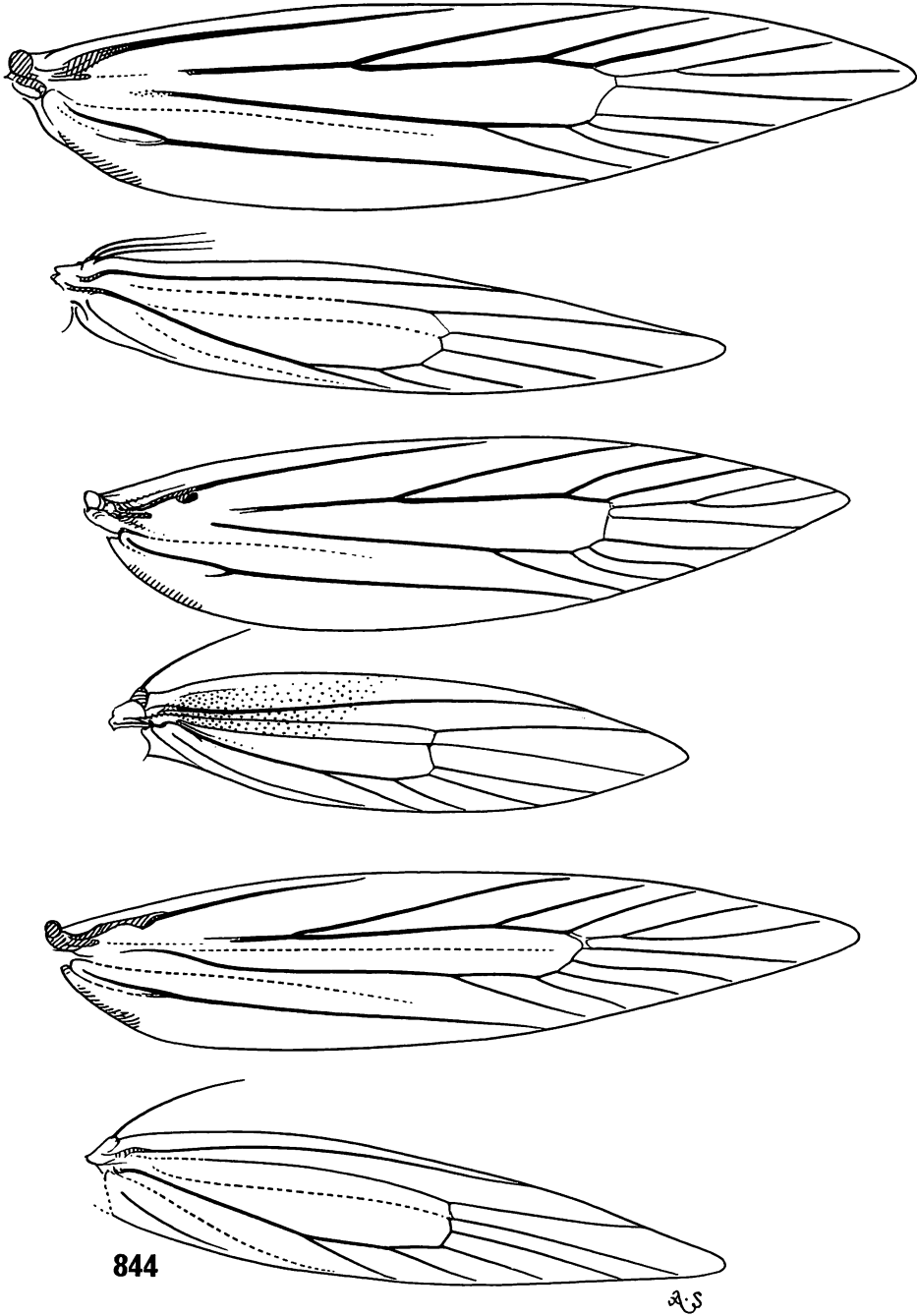


Figure 843—*Hyposmocoma*, wing venations. Top, (*E.*) *maestella* Walsingham, paratype (BM slide 8522); Kaholuamano, 4,000 feet, Kauai. Middle (*H.*) *malornata* Walsingham (BM slide 7504); Molokai, above 3,000 feet. This figure is misleading because the subcostal hairbrush has been broken away from the hind-wing; see figure 845 and the discussion in the text. Bottom, (*H.*) *marginotata* Walsingham, paratype (BM slide 5453); Kaholuamano, Kauai.



844

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Figure 844—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *mediella* Walsingham, paratype (BM slide 7934); Waianae Mts., Oahu. Middle, *mediospurcata* Walsingham, paratype (BM slide 5474); Hilo, 2,000 feet, Hawaii. Bottom, *metallica* Walsingham, paratype (BM slide 7982); Hualalai, 5,000 feet, Hawaii.

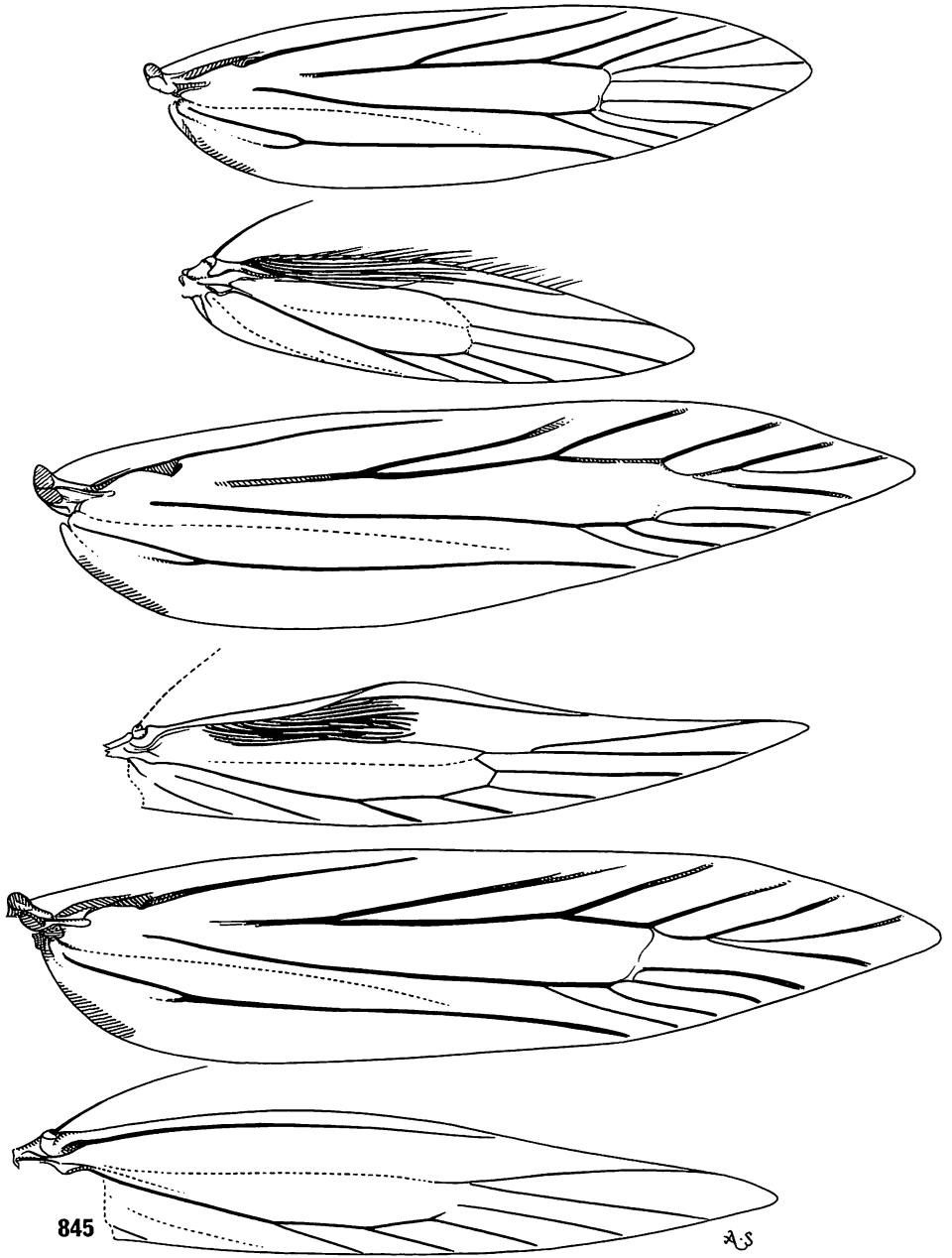


Figure 845—*Hyposmocoma* (*Hyposmocoma*), wing venations. Top, a specimen of *malornata* Walsingham, erroneously included as a paratype of *metrosiderella* Walsingham (BM slide 7508); Waianae Mts., Oahu. Middle, *mimema* Walsingham, paratype (BM slide 8466); Haleakala, 4,000 feet, Maui. Bottom, *mimica* Walsingham, paratype (BM slide 8467); Molokai, over 3,000 feet.



Figure 846—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *modesta* Walsingham, paratype (BM slide 8508); Kauai, 3,000 to 4,000 feet. Middle, *montivolans* (Butler), paratype (BM slide 8563); mountains near Honolulu. Bottom, *nebulifera* Walsingham (BM slide 5448); determined by Walsingham; northwest Koolau Mts., Oahu.



Figure 847—*Hyposmocoma* (*Hyposmocoma*), wing venations. Top, *nephelodes* Walsingham, paratype (BM slide 7346); Olinda, 4,000 feet, Maui. Middle, *nigralbida* Walsingham, paratype (BM slide 7871); Kauai, 3,000 to 4,000 feet. Bottom, *nigrescens* Walsingham, paratype (BM slide 8512); Kilauea, Hawaii; this specimen was labeled by Walsingham as a variety—it may not be true *nigrescens*.



Figure 848—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *nigrodentata* Walsingham, holotype (BM slide 7965); Kauai, 3,000 to 4,000 feet. Middle, *nividorSELLa* Walsingham, paratype (BM slide 5449); Kauai, 3,000 to 4,000 feet; note the wide space between veins 6 and 7 in the hindwing. Bottom, *notabilis* Walsingham, allotype (BM slide 7903); Molokai, above 3,000 feet.

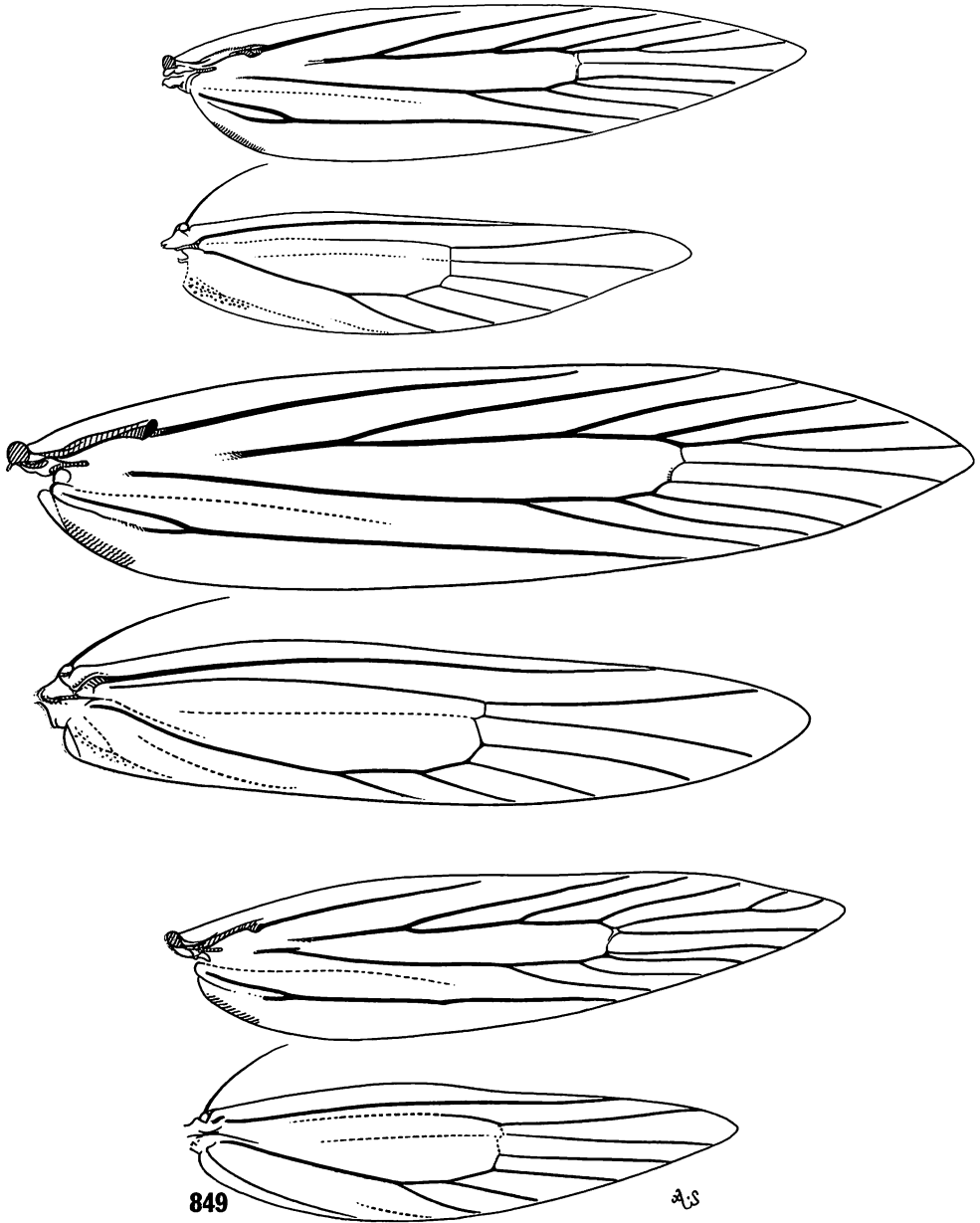


Figure 849—*Hyposmocoma*, wing venations. Top, (*E.* *obscura* Walsingham, paratype (BM slide 8504); Haleakala, 5,000 feet, Maui. Middle, (*E.* *ocellata* Walsingham, paratype (BM slide 8607); Kaholuamano, 4,000 feet, Kauai. Bottom, (*H.* *ochreocervina* Walsingham, paratype (BM slide 8468); Waianae Mts., about 3,000 feet, Oahu. Note the long stem of veins 7 and 8 in the forewing of *ochreocervina*, and compare the places of origin of vein 6 in the three species.



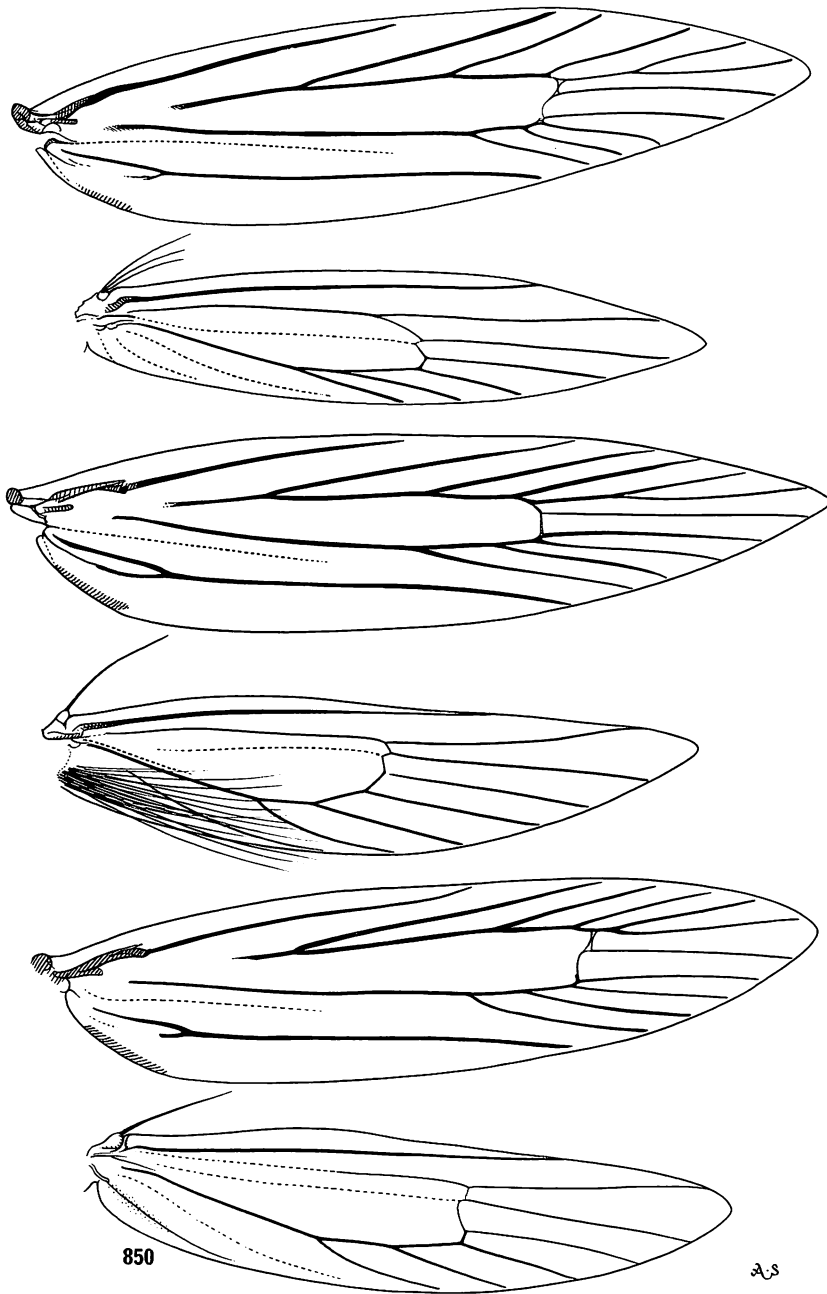


Figure 850—Wing venations of *Hyposmocoma*. Top, (*H.*) *ochreociliata* Walsingham, allotype (BM slide 8549); Kilauea, Hawaii. Middle, (*E.*) *ochreovittella* Walsingham, paratype (BM slide 8517); Kona, 4,000 feet, Hawaii. This drawing is somewhat misleading—there is long hair along the base of veins 1a and 1b on the hindwing, a heavy brush arises from beneath the inner corner of the vannus, and vein 1b is not shown on the drawing. Bottom, (*E.*) *oculifera* Walsingham, paratype (BM slide 7870); Kauai, 3,000 to 4,000 feet.

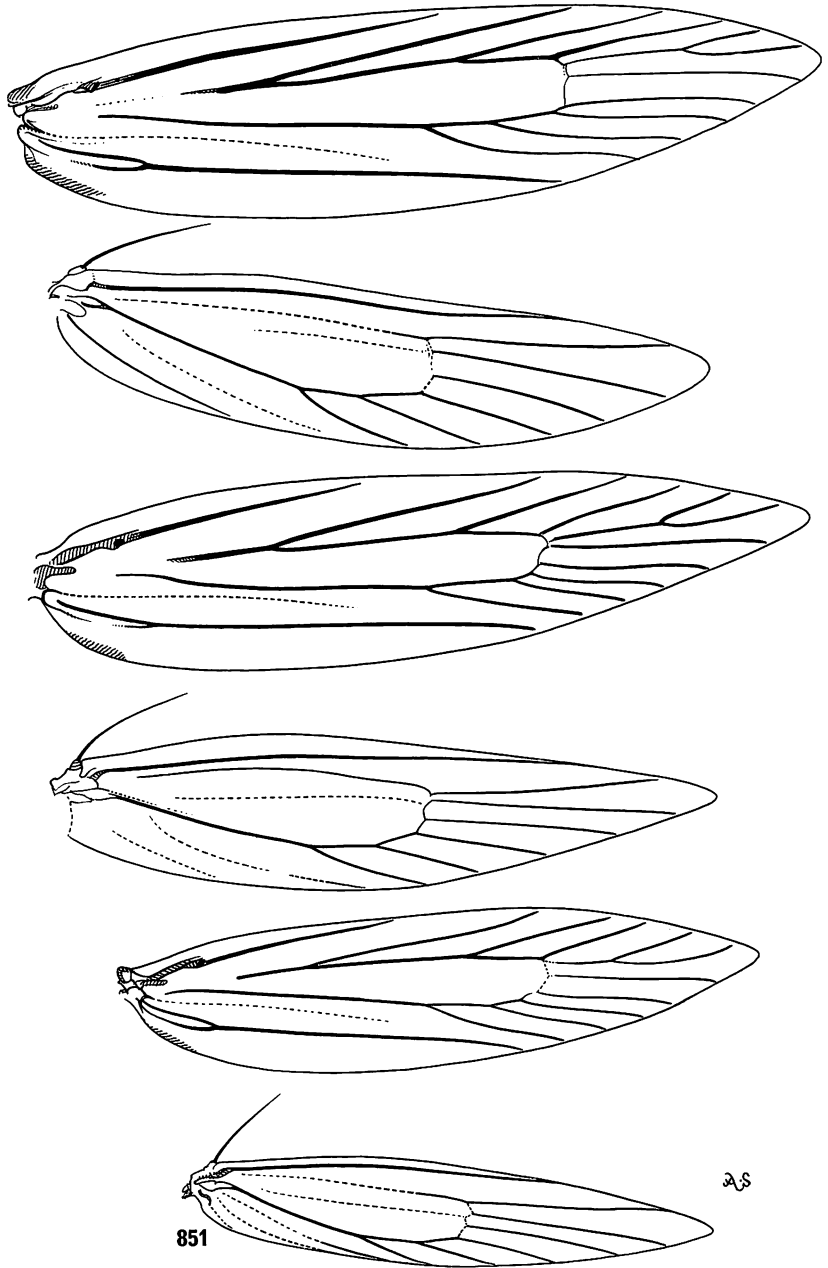
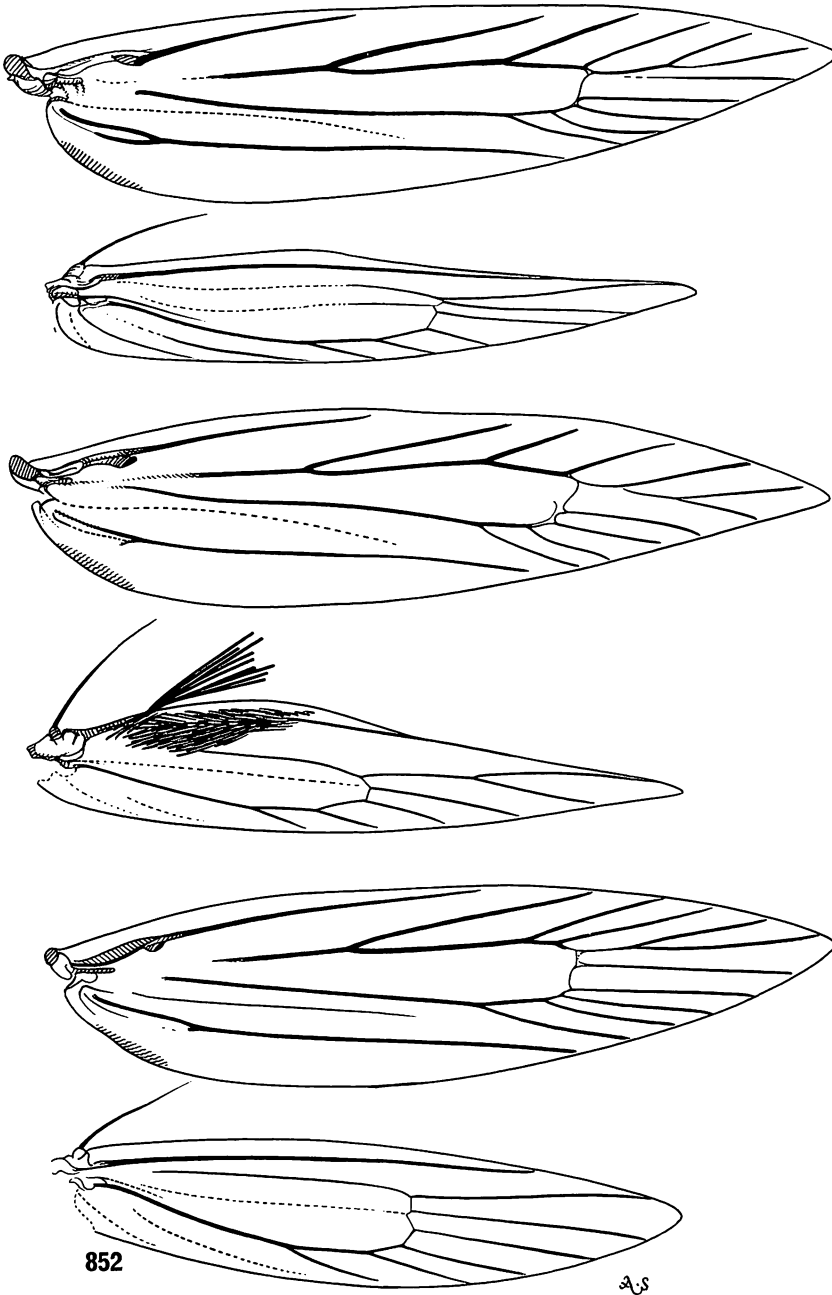


Figure 851—*Hyposmocoma*, wing venations. Top, (*E.*) *ossea* Walsingham, paratype (BM slide 8488). Middle, new species 24, previously confused as a paratype of (*H.*) *paradoxa* Walsingham (see text); Molokai, over 3,000 feet (BM slide 7502). Bottom, (*H.*) *persimilis* Walsingham, paratype (BM slide 8489); Kona, 4,000 feet, Hawaii.



852

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Figure 852—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *petrosicia* Meyrick, paratype (BM slide 5478); Koolau Mts., Oahu. Middle, *phalacra* Walsingham, paratype (BM slide 8577); Kauai, 3,000 to 4,000 feet. Bottom, possibly a subspecies of *picticornis* Walsingham (see the text for discussion) (BM slide 7330); Olinda, 4,000 feet, Maui. Note the places of origin of vein 6 in the forewings of these species, and also note the differences in the shape and venation of the hindwing.

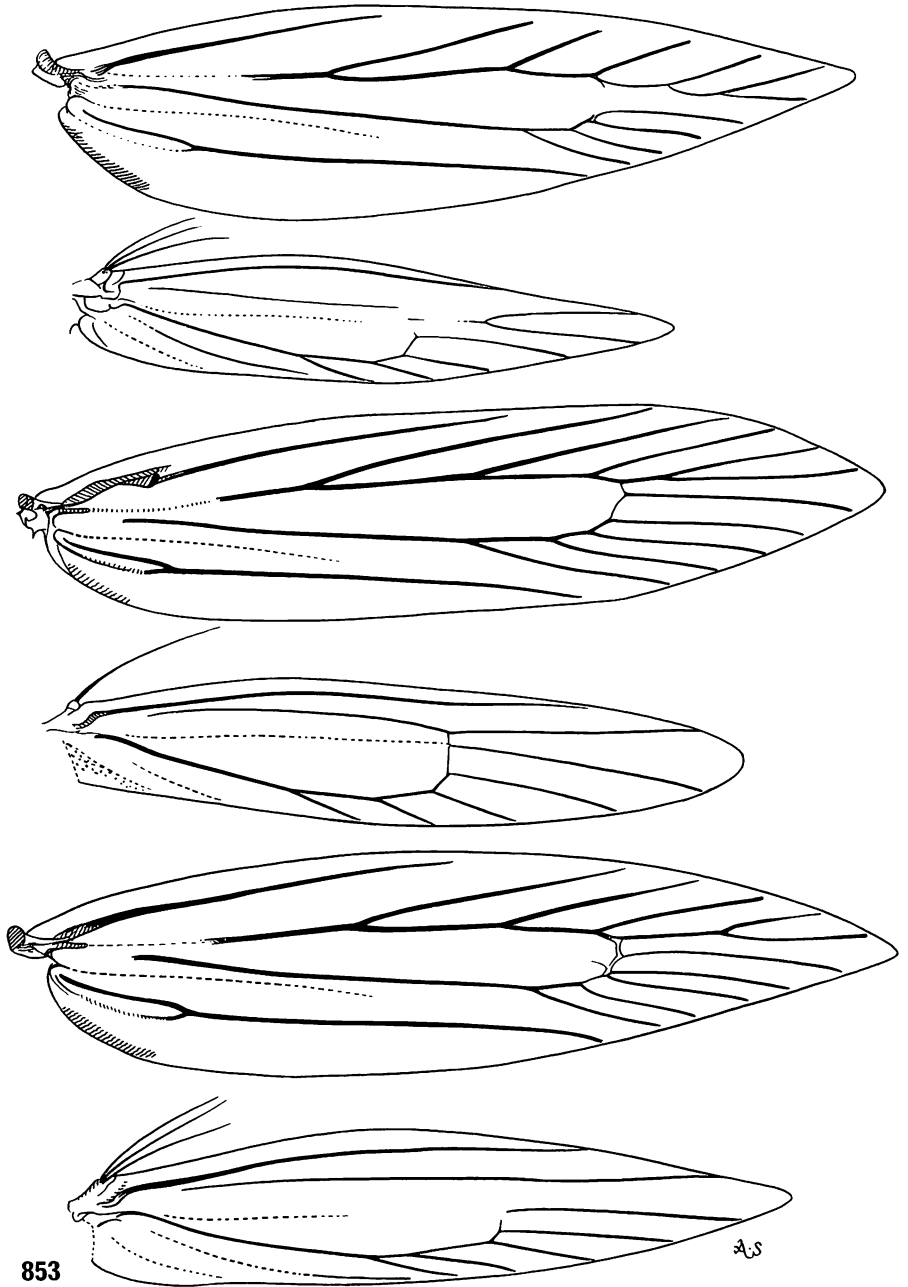


Figure 853—*Hyposmocoma*, wing venations. Top, (*H.*) *pseudolita* Walsingham, paratype (BM slide 8484); Kona, 2,000 feet, Hawaii. Middle, (*E.*) *pucciniella* Walsingham, paratype (BM slide 8575); Kilauea, Hawaii. Bottom, (*H.*) *quinquemaculata* Walsingham, allotype (BM slide 8006); Kona, 4,000 feet, Hawaii. Note especially vein 6 and the forking of 7 and 8 in the forewings of these species.

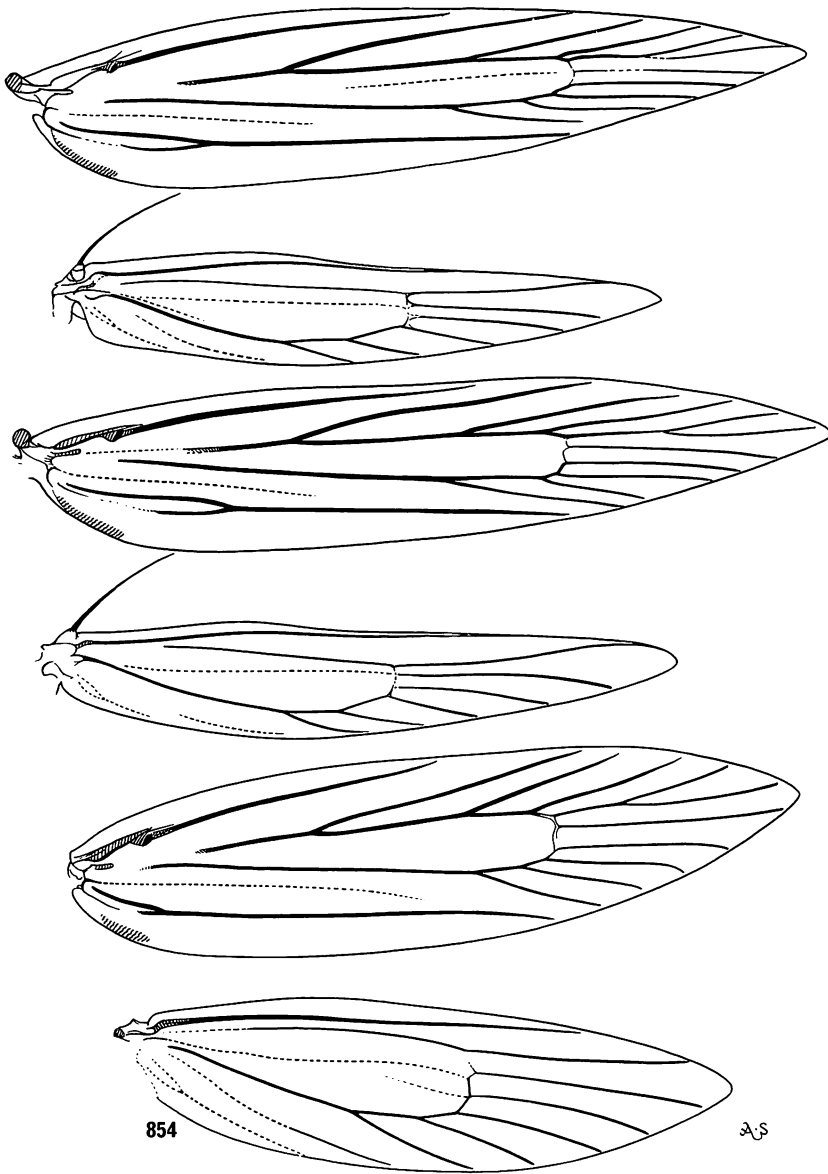


Figure 854—Wing venations of *Hyposmocoma*. Top, (*E.*) *radiatella* Walsingham, paratype (BM slide 8602); Hilo, 2,000 feet, Hawaii. Middle, (*E.*) *roseofulva* Walsingham, paratype (BM slide 8506); Kauai, 3,000 to 4,000 feet. Bottom, (*H.*) *rubescens* Walsingham, paratype (BM slide 6459); Kaholuamano, 4,000 feet, Kauai. Note particularly the differently shaped hindwings, and compare the distances between the bases of veins 3 and 4 and 4 and 7.

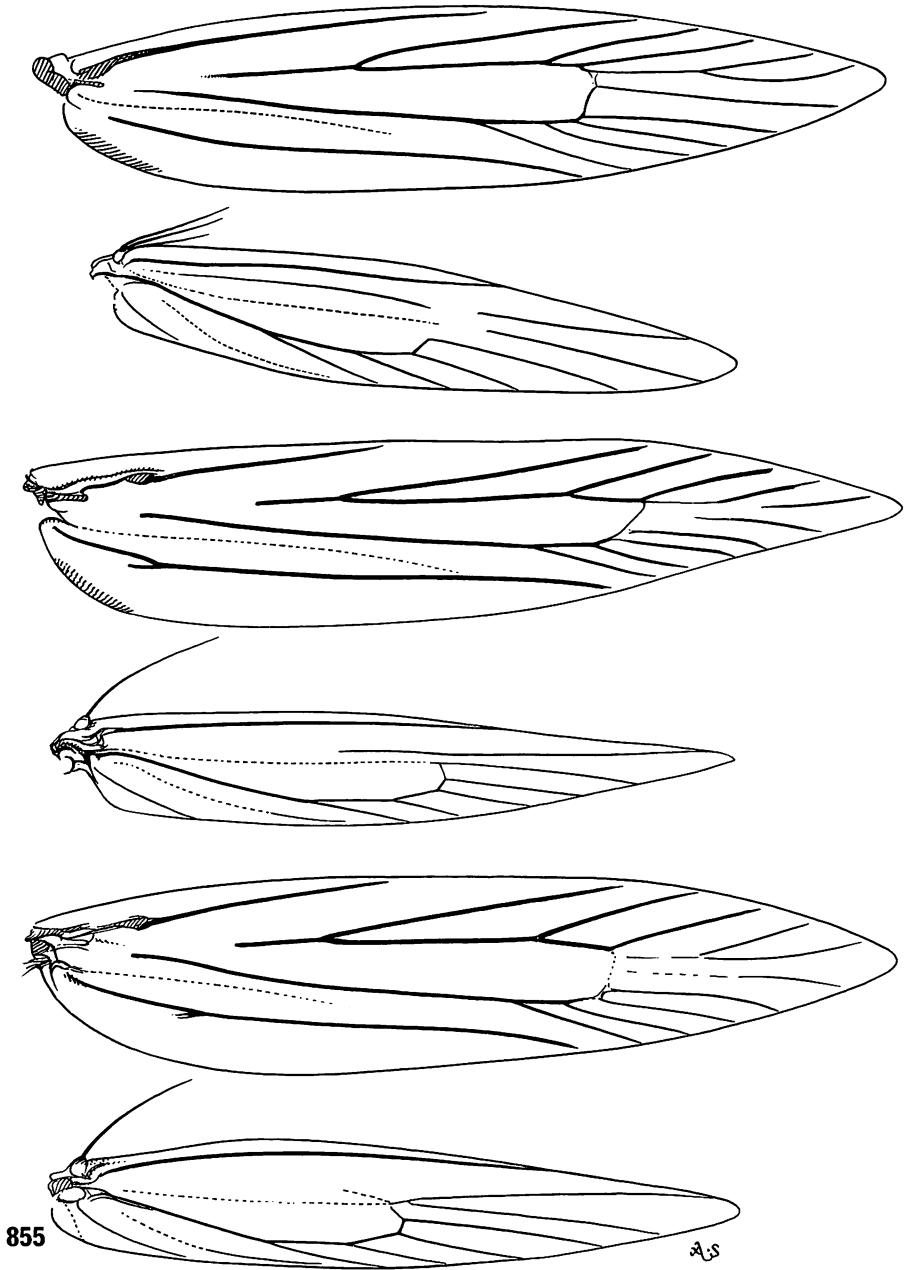


Figure 855—*Hyposmocoma* (*Hyposmocoma*), wing venations. Top, *sabulella* Walsingham, paratype (BM slide 7935); Halemanu, 4,000 feet, Kauai (part of the membrane of the end of the cell in the hindwing has been torn away). Middle, new species 26, formerly confused as a paratype of *saccophora* Walsingham (BM slide 5472); near head of Kawaiiloa Gulch, Oahu. Bottom, *saliaris* Walsingham, paratype (BM slide 5451); Kona, 4,000 feet, Hawaii. Compare the position of the origin of vein 2 in the hindwings of these and other species.

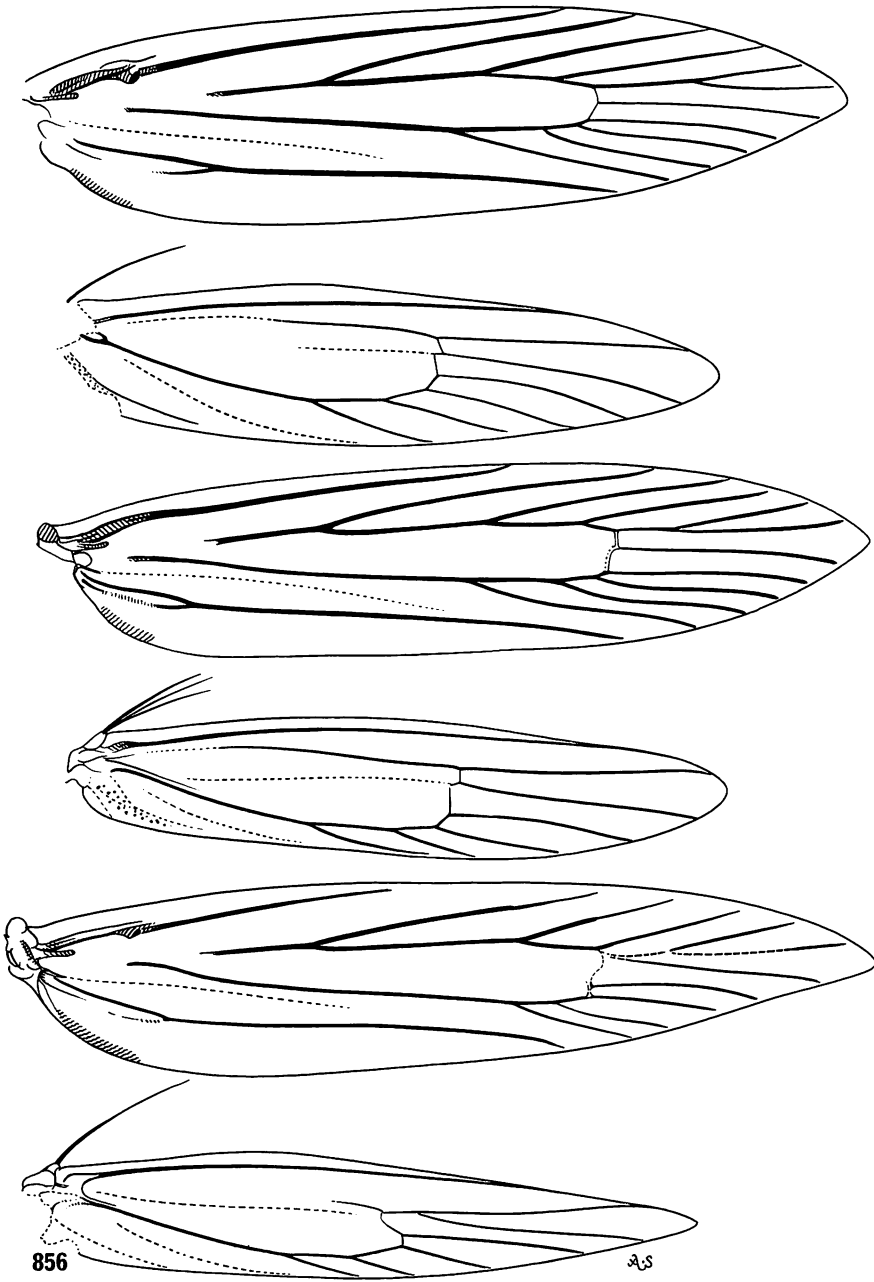


Figure 856—Wing venations of *Hyposmocoma*. Top, (*E.*) *scandens* Walsingham, paratype (BM slide 8519); Kauai, 3,000 to 4,000 feet. Middle, (*E.*) *scepticella* Walsingham, allotype (BM slide 7940); Olinda, 4,000 feet, Maui. Bottom, (*H.*) *schismatica* Walsingham, paratype (BM slide 8507); Kaholuamano, 4,000 feet, Kauai.



Figure 857—*Hyposmocoma*, wing venations. Top, (*H.*) *scolopax* Walsingham, paratype (BM slide 8578); Kauai, 3,000 to 4,000 feet. Middle, (*E.*) *semifuscata* Walsingham, paratype (BM slide 8571); Kona, 3,000 feet, Hawaii. Bottom, (*H.*) *similis* Walsingham, paratype (BM slide 8536). Compare the points of termination of vein 12 in the forewings.



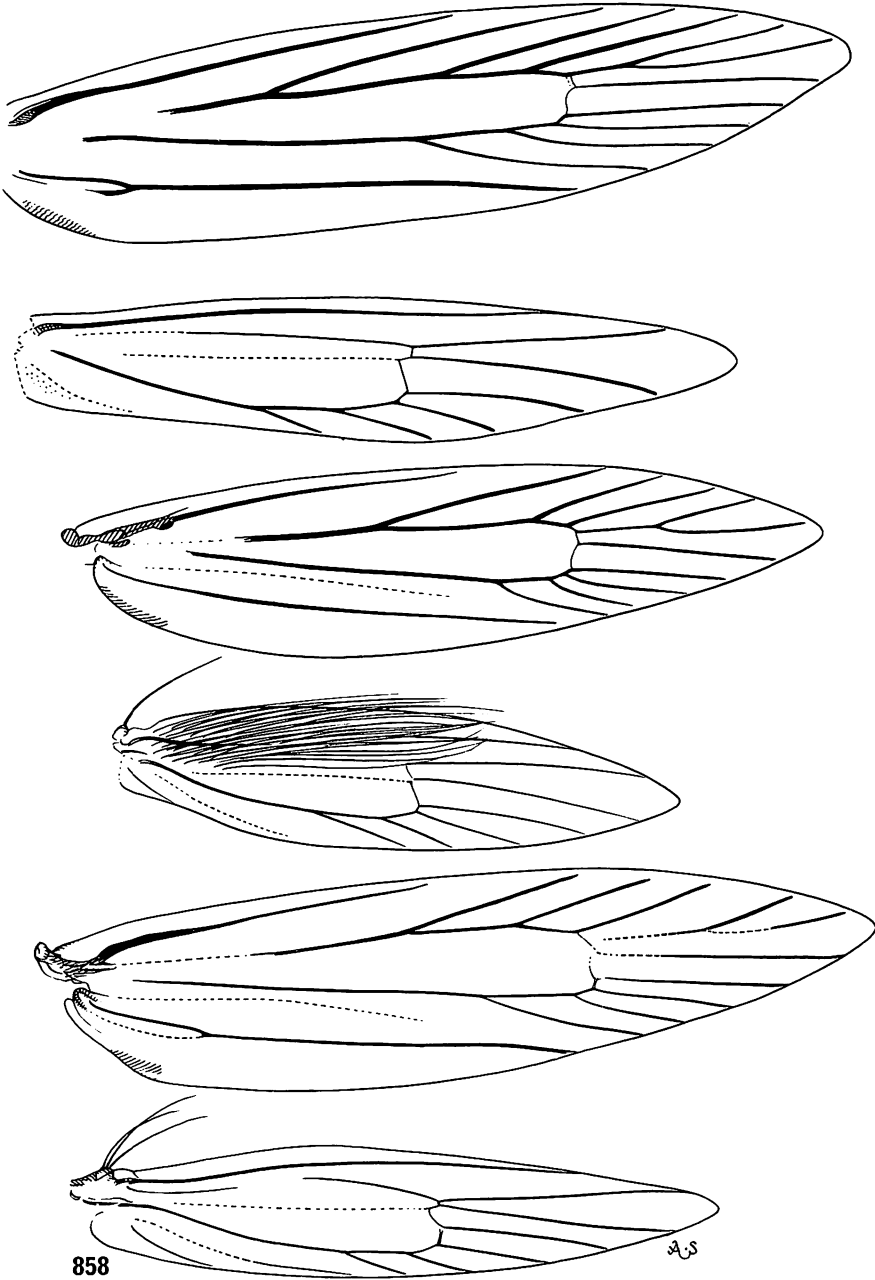


Figure 858—Wing venations of *Hyposmocoma*. Top, (*E. stigmatella* Walsingham, paratype female (BM slide 8535); Molokai, about 4,000 to 5,000 feet. Middle, (*H. straminella* Walsingham, paratype (BM slide 7981); Kona, 4,000 feet, Hawaii. Bottom, (*H. subcitrella* Walsingham, holotype (BM slide 4492); Kaho-luamano, 4,000 feet, Kauai.

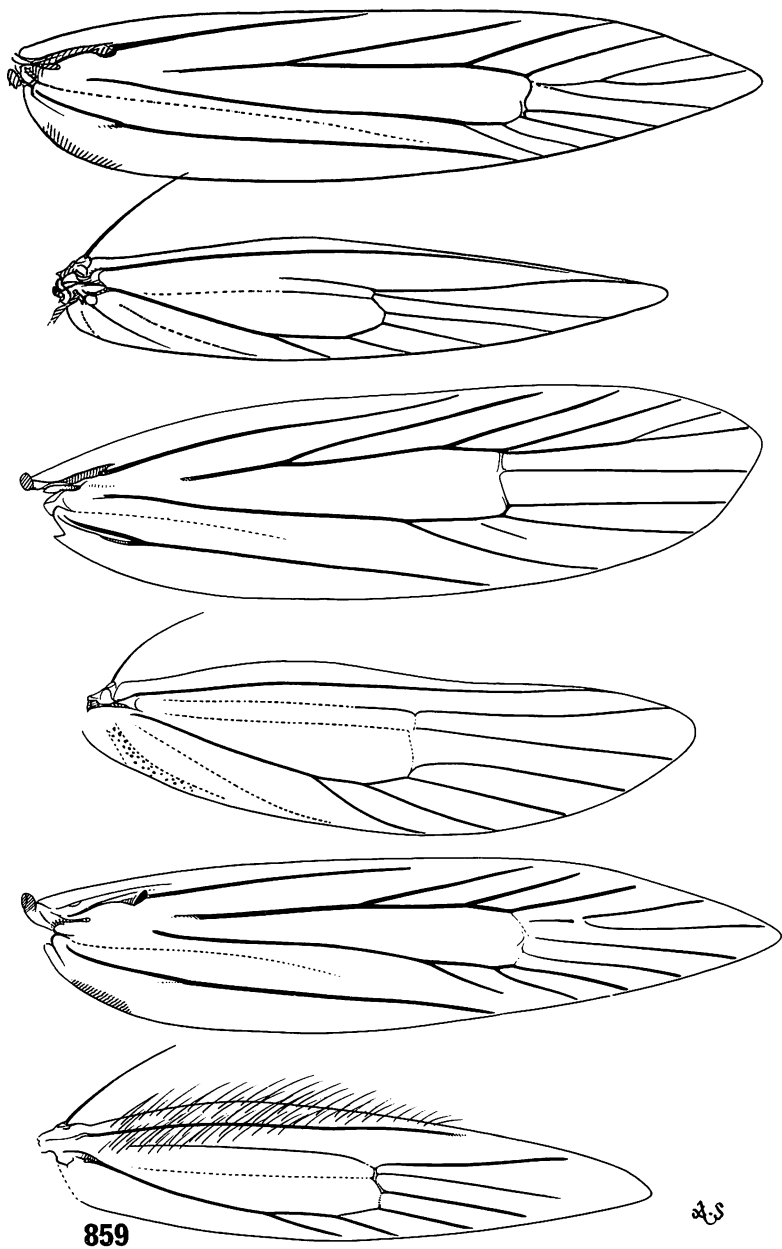


Figure 859—*Hyposmocoma*, wing venations. Top, (*H.*) *subflavidella* Walsingham, paratype (BM slide 5450); Haleakala, 5,000 feet, Maui. Middle, (*E.*) *subnitida* Walsingham, paratype (BM slide 8603); Kona, 4,000 feet, Hawaii. Bottom, (*H.*) *subscolopax* Walsingham, paratype (BM slide 8580); Kona, 4,000 feet, Hawaii.

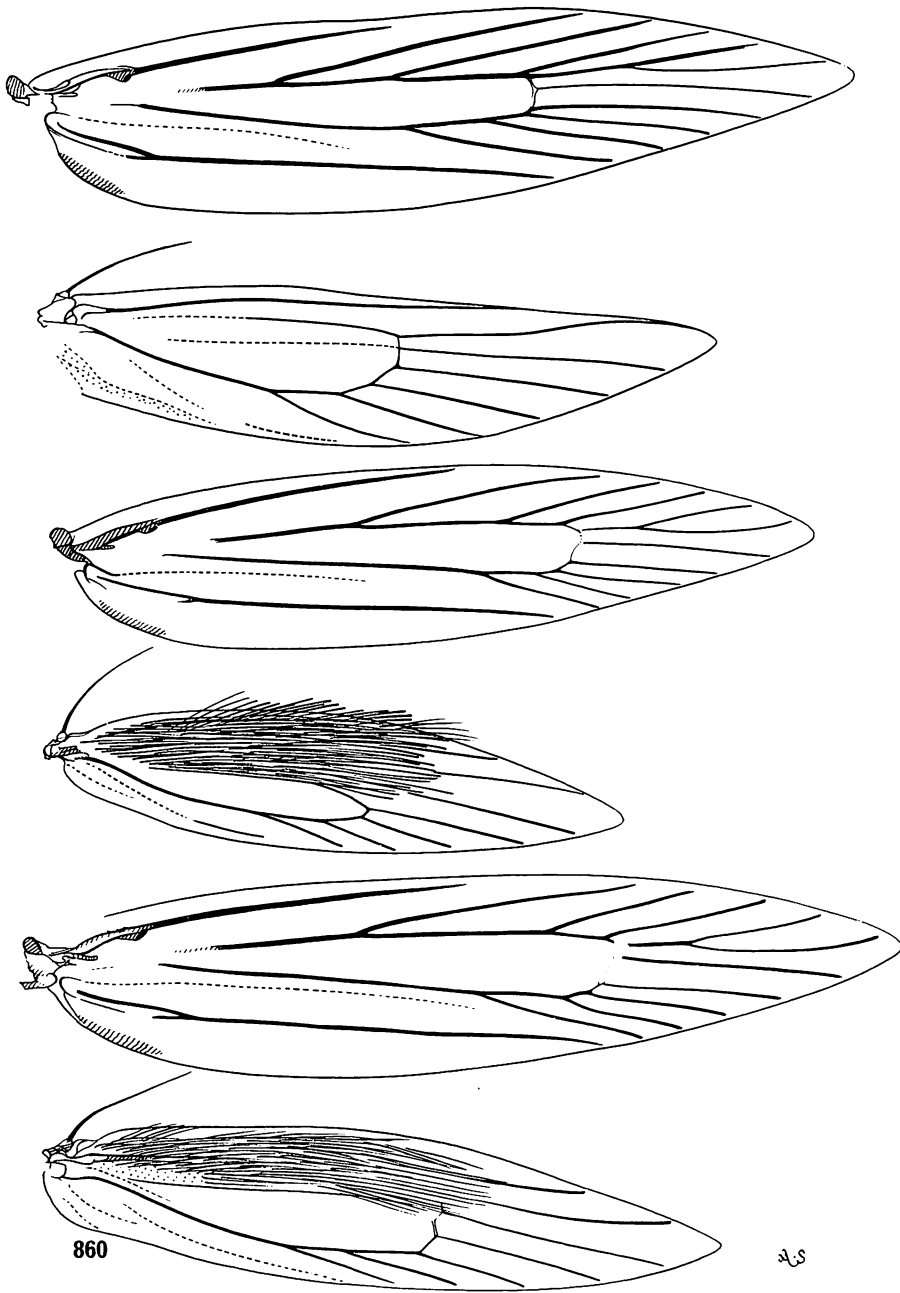


Figure 860—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *sudorella* Walsingham, paratype (BM slide 8518); Kaholuamano, 4,000 feet, Kauai. Middle, *suffusa* (Walsingham), paratype (BM slide 8608); Kilauea, Hawaii. Bottom, *suffusella* (Walsingham), paratype (BM slide 7335); Kaholuamano, 4,000 feet, Kauai.

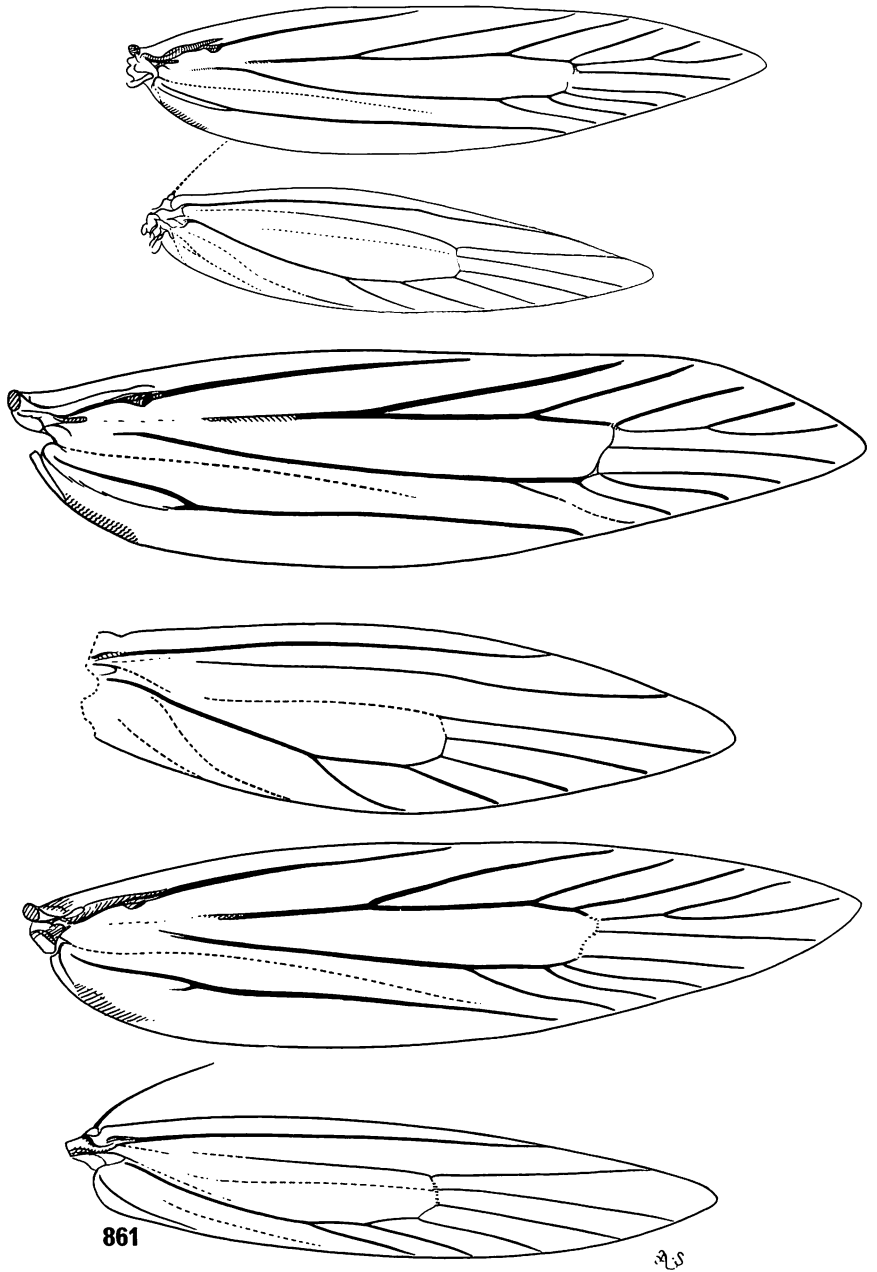


Figure 861—*Hyposmocoma* (*Hyposmocoma*), wing venations. Top, *syrrhaptus* Walsingham, paratype (BM slide 8561); Kauai, 3,000 to 4,000 feet. Middle, *tarsimaculata* Walsingham, paratype (BM slide 8560); Kauai, 4,000 feet. Bottom, *tenuipalpis* Walsingham, paratype (BM slide 8048); Molokai, 4,500 feet.

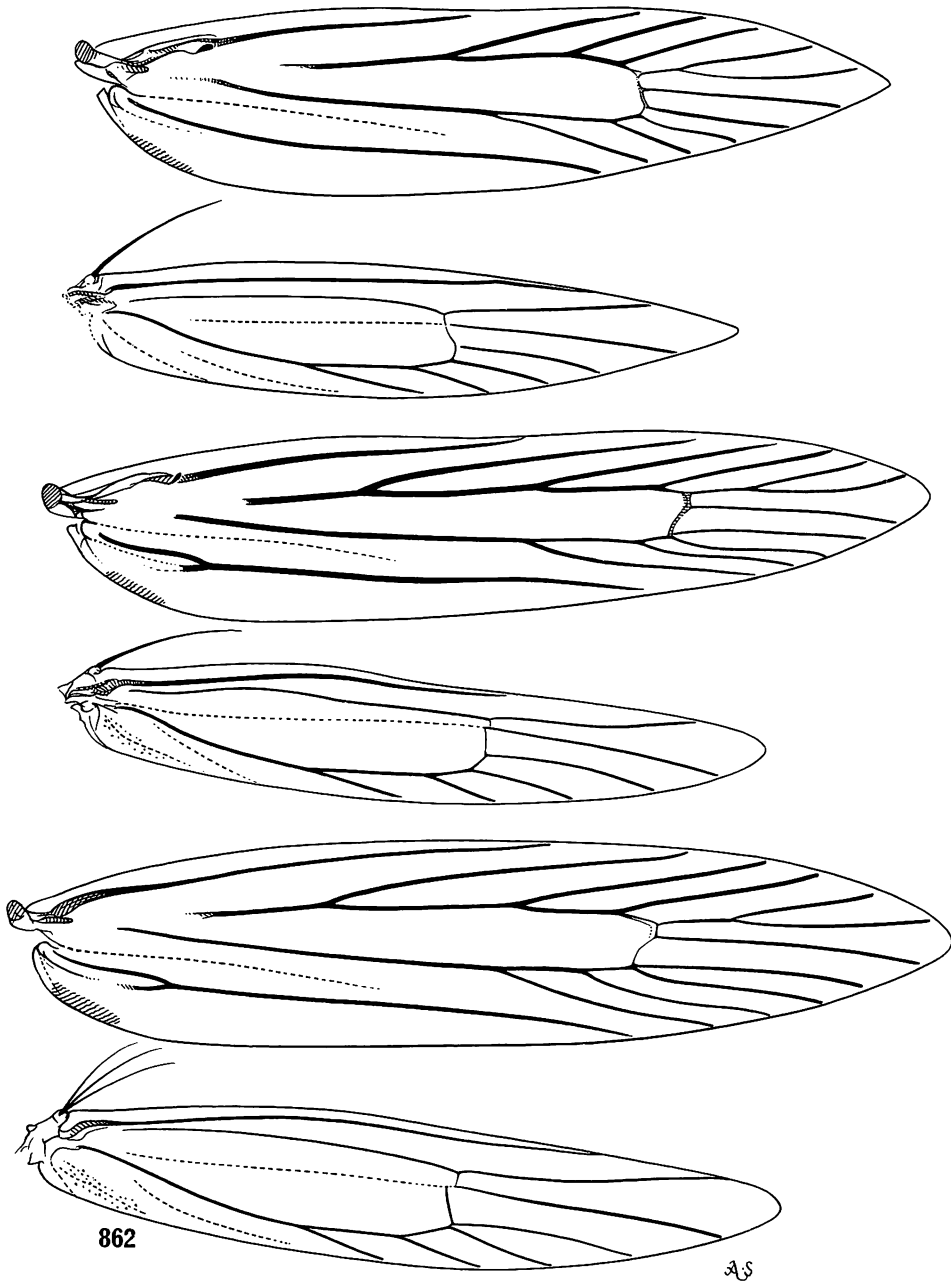


Figure 862—Wing venations of *Hyposmocoma* (*Hyposmocoma*). Top, *tetraonella* Walsingham, paratype (BM slide 8581); Kilauea, Hawaii. Middle, *tricincta* Walsingham, paratype (BM slide 6469); Kilauea, Hawaii. Bottom, *trilunella* Walsingham, paratype (BM slide 8089); Haleakala, 5,000 feet, Maui.

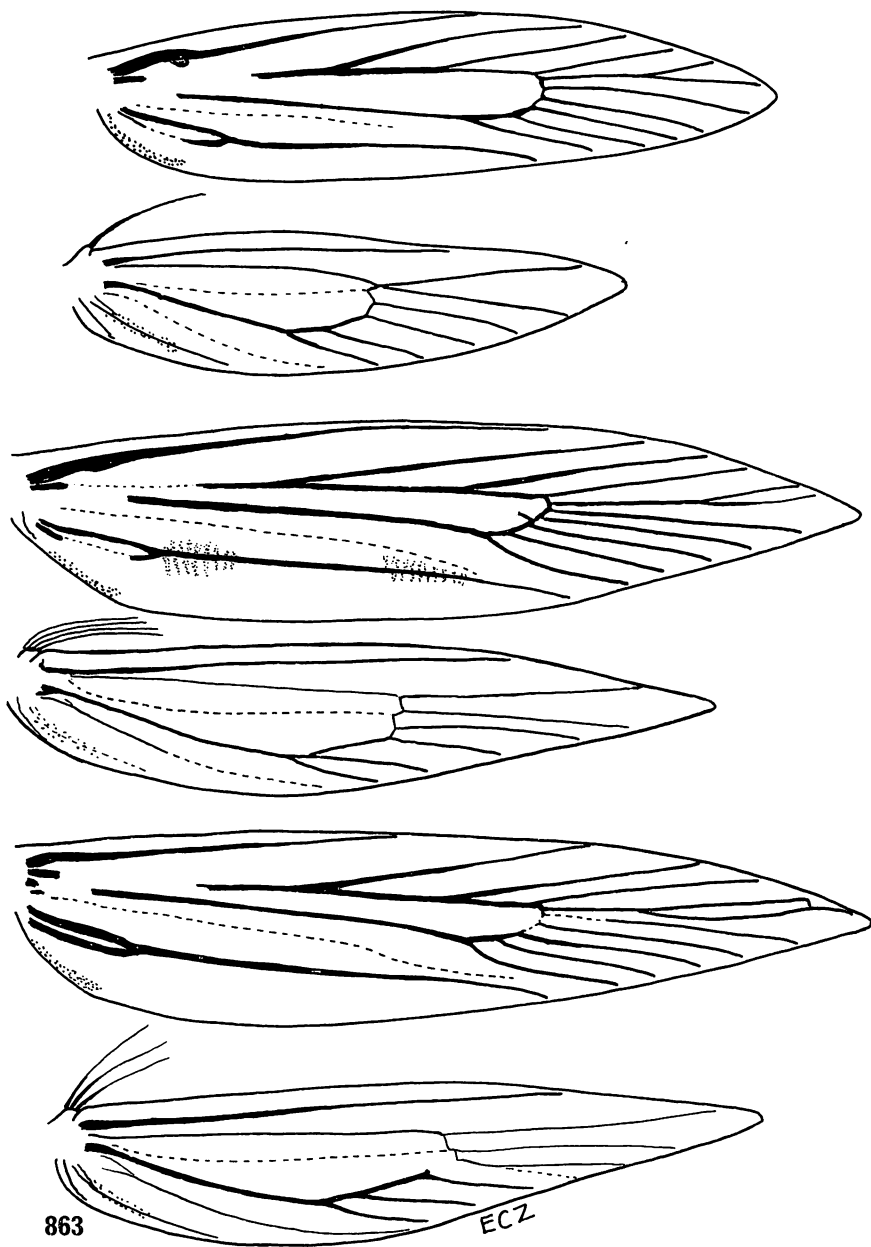


Figure 863—Wing venations of *Hyposmocoma* (*Euperissus*). Top, *thermoxylo* Meyrick; Honolulu (BM slide 16346). Middle, left wings drawn reversed, and with the sockets of the scales in the raised patches indicated, of *palmivora* Meyrick; Kumuwela, Kauai (BM slide 16343). Bottom, another specimen of *palmivora* showing individual variations; Kalalau, Kauai (BM slide 16339). Note that the female illustrated in the middle has an abnormal four setae in the frenulum.

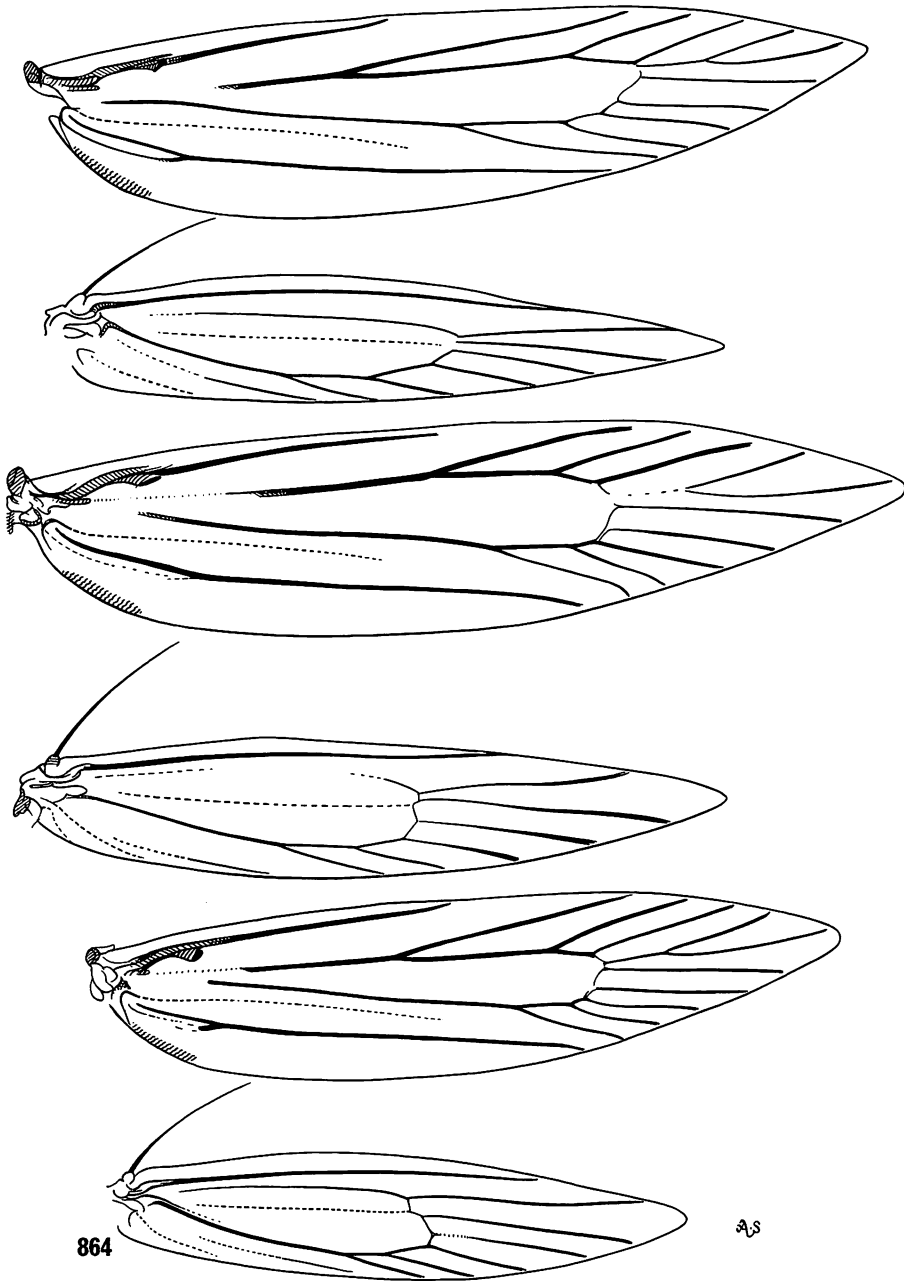


Figure 864—*Hyposmocoma* (*Hyposmocoma*), wing venations. Top, *trimaculata* Walsingham from a specimen determined by Dr. Swezey and not verified (BM slide 8605); Waianae Mts., Oahu. Middle, *turdella* Walsingham, paratype (BM slide 8601); Lanai, 2,000 feet. Bottom, *unistriata* Walsingham, paratype (BM slide 8511); Molokai, over 4,500 feet.

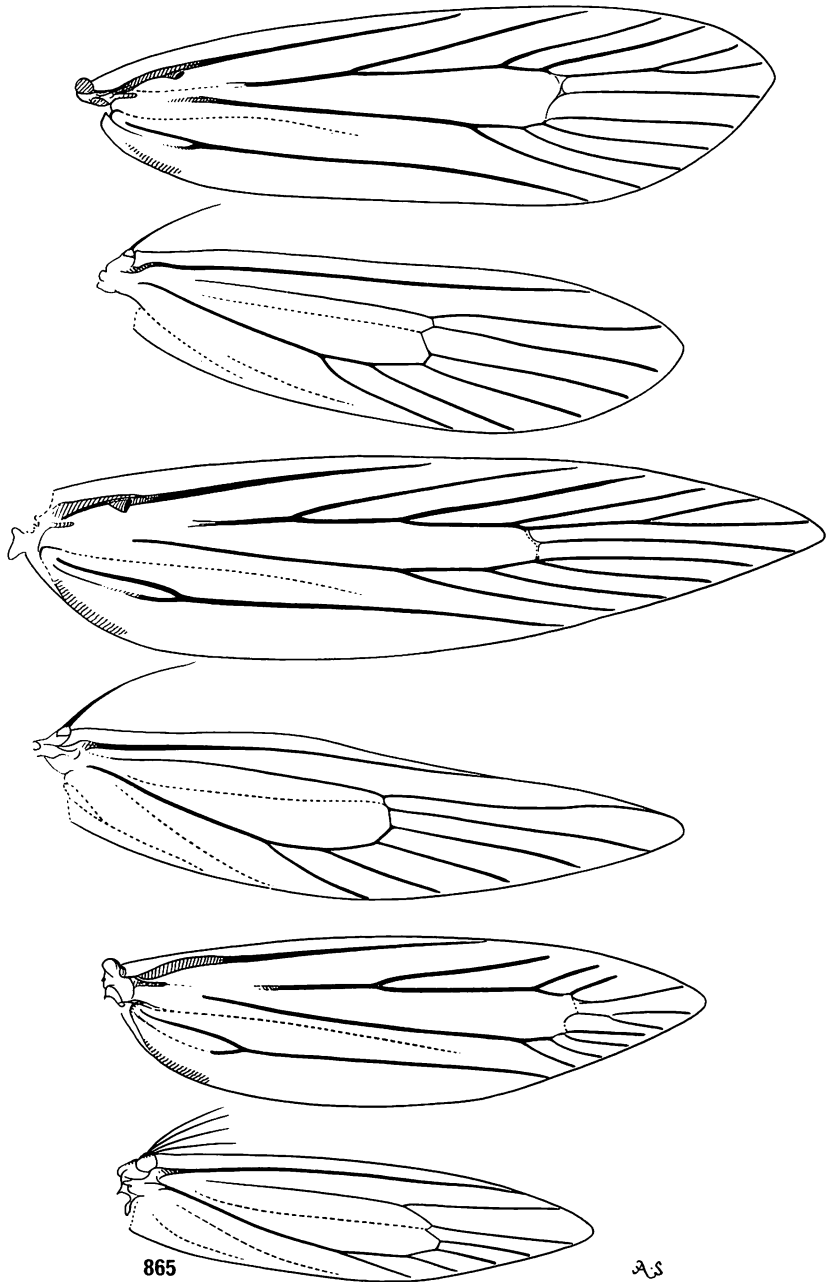


Figure 865—Wing venations of *Hyposmocoma*. Top, (*H.*) *vermiculata* Walsingham, paratype (BM slide 8513); Kaawaloa, Kona, 2,000 feet, Hawaii. Middle, (*E.*) *vicina* Walsingham, paratype (BM slide 8505); Waianae Mts., 1,700 feet, Oahu. Bottom, (*H.*) *vinicolor* Walsingham, paratype (BM slide 7059); Waianae Mts., 3,000 feet, Oahu. Note the differences in the shapes of the wings of these species. Note also that the specimen of *vinicolor* is abnormal, because veins 6 and 7 in the forewing arise from a common stalk. On the left wing of this specimen, and on the holotype, vein 7 runs normally out of 8 to costa.



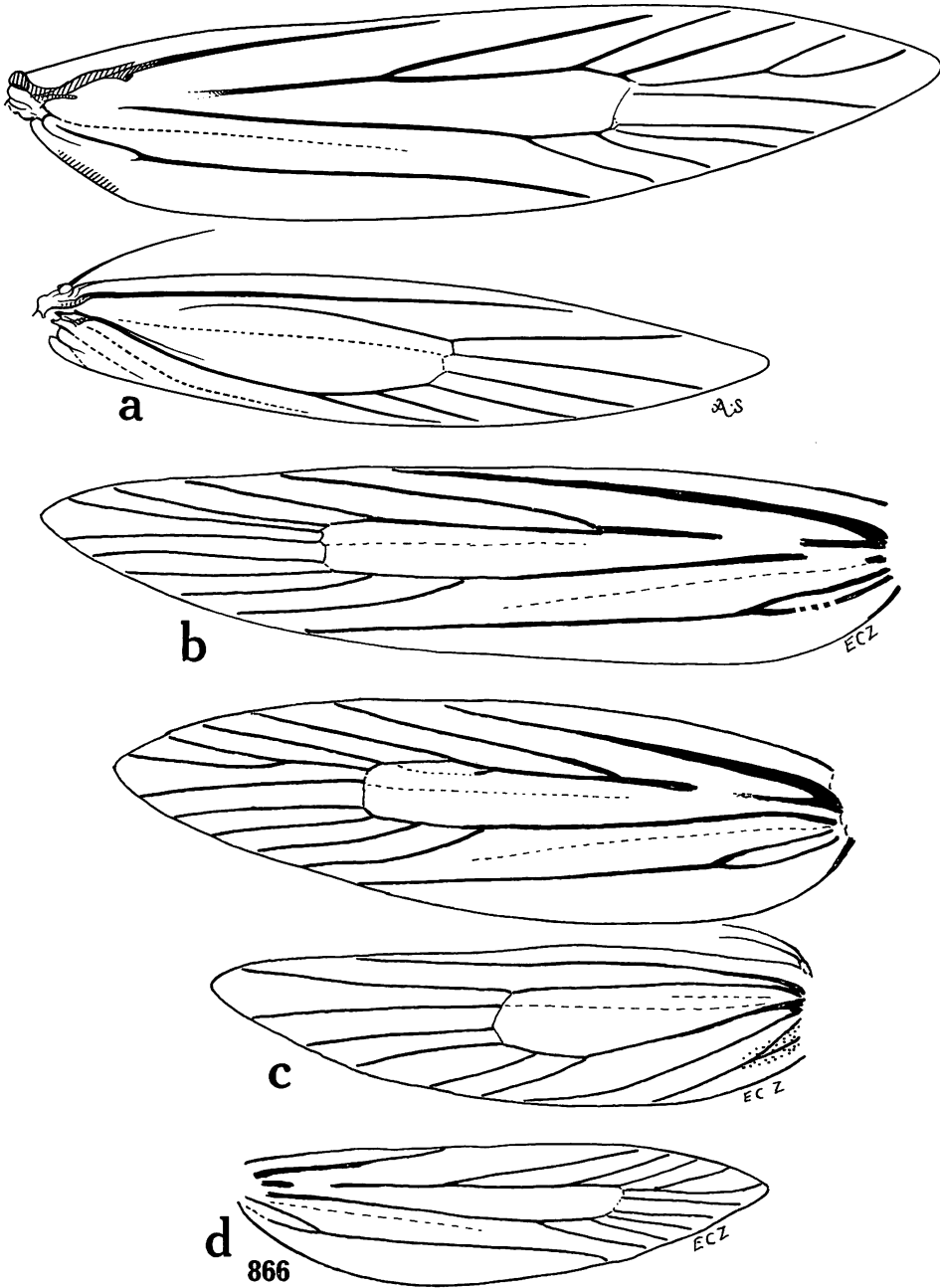


Figure 866—Wing venations of *Hyposmocoma*. *a*, (*H.*) *virgata* Walsingham, paratype (BM slide 5467); Haleakala, 5,000 feet, Maui. This may represent a subspecies of *virgata*; see illustration of the male genitalia of this specimen in figure 1194. *b*, forewing of the holotype female of (*E.*) *homopyrrha* (Meyrick), the type-species of *Phthoraula* Meyrick; Nuuanu, Oahu (slide Z-70-2); note the loss of vein 8; the left hindwing of the unique holotype was lost before I examined the specimen, and I have thus not been able to make a slide preparation of the hindwing. *c*, (*E.*) *argomacha* Meyrick, holotype (slide Z-70-4); Kilauea, Hawaii. *d*, forewing of (*H.*) *oxypetra* Meyrick, female holotype (slide Z-70-3); Pacific Heights, Oahu. The right hindwing of this specimen was lost before I examined it, and I have not been able to prepare a hindwing for illustration. These specimens have not been drawn to the same scale.

(Continued from page 1158.)

1. A major difference is whether the vestiture of the vannal area of the hindwing is clothed with squamae only or whether there are long hairs along vein 1b or between veins 1b and 1a. I have found that these differences will divide the huge genus in two approximately equal parts which correlate almost completely with differences in the male genitalia (but see the exceptional "*Diplosara*" *lignivora*), as I have detailed below. I have used these characters to divide the genus into what I have called subgenus *Euperissus* and subgenus *Hyposmocoma sensu stricto*.

It is noteworthy that no previous worker realized that the genus could be divided so nicely by these characters, although Walsingham did use the nature of what he called the "limbal hair-pencil" for the differentiation of some of the species he studied. The fact that the complex can be divided into two nearly equal major divisions is of great assistance to the formulation of a key, and we are most fortunate that this primary division can be made. An interesting fact is that all of the known species whose larvae are case makers belong to *Hyposmocoma sensu stricto*, and all whose larvae are known to be naked belong to subgenus *Euperissus*.

2. The male genitalia (figures 789–791, for example) usually exhibit many remarkable differential features. All parts of the genitalia may display good characters which can be used to distinguish species: the character of the genital "flaps" (see figures 791–793, 1039, for example); the nature of the sclerotization of the seventh and eighth abdominal sternites and tergites; development of the tegumen; shapes of the brachia; anellus lobe differences; aedeagus; size and shape of the valvae and nature of their vestiture; the presence or absence, number, size, arrangement, and shape of the spurs on the valvae and the kinds of expansions from the costal margins of the valvae; etc.

The female genitalia (figures 794–798, for example) have less conspicuous differences. But some features, especially of the ostium which often displays strong specific differences, serve for species separation. The ovipositor varies specifically in length, there may or may not be signa in the bursa copulatrix, and there are other characters of value as aids to identification.

3. There are specialized features of the abdomen that are useful in differentiating species. These include patches of modified squamae or setae (figure 1097), sclerotized rings and plates (figures 1037, 1062, 1066, 1071, 1119, 1120, 1132, 1133, 1138, for example), sclerotized appendages such as the pseuduncus which is very strongly developed in some species but absent from many (figures 791, 1035, 1050, 1051, 1072, 1075, 1119, for example), the caudal processes typical of most of the males of the "*Aphthonetus*" group, and other modifications.

4. The males of many, but not all species of *Hyposmocoma sensu stricto*, have strongly developed subcostal brushes on the hindwings. One species may appear closely similar to another species, but one will have a subcostal brush whereas the brush is lacking on the other species. All males of subgenus *Euperissus* lack subcostal brushes. The brushes vary in size, structure and color.

5. The forewing in the male may or may not have a costal fold or flap on the underside. The character of the vestiture of other parts of the ventral surface of the wing may be distinctive.

6. There may be patches of raised squamae on the forewings, and these may display specific differences. The shape and character of the squamae elsewhere on the wings may also differ.

7. The hindwing may or may not have a fringe of hair or specialized setae along the posterior edge of the basal part of the cell.

8. Wing shape and comparative breadths of the wings vary.

9. Wing venation may be used (with caution).

10. Some species have brushes of hair in the posterior axils of the hindwings or on the metapleura beneath the anterior corners of the hindwings. There are often sexual differences in these brushes when they are present. Most of the true "*Neelysia*" group and some other species have strong metapleural brushes which cross over the abdomen where they are held by clusters of greatly enlarged, specialized squamae (figure 878, top). I have not seen any of these conspicuous brushes on any of the "*Aphthonetus*" group, but some species have incipient or vestigial patches of hairs as do various species of other groups. Other features of the pleura such as the sizes and shapes of the squamae are also useful for differentiation.

11. Various characters of the antennae may be important. Sexual characters are often evident—the males of some species (*cristata*, for example) have long hairs on the underside basad of the middle. The shape of the first antennal segment and the nature of the pecten if one is present vary.

12. The nature of the vestiture of the head, thorax and abdomen differs. The metascutum may have broad squamae, long narrow squamae or hairs, or combinations of vestiture.

13. Characters of the palpi, such as size, shape and vestiture can be significant. For example, the palpi are diagnostic of the *lignivora* group as are the palpi of the two species formerly placed in *Euhyposmocoma*; see figures 778–787.

14. The vestiture of the legs, especially that of the posterior tibiae, and the tarsal chaetotaxy differ.

15. The color and color pattern of all parts, bearing in mind the considerable individual variation in some species, are, of course, valuable for species discrimination.

16. Locality may be used. However, caution is necessary in the light of how little is known concerning distributions. Some apparently wide distributions may actually involve sibling species clusters.

The discrimination of the multitude of species of *Hyposmocoma* is complex and very difficult. Specimens that may appear externally closely similar may have widely different genitalia. This external resemblance of species in clusters led previous authors to lump as many as seven or more species together under one name. Other species that have closely similar genitalia may be conspicuously different in external appearance. The male genitalia of *evanes-cens* (figure 1072), *haleakalae* (figure 1083), and *lacertella* (figure 1092), for example, are closely similar, but externally these moths are very distinct. Externally, *marginenotata* (figure 929) and *vermiculata* (figure 988) are closely

similar, and the genitalia of the males are also similar. But, astonishingly, the male of *marginenotata* (Kauai) has a well-developed subcostal brush on the hindwing whereas the male of *vermiculata* (Hawaii) lacks a subcostal brush. Similarly, *lineata* (figure 922) and *ludificata* (figure 924), both from Maui, have such extraordinarily similar black and white color patterns that one could easily consider them to be the same. However, *lineata* lacks a subcostal brush on the hindwing of the male whereas the male of *ludificata* has a strongly developed yellow subcostal brush and, in addition, it has enlarged, specialized squamae on the wing caudad of the brush. The male genitalia are very similar, but they are distinctive. The male genitalia of *illuminata* (figure 1086) and *indicella* (figure 1080, 1088), both of Maui, are closely similar, but externally the moths are so extremely different (figures 914, 915) that one can hardly believe that they are close allies if one does not examine the genitalia. The reader is referred to other discussions below under the species headings *Hyposmocoma blackburnii*, *longitudinalis*, and *lupella* and to the figures which accompany those discussions.

Some of the species of *Hyposmocoma* that may be grouped together because of their generally similar male genitalia are such externally distinctive moths that Walsingham and Durrant were led to separate them widely in their treatment of the genus. The cluster of species allied to *iodes*, for example, was placed as number 3 (*nigralbida*), 11 (*nebulifera*), 100 (*alliterata*), 140 (*ochreociliata*), 143 (*conditella*), 145 (*iodes*), and 146 (*literata*) in their arrangement. The male genitalia of some of these species are so similar that they might appear at first sight to represent the same species, but the moths are very different organisms. Compare my figures 937, bottom, of *nigralbida*, 870, top, of *alliterata*, and 917, top, of *iodes*, for example.

Similarly, the *admirationis* group of *Hyposmocoma* includes 15 or more species most of which have closely similar male genitalia. Some of these have almost identical genitalia. Many of the moths are, however, conspicuously different. Some of the species, such as *admirationis*, *alveata*, *carbonenotata*, *irregularis*, *propinqua*, *scolopax*, *subcitrella*, *subscolopax*, *torella*, and *trimaculata*, have subcostal brushes on the hindwings of the males. One could logically conclude that the subcostal brush would be a character of the group. Surprisingly, however, some of the closely associated species having the same pattern of male genitalia, such as *oxypetra*, *persimilis*, *somatodes*, *tetraonella*, and *turdella*, lack subcostal brushes. Moreover, some of these species have a pseuduncus (*admirationis*, *carbonenotata*, *irregularis*, *oxypetra*, *propinqua*, *scolopax*, *somatodes*, *subcitrella*, *subscolopax*, *tetraonella*, *torella*, *trimaculata*, *turdella*), whereas other species lack the pseuduncus (*alveata*, *persimilis*). Some of the species that have the subcostal brushes on the hindwings of the males have a pseuduncus while others do not. The reverse is also true—some species that lack the subcostal brushes have a pseuduncus and others lack a pseuduncus.

Thus, there are complexes within complexes of *Hyposmocoma* to confuse and to bewilder the observer. One cannot predict what one will find next as he studies more and more species of this astounding assemblage of sibling species, species swarms, and superspecies. Although prolonged field studies and careful rearings will enlighten some spots in the darkness, it is safe to say that *Hyposmocoma* can never be more than slightly understood.

## KEY TO THE SUBGENERA OF HYPOSMOCOMA

1. Terminal segment of labial palpus with the vestiture expanded on the inner (upper) side, thus making the segment appear distinctly widened, as in figure 761; vannus (the inner posterior corner area; the anal area) of hindwing with a conspicuous tuft of hair in the area of vein 1b; hindwing with a subcostal brush; forewings with distinct patches of raised squamae; large species whose larvae make large cases. The species placed here have genitalia and other characters of subgenus *Hyposmocoma*, but they have hindwing vannus hair tufts of subgenus *Euperissus*, and they are thus unusual. No other known species group combines so clearly the characters of the two subgenera. . . . .  
 . . . *lignivora* species group of **Hyposmocoma** *sensu stricto*.  
 Terminal segment of labial palpus not thus expanded, most often slender or very slender (see figures 778 to 787); other characters variable. . . . . 2
2. Hindwings of both sexes with the dorsal surface of vannus with a variable development of long hairs usually confined along the base of vein 1b or along and between veins 1b and 1a. There may be only a few long hairs or there may be a lesser or greater tuft or area of long, slender, fine-pointed hair (*not* blunt tipped, flattened, elongate squamae) on the area. Some of these hairs extend distinctly beyond the wing margin and overlap the cilia (fringe).

The specimens must be examined, very carefully— if the wing is partly abraded or there are only a few of the long hairs present they might easily be overlooked. These hairs must not be confused with the submarginal, marginal or axillary hairs, or the cilia. The hairs in question are always on the dorsal surface along the anal veins and inserted away from the edges of the wing and are not those on the curled-over basal edge of the wing. When strongly developed as a brush, it is what Walsingham called the “limbal hair-pencil”.

The highly unusual *marginenotata* and its close ally *vermiculata* may cause confusion here because *the males only* have a large area or mat of very elongate squamae on the vannus in the area where the hairs described above are located. These elongate squamae tend to lie subparallel to the long axis of the wing so that they are

mostly directed toward the wing apex and are not normally directed back across the wing and do not cross the cilia, although the tips of some of the submarginal squamae, especially when erected, may partly overlap the bases of the cilia. However, these species belong to subgenus *Hyposmocoma sensu stricto*. They have strongly developed spurs on the male genital valvae, and they have a well-developed pseuduncus. The male of *fractistriata*, another member of subgenus *Hyposmocoma*, has a subbasal cluster of elongate, slanting erect squamae and a few erect hairs, but these are entirely subbasal and far removed from the wing margin and thus should not cause confusion here.

Hindwings of males lack subcostal brushes. Valvae of male genitalia *never* have strongly differentiated or spurlike enlarged setae along the dorsal (costal) or apical margins (but do not confuse the *Diplosara* species group described above); abdomen never has a pseuduncus (except in *nemoricola*?); right brachium of male genitalia is usually rather similar to the kind shown in figures 789, 1034, 1069. . . . . subgenus **Euperissus**.

Hindwing with dorsal surface of vannus clothed entirely with squamae and never with long hairs along ven 1b or along and between veins 1a and 1b and never with any tendency toward the development of a vannal hair tuft or brush. However, note the development of masses of very elongate, slender squamae on the males of *marginotata* and *vermiculata* and the subbasal cluster of slanting erect squamae on the male of *fractistriata* as described just above, and see also the exceptional *lignivora* group described above.

Valvae almost invariably have highly developed spurs or specialized, differentiated, enlarged, strong setae on dorsal (costal) or apical margins. Evidently these spurs are usually aborted on such species as *arenella* and *nephelodes*, but the setal sockets remain, and each of these species has developed a pseuduncus. Many species have the pseuduncus developed to a lesser or greater degree. Many males have subcostal brushes on the hindwings. . . . . subgenus **Hyposmocoma sensu stricto**.

All 23 species known to me whose larvae are proven casemakers belong to *Hyposmocoma sensu stricto*, including the anomalous "*Diplosara*" *lignivora* species group. There is, of course, a large number of other species whose larvae are

casemakers, but they have not been reared and are thus not recorded as case-makers. Many larval cases of a variety of forms have been found which have never been associated with their moths. *Hyposmocoma* larval cases are common objects in Hawaiian forests, but they are mostly overlooked by collectors. It would appear that all the members of *Hyposmocoma sensu stricto* are case-makers.

All 33 species thus far reared from larvae which are naked stem- or wood-borers, or fern-eaters, or make silken tunnels in moss belong to subgenus *Euperissus*. Perhaps all species of *Euperissus* have naked larvae.

The species of *Euperissus* are generally more difficult to discriminate than are those of *Hyposmocoma sensu stricto* because of the greater similarities of their genitalia, especially because of their lack of spurs and marginal processes on the valvae.

### **A NOTE ON THE ARRANGEMENT OF THE ILLUSTRATIONS**

Most of the several hundred illustrations of *Hyposmocoma* were made before my detailed studies began. To facilitate study and to enable the illustrations to be easily located when needed, most of them were arranged as nearly as possible in alphabetical order. Although this arrangement has served the purpose intended and has saved much time in handling such a mass of detail, the end result is an arrangement with little regard to relationship. This may be considered a fault in the text and may attract criticism. After my studies were completed, and a new classification slowly evolved through a series of many changes, a new arrangement of illustrations should have been made. Such a change would have been very costly, and I have been unable to accomplish it. When beginning a complicated study such as this, one cannot always predict how best to arrange various parts of the manuscript.

I have incorporated a large amount of detail in the figure legends instead of placing it under the main species headings in the text so that one can consider the commentary while viewing the all-important illustrations. I have not considered it essential to repeat in the text what may be obtained from a study of the figures and their legends.

Subgenus **EUPERISSUS** (Butler), **new status**

- Euperissus* Butler, 1881:401. Type-species: *Euperissus cristatus* Butler, 1881:402, monotypic. Walsingham, 1907b:643, redescription.
- Aphthonetus* Walsingham, 1907b:517. Type-species: *Aphthonetus diffusa* Walsingham, 1907b:527, by original designation. **New synonym.**
- Rhinomactrum* Walsingham, 1907b:531. Type-species: *Rhinomactrum rutilellum* Walsingham, 1907b:531, by original designation. **New synonym.**
- Neelysia* Walsingham, 1907b:533. Type-species: *Neelysia lignicolor* Walsingham, 1907b:533, by original designation. **New synonym.**
- Dysphoria* Walsingham, 1907b:547. Type-species: *Dysphoria semicolon* Walsingham, 1907b:547, monotypic and by original designation. **New synonym.**
- Bubaloceras* Walsingham, 1907b:548. Type-species: *Bubaloceras subburneum* Walsingham, 1907b:549, monotypic and by original designation. **New synonym.**
- Hyperdasys* Walsingham, 1907b:640. Type-species: *Hyperdasys cryptogamiellus* Walsingham, 1907b:642, by original designation. Homonym. See *Hyperdasyyella*.
- Hyperdasyyella* T. B. Fletcher, 1940:18, replacement name for *Hyperdasys* Walsingham, 1907b, not Butler, 1891. See *Hyperdasys* above. **New synonym.**
- Semnoprepia* Walsingham, 1907b:644. Type-species: *Semnoprepia fulvogrisea* Walsingham, 1907b:644, by original designation. **New synonym.**
- Euhyposmocoma* Swezey, 1913f:277. Type-species: *Hyposmocoma ekaha* Swezey, 1910d:105, by original designation. **New synonym.**
- Phthoraula* Meyrick, 1935a:65. Type-species: *Phthoraula homopyrrha* Meyrick, 1935a:65, monotypic. **New synonym.**

The distinctive characters of subgenus *Euperissus* are outlined in the foregoing key to the subgenera of *Hyposmocoma* and need not be repeated here.

**Hyposmocoma (Euperissus) adelphella** Walsingham (figs. 867, moth; 1042, male genitalia; 1195?, 1226, female genitalia).

*Hyposmocoma adelphella* Walsingham, 1907b:615, pl. 23, fig. 4.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

Walsingham included in his type series a male and a female from Hawaii and a single female (figures 823, wing venation; 1195, female genitalia) from Kauai. I have deleted the Kauai record because I consider it uncertain and possibly erroneous.

**Hyposmocoma (Euperissus) adolescens** Walsingham (figs. 868, moth; 1034, male genitalia).

*Hyposmocoma adolescens* Walsingham, 1907b:587, pl. 20, fig. 27.

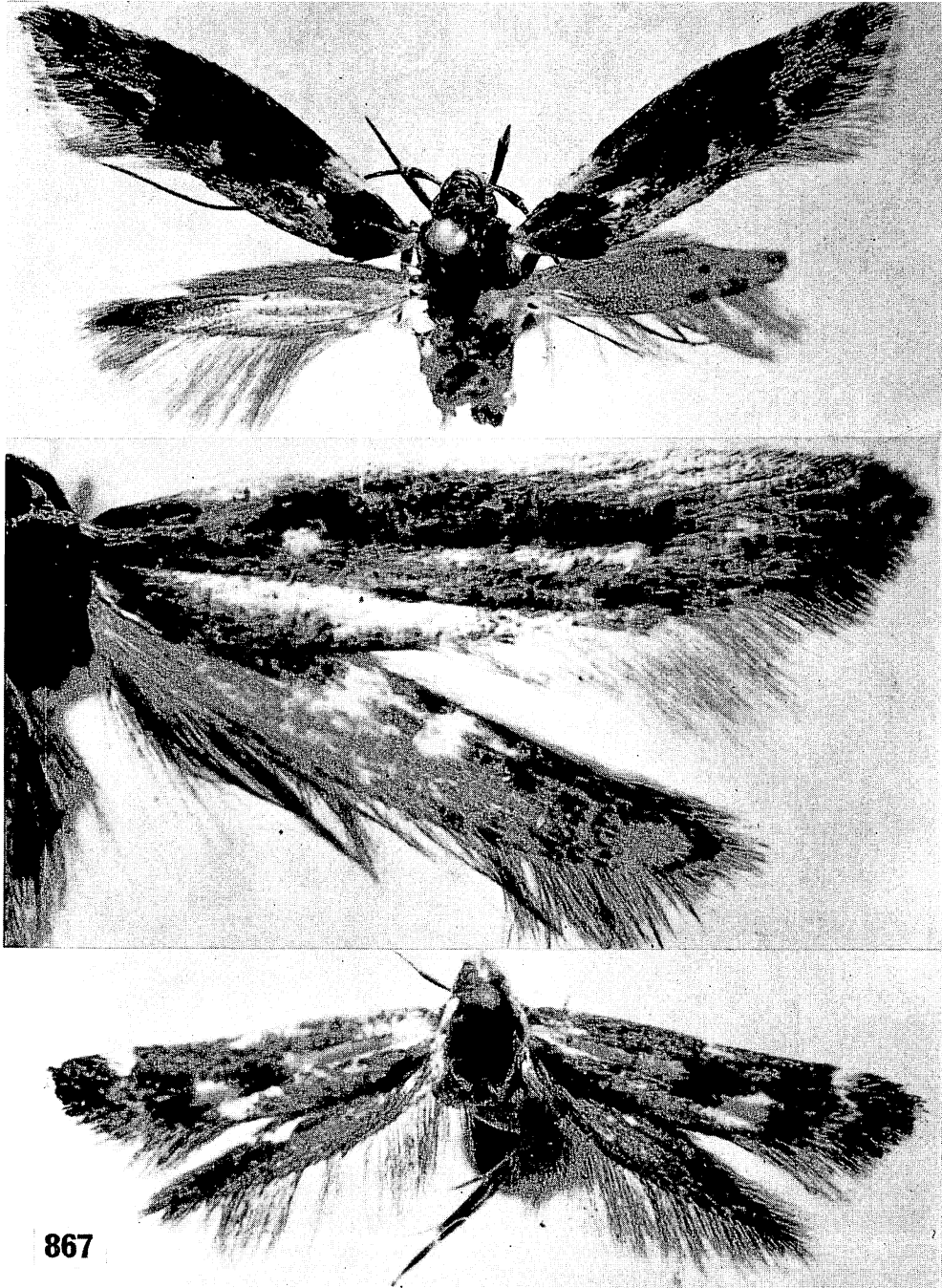
Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

I have seen only the unique male holotype. It is an associate of *enixa*, which see.

(Text continued on page 1348.)





867

Figure 867—*Hyposmocoma*. Top, (*H.*) *abjecta* (Butler), holotype female (BM slide 4475); Oahu; expanse 13.5 mm.; forewings fuscous and white. Middle, (*E.*) *adelphella* Walsingham, holotype male (BM slide 4353); Kona, 4,000 feet, Hawaii; forewing 6 mm., pale brownish and dirty white with fuscous maculae (the pale rounded spots on the wings are abraded areas and the dark fuscous maculae on the forewings are not adequately revealed in the photograph). Bottom, (*H.*) *admirationis* Walsingham, holotype male (BM slide 4124); Molokai, about 4,000 feet; expanse 8 mm., brownish fuscous with white maculae (too much light has been directed from the front of the specimen). All of these specimens are figured in color in *Fauna Hawaiiensis*.

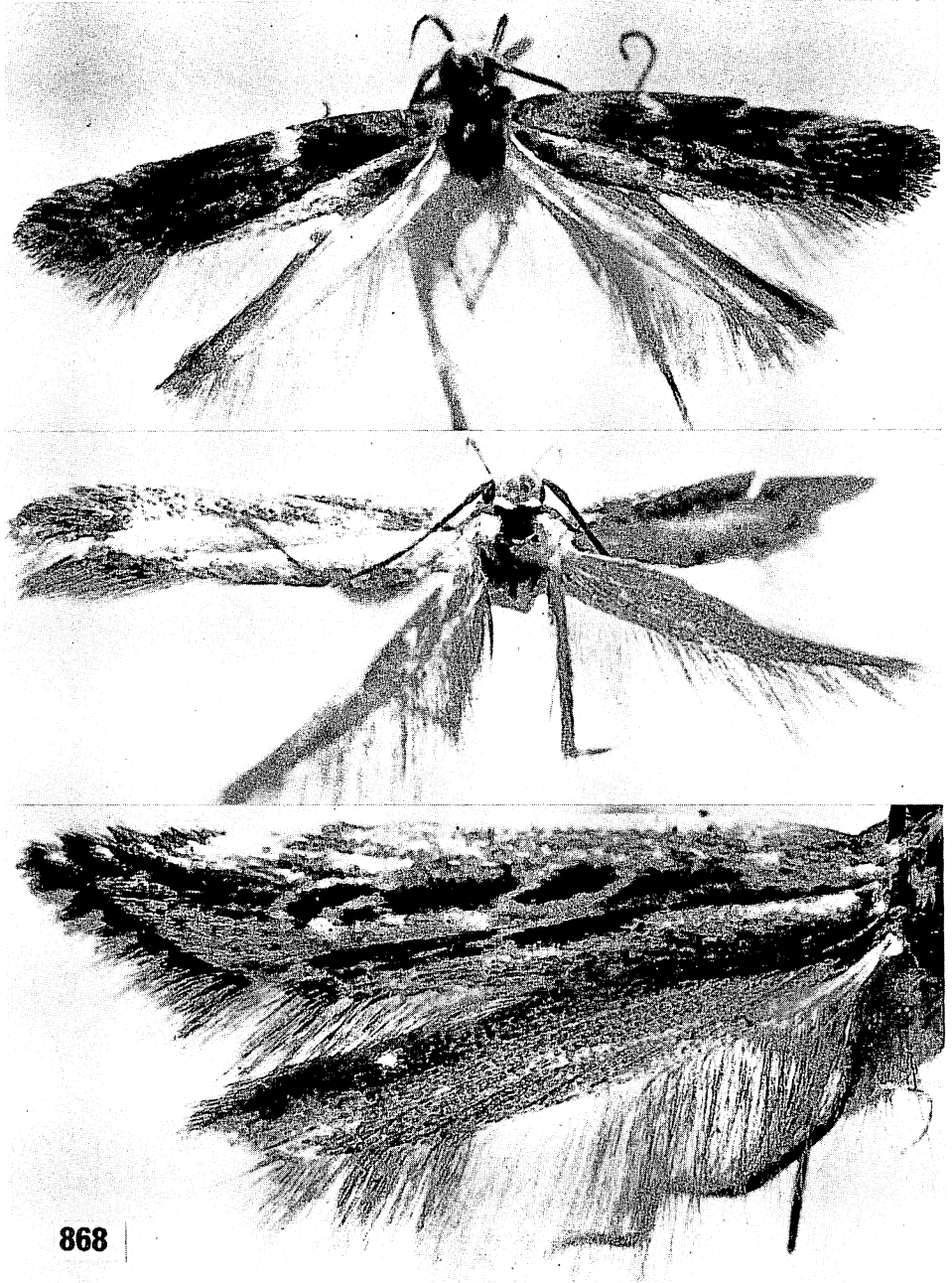


Figure 868—*Hyposmocoma*. Top, (*E.*) *adolescens* Walsingham, holotype male (BM slide 4137); Kilauea, Hawaii; expanse 13.5 mm., basically bronzy brown with three dark maculae (the white-appearing areas are abraded). Middle, (*H.*) *advena* Walsingham, holotype female (BM slide 4532); Molokai, 4,000 feet; forewing 5 mm.; the photograph does not reveal enough contrast between the yellow medial area and the brown costal and posterior areas. Bottom, (*E.*) *agnetella* (Walsingham) ("*Neelysia*"), holotype male (BM slide 4432); Olinda, 4,000 feet, Maui; forewing 6.5 mm., white and brownish fuscous with dark fuscous maculae. These three specimens are figured in *Fauna Hawaiiensis*.

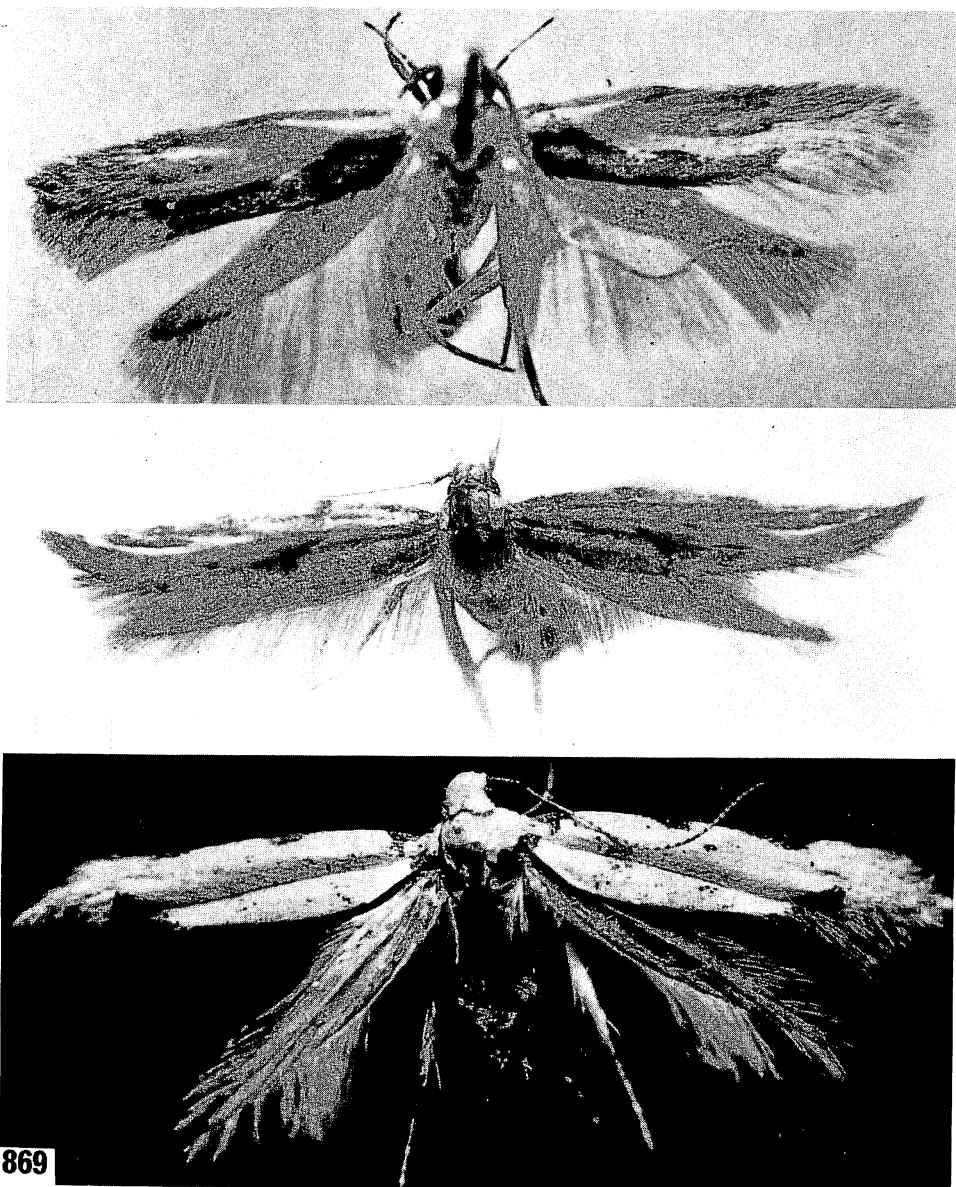


Figure 869—*Hyposmocoma*. Top, (*H.*) *albifrontella* Walsingham, holotype male (BM slide 4100); Molokai, about 4,000 feet; expanse 13 mm.; forewings mostly nearly white with prominent fuscous maculae. Middle, (*E.*) *albocinerea* (Walsingham) ("*Aphthonetus*"), holotype female (BM slide 4753); Kauai, 3,000 to 4,000 feet; expanse 15.5 mm.; forewings with white background with brownish and fuscous scaling that is tipped with ferruginous coloring. Bottom, (*H.*) *albonivea* Walsingham, holotype female (BM slide 14306); Waianae Mts., Oahu; expanse 10.5 mm.; forewings white with dark fuscous maculae. These three specimens are figured in *Fauna Hawaiiensis*.

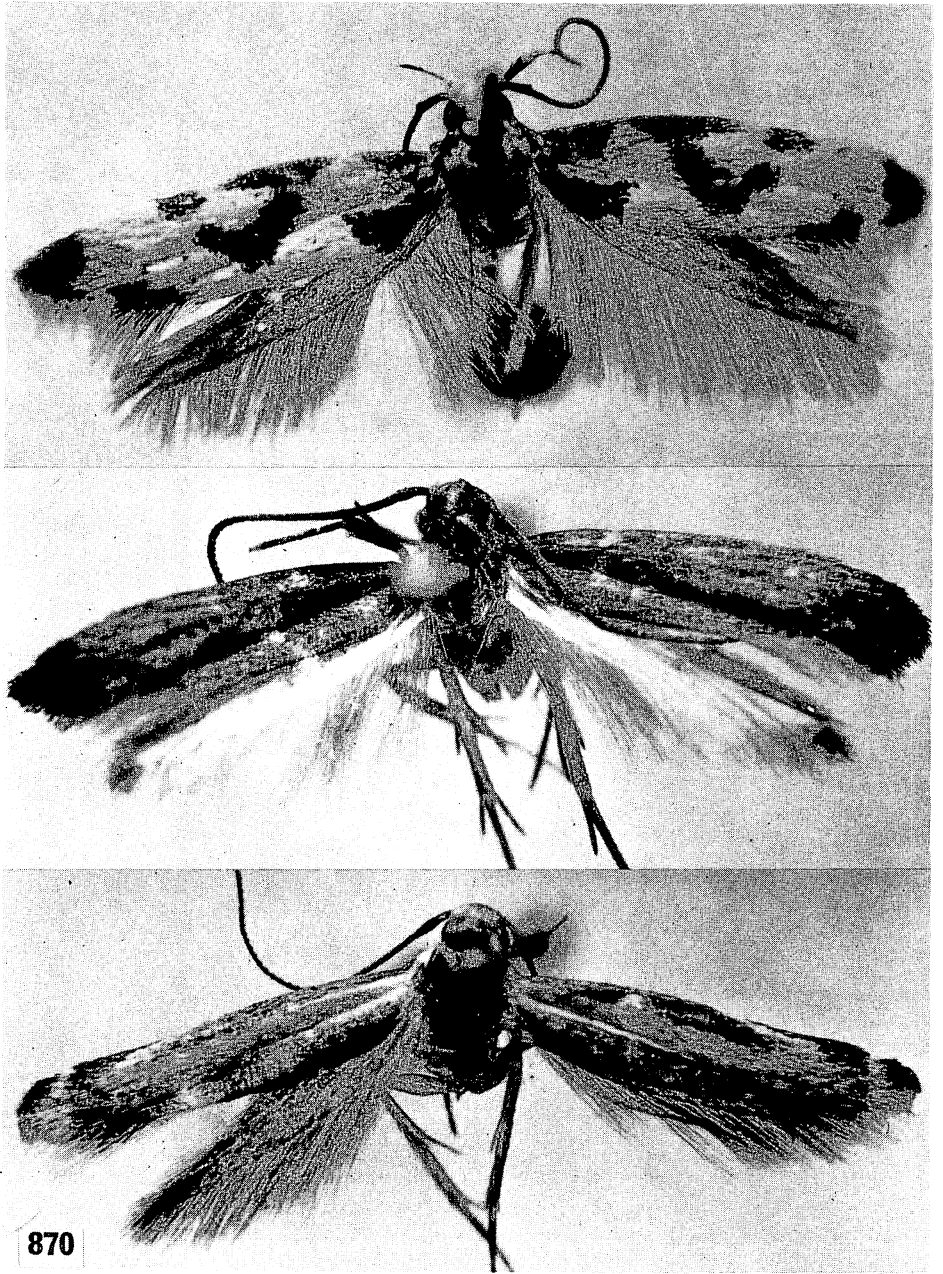
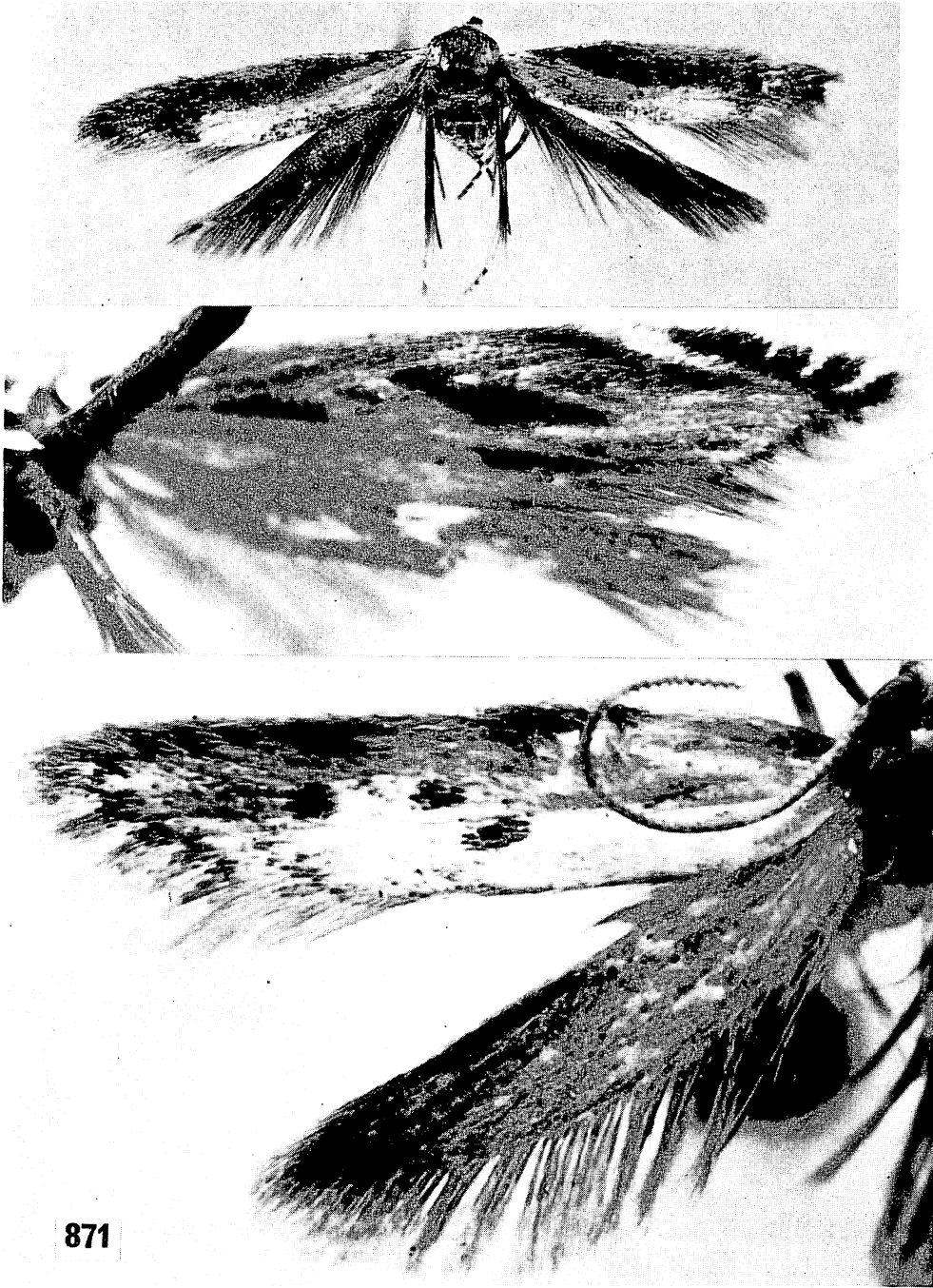


Figure 870—*Hyposmocoma*. Top, (*H.*) *alliterata* Walsingham, holotype male (BM slide 4322); Molokai, 4,000 feet; expanse 11 mm.; forewings white with black maculae. This specimen is figured in *Fauna Hawaiiensis*. Middle, (*E.*) *alticola* Meyrick, lectotype male (BM slide 9559 Clarke); Honolulu; forewing 4.5 mm, mostly fuscous with purplish reflections. Bottom, (*E.*) *alveata* (Meyrick) ("*Neelysia*"), lectotype male (BM slide 9580 Clarke); Koolau Mts., Oahu; forewing 4.75 mm., white with fuscous maculae.



871

Figure 871—*Hyposmocoma*. Top (*H. anisoplecta* Meyrick, paratype (a broken specimen); Mt. Kaala, Oahu; forewing 5.5 mm., fuscous with whitish to yellow pale areas. Middle, (*E. anthinella* (Walsingham) ("*Neelysia*"), holotype male (BM slide 4436); Lanai, 2,000 feet; forewing 4.5 mm., white and fuscous; there is an incipient brush of a few long scales on the metapleuron beneath the anterior corner of hindwing. Bottom, (*H. arenella* Walsingham, holotype male (BM slide 4486); Kona, 2,000 feet, Hawaii; forewing 6.5 mm., cream-colored and fuscous. The two lower specimens are figured in *Fauna Hawaiiensis*.

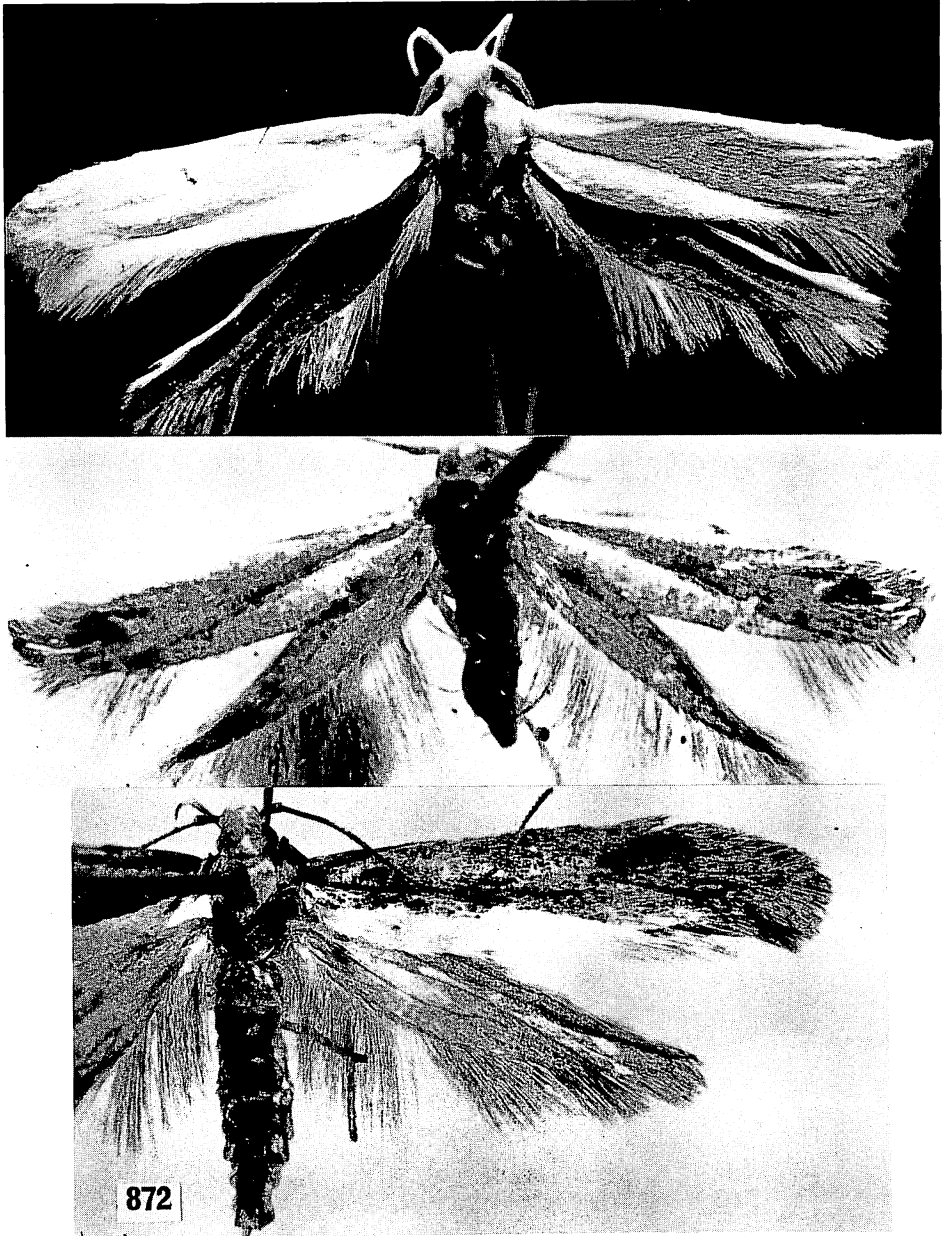


Figure 872—*Hyposmocoma*. Top, (*E.*) *argentea* Walsingham, holotype male (BM slide 4317); Molokai, about 4,000 feet; expanse 16 mm.; forewing pale creamy white. Note the pale tufts of hair coming from the vannal areas of the hindwings. Compare *subargentea*, figure 973. Middle, (*H.*) *argentifera* (Walsingham) (“*Agonismus*”), holotype female (BM slide 7171); Kilauea, Hawaii; expanse 8.5 mm; forewings submetallic grey to greyish fuscous with a subterminal white fascia (what appear to be subapical dark maculae arc shadows). Bottom, (*E.*) *argomacha* Meyrick, holotype female; Kilauea, Hawaii; forewing 10 mm. brownish, fuscous with conspicuous white posterior area.

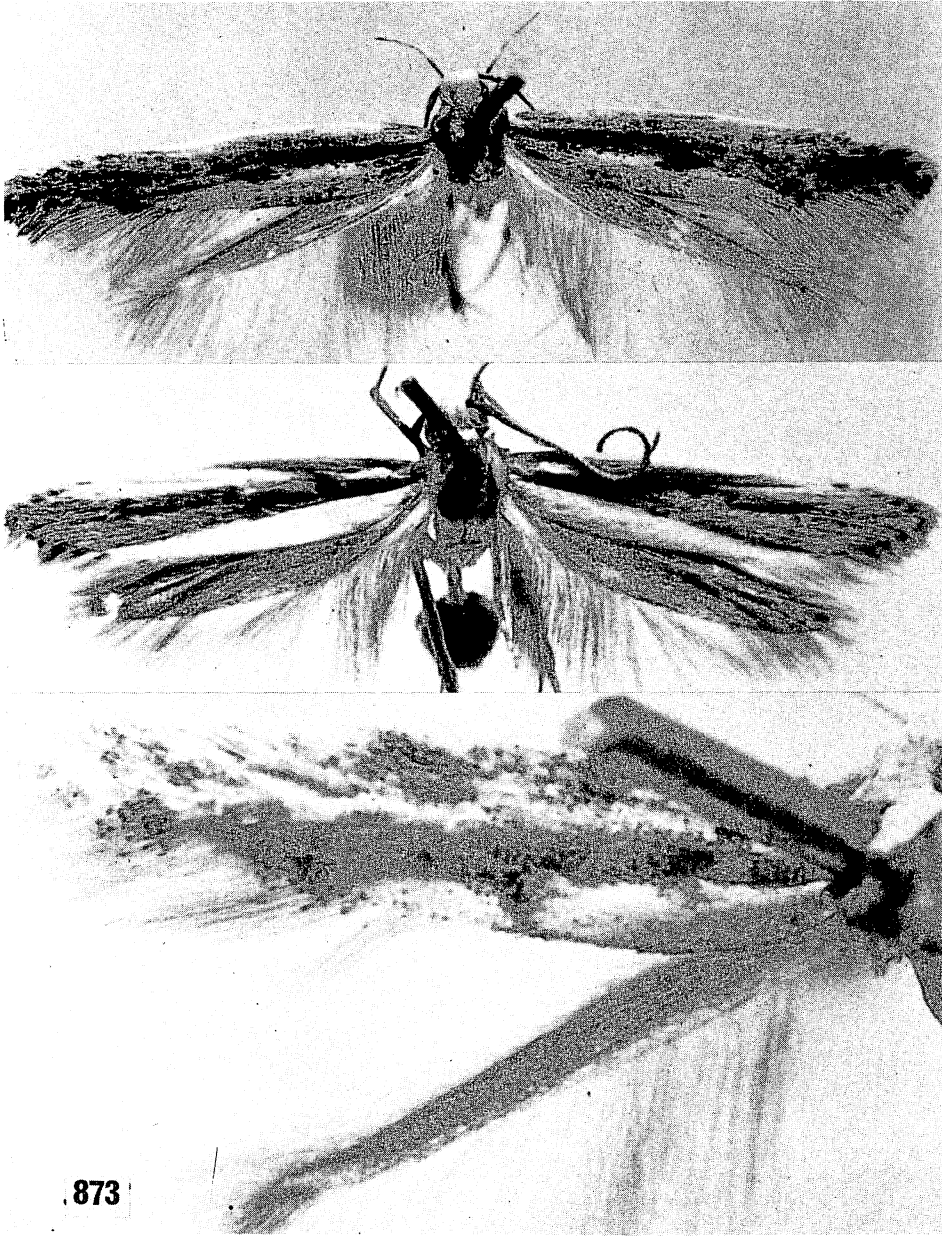


Figure 873—*Hyposmocoma* (*Euperissus*). Top, *argyresthiella* (Walsingham) ("*Neelysia*"), allotype female (BM slide 4465); Kona, 4,000 feet, Hawaii; expanse 11.5 mm.; forewings with white background and yellow, brownish, orange, and fuscous scaling and maculae. Middle, *arundinicolor* (Walsingham) ("*Hyper-dasyella*"), holotype male (BM slide 4424); Kauai, 3,000 to 4,000 feet; expanse 15 mm.; forewings buff or ochraceous with fuscous maculae. Bottom, *aspersa* (Butler) ("*Aphthonetus*"), holotype female (BM slide 4412); near Honolulu; forewing 6 mm., white with yellow-tipped and fuscous-tipped scales and maculae. The middle and bottom specimens are figured in *Fauna Hawaiiensis*.

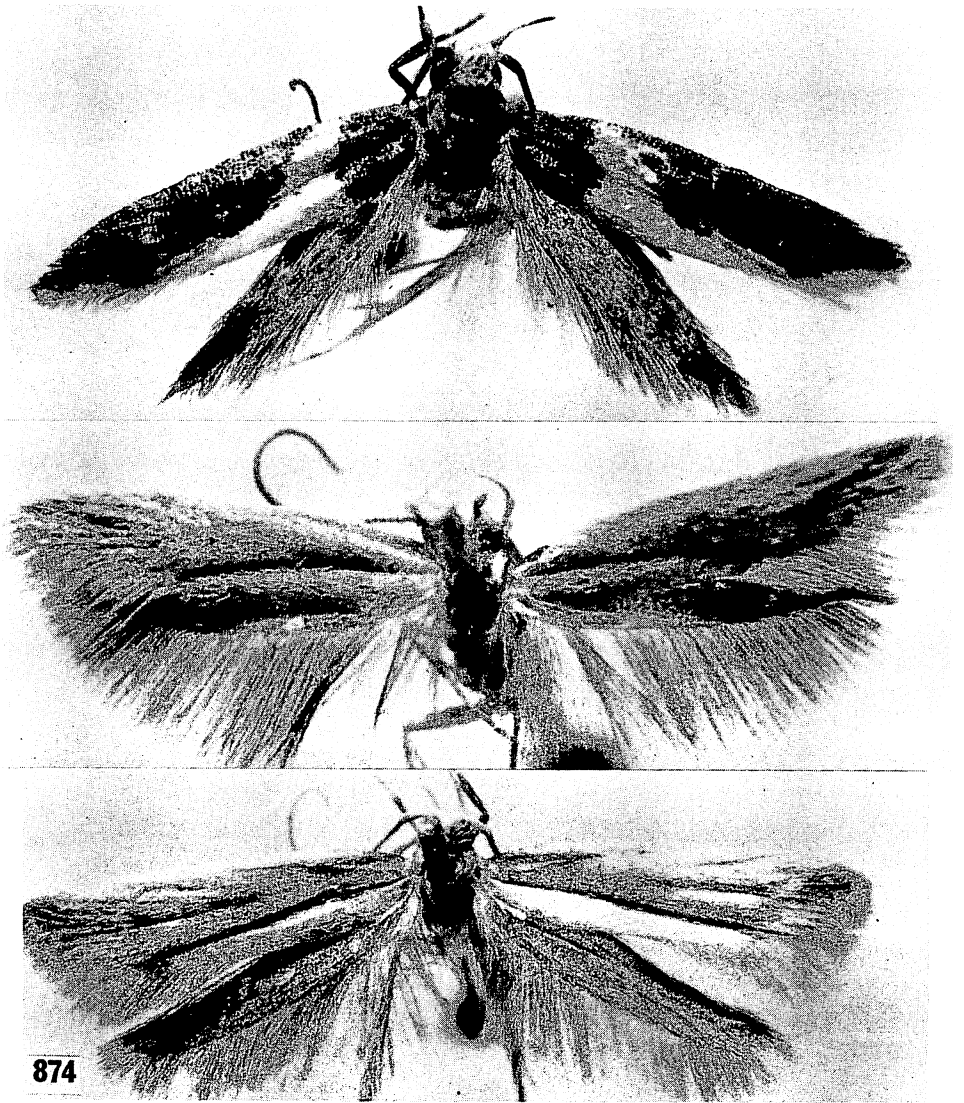


Figure 874—*Hyposmocoma*. Top, (*H. atrovittella* Walsingham, holotype male, abdomen lost; Olaa, Hawaii; expanse 10 mm.; forewings white and dark fuscous. Middle, (*H. auripennis* (Butler), holotype male (BM slide 4109); Haleakala, Maui; expanse 12 mm.; forewings a beautiful, concolorous, golden yellow. Bottom, (*E. auroargentea* Walsingham, holotype male (BM slide 4107); Haleakala, 5,000 feet, Maui; expanse as spread, 16 mm.; forewings mostly shining silvery white with some greyish markings. These three specimens are figured in *Fauna Hawaiiensis*.





875

Figure 875—*Hyposmocoma*. Top, (*H.*) *auropurpurea* Walsingham, holotype male (BM slide 4352); Waianae Mts., 2,000 feet, Oahu; expanse 8 mm. This specimen was difficult to photograph because of its purplish and coppery submetallic scaling. The dark areas are purplish. The pale vitta along the fold that continues as a preapical fascia is golden. Middle, (*H.*) *bacillella* Walsingham, holotype male (BM slide 4325); Halemanu and Kaholuamano, 4,000 feet, Kauai; expanse 10 mm.; forewings white and fuscous. (The case from which this specimen was reared is shown in figure 800.) Bottom, (*E.*) *barbata* Walsingham, holotype female (BM slide 7175); Molokai, over 3,000 feet; expanse 14.5 mm.; forewings with a white background and yellow and fuscous vittae and maculae. These three specimens are figured in *Fauna Hawaiiensis*.

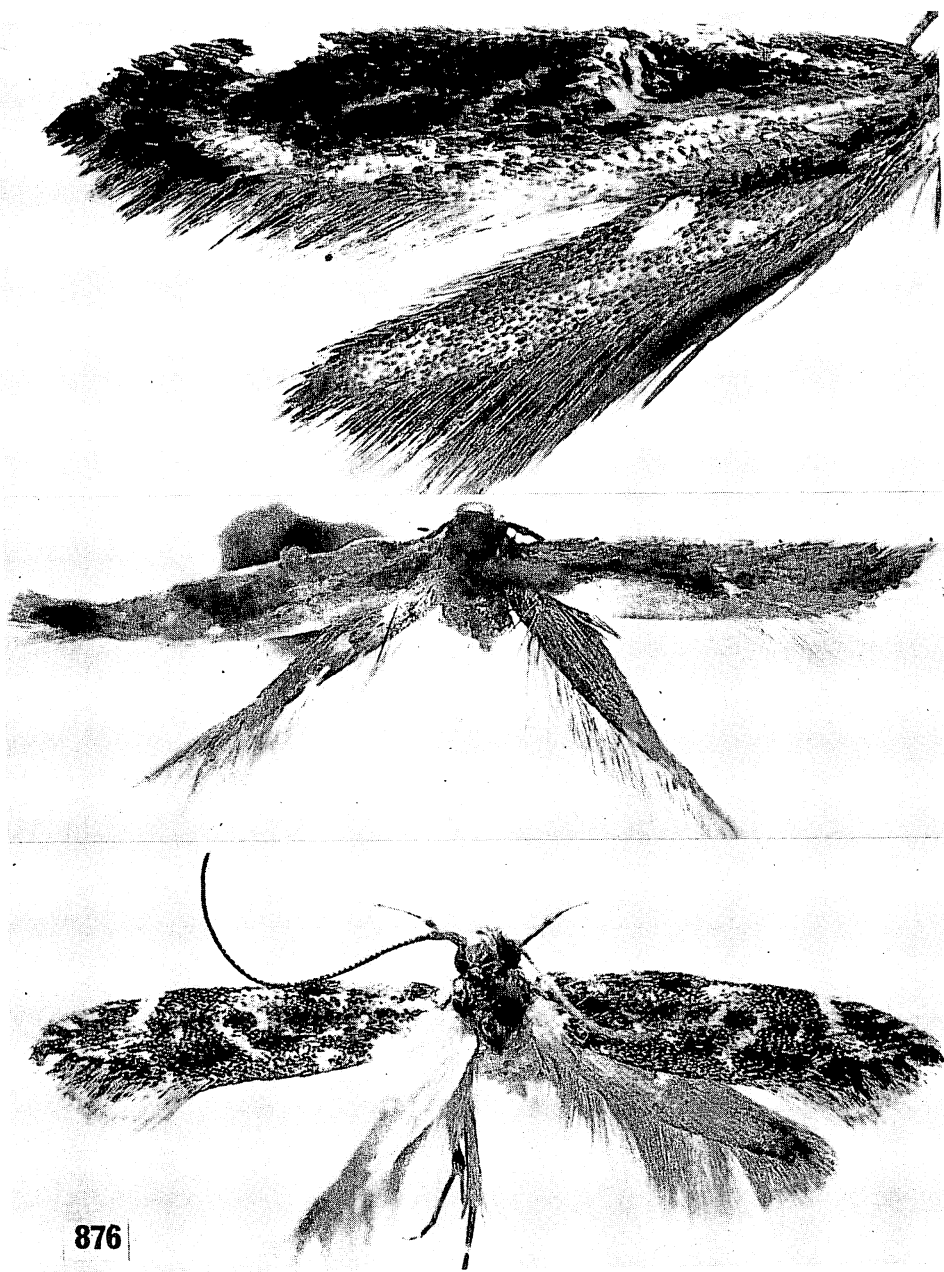


Figure 876—*Hyposmocoma*. Top, (*E.*) *basivittata* (Walsingham) (“*Neelysia*”), holotype male (BM slide 4440); Haleakala, 5,000 feet, Maui; forewing 6 mm., brownish fuscous with white maculae (there is an abraded area between the costa and the end of the white vitta on the fold). Middle, (*H.*) *bella* Walsingham, holotype male (BM slide 4350); expanse 9 mm.; in the forewing the pale scaling is yellow, contrasting sharply with the anterior brown scaling (the pale spots that appear to form a submedial fascia near the middle of the right wing are abraded areas). Bottom, (*H.*) *belophora* Walsingham, holotype male (BM slide 4490); near head of Kawailoa Gulch, Oahu; expanse 14 mm.; forewings are white with dark scales which are golden basad and fuscous distad. All of these specimens are figured in *Fauna Hawaiensis*.

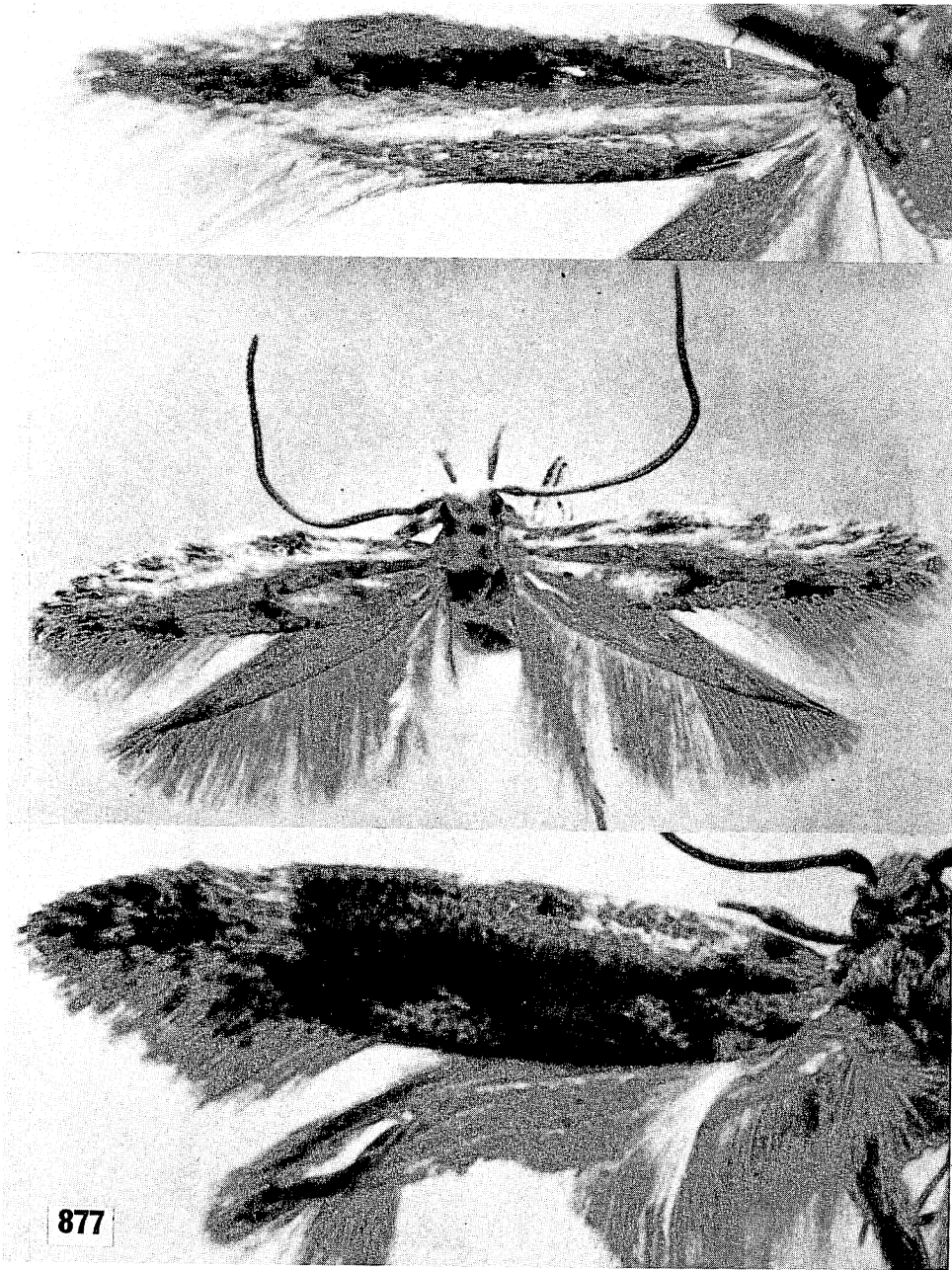


Figure 877—*Hyposmocoma*. Top, (*H.*) *bilineata* Walsingham, holotype female (incorrectly cited as a male); (BM slide 4112); Waianae Mts., 2,000 to 3,000 feet, Oahu; forewing 5.5 mm.; orange with fuscous brown vittae. Middle, (*E.*) *bitincta* (Walsingham) ("*Aphthonelus*"), holotype male (BM slide 4743); Haleakala, 4,000 feet, Maui; expanse 13 mm.; forewing white with yellow and fuscous maculae. Bottom, (*H.*) *blackburnii* Butler, holotype male (BM slide 4088); forewing 9 mm., brownish fuscous and white. Part of the subcostal brush protrudes across the hindwing. These three specimens are figured in *Fauna Hawaiianis*.

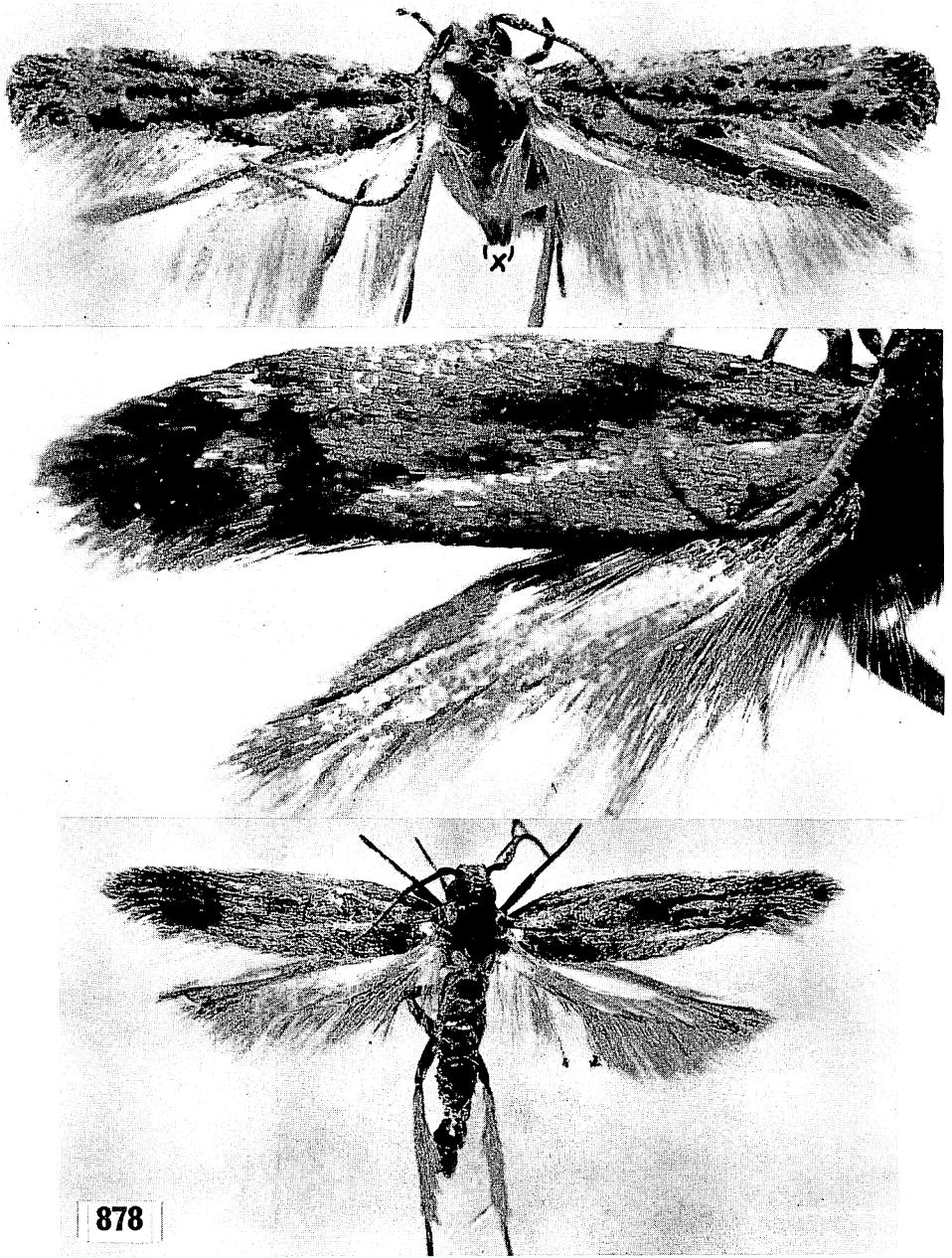


Figure 878—*Hyposmocoma*. Top, (*E. brevistrigata* Walsingham, holotype male (BM slide 4494); Kauai, 3,000 to 4,000 feet; expanse 12 mm.; forewings mostly white with yellowish and fuscous scales. The strong hairbrushes arising from the metapleura and which cross over the base of the abdomen can be seen at "X". Middle, (*H. butalidella* Walsingham, holotype male (BM slide 4119); Haleakala, forewing 5.5 mm., brownish fuscous with a white streak along the fold and a white subapical fascia. Bottom, (*E. caecinervis* Meyrick, holotype male; Mt. Kaala, Oahu; forewing 7 mm., yellowish brown with the veins marked with fuscous and with a paler streak along the fold. The top and middle specimens are figured in *Fauna Hawaiiensis*.



Figure 879—*Hyposmocoma* (*Hyposmocoma*). Top, *calva* Walsingham, holotype male (abdomen lost); Kona, 4,000 feet, Hawaii; expanse 16 mm.; forewings white and fuscous. Middle, *canella* Walsingham, holotype male (BM slide 4326); Molokai, 3,000 feet; forewing 4 mm., white and fuscous. Bottom, *carbonotata* Walsingham, holotype male (BM slide 4321); Kauai, 3,000 to 4,000 feet; expanse 11 mm.; forewings white with dark fuscous maculae. These three specimens are figured in *Fauna Hawaiensis*.

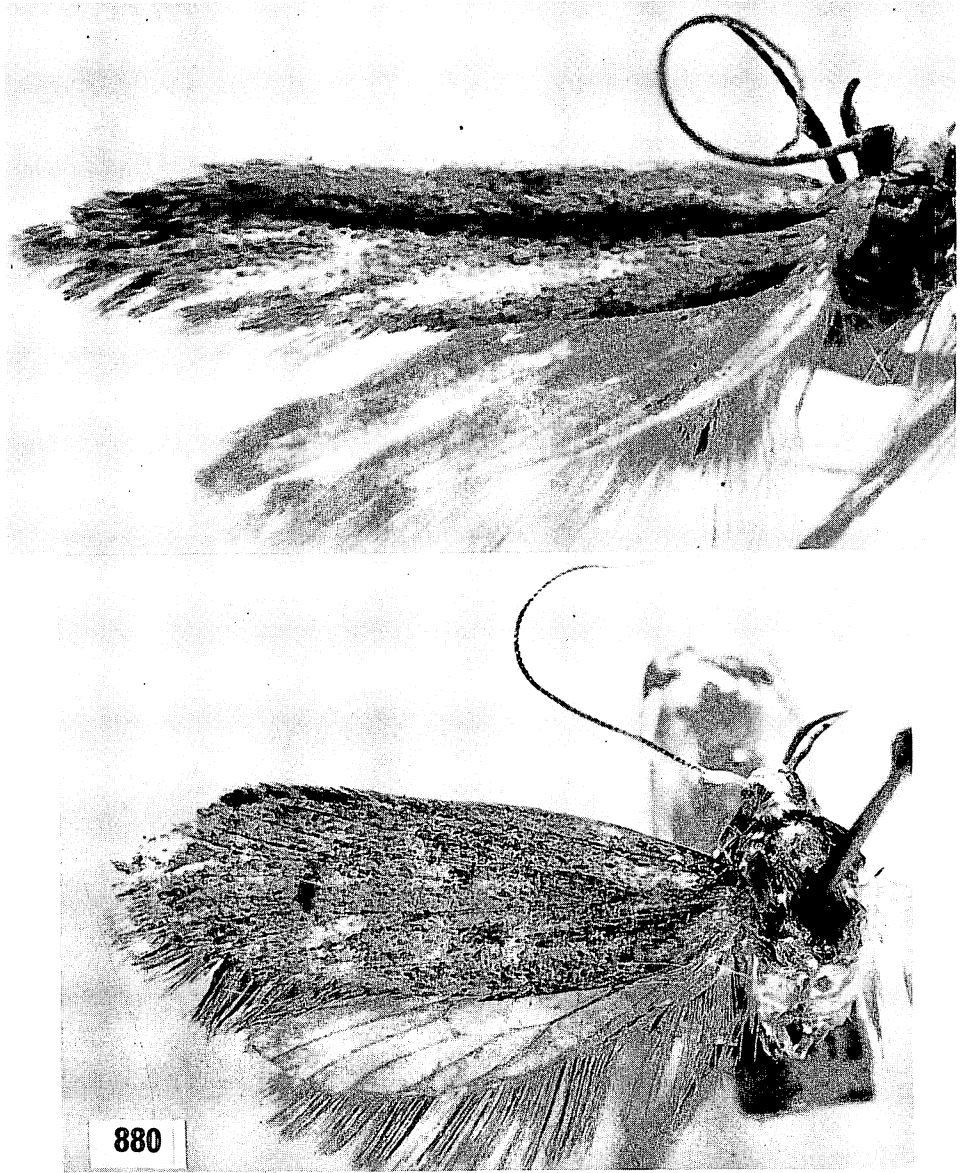


Figure 880—*Hyposmocoma*. Top, (*H. carnea* Walsingham, holotype male (BM slide 4343); Kauai, 3,000 to 4,000 feet; forewing 8.5 mm., straw-colored overlaid by pink and brown shades. This specimen is figured in *Fauna Hawaiiensis*. Bottom, (*E. catapyrrha* (Meyrick), holotype male (abdomen lost); Olinda, Maui, ex *Rubus* stem; forewing 11 mm., “golden-ochreous suffused ferruginous” (Meyrick).

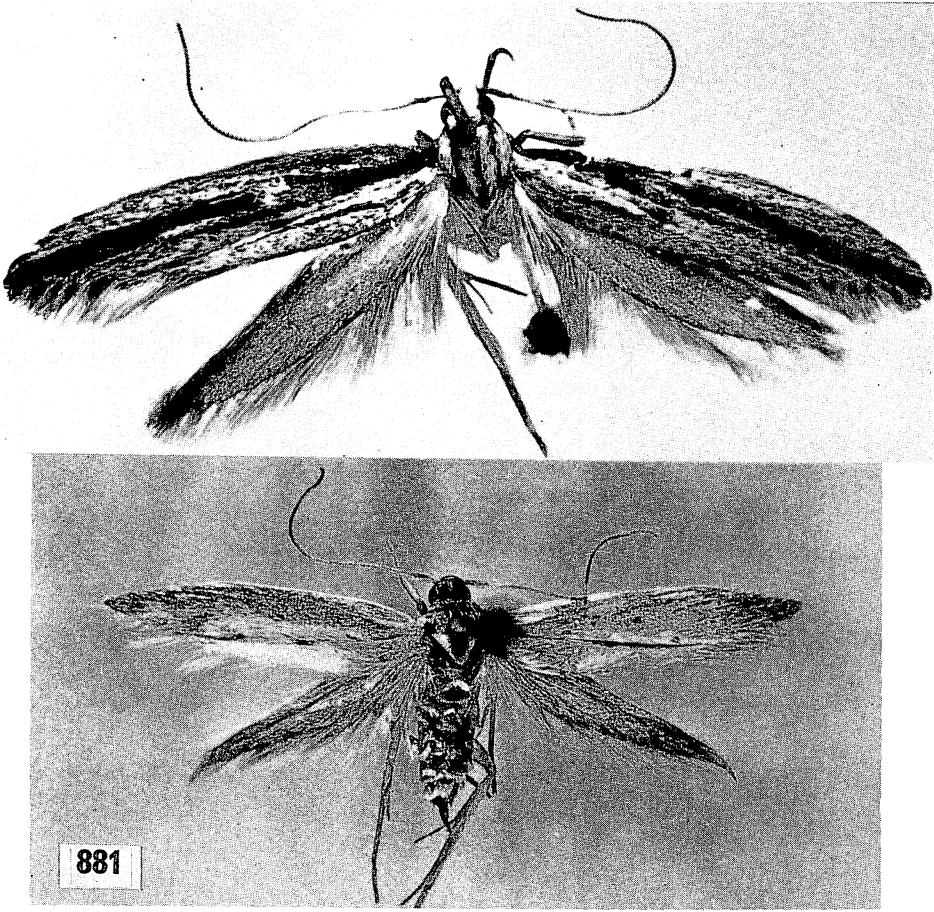


Figure 881—*Hyposmocoma (Euperissus)*. Top, *centralia* Walsingham, holotype male (BM slide 4497); Lihue, 4,000 feet, Kauai; expanse 26 mm.; forewings white with fuscous maculae. Note the strong vernal brushes on the hindwings. This specimen was used for the *Fauna Hawaiiensis* figure. Bottom, *centronoma* Meyrick, holotype female; Kawaihapai, Oahu; forewing 6.75 mm., mostly white or iridescent white suffused with brownish or fuscous costae and with two small fuscous dots on fold (the dark tips of the wings are caused by shadows and are not color).

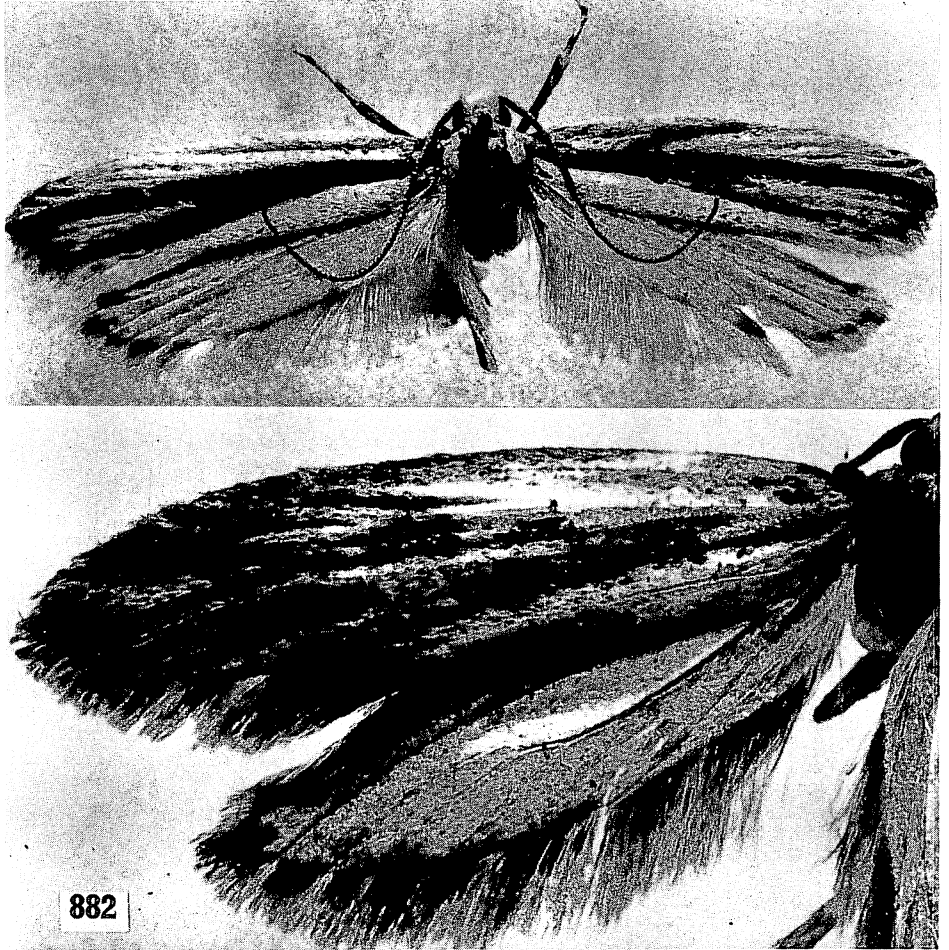


Figure 882—*Hyposmocoma* (*Euperissus*). Top, *chilonella chilonella* Walsingham, holotype male (BM slide 4499); Kauai, 3,000 to 4,000 feet; expanse 23.5 mm.; forewings straw-colored with brownish fuscous markings; there is a moderate tuft of long scales on each metapleuron. Bottom, *chilonella percondita* Walsingham, holotype male (BM slide 4501); Kilauea, Hawaii; forewing 13 mm., mostly yellowish fuscous to fuscous (the pale areas are abraded); a moderate scale tuft is on the metapleuron. These specimens are illustrated in *Fauna Hawaïiensis*.



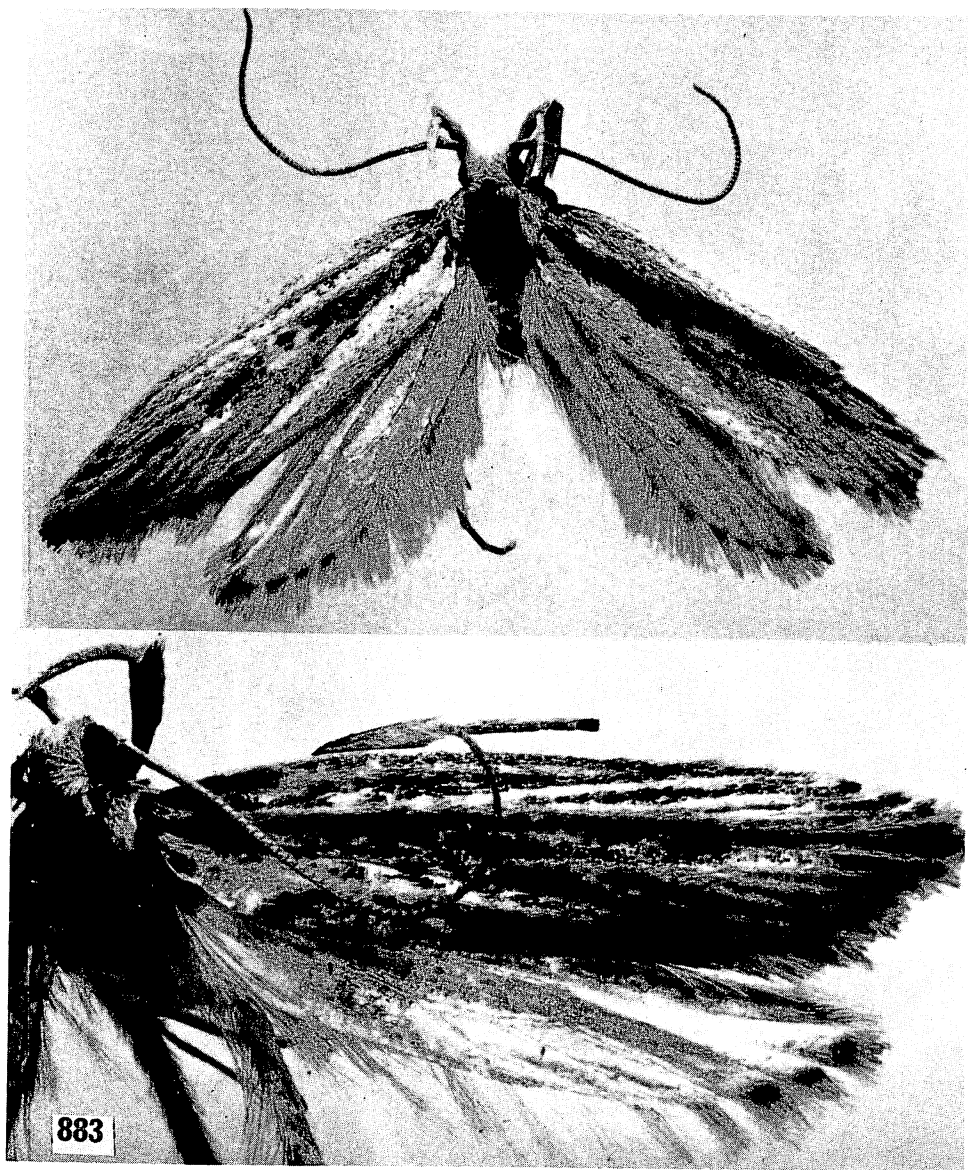


Figure 883—*Hyposmocoma* (*Euperissus*). Top, *chilonella triocellata* Walsingham, holotype male (BM slide 4498); Molokai, about 4,000 feet; forewing 11 mm., basically cream-colored with yellowish to fuscous maculae. There is a moderate tuft of long scales on each metapleuron. Note the well-developed tufts on the vannal areas of the hindwings. Bottom, *chilonella venosa* Walsingham, holotype male (BM slide 4500); Kauai, 3,000 to 4,000 feet; forewing 11 mm., background scaling pale straw-colored with mostly fuscous markings and fuscous scales along the veins. The metapleural tuft of scales appears to be moderate. These specimens were used for the *Fauna Hawaiiensis* illustrations.

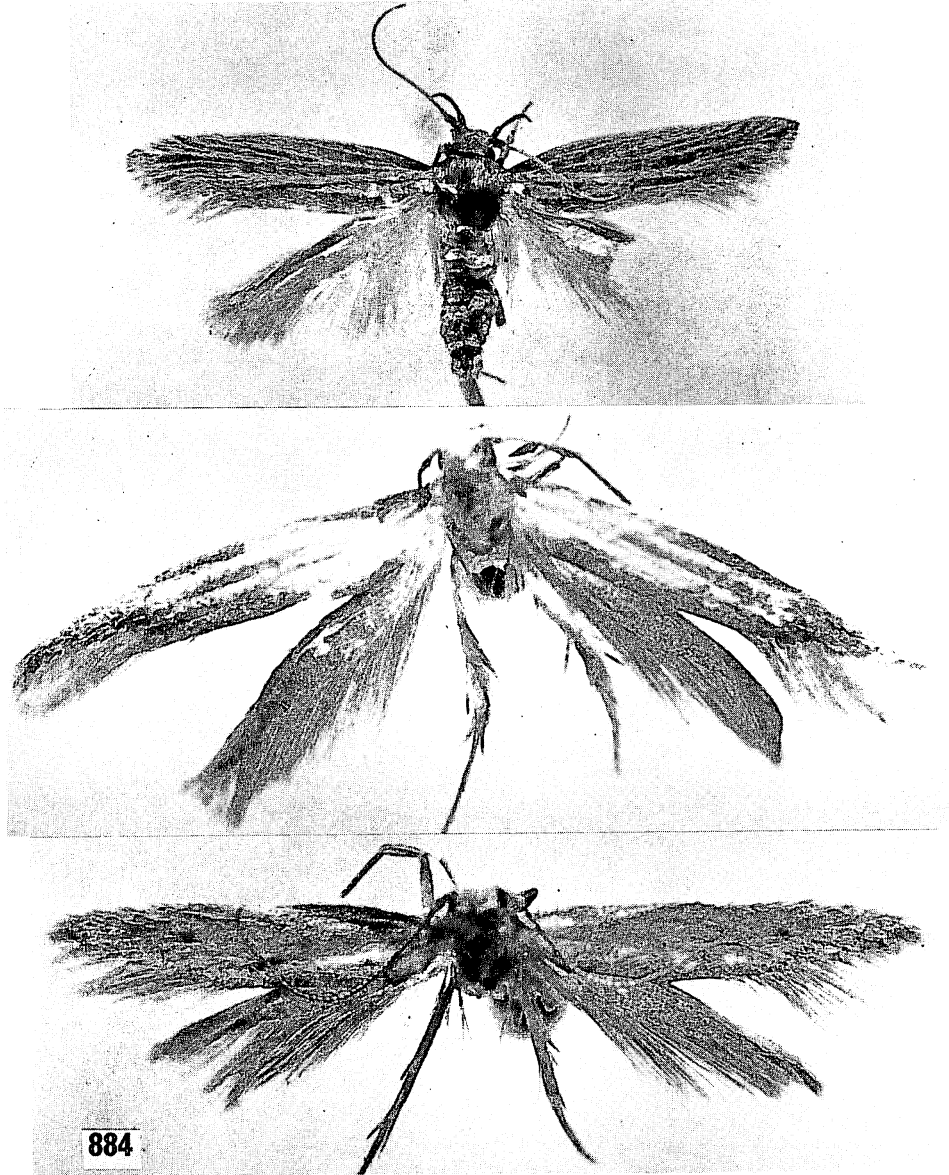
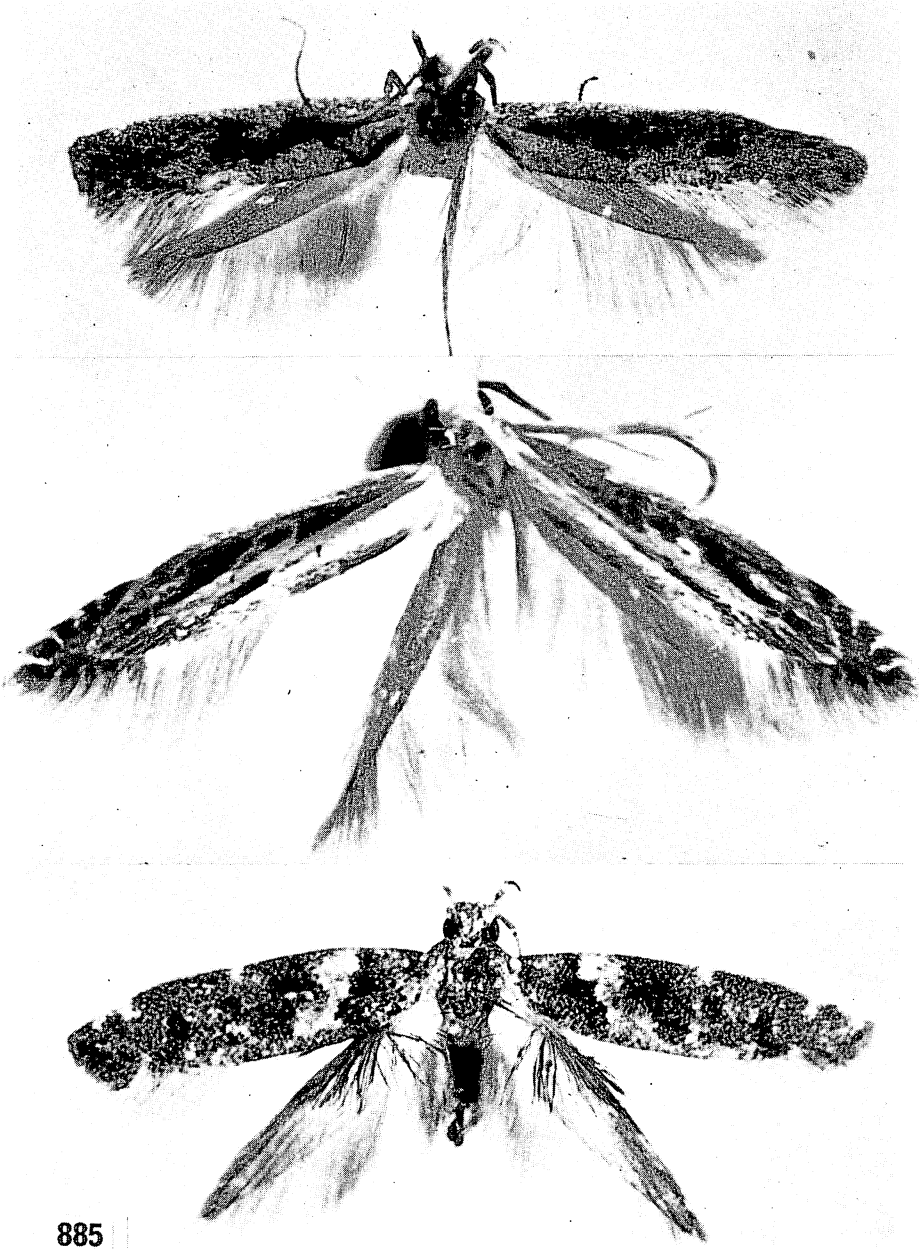


Figure 884—*Hyposmocoma*. Top, (*E.*) *chloraula* Meyrick, holotype male (slide Z-I-23-61-2); Summit Camp, Kauai, ex *Astelia*; forewing 8 mm., fuscous and whitish. Middle, (*H.*) *cincta* Walsingham, holotype female (BM slide 7060); Halemanu, Kauai, 4,000 feet; expanse 13 mm.; forewings with median zone mostly very pale and the margins brownish fuscous in distinct contrast. This is a poor photograph. Bottom, (*H.*) *adjacens* (Walsingham) (formerly considered a form of *cincta*), holotype female (BM slide 4472); Kauai, 3,000 to 4,000 feet; expanse 13 mm.; forewings with straw-colored background on which there are mostly scattered brownish fuscous maculae. The middle and bottom specimens are figured in *Fauna Hawaiiensis*.



885

Figure 885—*Hyposmocoma*. Top, (*H.*) *cinereosparsa* Walsingham, holotype male (BM slide 4328); Kauai, 3,000 to 4,000 feet; expanse 12 mm.; forewings fuscous and white. Middle, (*E.*) *cleodorella* (Walsingham) ("*Neelysia*"), holotype male (BM slide 4435); Kona, 4,000 feet, Hawaii; forewing 5.5 mm., white and fuscous. There is an incipient brush of long scales on each metapleuron beneath the bases of the hindwings. Bottom, (*H.*) *new species 11* (Walsingham specimen 25160; BM slide 14317); Waianae Mts., about 3,000 feet, Oahu; expanse 15 mm.; forewings have scales which are mostly yellowish and greenish tipped with fuscous, and with white maculae. Note the expanded subcostal brushes on the hindwings. See the text for additional details. The top and middle specimens are figured in *Fauna Hawaiiensis*.

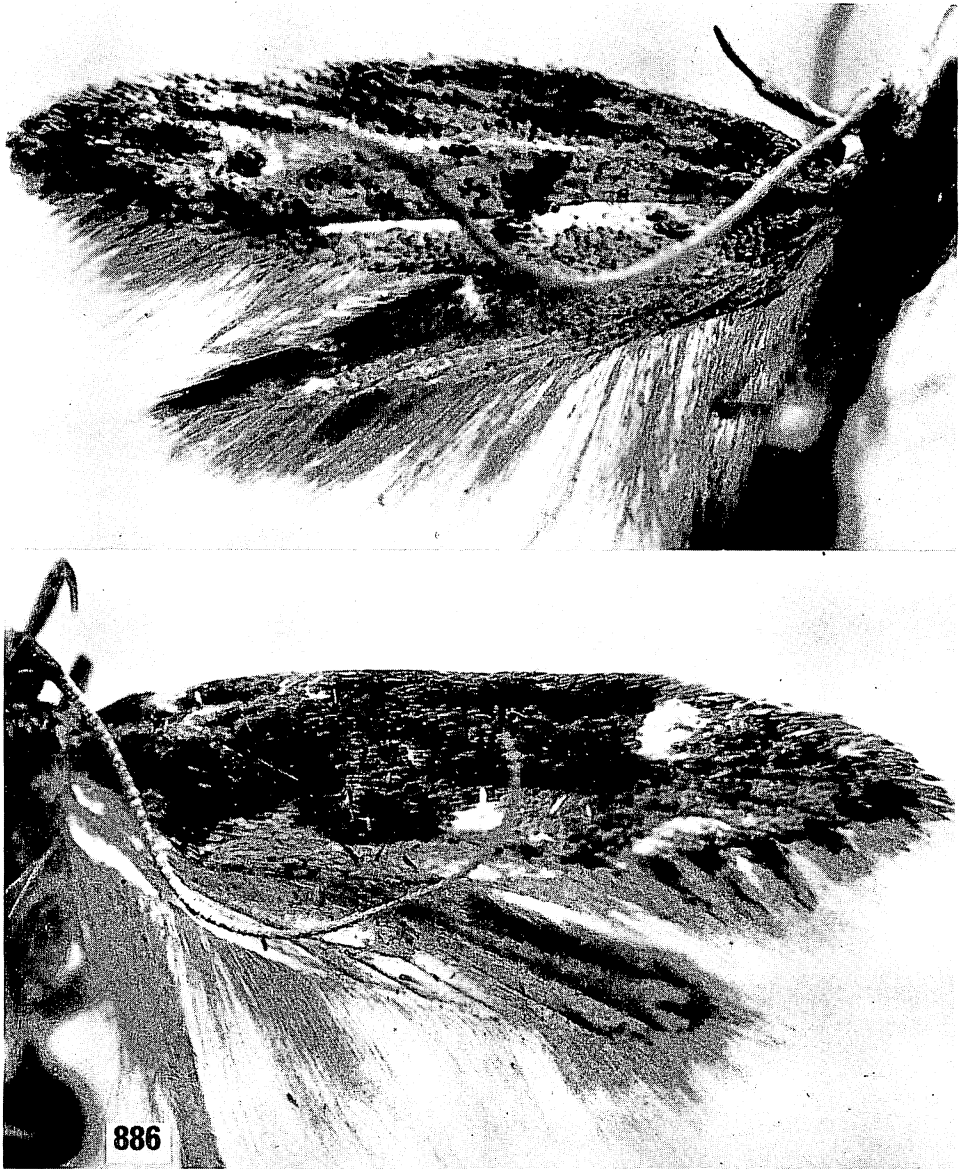


Figure 886—*Hyposmocoma*. Top, (*E.*) *columbella* (Walsingham) (“*Aphthonetus*”) allotype male (BM slide 4744); Molokai, over 3,000 feet; forewing 6.25 mm., white with some yellow and with mostly fuscous maculae. Bottom, (*H.*) *commensella* Walsingham, holotype male (BM slide 4086); Kilauea, Hawaii; expanse 18 mm.; forewing fuscous with coppery reflections and with white maculae. There is a moderate metapleural scale tuft. These specimens are figured in *Fauna Hawaiiensis*.

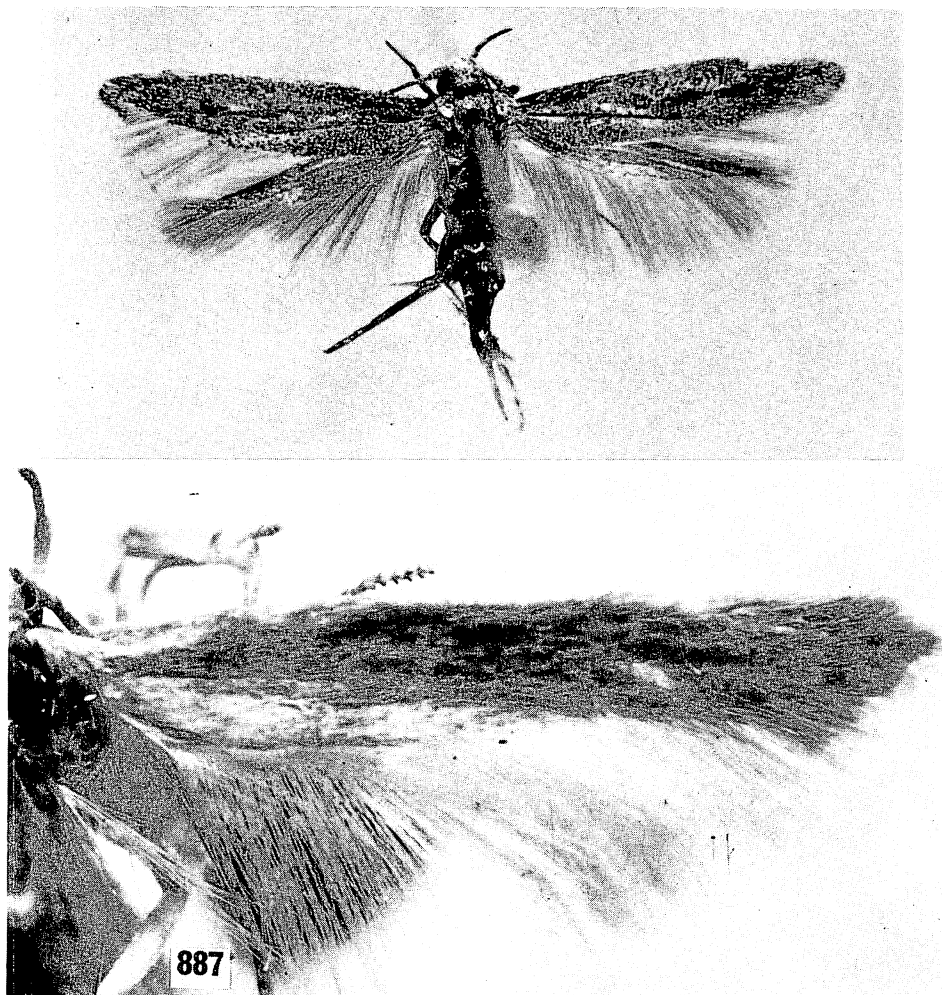


Figure 887—*Hyposmocoma*. Top, (*H.*) *communis* (Swezey) (“*Petrochroa*”), Honolulu; forewing 4.25 mm. Bottom, (*E.*) *complanella* (Walsingham) (“*Neelysia*”), holotype male (BM slide 4459); Molokai, over 3,000 feet; forewing 5 mm., mostly orange. These specimens were used for the *Fauna Hawaiiensis* figures.

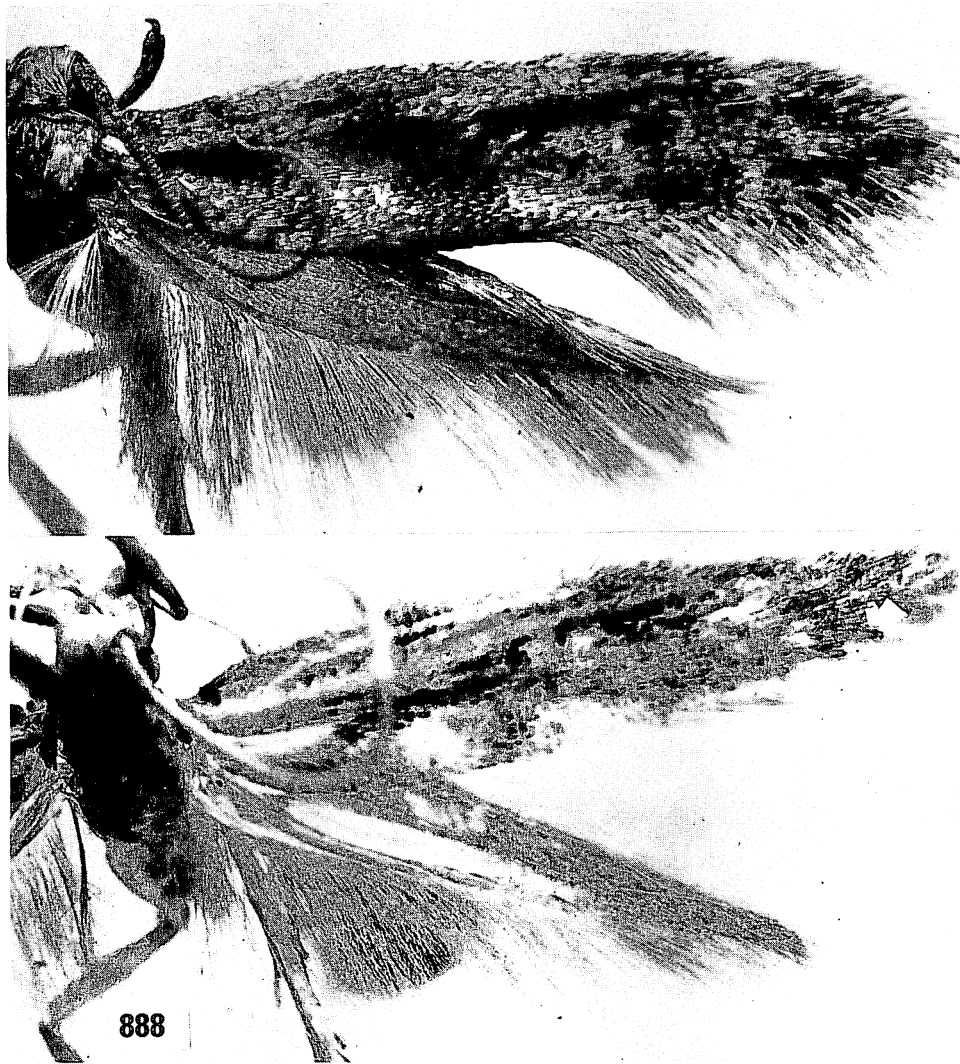


Figure 888—*Hyposmocoma*. Top, (*H.*) *conditella* Walsingham, holotype male (abdomen lost); Kauai, 3,000 to 4,000 feet; forewing 7.5 mm., mixed white and fuscous. Bottom, (*E.*) *confusa* (Walsingham) ("*Aphthonetus*"), holotype male (BM slide 4746); Olinda, 4,000 feet, Maui; forewing 6 mm., basically white with some yellow and with brownish to fuscous maculae. These specimens were used for the *Fauna Hawaiiensis* illustrations.

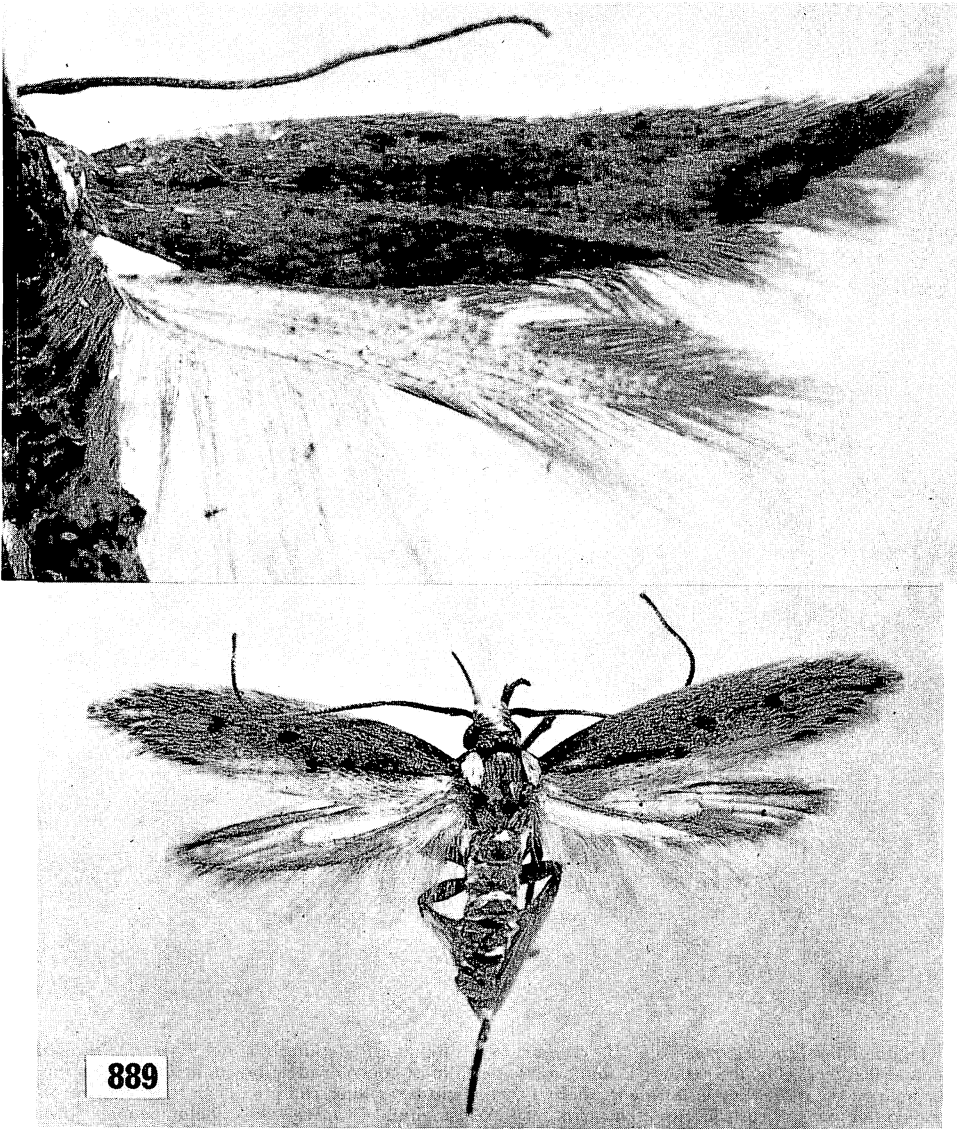


Figure 889—*Hyposmocoma*. Top, (*H.*) *continuella* Walsingham, holotype female (BM slide 7062); Haleakala, 5,000 feet, Maui; forewing 5 mm., mostly fuscous with a paler vitta along the fold, as faintly indicated in the photograph. This specimen is illustrated in *Fauna Hawaiiensis*. Bottom, (*E.*) *coprosmae* (Swezey) ("*Semnoprepia*"), holotype male; Malamalama, Mt. Konahuanui, Oahu; forewing 8.5 mm., mostly ochreous brown and with three fuscous dots as shown (the anterior parts of the wings are too dark in the photograph, and the dark dots are not revealed with enough contrast).

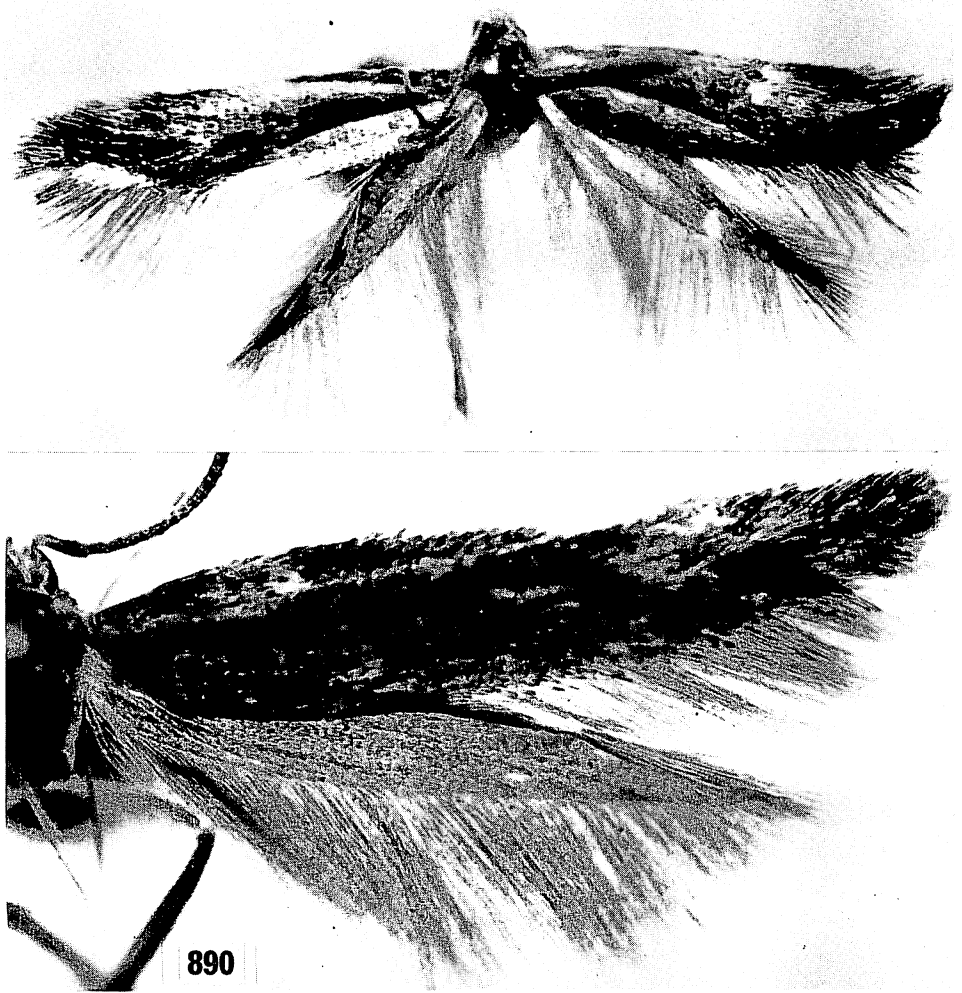


Figure 890—*Hyposmocoma*. Top, (*H.* *coruscans* (Walsingham) (“*Agonismus*”), holotype (BM slide 5435); Kona, 4,000 feet, Hawaii; expanse 9 mm.; forewings almost concolorous submetallic greyish fuscous (the pale area on the right wing is abraded); there is a small cluster of long, sharp hairs on the metapleuron, but these do not form a brush. Bottom, (*E.* *corticicolor* (Walsingham) (“*Aphthonetus*”), holotype male (BM slide 4740): Haleakala, 5,000 feet, Maui; forewing 6 mm., mostly yellowish brown with cream and fuscous scaling and maculae (the photograph is too dark). These specimens were used for the *Fauna Hawaiiensis* illustrations.



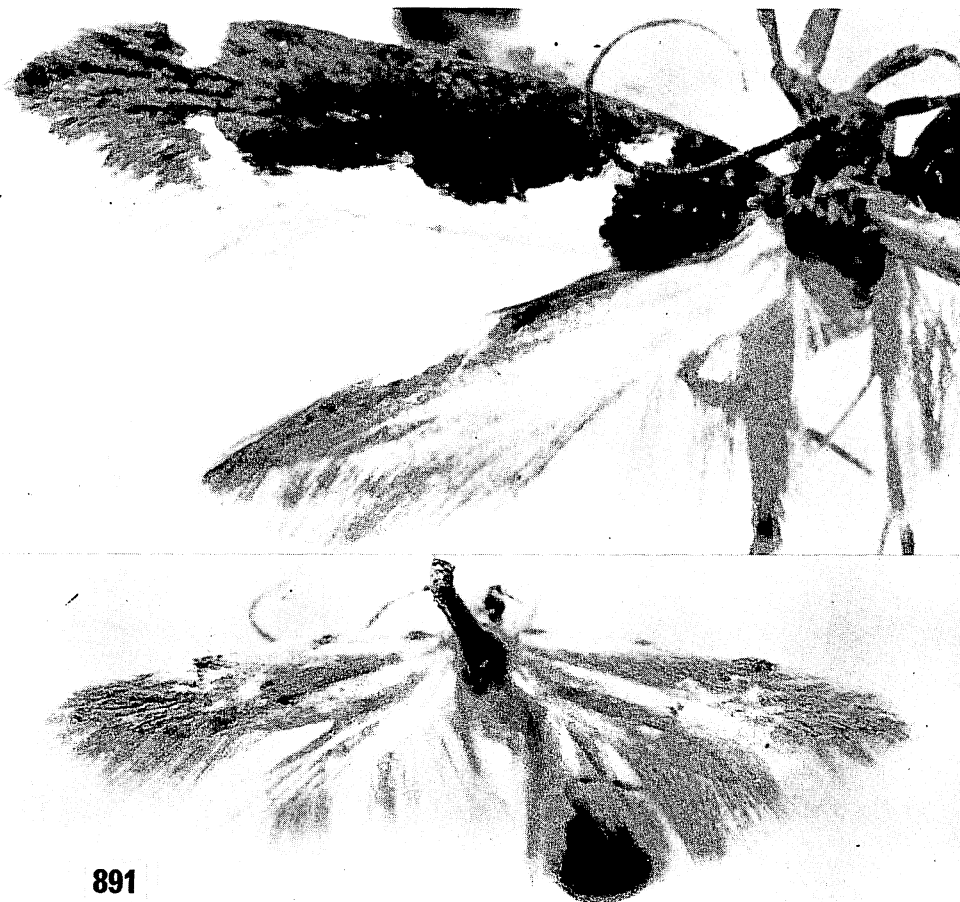


Figure 891—*Hyposmocoma* (*Hyposmocoma*). Top, *corvina* (Butler), holotype male (BM slide 4083); Haleakala, Maui; forewing 7.25 mm., black and white; note the black subcostal brush on the hindwing. Bottom, *costimaculata* Walsingham, holotype male (BM slide 4110); Molokai, above 3,000 feet; forewing 4.25 mm., golden yellow with fuscous maculae (this is a rather poor photograph). These two specimens were used for the illustrations in *Fauna Hawaïensis*.

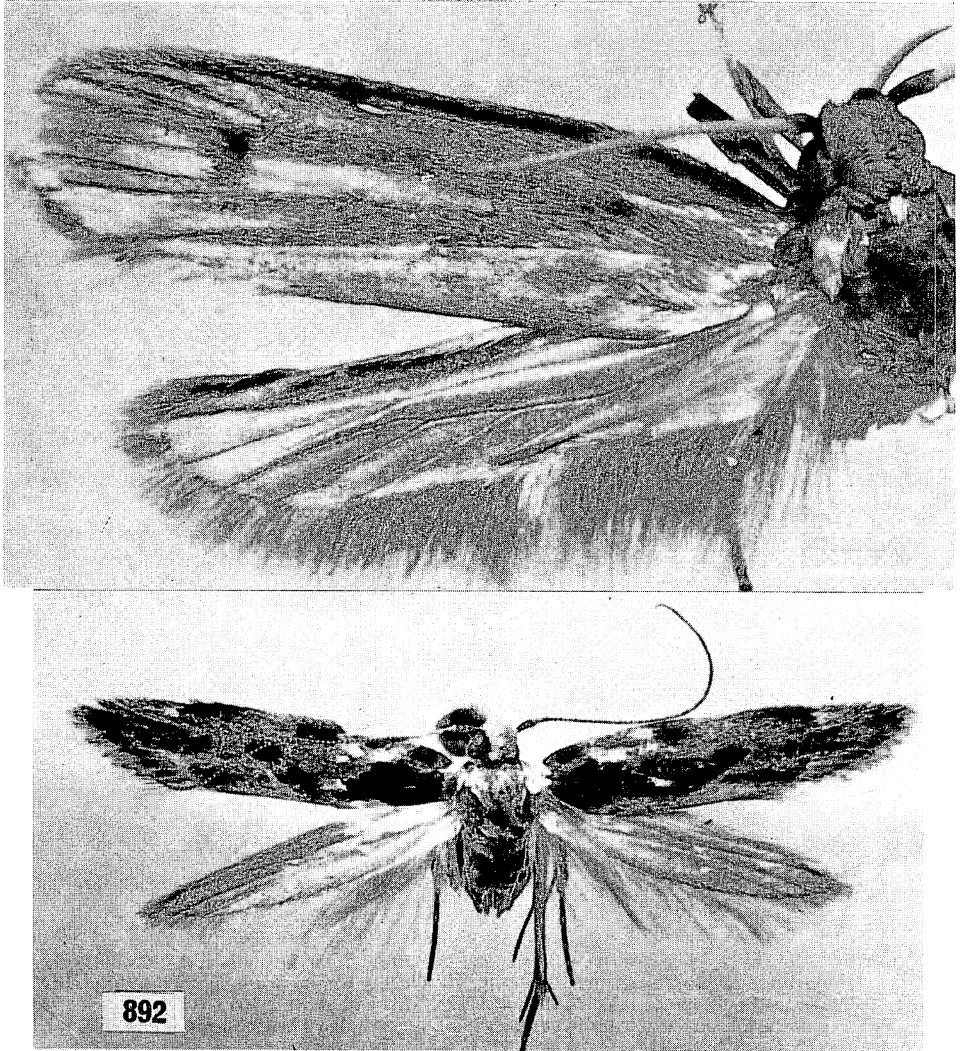


Figure 892—*Hyposmocoma*. Top, (*E.*) *cristata* (Butler), holotype male (BM slide 4390); mountains near Honolulu; forewing 10.5 mm., pale tan, or, in some light, pinkish-buff with fuscous maculae and shiny. This specimen is illustrated in *Fauna Hawaiiensis*. Bottom, (*H.*) *crossotis* Meyrick, holotype female (abdomen lost); Koolau Mts., near Honolulu; expanse 21 mm.; forewings with purplish brown background scaling with black maculae and rather dirty cream-colored areas.

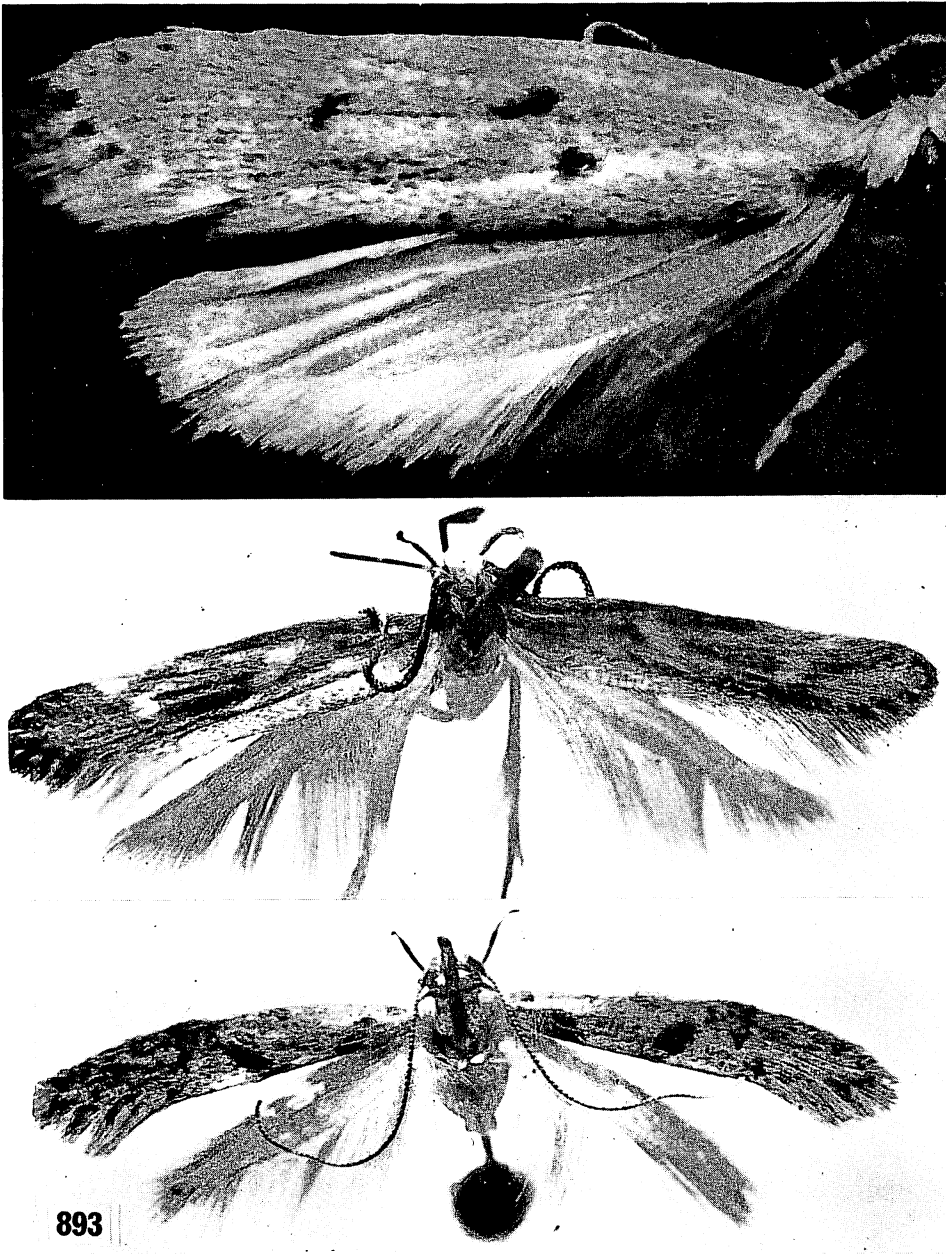


Figure 893—*Hyposmocoma*. Top, (*E.*) *cryptogamiella* (Walsingham) ("*Hyperdasylella*"), holotype male (BM slide 4428); Oloa, Hawaii; forewing 8.5 mm., buff with scattered fuscous scales and maculae. Middle, (*E.*) *cuprea* (Walsingham) ("*Neelysia*"), holotype male (BM slide 4433); Kauai, 3,000 to 4,000 feet; expanse 11.5 mm.; forewings coppery with yellow maculae. Bottom, (*H.*) *cupreomaculata* Walsingham, holotype female (BM slide 4474); Molokai, 3,000 feet; expanse 13.5 mm.; forewings with background scaling mostly dirty white, pale fuscous scale tips, darker fuscous maculae, and some coppery reflections. These specimens are illustrated in *Fauna Hawaiiensis*.

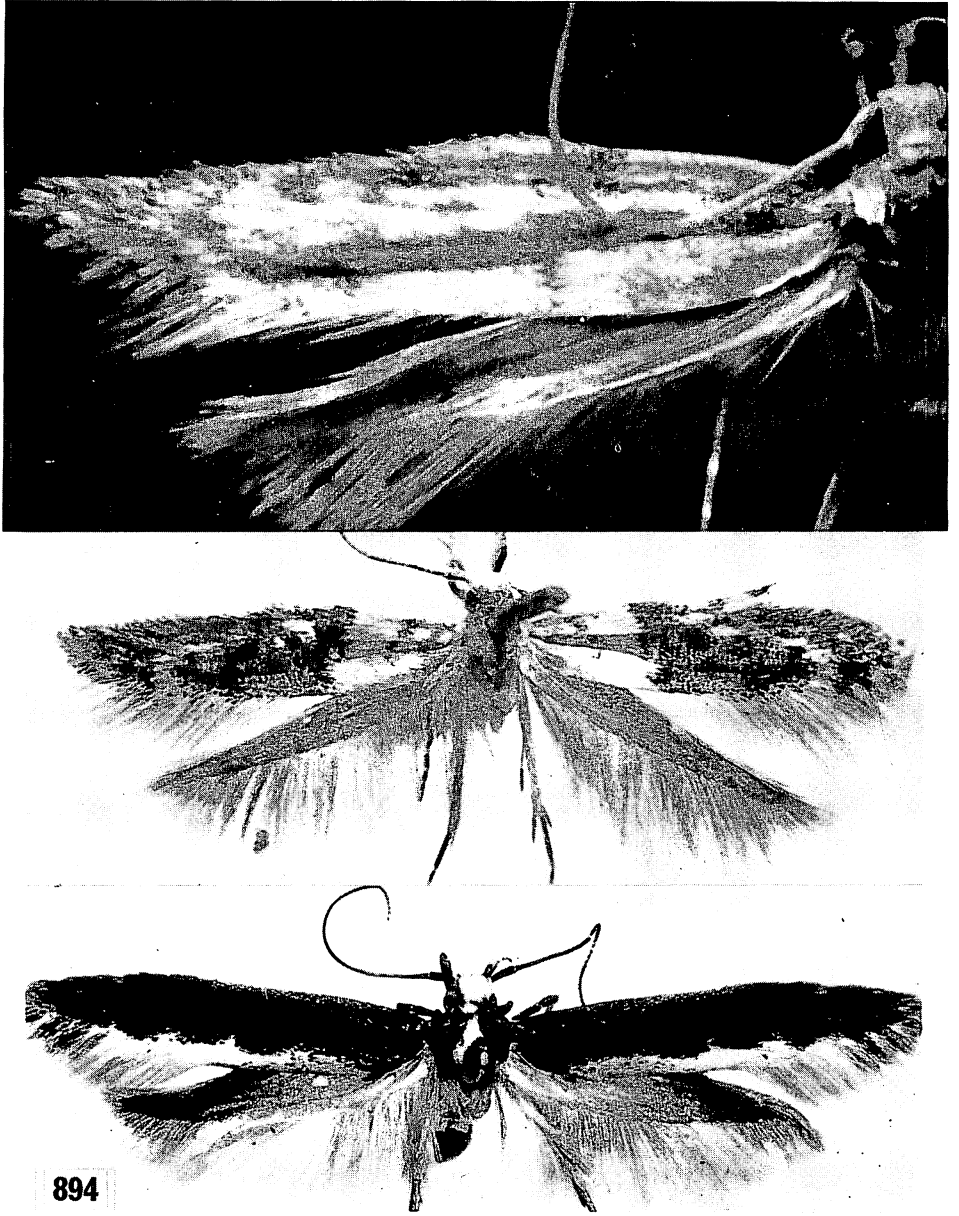


Figure 894—*Hyposmocoma*. Top, (*E.*) *diffusa* (Walsingham) (“*Aphthonetus*”), holotype male (BM slide 4423); Olinda, 4,000 feet, Maui; forewing 9 mm., white with ferrugineous- and fuscous-tipped scales scattered on the wing and condensed in maculae, thus giving the wing a brown and white appearance. Middle, (*E.*) *digressa* (Walsingham) (“*Aphthonetus*”), holotype male (BM slide 4745); Haleakala, 5,000 feet, Maui; expanse 12 mm.; forewings white with brownish to fuscous maculae. Bottom, (*H.*) *discella* Walsingham, allotype male (BM slide 4084); Kaholuamano, 4,000 feet, Kauai; expanse 17 mm.; forewings black and white; there is a moderate metapleural tuft. The top and middle specimens were used for the *Fauna Hawaiiensis* illustrations.

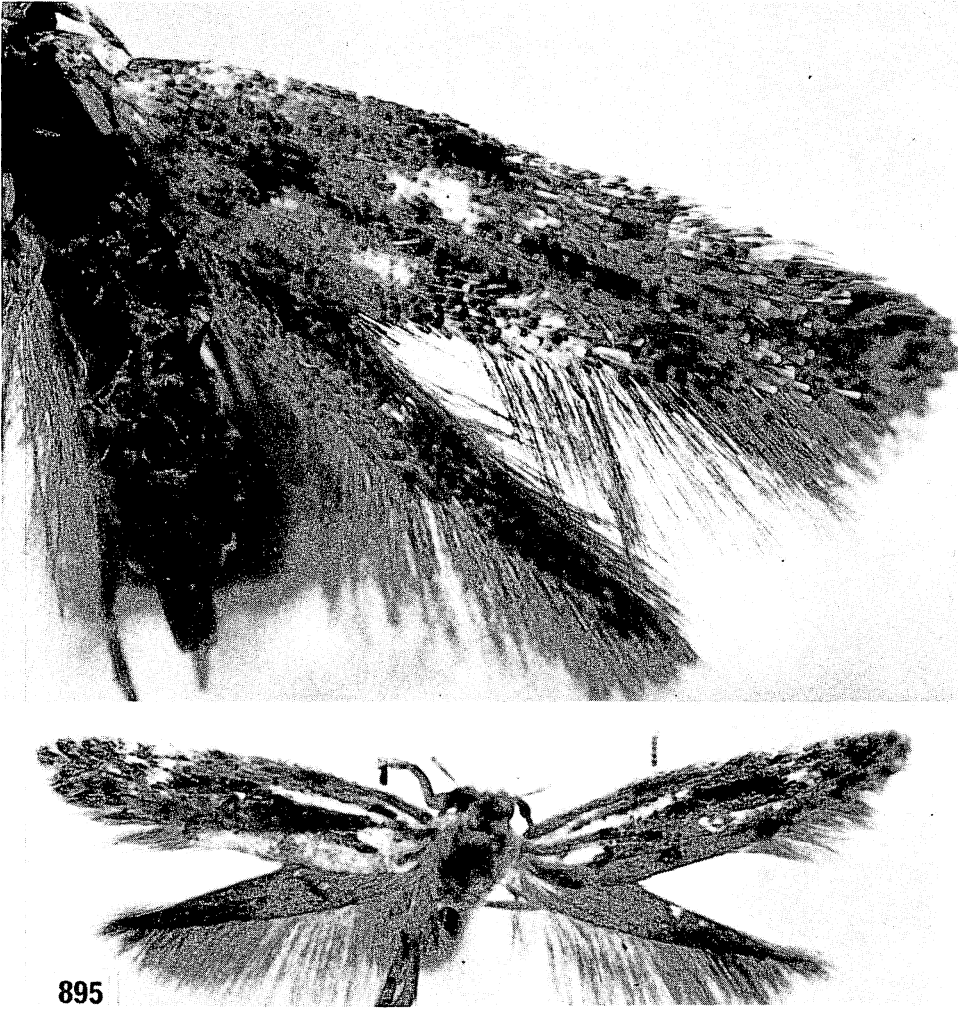


Figure 895—*Hyposmocoma (Euperissus)*. Top, *discolor* Walsingham, holotype female (BM slide 7172); Kilauea, Hawaii; forewing 5.25 mm., yellowish, white, and fuscous (several of the pale-appearing areas are abrasions). Bottom, *divergens* (Walsingham) ("*Aphthonetus*"), holotype male (BM slide 5237); Molokai, above 3,000 feet; expanse 11 mm.; forewings ferruginous with yellow and fuscous vitta and maculae and with some white in the preapical areas. These specimens were used for the *Fauna Hawaiiensis* illustrations.

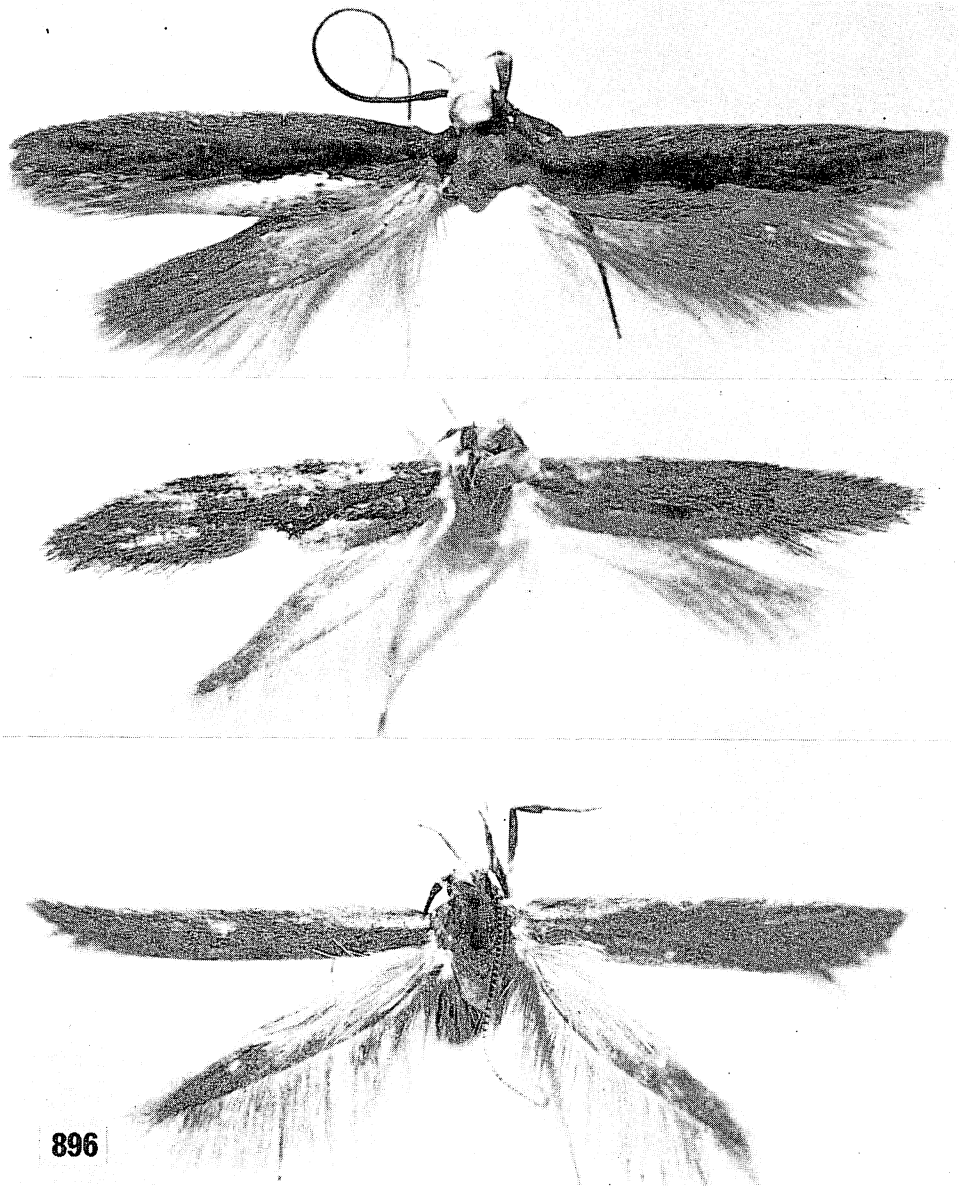
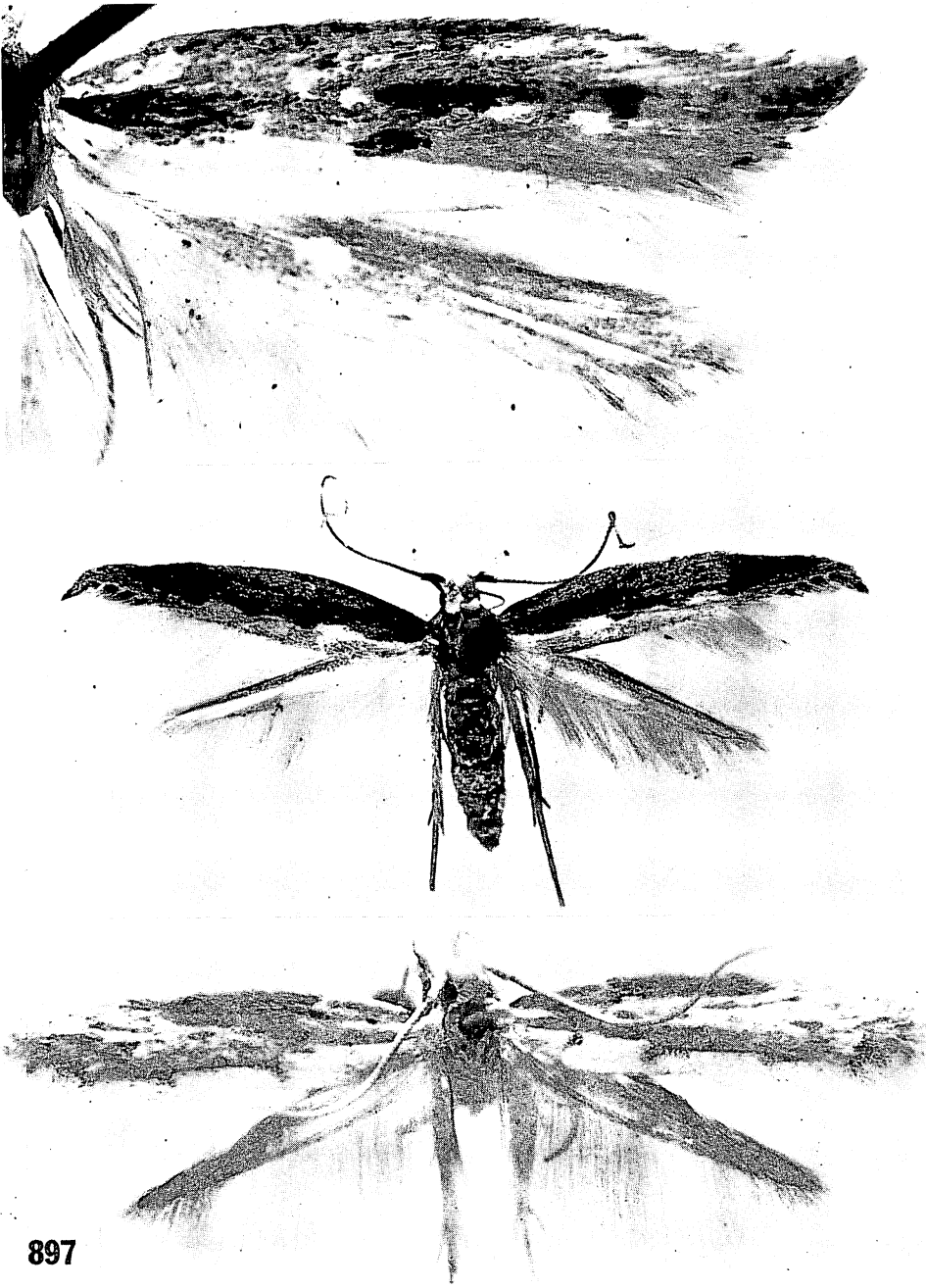


Figure 896—*Hyposmocoma* (*Hyposmocoma*). Top, *divisa* Walsingham, holotype male (abdomen lost); Kauai, 3,000 to 4,000 feet; expanse 15 mm.; forewings black and white. Middle, *domicolens* (Butler), holotype female (wrongly labeled as a male) (BM slide 4096); Makawao, about 2,000 feet, Maui; expanse 13.5 mm.; forewings straw-colored and fuscous. Bottom, *suffusa* (Walsingham) (formerly considered to be a form of *domicolens*), holotype male (BM slide 4095); Kilauea, Hawaii; expanse 18 mm.; forewings with the scales mostly greyish white and tipped with yellowish or brownish which gives a brownish cast; note the expanded pale yellow subcostal brushes on the hindwings. These specimens are illustrated in *Fauna Hawaiiensis*.



897

Figure 897—*Hyposmocoma* (*Euperissus*). Top, *dorsella* Walsingham, holotype male (BM slide 4331); Waianae Mts., 3,000 feet, Oahu; forewing 7 mm., cream-colored and brownish fuscous with fuscous maculae. Middle, *ekaha* (Swezey) ("*Euhyposmocoma*"), holotype; Halawa Valley, Oahu; forewing 8 mm., brown with posterior whitish ochreous zone sprinkled with brownish scales. Bottom, *elegans* (Walsingham) ("*Aphthonetus*"), holotype male (BM slide 4756); Olinda, 4,000 feet, Maui; expanse 18 mm.; forewings with the background scaling white and pale green with fuscous-tipped scales which form maculae. A long tuft of hair arises from the axil of each hindwing. The top and the bottom specimens are illustrated in *Fauna Hawaiiensis*.

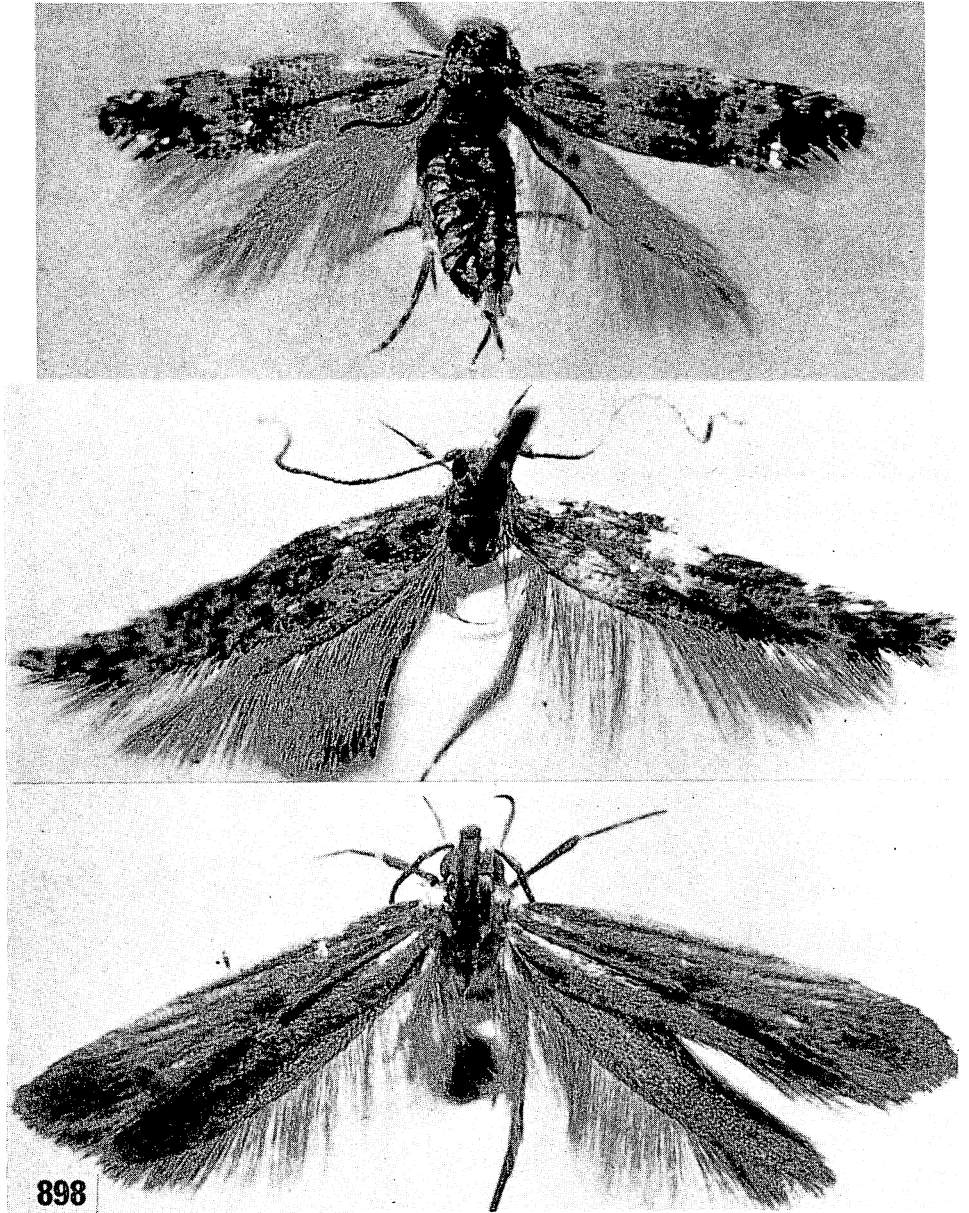
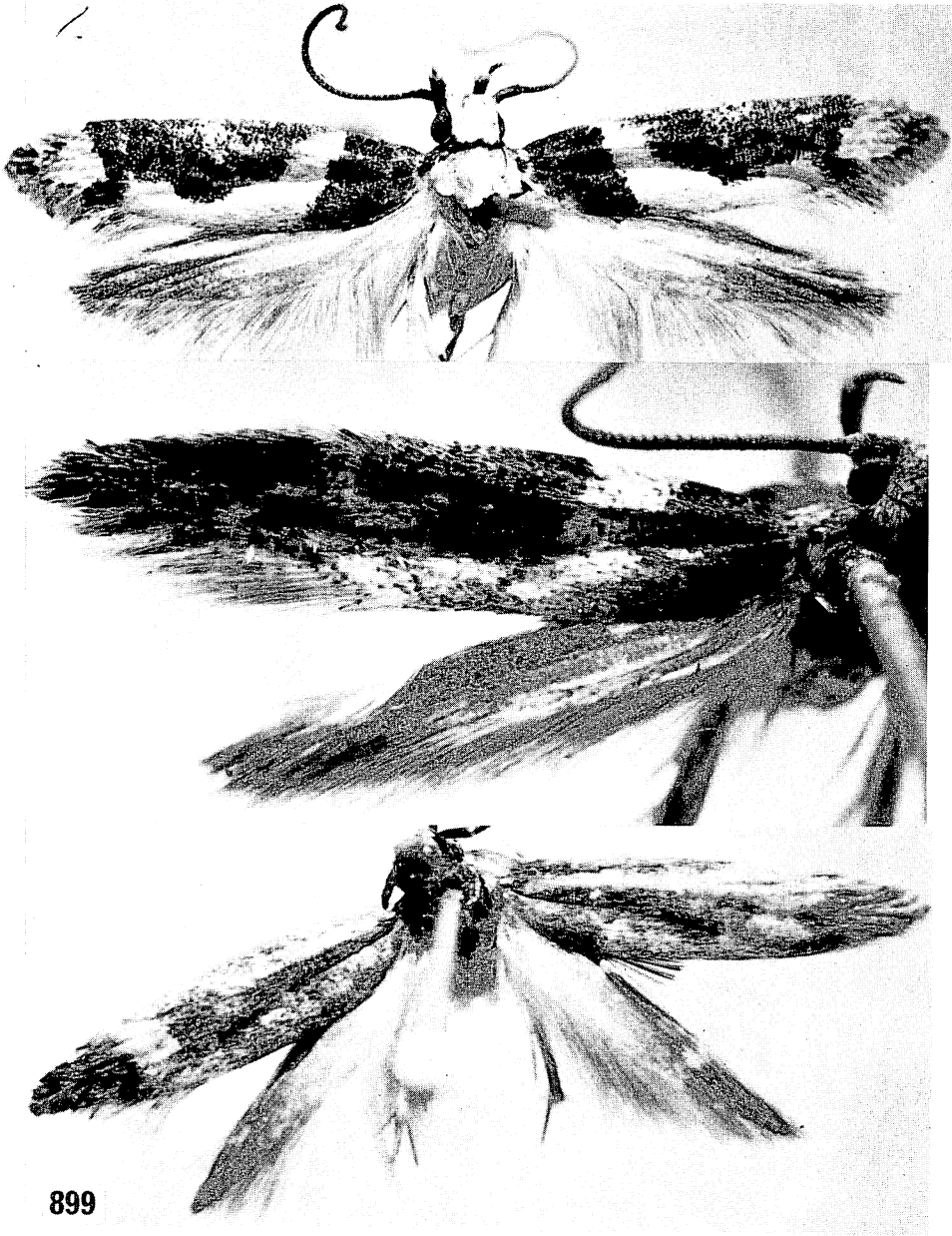


Figure 898—*Hyposmocoma*. Top, (*H. elegantula* (Swezey) (“*Petrochroa*”) lectotype (here designated); Koko Head, Oahu; forewing 2.5 mm., brown and fuscous with a variable whitish fascia near basal fourth, a yellow or whitish macula near distal three-fourths, and scattered submetallic scales distad as revealed by the white spots in the photograph. Middle, (*E. eleuthera* (Walsingham) (“*Aphthonetus*”), holotype female (BM slide 4716); Kilauea, Hawaii; expanse 10 mm.; forewings with mixed white, yellowish, and fuscous scales (the large, pale costal area on the right forewing is an abrasion). Bottom, (*E. emendata* Walsingham, holotype male (BM slide 4138); Haleakala, 5,000 feet, Maui; expanse 14.5 mm.; forewing brownish fuscous with a cream-colored vitta at the basal half of the fold and from there a scattering of cream-colored scales reaching to a cream-colored spot on termen. The middle and bottom specimens are figured in *Fauna Hawaiiensis*.





899

Figure 899—*Hyposmocoma*. Top, (*H.*) *empedota* Meyrick, lectotype male (BM slide 9556 Clarke); Koolau Mts., near Honolulu; expanse 13 mm.; a boldly marked black and white species. Middle, (*E.*) *empetra* (Meyrick) ("*Aphthonetus*"), lectotype male (BM slide 9579 Clarke); Koolau Mts., Oahu; forewing 5 mm., brownish with a broad pale fascia near basal fourth (a shadow the length of the forewing confuses the pattern in the photograph, and the area costad of what appears as a pale area along the posterior part of the wing should appear concolorous). Bottom, (*H.*) *endryas* Meyrick, holotype male (abdomen lost); Koolau Mts., near Honolulu; forewing 4.75 mm., brownish fuscous with paler and darker areas. Note the dark subcostal brushes protruding from the hindwings.

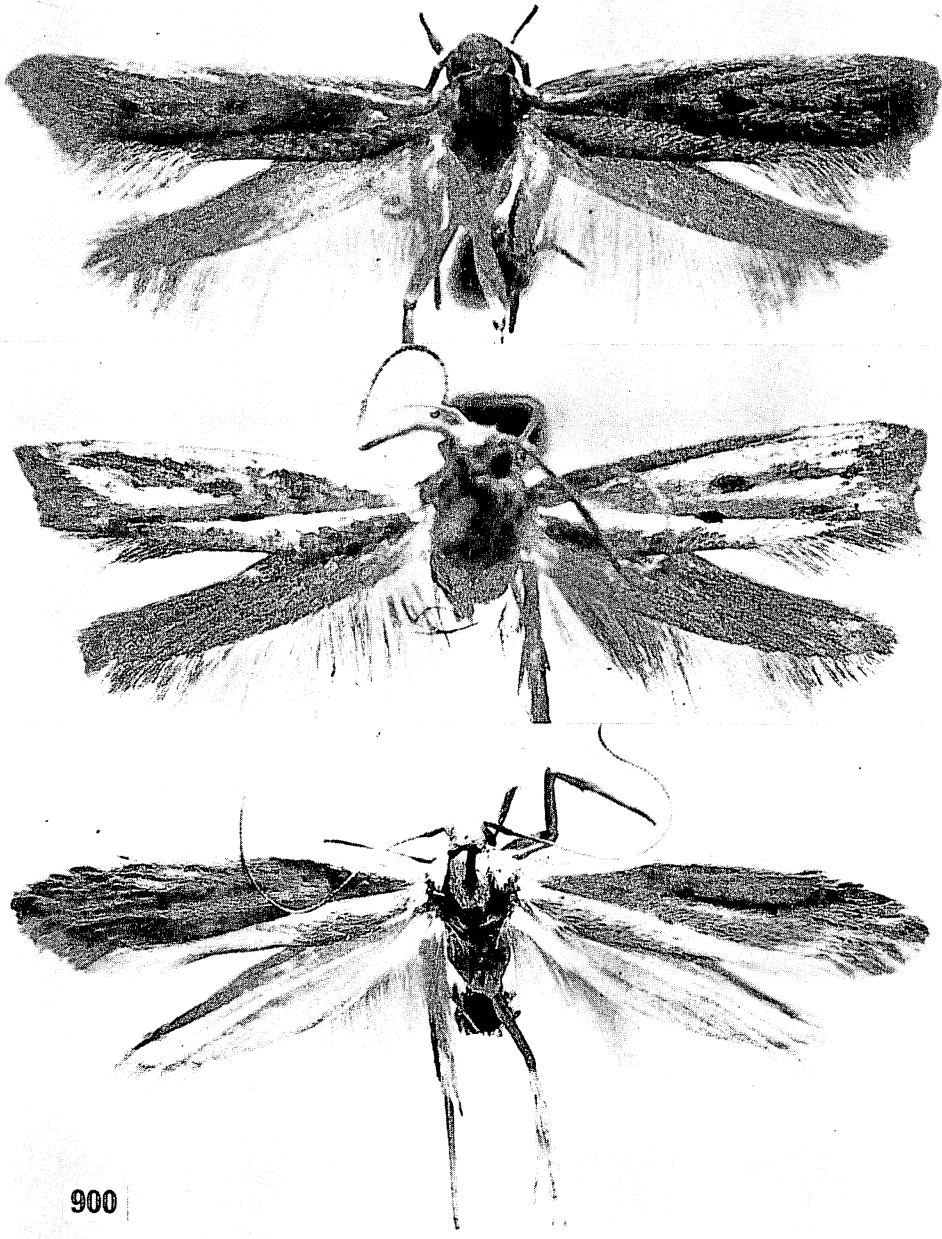


Figure 900—*Hyposmocoma* (*Euperissus*). Top, *enixa* Walsingham, holotype male (BM slide 4134); Kaholuamano, 4,000 feet, Kauai; expanse 13 mm.; forewings brownish fuscous with darker maculae. Middle, *ensifer* Walsingham, holotype male (BM slide 4139); Kilauea, Hawaii; expanse 12.5 mm. as mounted; forewings mostly fuscous with cream and yellow pale areas. There is a small metapleural cluster of long scales. Bottom, *epicharis* Walsingham, holotype female (abdomen lost); Molokai, above 3,000 feet; expanse 28.5 mm. This is one of the largest and finest of the species whose forewings are almost entirely canary yellow (the shadows on the photograph give a misleading impression). The vannal tufts on the hindwings are well developed. These specimens are figured in *Fauna Hawaiiensis*.

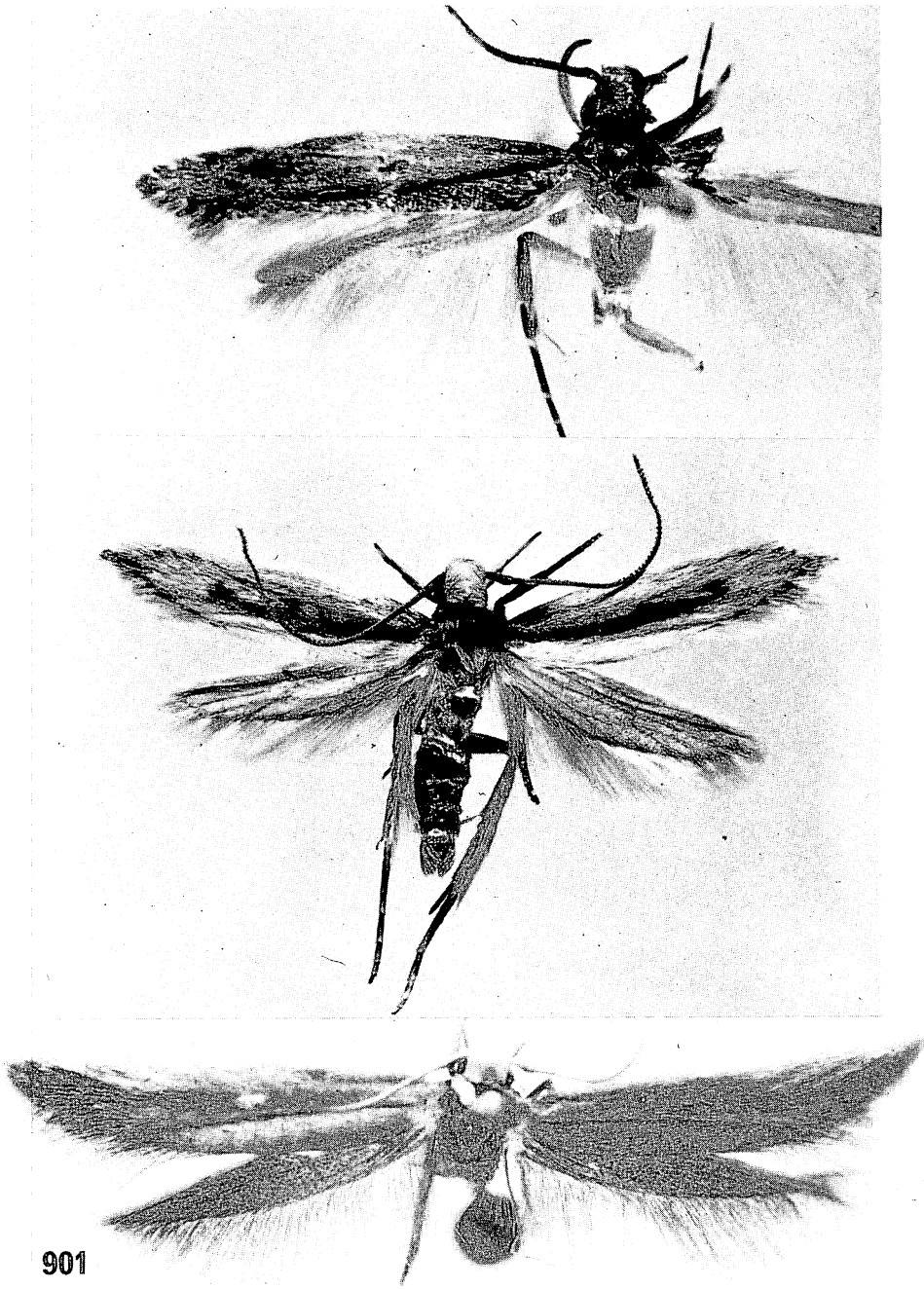


Figure 901—*Hyposmocoma*. Top, (*E.*) *erebogramma* (Meyrick) (“*Neelysia*”), holotype male (damaged, abdomen lost); Kahuku, Oahu, ex *Hesperomannia*; forewing 5 mm., in some lights bronzy brown-fuscous costad and brownish fuscous flecked posteriorly with white squamae and with fuscous maculae (the dark area across the wing at about distal quarter is mostly shadow and not dark color). Middle, (*E.*) *erismatias* Meyrick, holotype male (slide Z-I-22-61-4); Nuuanu, Honolulu; ex *Euphorbia*; forewing 7.25 mm., ochraceous white with prominent brown to fuscous maculae. Bottom, (*H.*) *evanescens* Walsingham, holotype male (BM slide 4113); Haleakala, 5,000 feet, Maui; expanse 14.5 mm.; forewings brassy grey suffused with fuscous (the photograph does not reveal the delicate shading of the colors). This specimen is figured in *Fauna Hawaiiensis*.

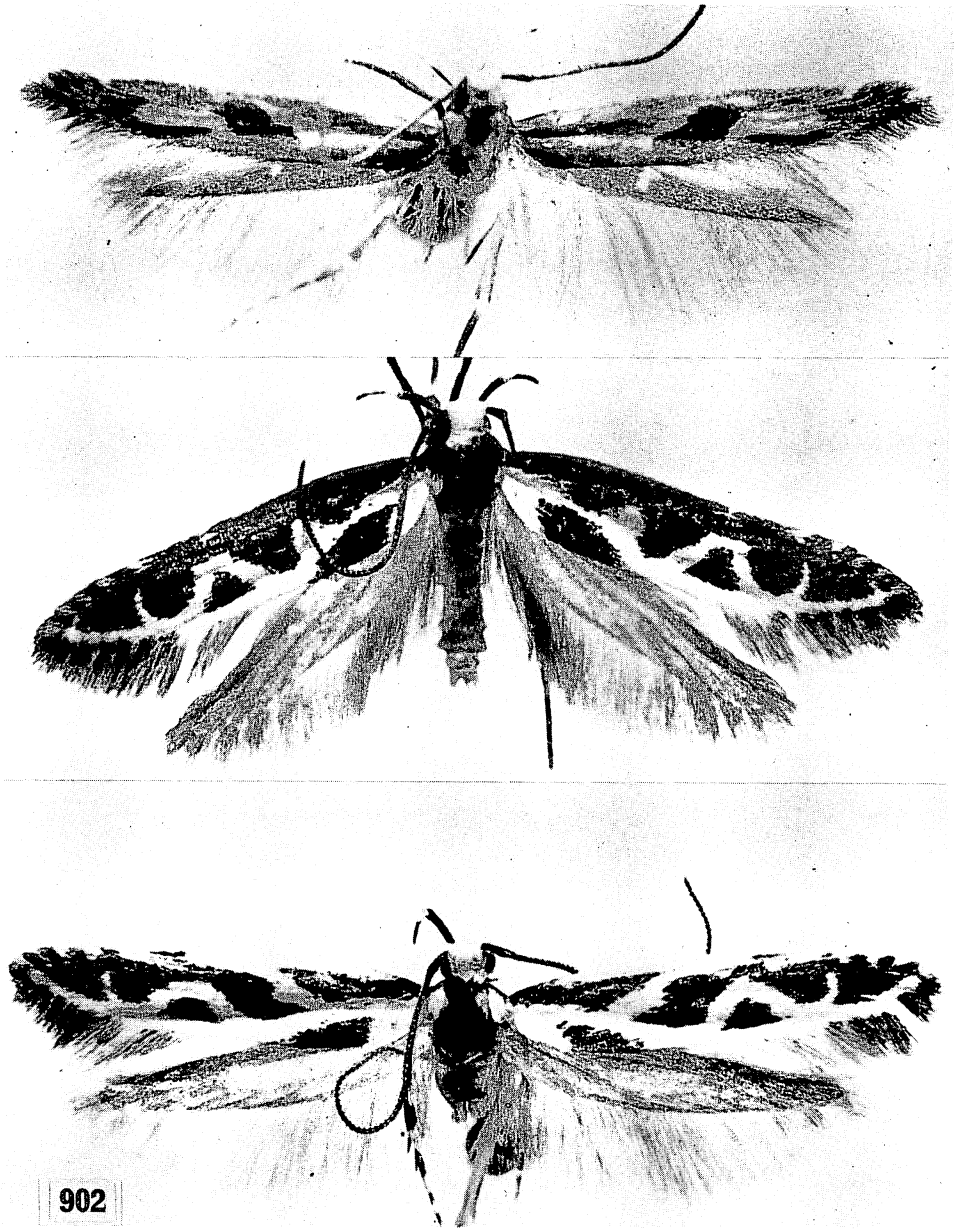


Figure 902—*Hyposmocoma* (*Euperissus*). Top, *exaltata* (Walsingham) (“*Neelysia*”), holotype male (BM slide 4444); Haleakala, 4,000 feet, Maui; expanse 12.5 mm.; forewing yellow to orange with white and fuscous maculae, the submedial oblique fascia is fuscous orange, bordered with fuscous. There is a pair of strong, yellow metapleural brushes which cross over the abdomen, and the abdomen has large, modified dorsal squamae. Middle, *exornata* Walsingham, holotype male (BM slide 5556); Kona, 4,000 feet, Hawaii; expanse 17 mm.; forewings cream and black. Each metapleuron has a weak tuft of long hairs and scales. Bottom, *flavicosta* (Walsingham) (formerly considered a form of *exornata*), holotype male (BM slide 4079); Kilauea, Hawaii; expanse 19.5 mm.; forewings white and cream with bold black maculae. Each metapleuron has a weak tuft of fine hairs and long slender squamae. These three specimens are figured in *Fauna Hawaiiensis*.

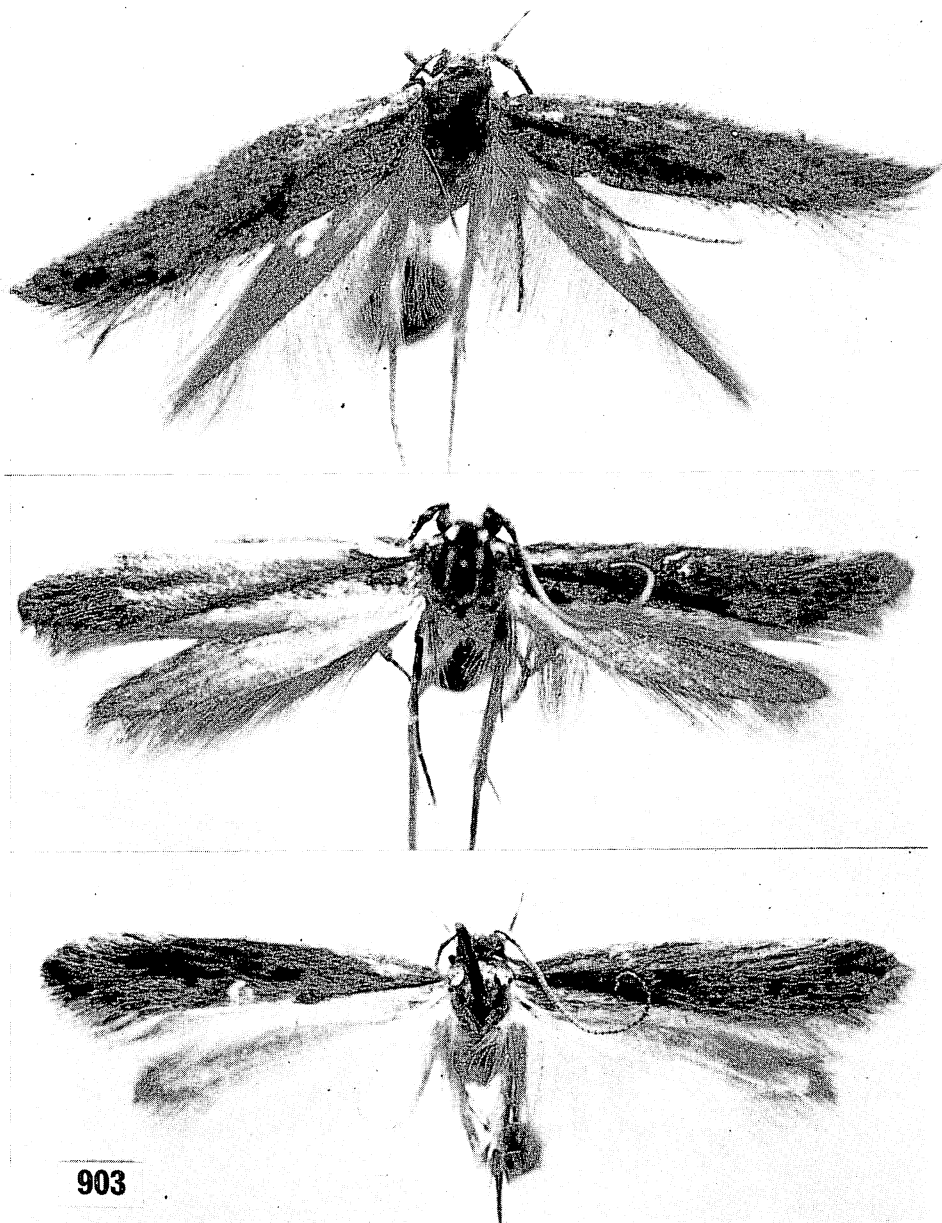


Figure 903—*Hyposmocoma*. Top, (*E.*) *exsul* (Walsingham) (“*Aphthonetus*”), holotype female (BM slide 4414); Kilauea, Hawaii; expanse 12 mm.; forewings with whitish background densely set with brownish and fuscous-tipped scales. Middle, (*H.*) *fallacella* Walsingham, holotype male (BM slide 4332); expanse 15 mm.; the pale (cream) posterior margin of the forewing is not revealed with enough contrast to the remainder of the wing which is mostly brown (the apparently pale subcostal zone on the left forewing is from light reflection and is not a pale area). Bottom, (*E.*) *falsimella* Walsingham, holotype male (BM slide 4333); expanse 18 mm.; forewings with pale area behind fold cream-colored with remainder of wing mostly brownish and with darker maculae (the pale spot near posterior margin of left forewing is an abrasion). Each of these specimens is figured in *Fauna Hawaiensis*.

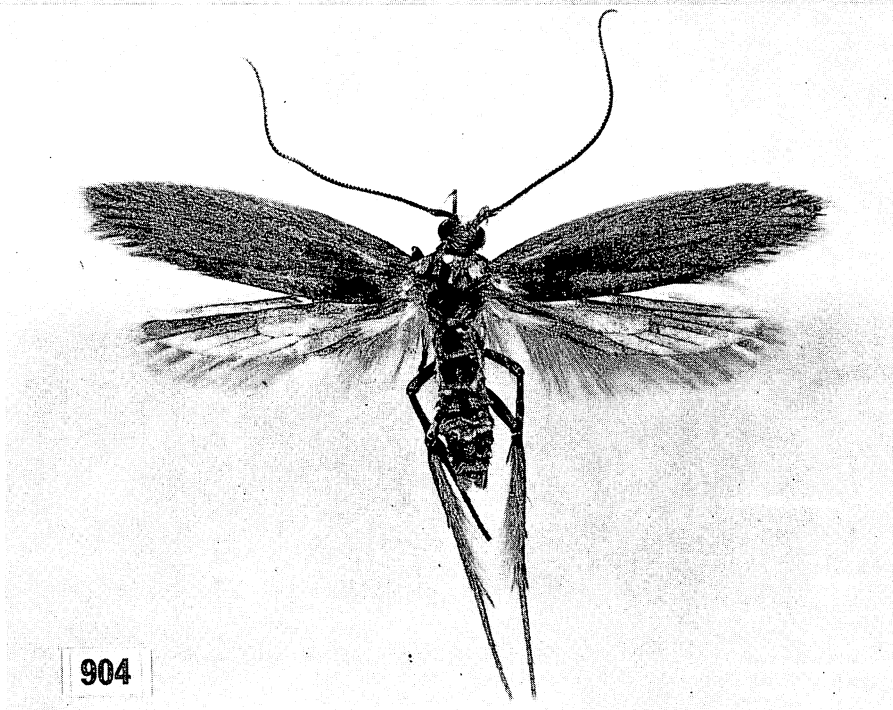
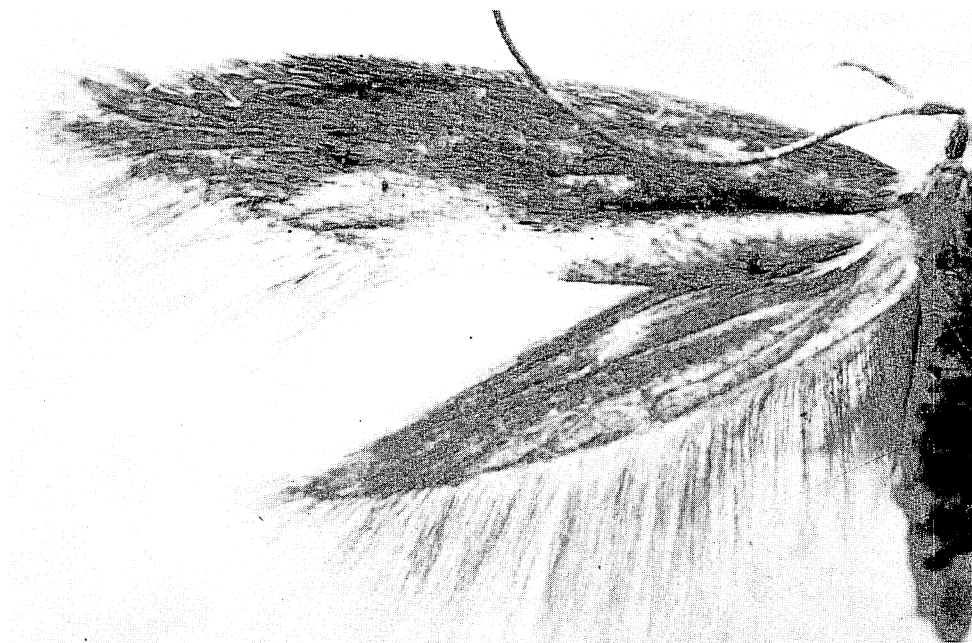


Figure 904—*Hyposmocoma*. Top, (*H.*) *ferricolor* Walsingham, holotype female (BM slide 7066); Hualalai, Kona, 5,000 feet, Hawaii; forewing 6.75 mm., ferruginous brownish with darker or more ferruginous areas. This specimen is figured in *Fauna Hawaiiensis*. Bottom, (*E.*) *ferruginea* (Swezey) ("*Sennoprepia*"), holotype male; Mt. Olympus, Oahu; ex *Cheirodendron*; forewing 12 mm., immaculate, concolorous ferruginous.

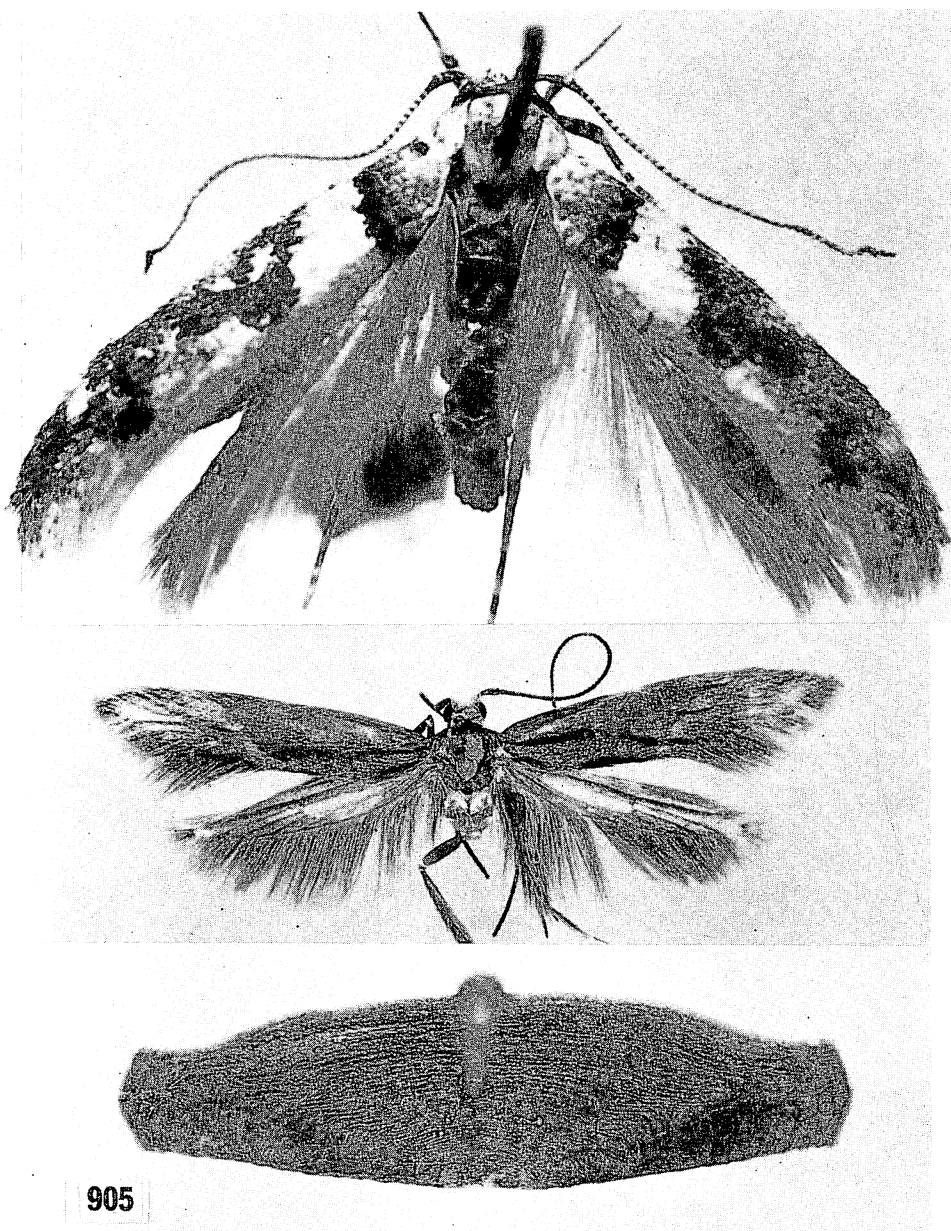


Figure 905—*Hyposmocoma* (*Hyposmocoma*). Top, *fervida* Walsingham, holotype female (slide not made); Molokai, above 3,000 feet; forewing 5.75 mm., white and fuscous. This specimen is illustrated in color in *Fauna Hawaiiensis*. Middle, *flicivora* Meyrick, holotype (abdomen lost); Konahuanui, Oahu; ex *Cibotium*; forewing 7.5 mm., mostly ferruginous and fuscous, paler and tinged with ochraceous distad, and with an outwardly oblique paler fascia from near middle of posterior margin extending about halfway across forewing. Bottom, a larval case of the same species; length 12 mm.

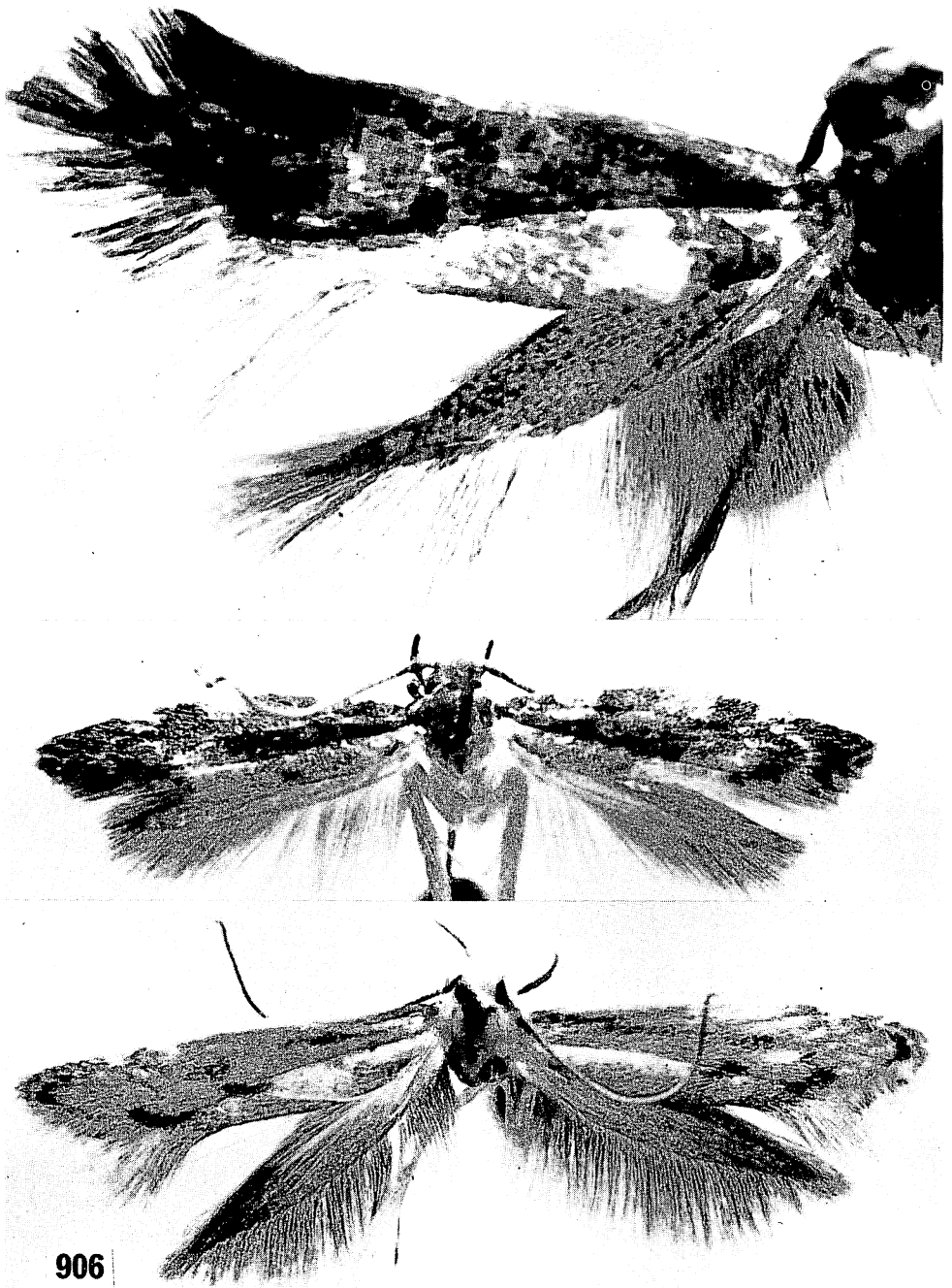


Figure 906—*Hyposmocoma*. Top, (*H. flavipalpis* (Walsingham) ("Agonismus"), holotype female (BM slide 4309); Haleakala, 4,000 feet, Hawaii; forewing 4.25 mm., fuscous with coppery and submetallic reflections and some paler areas (the subbasal pale area and the large pale macula behind the fold near the basal quarter are too pale in the photograph). Middle, (*E. fluctuosa* (Walsingham) ("Aphthonetus"), holotype male (BM slide 4741); Kauai, 3,000 to 4,000 feet; expanse 14 mm.; forewings ferruginous with white or cream and fuscous scaling and maculae. Bottom, (*H. fractinubella* Walsingham, holotype male (BM slide 4146); Olinda, 4,000 feet, Maui; expanse 14 mm.; forewings cream and straw-colored with fuscous markings. A yellow subcostal brush is visible on the left hindwing. These specimens are illustrated in *Fauna Hawaiiensis*.



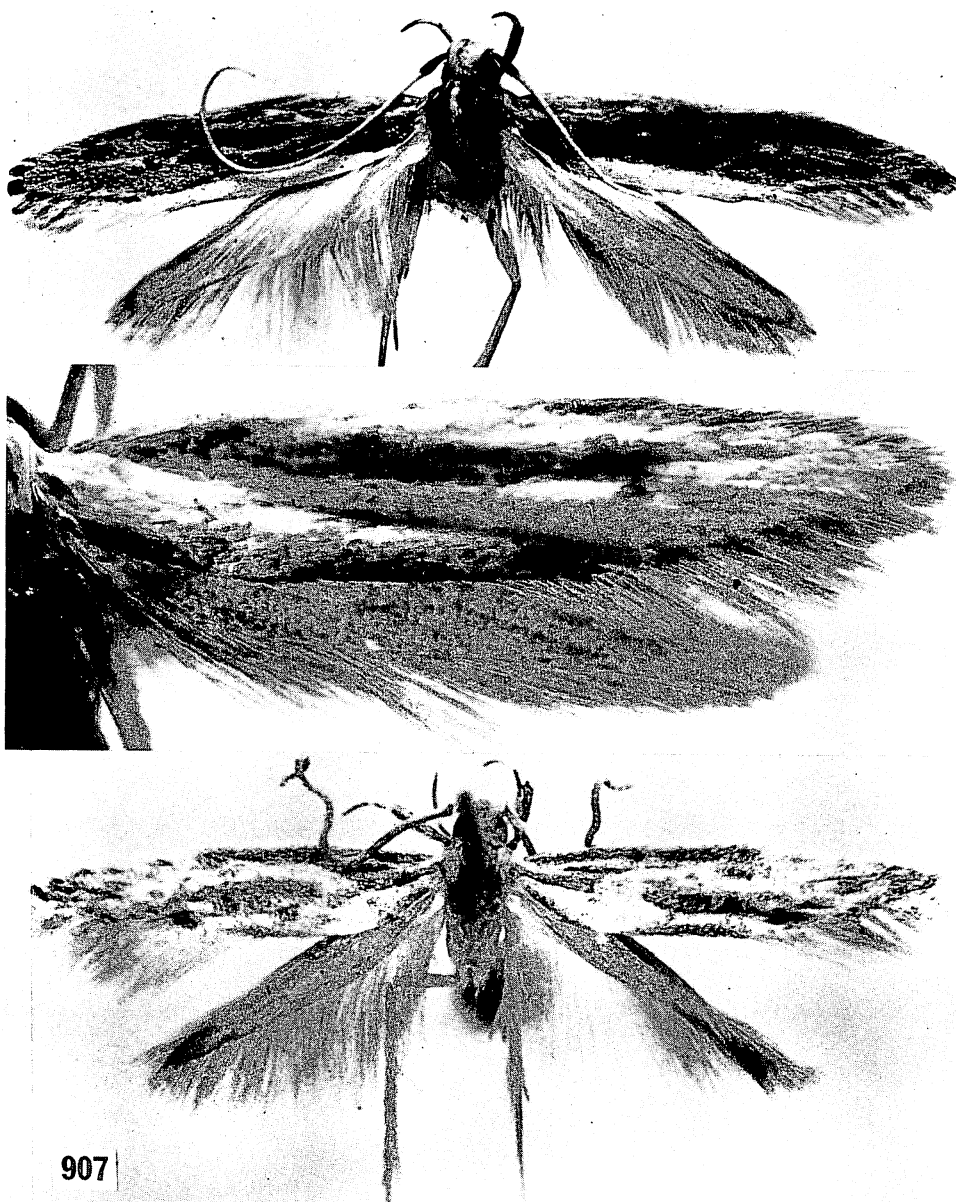
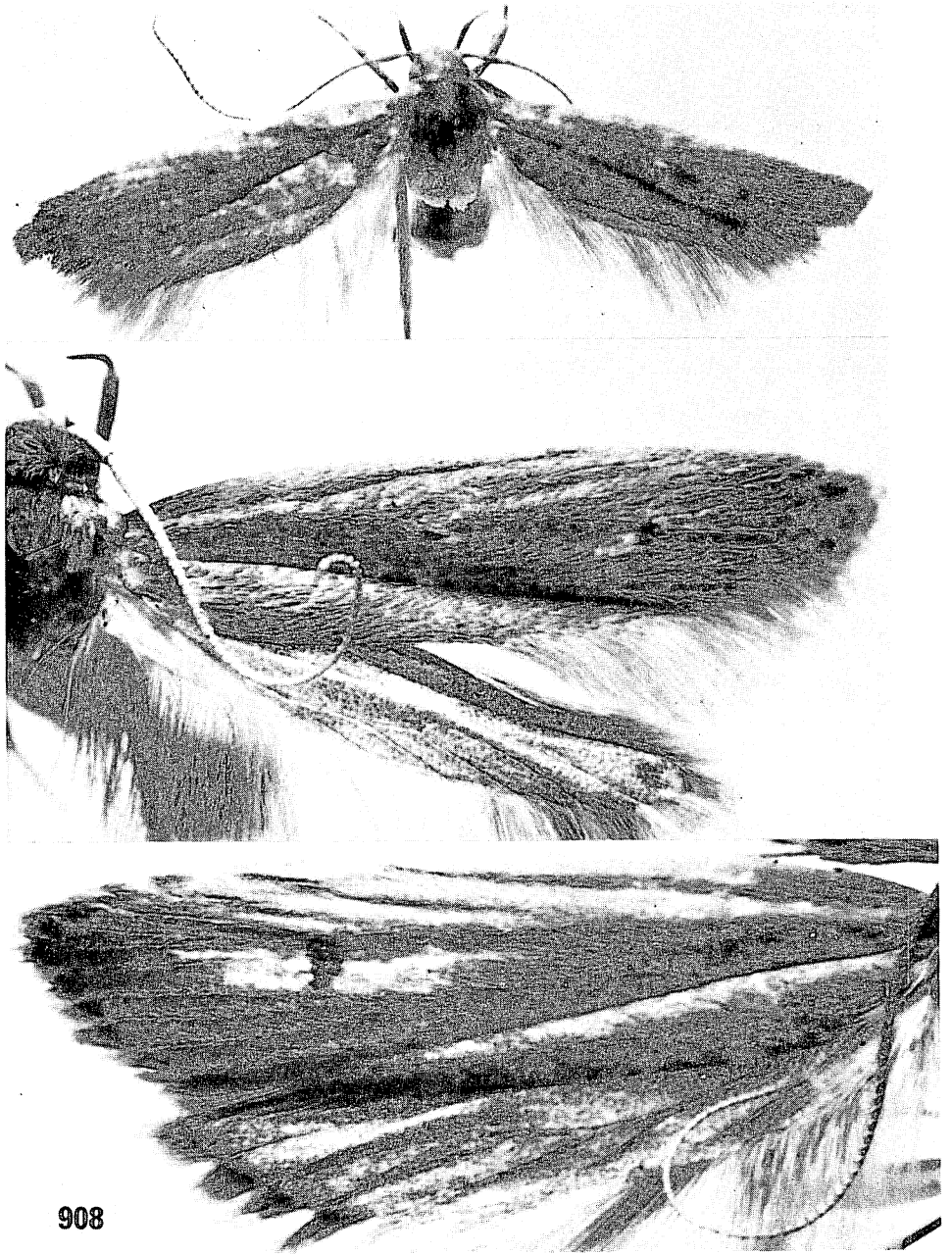


Figure 907—*Hyposmocoma*. Top, *H. fractistriata* Walsingham, allotype male (BM slide 4496); Waianac Mts., Oahu; expanse 17.5 mm.; forewings straw-colored with brownish fuscous markings. (Note the dark base of the antenna and the strong, pale subcostal brushes on the hindwings.) There is a modest metapleural cluster of long scales. Middle, (*E.*) *fractivittella* Walsingham, holotype female (BM slide 7063); Kauai, 3,000 to 4,000 feet; forewing 6 mm. long, cream with fuscous maculae. Bottom, (*E.*) *fugitiva* (Walsingham) (“*Aphthonetus*”), holotype male (BM slide 4738); Kaholuamano, 4,000 feet, Kauai; expanse 13 mm.; forewings white with yellow and fuscous maculae. The middle and bottom specimens were used for the *Fauna Hawaïensis* illustrations.



908

Figure 908—*Hyposmocoma* (*Euperissus*). Top, *fulvida* Walsingham, holotype male (BM slide 4337); Molokai, about 4,000 feet; expanse 14 mm.; forewings brown with fuscous maculae. Middle, *fulvocervina* Walsingham, holotype male (BM slide 4342); Kaholuamano, 4,000 feet, Kauai; forewing 9 mm., mostly ferruginous with three nearly black discal spots, partly outlined in pale coloring, and apex with fuscous maculae. Bottom, *fulvogrisea* (Walsingham) ("*Semnoprepia*"), holotype male (BM slide 4429); Kauai, 3,000 to 4,000 feet; forewing 10.5 mm., pale brown with fuscous maculae. These specimens are illustrated in *Fauna Hawaiiensis*.

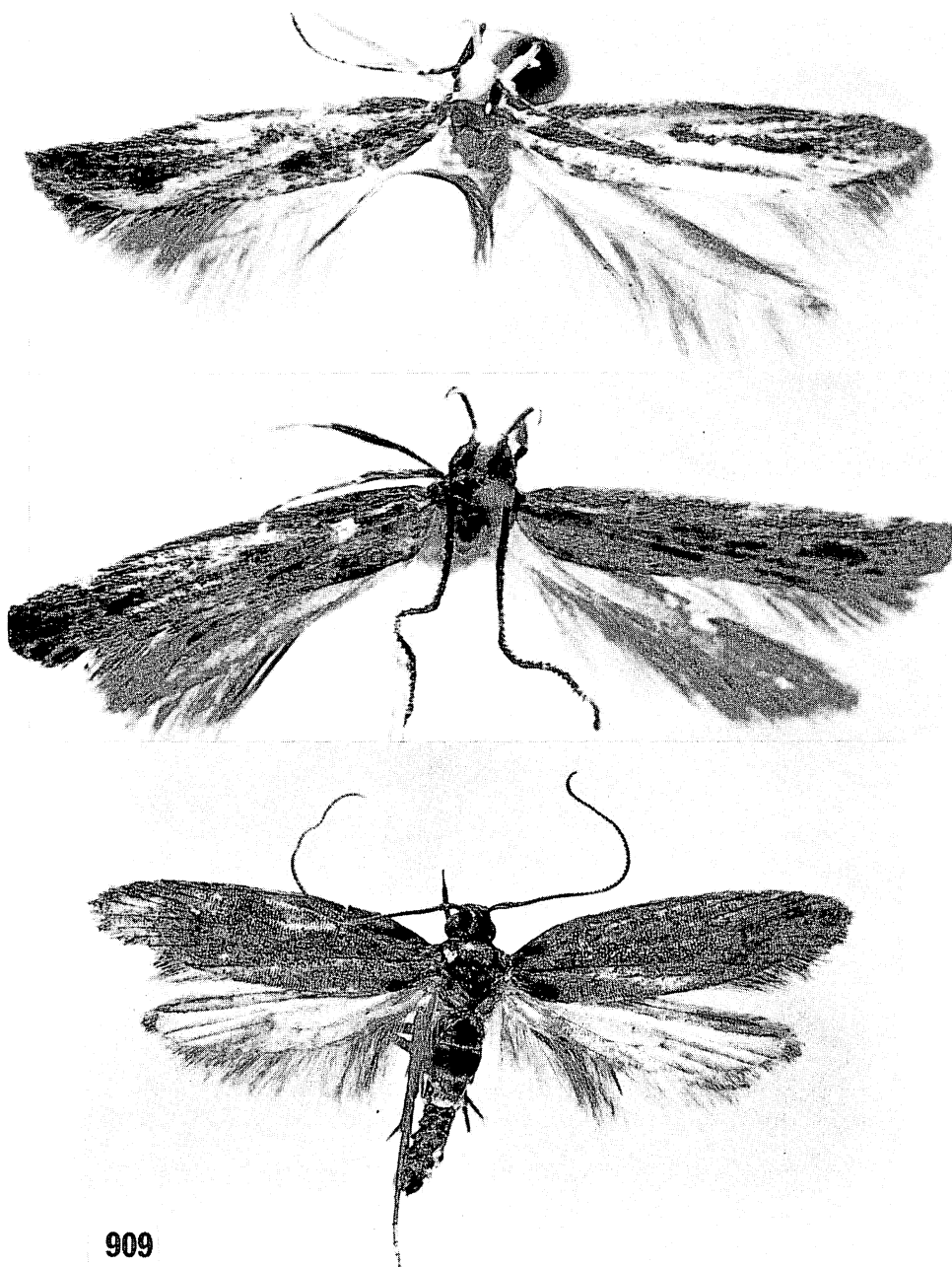


Figure 909—*Hyposmocoma* (*Euperissus*). Top, *fuscodentata* Walsingham, holotype female (BM slide 4462); Kilauea, Hawaii; expanse 12.5 mm.; forewings white and fuscous. Middle, *fuscofusa* (Walsingham) ("*Neelysia*"), holotype male (BM slide 4439); Kauai, 3,000 to 4,000 feet; forewing 5.25 mm., yellow fuscous and brownish fuscous marked with dark fuscous vittae at middle of wing. Bottom, *fuscopurpurata* Zimmerman, holotype female (slide not made); Mt. Olympus, Oahu; forewing 9.75 mm., almost entirely purplish fuscous. The top and middle specimens are figured in *Fauna Hawaiiensis*.

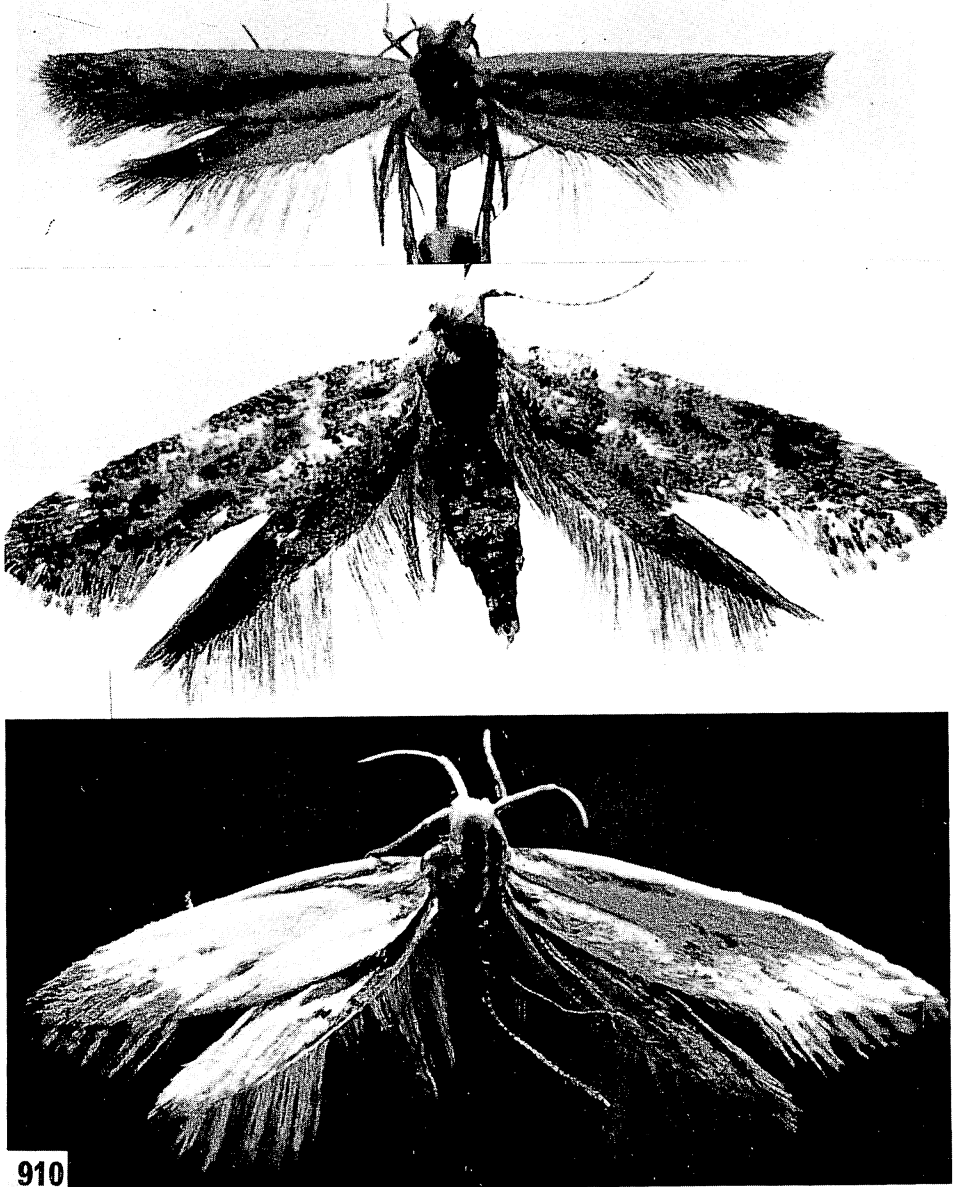


Figure 910—*Hyposmocoma* (*Hyposmocoma*). Top, *fuscopurpurea* Walsingham, holotype male (BM slide 4127); Haleakala, 5,000 feet, Maui; expanse 12 mm.; forewings solidly dark purplish fuscous. Middle, *fuscotogata* Walsingham, holotype female (BM slide 7173); Molokai, over 3,000 feet; expanse 13 mm.; forewings yellow-orange, white, and fuscous. Bottom, *geminella* Walsingham, holotype male (BM slide 4147); Kauai, 3,000 to 4,000 feet; expanse 12 mm.; forewings white to cream-colored with fuscous markings (which have been nearly obliterated in my photograph, especially on left side). The top and middle specimens were illustrated in *Fauna Hawaiiensis*.

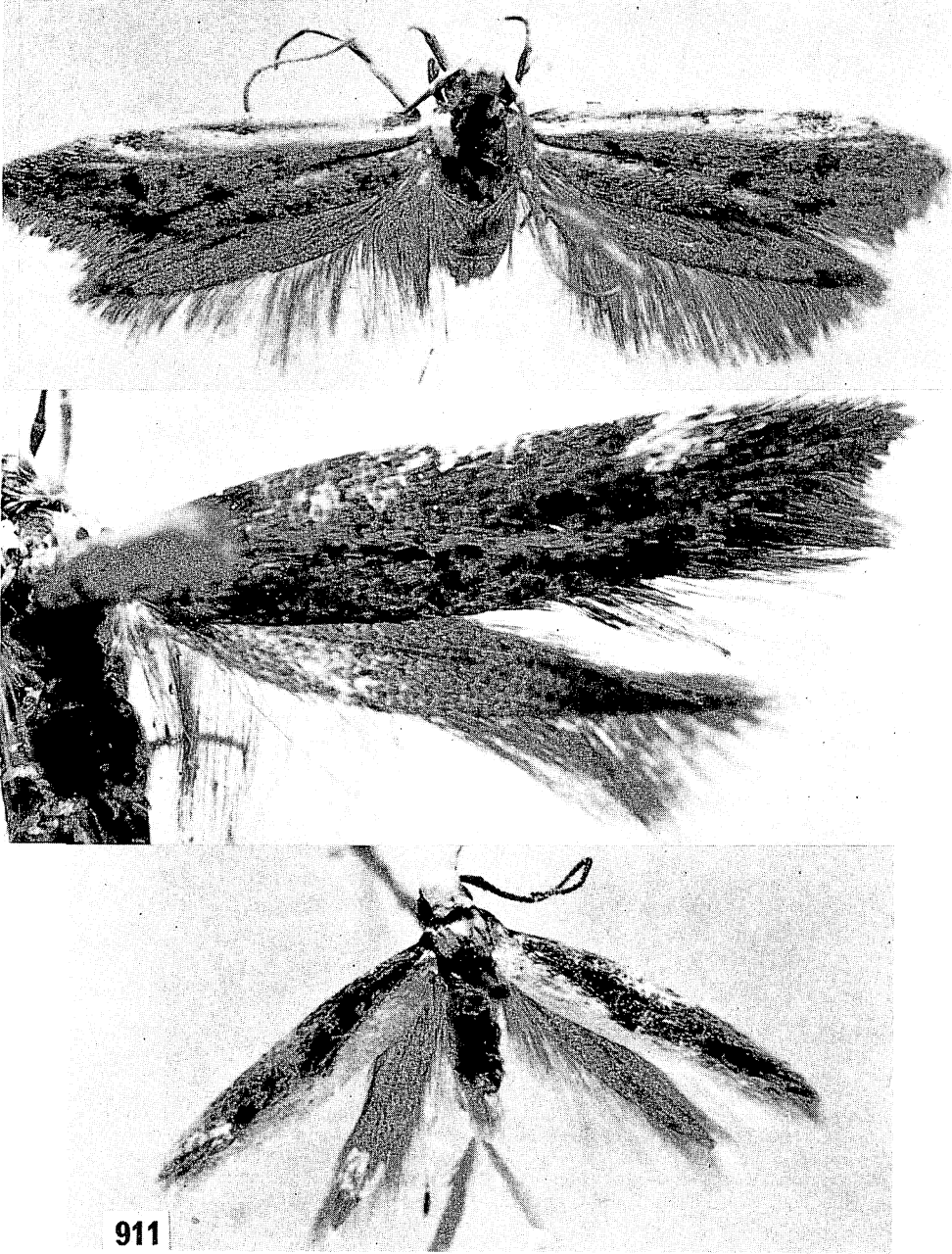


Figure 911—*Hyposmocoma* (*Hyposmocoma*). Top, *genitalis* Walsingham, holotype male (BM slide 4145); Olinda, 4,000 feet, Maui; expanse 17 mm.; forewings mostly straw-colored with fuscous markings. Middle, *haleakalae* (Butler), holotype female (BM slide 7067); Haleakala, about 4,000 feet, Maui; forewing 6 mm., fuscous brown with orange vittae (mostly obscure in this photograph) and orange maculae. Bottom, *hemicasis* Meyrick, paratype male; Pacific Heights, Oahu; forewing 4.5 mm., fuscous and pale yellow or cream-colored. The top and middle specimens were used for the *Fauna Hawaïensis* illustrations.

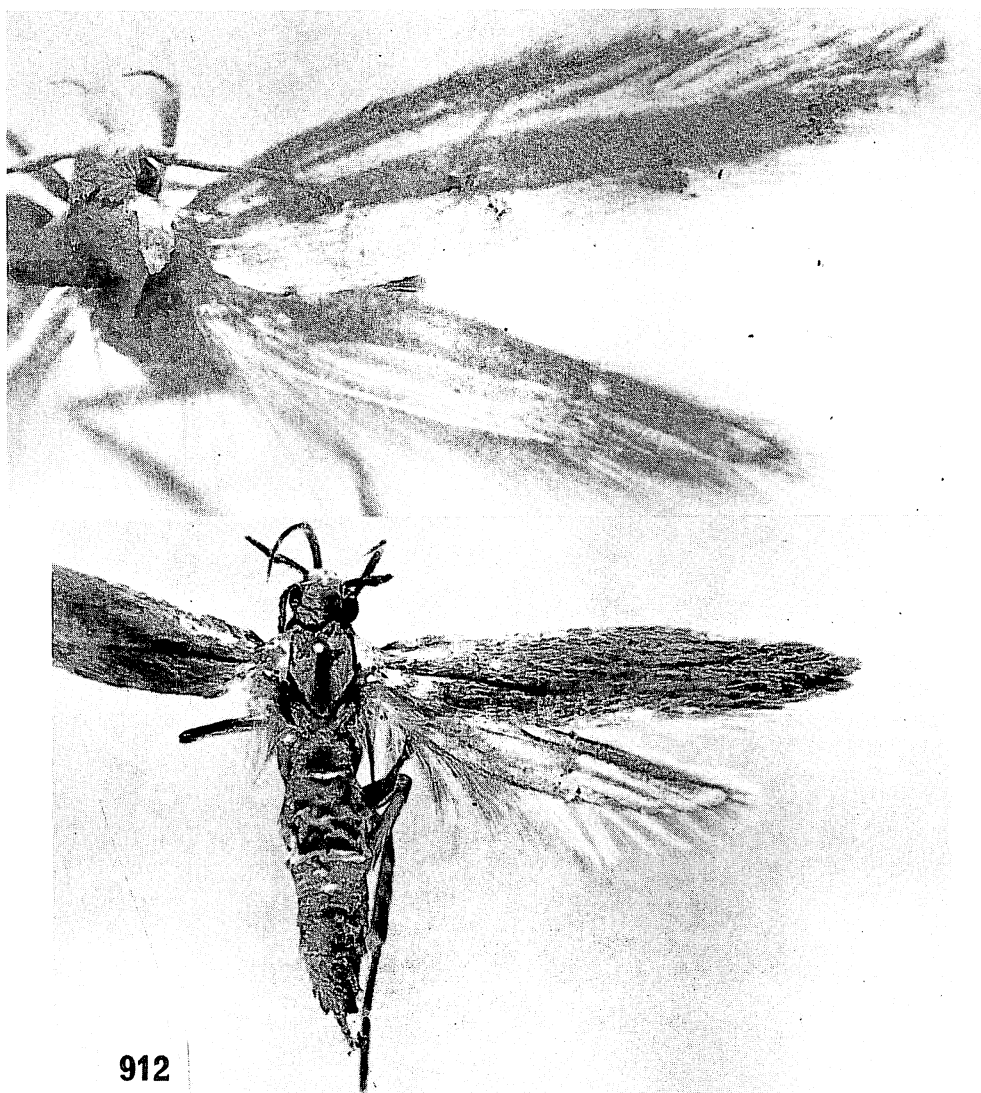


Figure 912—*Hyposmocoma* (*Euperissus*). Top, *hirsuta* (Walsingham) (“*Aphthonetus*”), holotype female (BM slide 4413); Kauai, 3,000 to 4,000 feet; forewing 9 mm., pale straw- or cream-colored with clusters of fuscous-tipped squamae (especially those in the raised clusters). This specimen is illustrated in color in *Fauna Hawaïensis*. Bottom, *homopyrrha* (Meyrick) (“*Phthoraula*”), holotype female (slide Z-IX-5-61-A); Nuuanu, Honolulu; ex dead *Metrosideros*; forewing 7.5 mm., extensively ochreous, paler costad, without maculae.

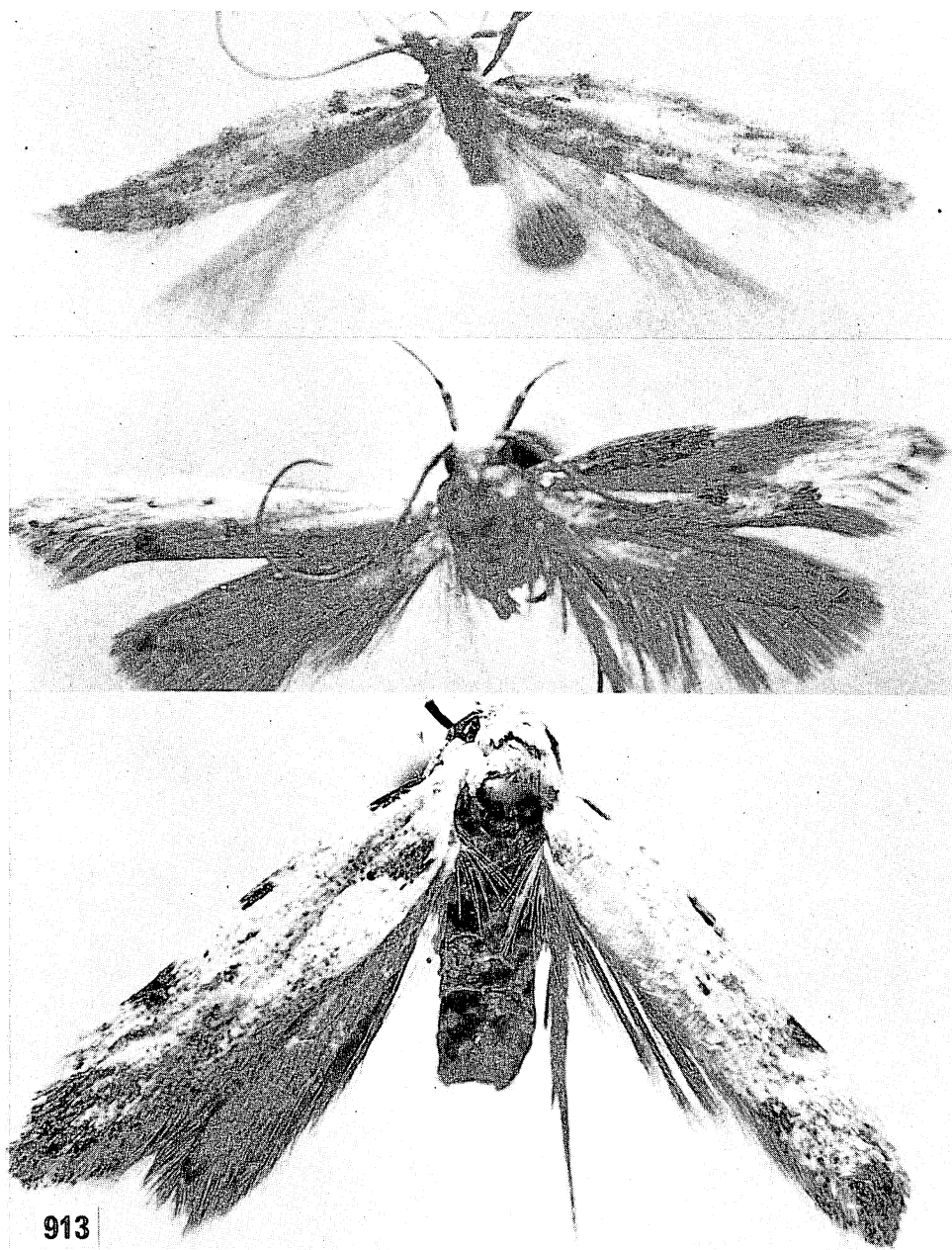


Figure 913—*Hyposmocoma*. Top, (*E.*) *humerella* (Walsingham) (“*Aphthonetus*”), allotype male (BM slide 4754); Haleakala, 5,000 feet, Maui; expanse 14 mm.; forewings white with fuscous-tipped squamae scattered among and in the maculae. A tuft of long, fine hair issues from each hindwing axil. Middle, (*H.*) *humerovittella* Walsingham, holotype male (BM slide 4101); Waianae Mts., 3,000 feet; forewing expanse 15 mm., whitish ochreous with brown to fuscous maculae. This specimen is figured in *Fauna Hawaiensis*. Bottom, (*H.*) *hygroscopta* Meyrick, paratype female; Halemanu, Kauai; forewing 6 mm., white sprinkled with brown and with fuscous to black maculae.

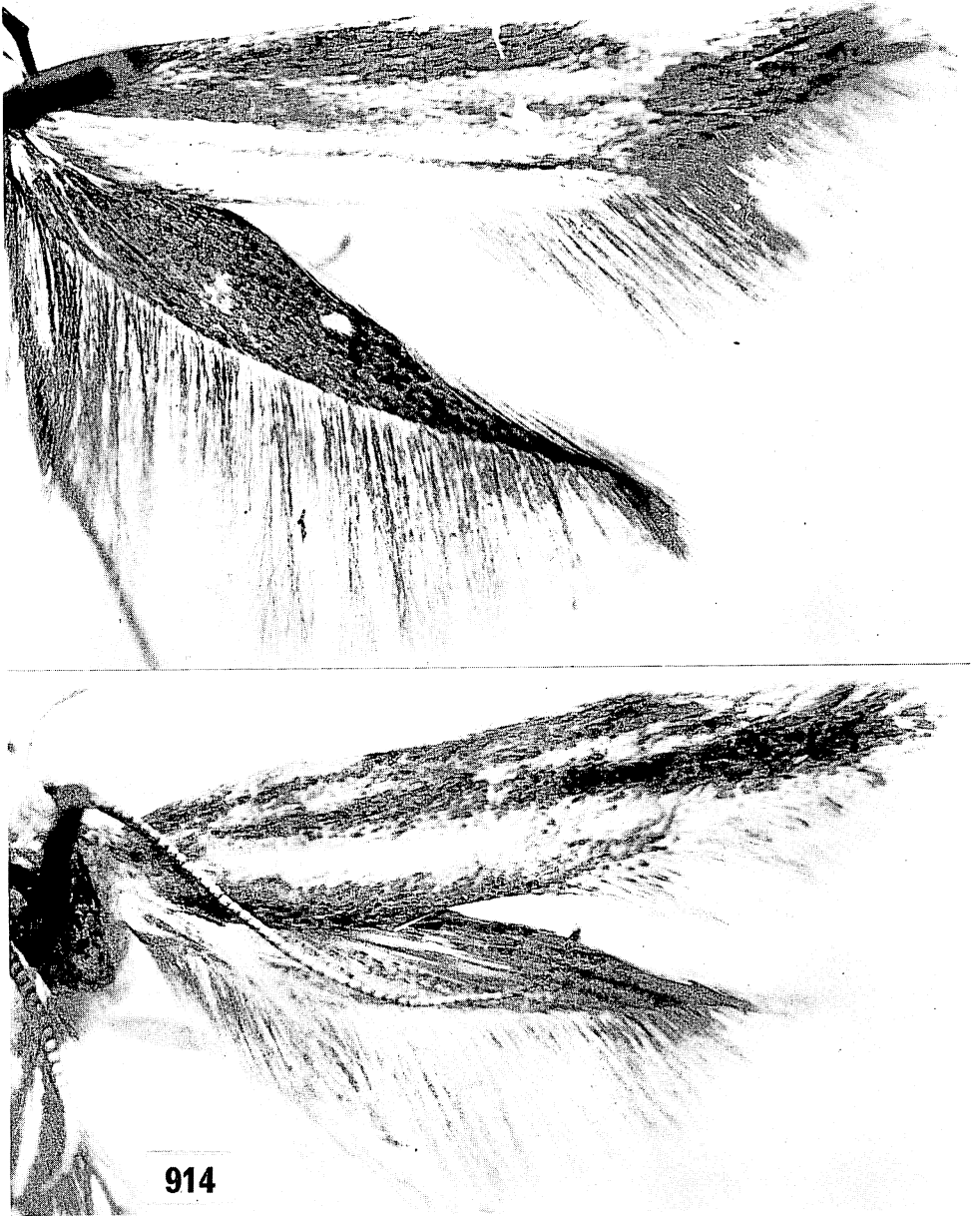


Figure 914—*Hyposmocoma* (*Hyposmocoma*). Top, *illuminata* Walsingham, holotype male (BM slide 4108); Haleakala, 5,000 feet, Maui; forewing 6.5 mm., mostly silvery white with a dark costal vitta (the color pattern is poorly rendered in the photograph, and the white spots are faults in the negative). Bottom, *impunctata* Walsingham, holotype male (BM slide 4114); Kilauea, Hawaii; forewing 7.5 mm., pale brown with dark vittae. Note the yellow hairbrushes on the hindwing. These specimens are illustrated in *Fauna Hawaiiensis*.



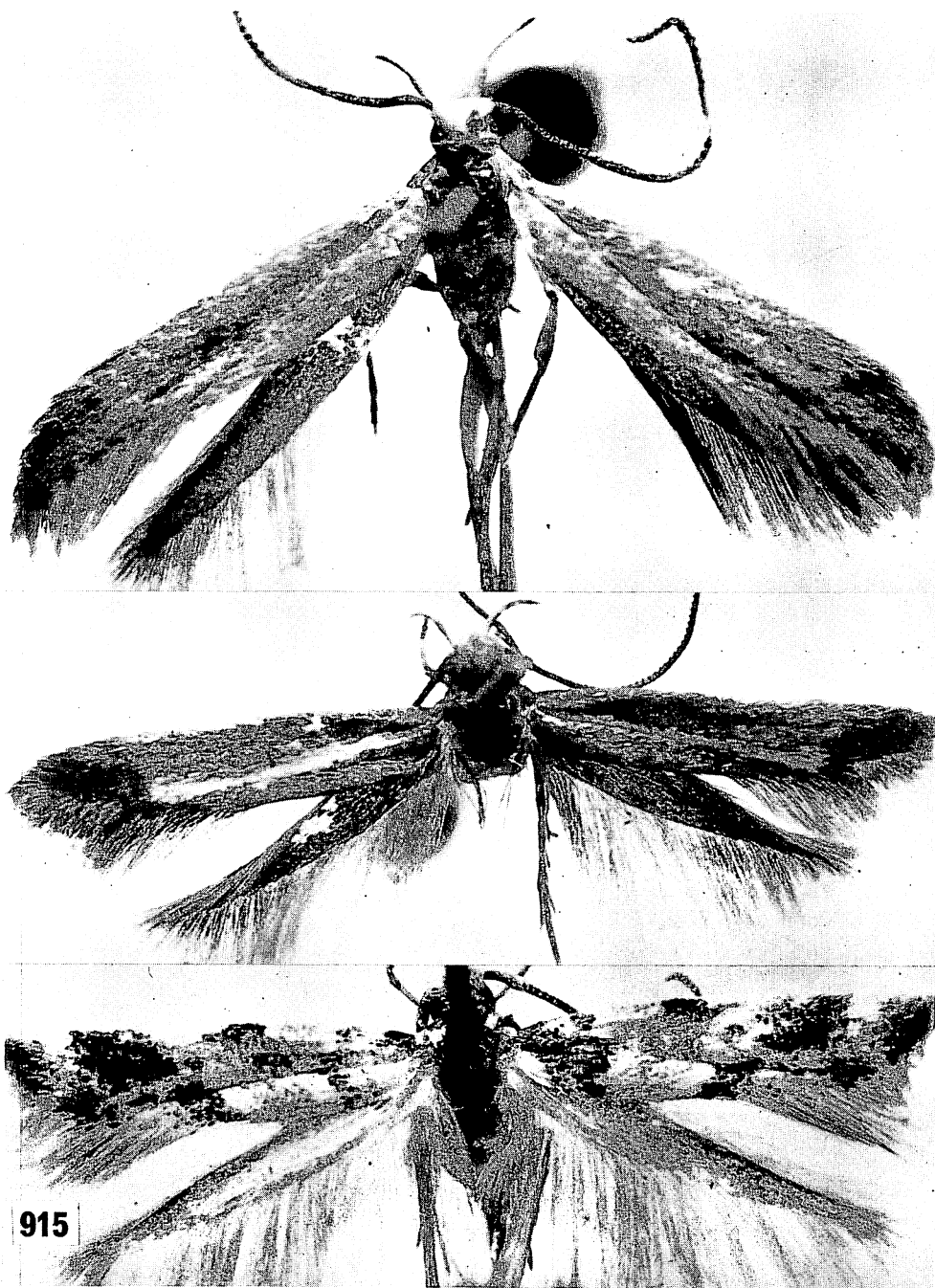


Figure 915—*Hyposmocoma*. Top, (*E*) *incongrua* (Walsingham) ("*Neelysia*"), holotype male (BM slide 4512); Haleakala, 5,000 feet, Maui; forewing 5 mm., concolorous orange. Middle, (*H.*) *indicella* Walsingham, holotype male (BM slide 4117); Haleakala, 5,000 feet, Maui; expanse 10 mm.; the photograph does not reveal adequately the sharp contrast between the blackish background scaling and the pure white vitta along the fold. Bottom, (*E.*) *inflexa* Walsingham, holotype male (BM slide 4493); Haleakala, 5,000 feet, Maui; expanse 9.5 mm.; forewings white, yellow, and fuscous. These three specimens are figured in *Fauna Hawaiiensis*.

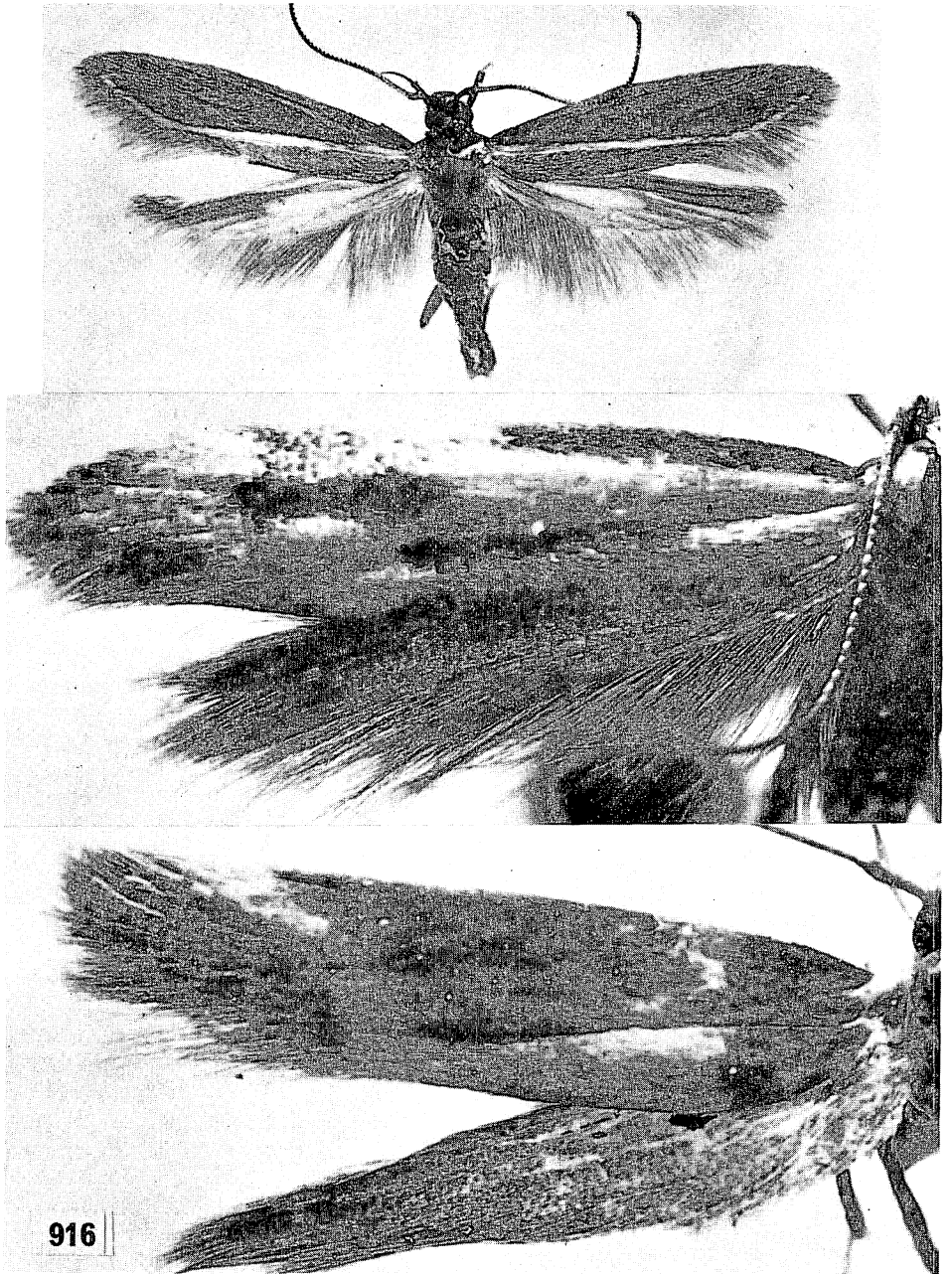
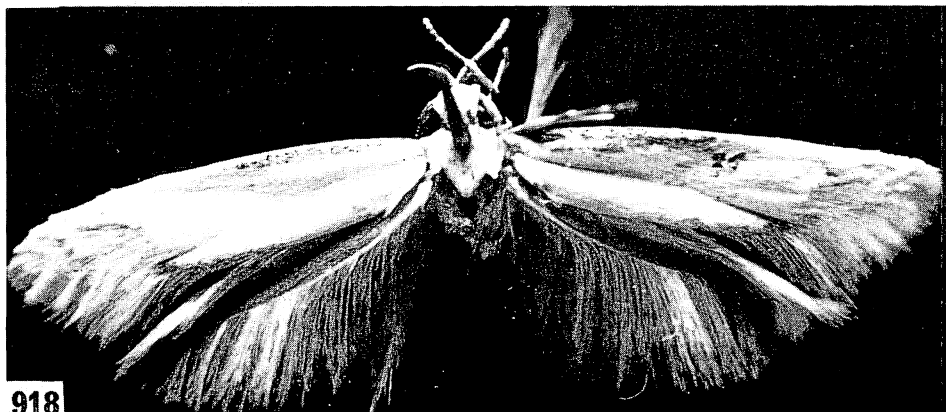
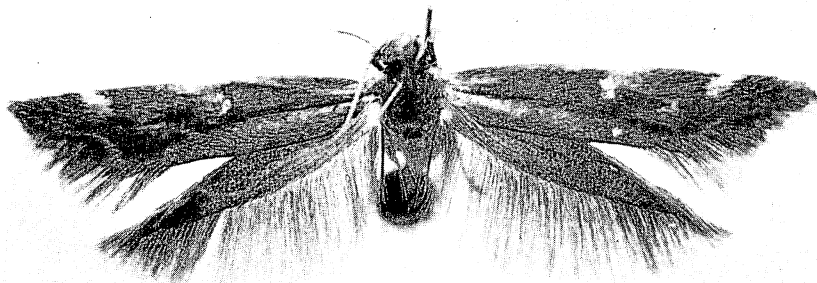
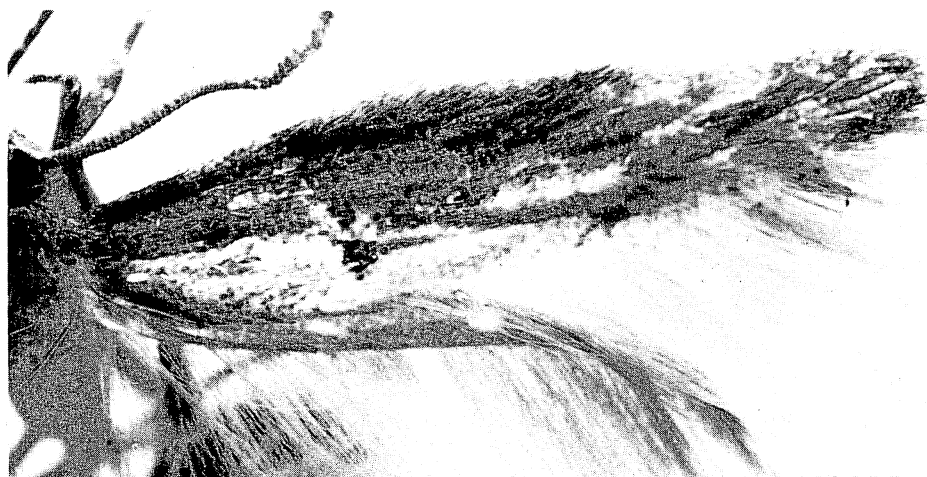


Figure 916—*Hyposmocoma*. Top, (*E.*) *insinuatrix* Meyrick, holotype male (slide Z-I-22-61-2); Kainalu, 2,000 to 3,000 feet, Molokai; ex *Smilax*; forewing 8.25 mm., purplish fuscous with a sharply contrasting white vitta as figured. Middle, (*H.*) *intermixta* Walsingham, holotype female (BM slide 7064); Molokai, about 4,000 feet; forewing 6.5 mm., straw-colored with fuscous markings. Bottom, (*H.*) *inversella* Walsingham, holotype female (no slide was made because the abdomen found glued to the mounting pith may not belong to this species); Waianae Mts., Oahu, 2,000 feet, Oahu. Forewing 5 mm., the dark area is purplish, and the pale areas are orange. The middle and bottom specimens are figured in *Fauna Hawaiiensis*.



Figure 917—*Hyposmocoma*. Top, (*H. iodes* Walsingham, holotype male (BM slide 4477); Molokai, 3,000 feet, forewing 6 mm., mixed greyish white, brownish and fuscous. Middle, (*H. irregularis* Walsingham, holotype male (BM slide 4484); Kauai, 3,000 to 4,000 feet; expanse 14 mm.; forewings white and fuscous. Bottom, (*E. jugifera* Meyrick, holotype male (slide Z-I-20-61-3); Mt. Tantalus, Oahu; ex dead *Acacia koa* wood; forewing 7.5 mm., pale brownish flecked with black and with black maculae. The top and middle specimens are illustrated in *Fauna Hawaiiensis*.



918

Figure 918—*Hyposmocoma*. Top, (*E.*) *kauaiensis* (Walsingham) (“*Aphthonetus*”), holotype male (BM slide 4739); Halemanu, 4,000 feet, Kauai; forewing 5.5 mm., white with yellowish to fuscous scaling and maculae. Middle, (*H.*) *lacertella* Walsingham, allotype (BM slide 4129); Haleakala, 5,000 feet, Maui; expanse 15 mm.; forewings brownish with whitish maculae. There is an incipient hairbrush on each metapleuron. Bottom, (*H.*) *lactea* Walsingham, holotype male (BM slide 4318); Halemanu, 4,000 feet, Kauai; expanse 14 mm.; forewings straw-colored with a strong fuscous costal vitta on the basal half and some fuscous on the posterior margin basad of the fringe; the dark maculae do not show well on this photograph. The top and bottom specimens are figured in *Fauna Hawaiiensis*.

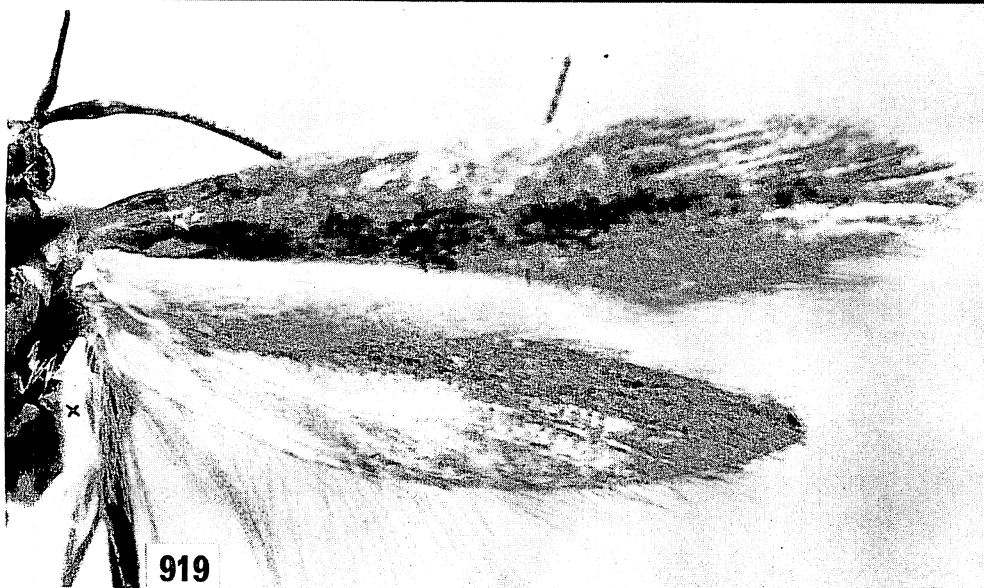


Figure 919—*Hyposmocoma*. Top, (*H. lacticretella* Walsingham, holotype female (BM slide 7065); Olinda, 4,000 feet, Maui; forewing 5.5 mm., cream-colored with fuscous maculae. This specimen is figured in *Fauna Hawaiiensis*. Bottom, (*E. latiflua* Meyrick, holotype male (BM slide 9558 Clarke); Koolau Mts., above Honolulu; forewing 6.25 mm., yellow, brown, and fuscous (the contrast between the yellow posterior part of the forewing and the anterior brown or fuscous part is more obvious in nature than is revealed in this photograph). Note the strong yellow brush (marked by "X" and mostly out of focus) from the posterior axil of the hindwing.

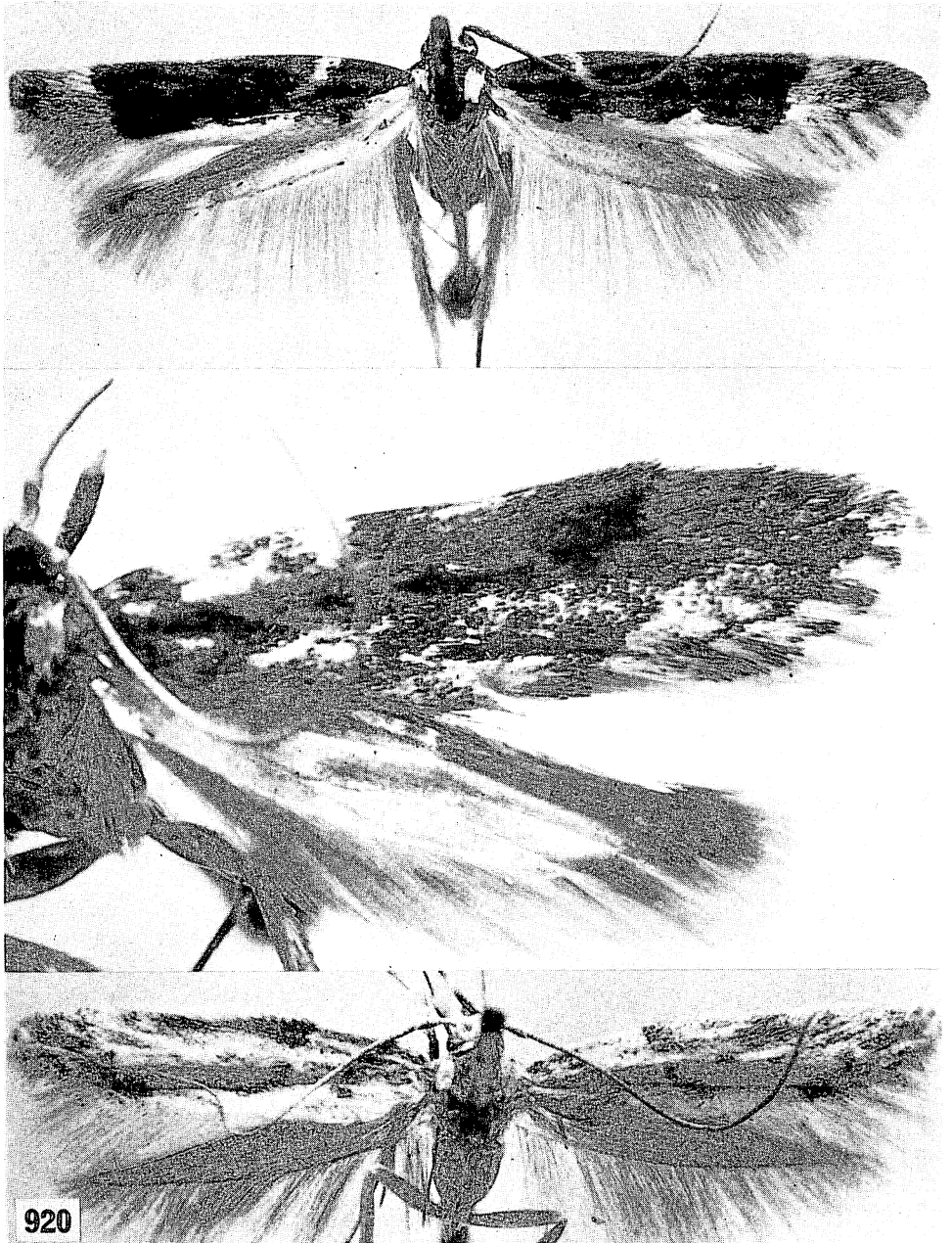


Figure 920—*Hyposmocoma*. Top, (*H. lebetella* Walsingham, holotype male (BM slide 4094); Olinda, 4,000 feet Maui; expanse 18 mm.; forewings white with areas of yellow and dark fuscous; there is a moderate metapleural tuft. Middle, (*H. leporella* Walsingham, holotype male (BM slide 4087); Kauai, 3,000 to 4,000 feet; forewing 10.5 mm., dirty white and fuscous with coppery reflections. Bottom, (*E. lichenalis* (Walsingham) ("*Aphthonetus*"), holotype female (abdomen lost); Lanai, 2,000 feet; expanse 14 mm.; forewings with yellow, brownish, and fuscous maculae. All of these specimens are illustrated in *Fauna Hawaiiensis*.



921

Figure 921—*Hyposmocoma* (*Hyposmocoma*). Top, *lignicolor* (Walsingham), holotype male (BM slide 4392); Haleakala, 5,000 feet, Maui; forewing 6.5 mm., cream-colored with pale and dark fuscous maculae; the metapleurae lack hairbrushes. Bottom, *lignivora* (Butler) ("*Diplosara*"), holotype male (BM wing slide 9609 Clarke; abdomen lost); Oahu; forewing 10 mm., white, pale, and dark fuscous with large, conspicuous tufts of raised squamae. There is an incipient metapleural brush, and there is an unusual (for its group) vannal brush. Both of these specimens are figured in *Fauna Hawaiiensis*.

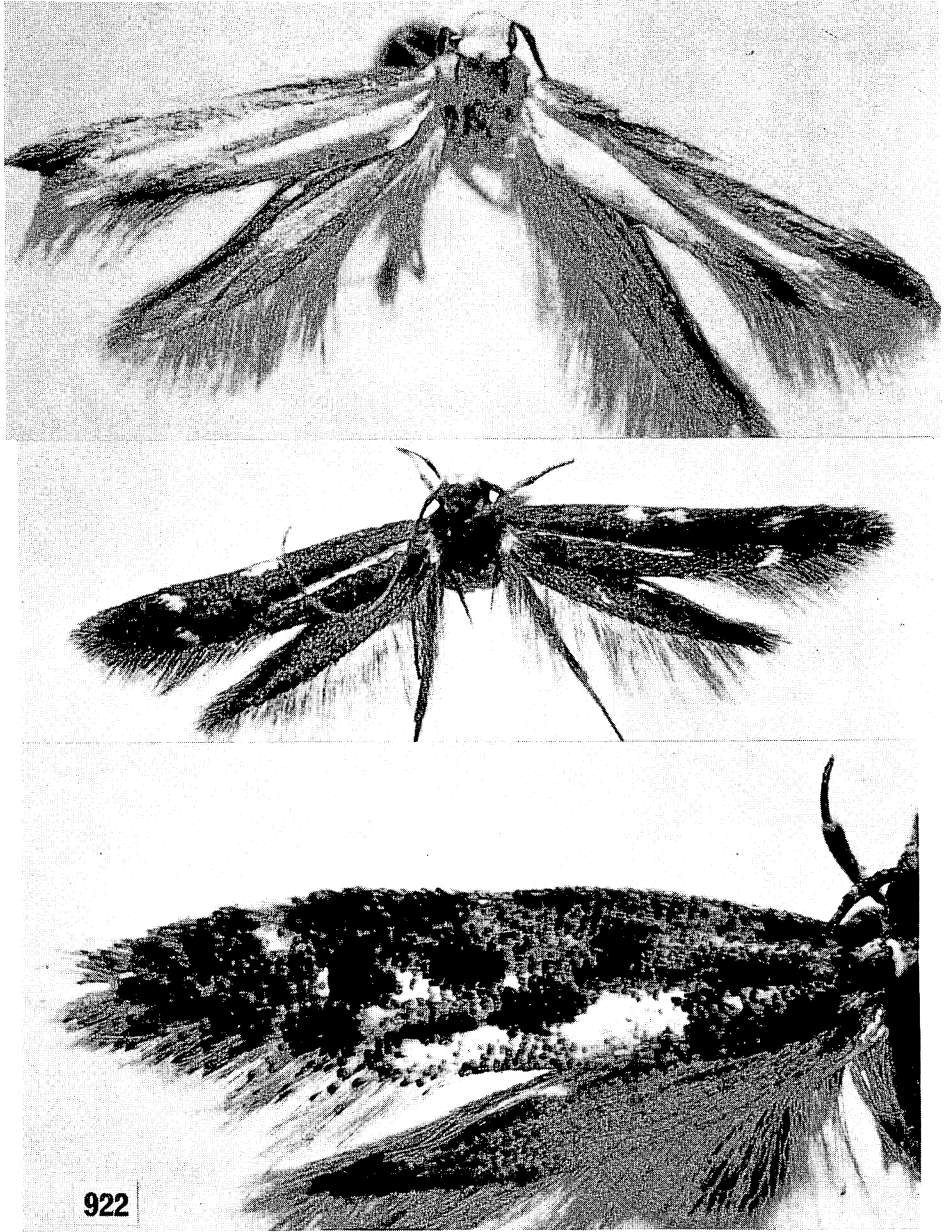


Figure 922—*Hyposmocoma*. Top, (*E.*) *limata* Walsingham, holotype male (BM slide 4105); Kilauea, Hawaii; forewing 7 mm., brown and white (the photograph has too much light on the front and the brown costal zone appears to be pale, but it should contrast with the white medial and posterior zones). Middle, (*H.*) *lineata* Walsingham, holotype male (BM slide 4122); Haleakala, 5,000 feet, Maui; expanse 12 mm.; forewings fuscous with white maculae (the most basad of the two submedial white spots on the right forewing is a hole). This species looks almost exactly like *ludificata* (figure 924), but it lacks the subcostal brush on the hindwings. Bottom, (*H.*) *liturata* Walsingham, holotype male (BM slide 4478); Kona, 4,000 feet, Hawaii; forewing 6 mm., white and fuscous. The sides of the thorax have very large, broad squamae. These specimens are illustrated in *Fauna Hawaïensis*.



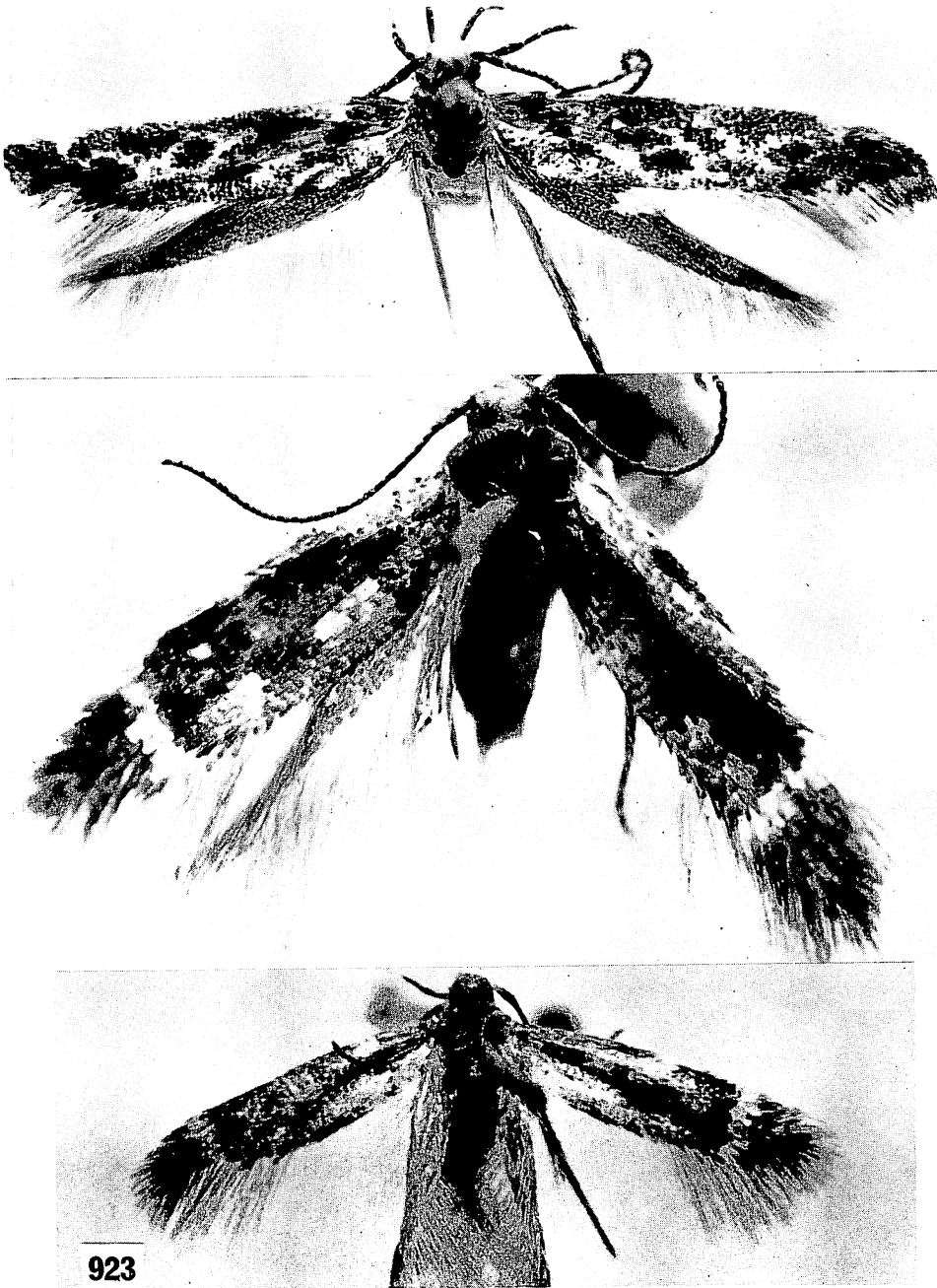


Figure 923—*Hypsmocoma* (*Hypsmocoma*). Top, *lixiviella* Walsingham, allotype male (BM slide 4480); Kauai, 3,000 to 4,000 feet; expanse 10 mm.; forewings creamy white and fuscous. Middle, *longisquamella* (Walsingham) ("*Elachista*"), holotype female (BM slide 7176); Kona, 4,000 feet, Hawaii; forewing 3 mm., fuscous and white. This specimen is figured in *Fauna Hawaiiensis*. Bottom, a paratype of the synonym "*Petrochroa*" *nigrella* Swezey; Kilauea, Hawaii; forewing 2.75 mm.



924

Figure 924—*Hyposmocoma*. Top, (*E.*) *longitudinalis* Walsingham, allotype male (abdomen lost); Kona, 4,000 feet, Hawaii; expanse 17 mm.; forewings streaked with white, yellowish, and fuscous; there is a moderate cluster of long squamae on each metapleuron. Middle, (*H.*) *lucifer* Walsingham, holotype female (BM slide 7061); Molokai, above 4,000 feet; forewing 7 mm., brown with a yellow vitta along fold and yellow maculae along costa. Bottom, (*H.*) *ludificata* Walsingham, holotype male (BM slide 4121); Haleakala, 5,000 feet, Maui; expanse 16 mm.; forewings fuscous and white (on the right forewing, the pale costal area and the inward extension of the submedial white maculae are abrasions). This species is closely similar to *lineata* (figure 922), but *ludificata* has a strong yellow subcostal brush on the hindwing. The middle and bottom specimens are illustrated in *Fauna Hawaiiensis*.



Figure 925—*Hyposmocoma*. Top, (*E. lugens* Walsingham, holotype male (BM slide 4135); Haleakala, 5,000 feet, Maui; forewing 12 mm., scales mostly brown with greyish white bases. Middle, (*E. lunifer* Walsingham, holotype female (slide not made); Haleakala, 5,000 feet, Maui; expanse 14 mm.; forewings dark fuscous with white maculae. Bottom, (*H. torquata* Walsingham female (BM slide 4092); Kauai, 3,000 to 4,000 feet; expanse 9 mm. (with tips of wings bent down, as mounted); forewings dark fuscous with white maculae which include yellow squamae. This specimen was labeled "male", but it is a female. All of these specimens were illustrated in *Fauna Hawaiiensis*.

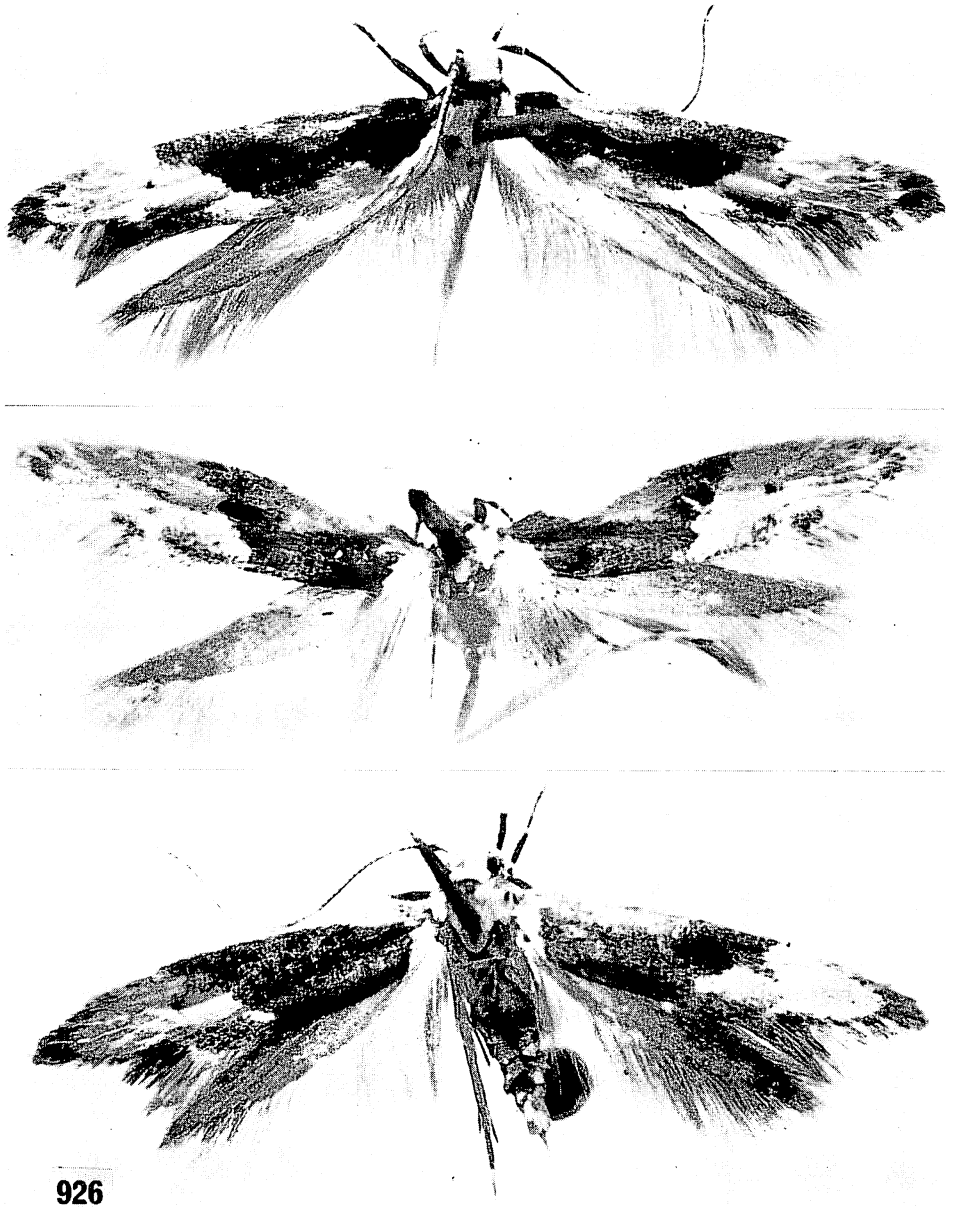


Figure 926—*Hyposmocoma* (*Hyposmocoma*). Top, *lupella* Walsingham, holotype male (BM slide 4097); Kaholuamano, 4,000 feet, Kauai; expanse 15 mm.; forewings dark and pale fuscous and white. There is a small tuft on each metapleuron. Middle, *candidella* (Walsingham) (formerly considered a form of *lupella*); holotype male (BM slide 4360); Kona, 4,000 feet, Hawaii; expanse 13 mm.; forewings white and fuscous with reflections of copper. Bottom, *suffusella* (Walsingham), holotype female (slide not made); Molokai, above 3,000 feet; expanse 14 mm.; white and brownish fuscous with reflections of copper. These three specimens are illustrated in *Fauna Hawaiiensis*.

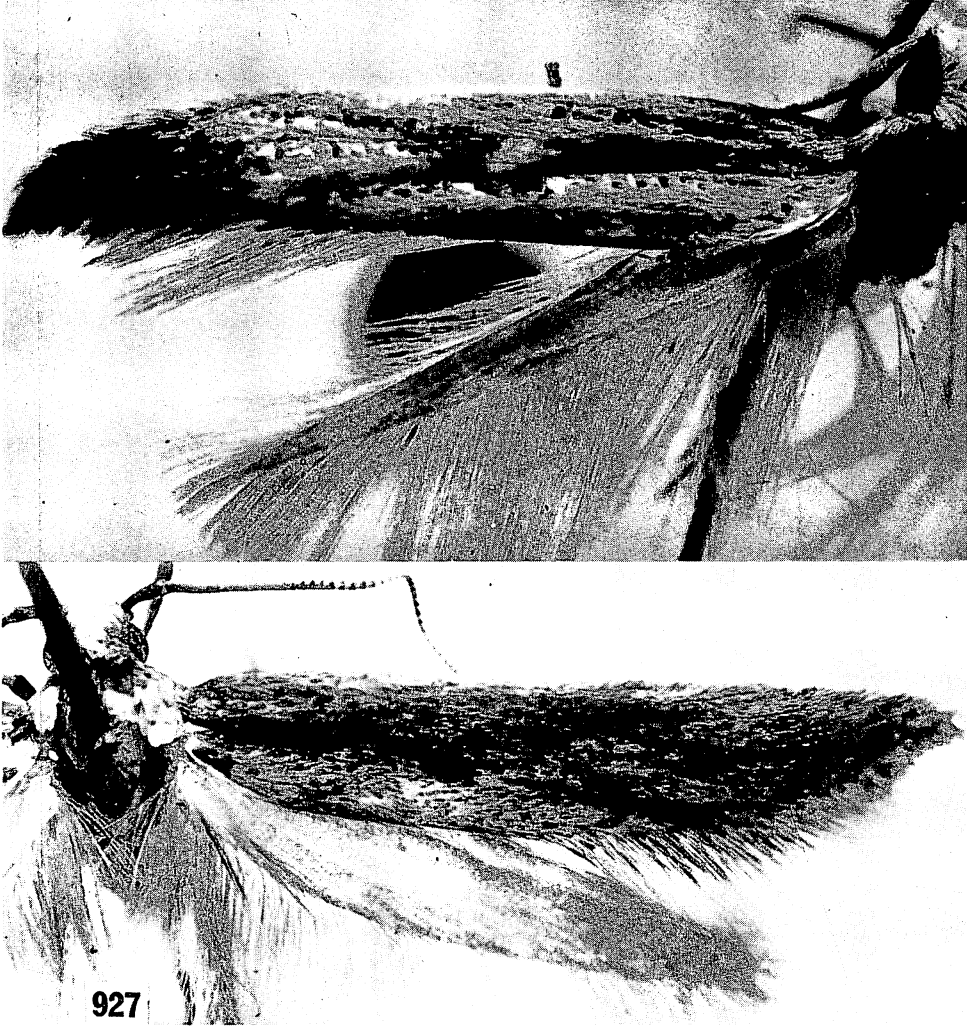


Figure 927—*Hyposmocoma (Euperissus)*. Top, *mactella* (Walsingham) (“*Neelysia*”), holotype male (BM slide 4450); Kauai, 3,000 to 4,000 feet; forewing 5 mm. long, brownish orange with blackish and whitish scales tending to form vittae. The male has strong metapleural brushes that cross over the abdomen where their apices are enclosed by a mass of huge squamae. Bottom, *maestella* Walsingham, holotype male (BM slide 4341); Kaholuamano, 4,000 feet, Kauai; forewing 10 mm., brown with white and fuscous maculae. These two specimens are illustrated in *Fauna Hawaiiensis*.

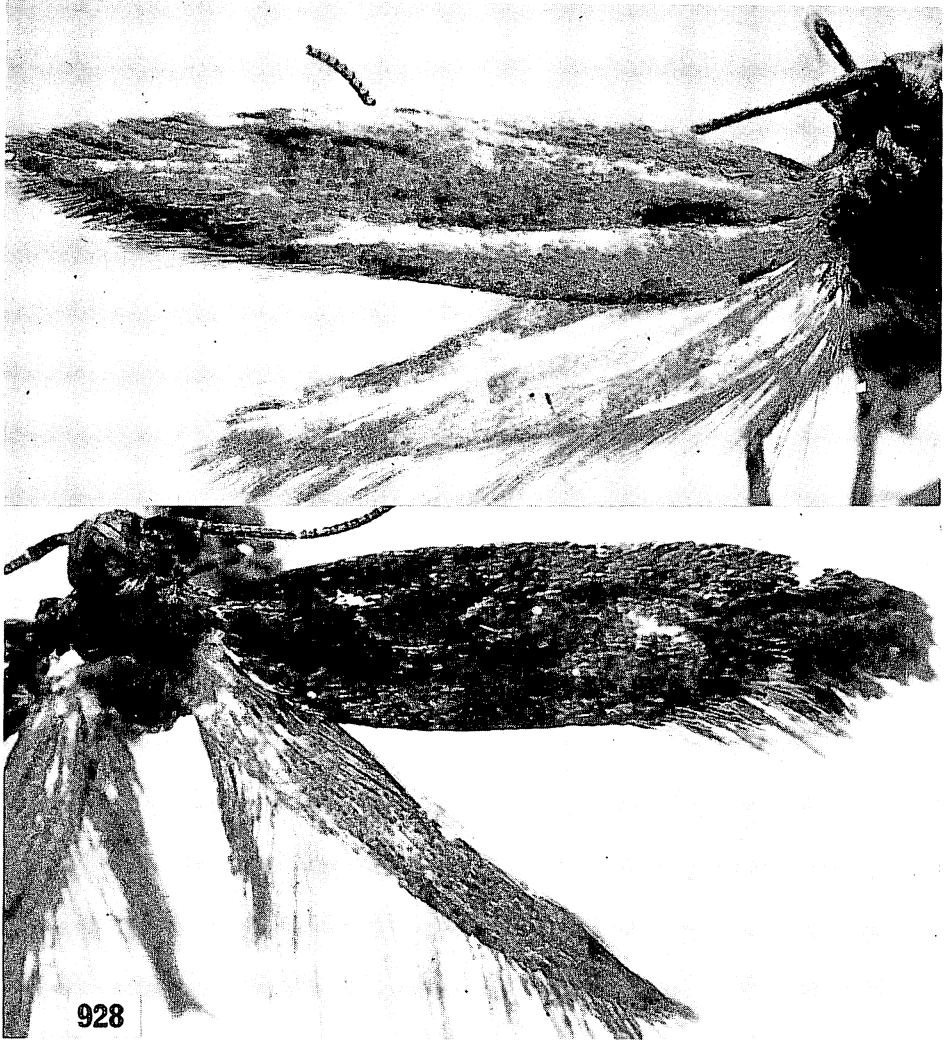


Figure 928—*Hyposmocoma*. Top, (*E.*) *malacopa* Meyrick, lectotype male (BM slide 9568 Clarke); Koolau Mts., Oahu; forewing 6.5 mm., brownish orange. Bottom, (*H.*) *malornata* Walsingham, holotype male (BM slide 4358); Olinda, 4,000 feet, Maui; forewing 6.5 mm., dark fuscous with a few white to cream-colored scales and two cream-colored, preapical, marginal maculae as shown. Note the subcostal brush on the hindwing. There is a small metapleural tuft. This specimen is figured in color in *Fauna Hawaiiensis*.

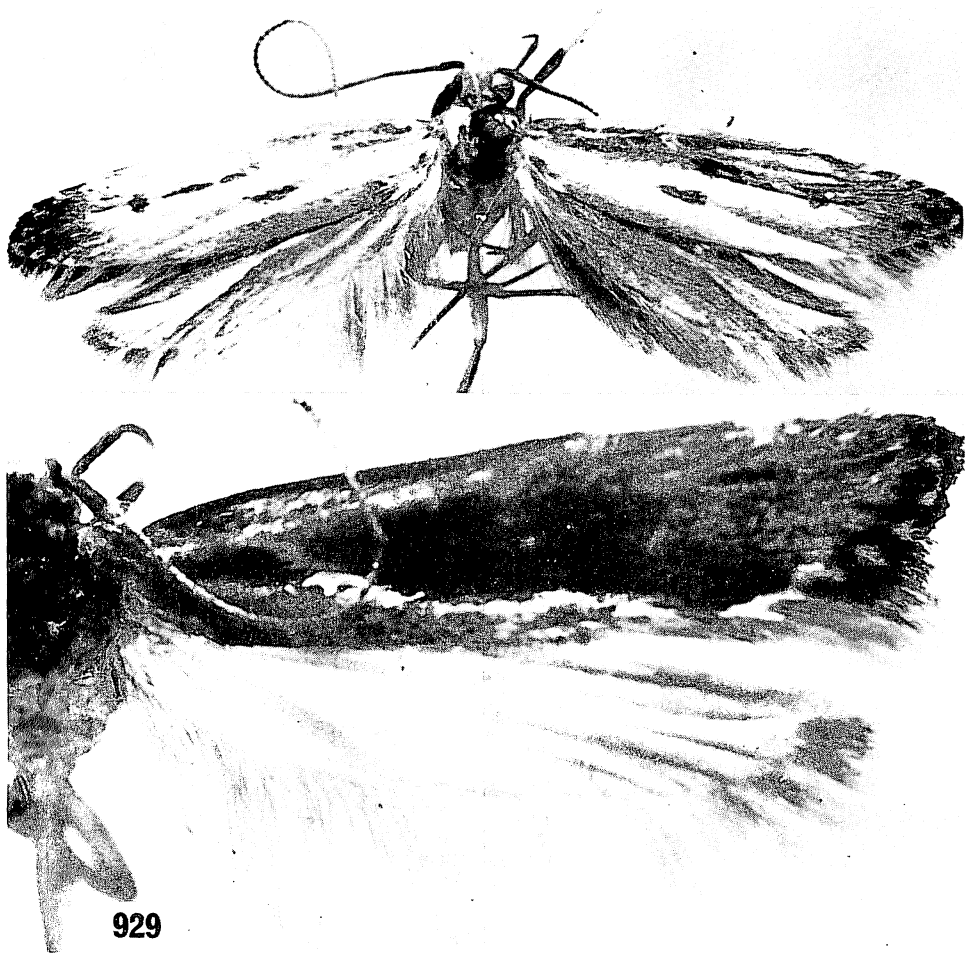


Figure 929—*Hyposmocoma*. Top, (*E.*) *margella* (Walsingham) ("*Semnoprepia*"), holotype male (BM slide 4430); Kilauea, Hawaii; expanse 18.5 mm.; forewings rather dirty whitish with fuscous maculae. Bottom, (*H.*) *marginotata* Walsingham, holotype male (BM slide 4132); Kauai, 3,000 to 4,000 feet; forewing 7 mm., fuscous with white maculae. Both of these specimens are illustrated in *Fauna Hawaiiensis*.

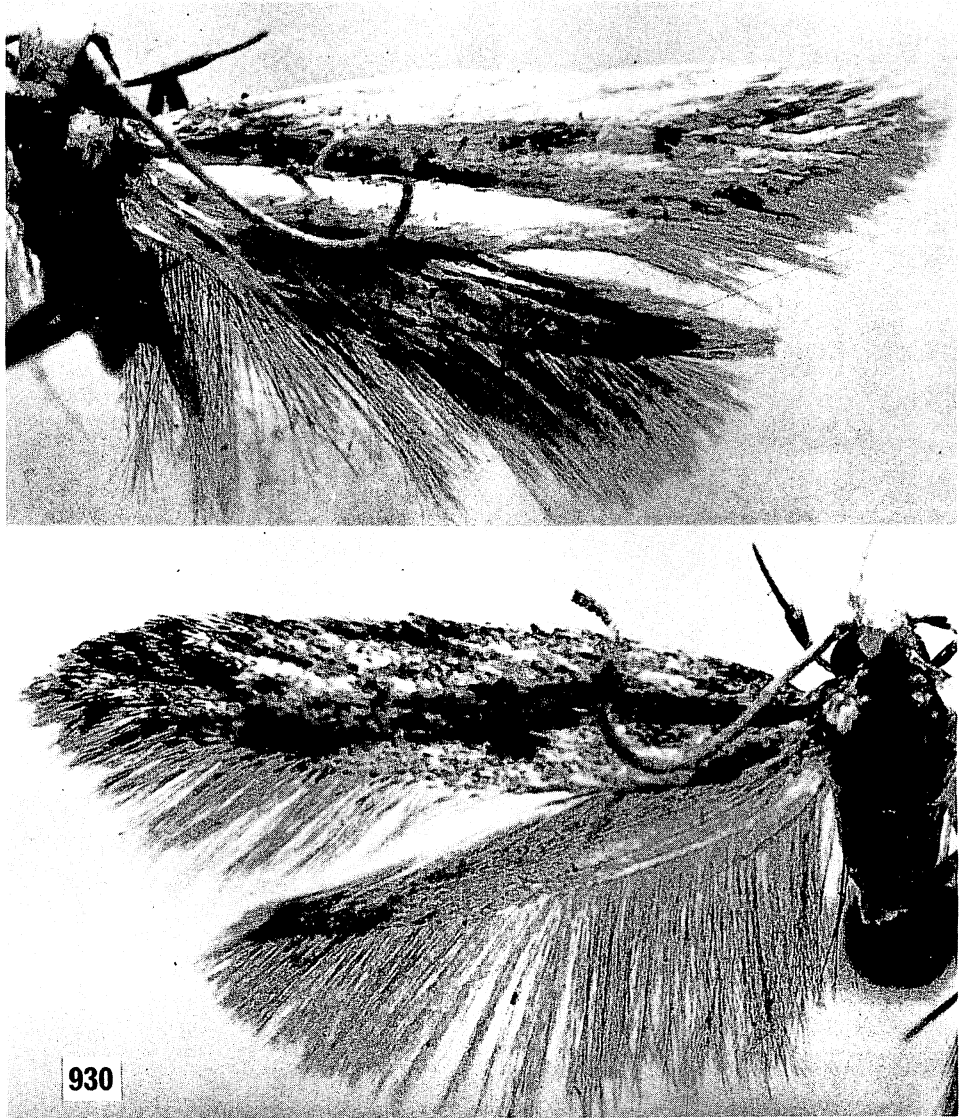


Figure 930—*Hyposmocoma*. Top, (*H.*) *mediella* Walsingham, allotype male (BM slide 4098); Waianae Mts., Oahu; forewing 5 mm., white to cream-colored with brown to fuscous maculae. Bottom, (*E.*) *mediocris* (Walsingham) ("*Aphthonetus*"), holotype male (BM slide 4737); Haleakala, 5,000 feet, Maui; forewing 8 mm., mixed white, yellowish, brownish, and fuscous. The dark macula behind the fold and beyond the end curve of the antenna is a cluster of raised squamae. This specimen is figured in *Fauna Hawaiiensis*.



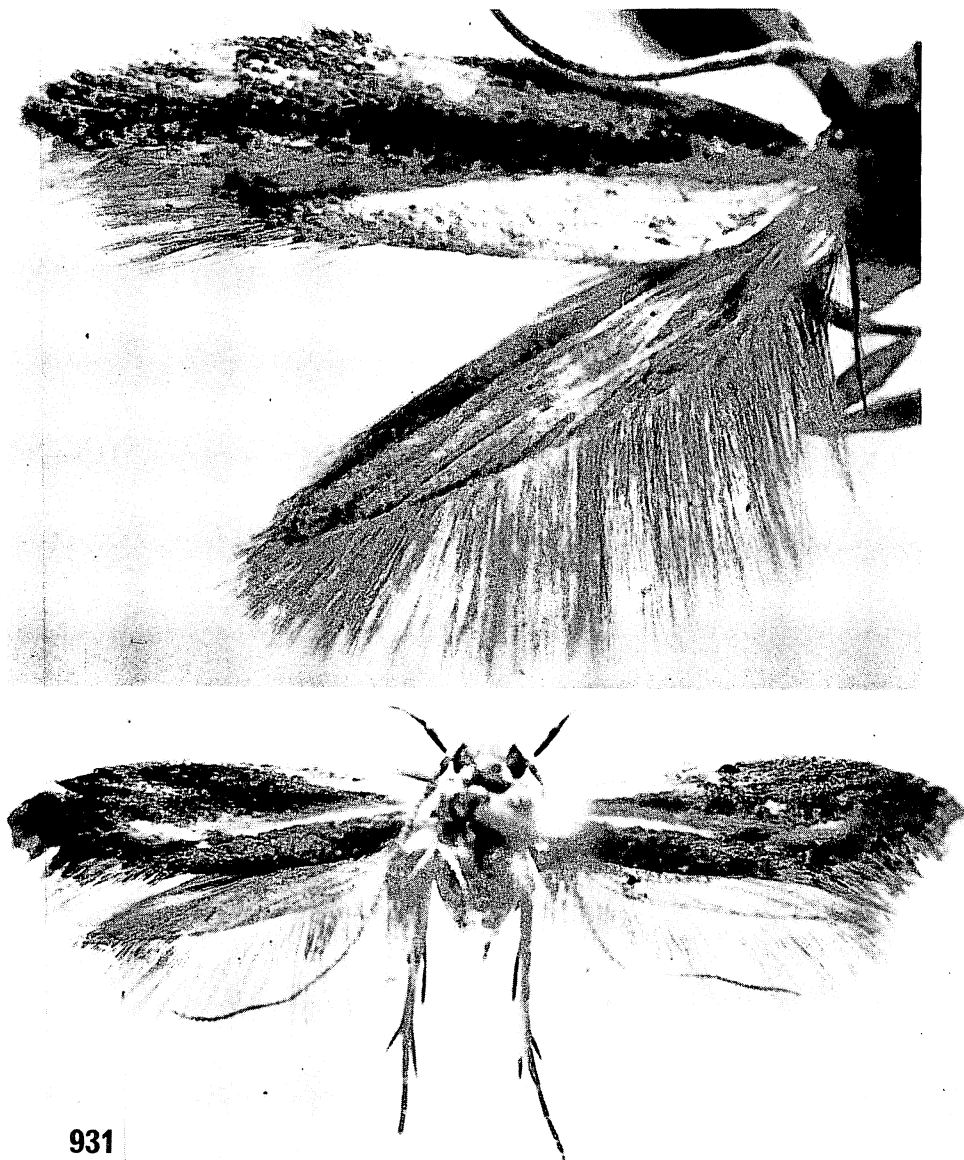
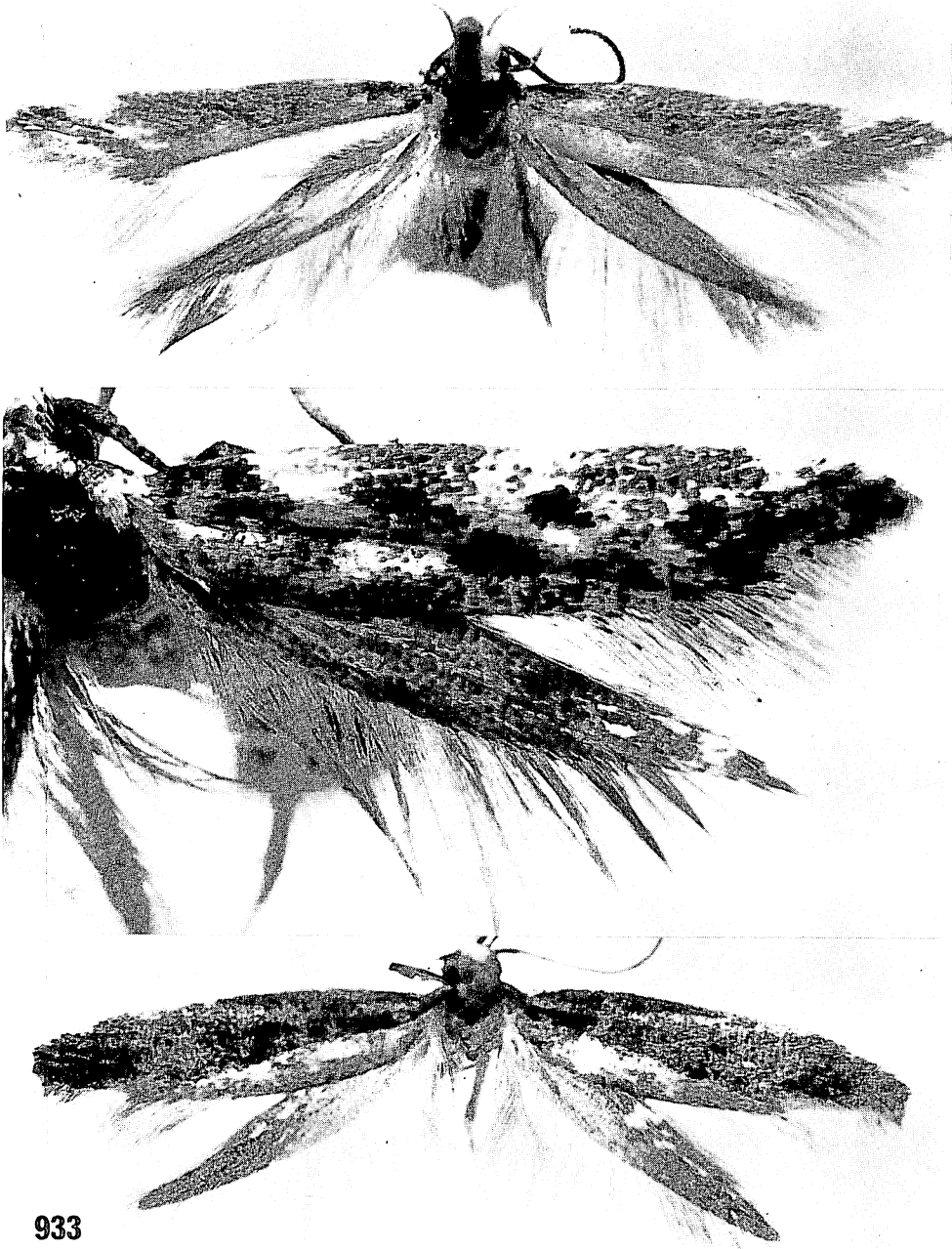


Figure 931—*Hyposmocoma* (*Hyposmocoma*). Top, *mediospurcata* Walsingham, holotype (BM slide 4102); Kilauea, Hawaii; forewing 6 mm., white to cream-colored with brownish maculae. This specimen is illustrated in color in *Fauna Hawaiiensis*. Bottom, *mesorectis* Meyrick, holotype male (BM slide 9569 Clarke); Koolau Mts., Oahu; expanse 11.5 mm.; forewings brown with a very conspicuous pale vitta (the apparently pale basal costal areas in this photograph are light reflections and are not the pale scaling which is confined to the submedial vittae).



932

Figure 932—*Hypsmocoma (Hypsmocoma)*. Top, *metallica* Walsingham, holotype male (BM slide 4116); Kona, about 5,000 feet, Hawaii; forewing 6.5 mm., very dark with a metallic sheen. The photograph cannot accurately reproduce the rather brassy, shiny squamae. The reflections from them produce an inaccurate appearance. Bottom, *metrosiderella* Walsingham, holotype male (BM slide 4354); Halemanu and Kaholuamano, 4,000 feet, Kauai; forewing 6 mm., creamy white and fuscous. See figure 802 for a figure of the larval case from which this moth was reared. Note the strong subcostal brush. These specimens are illustrated in *Fauna Hawaiensis*.



933

Figure 933—*Hyposmocoma* (*Hyposmocoma*). Top, *mimema* Walsingham, holotype male (BM slide 4349); Haleakala, 5,000 feet, Maui; expanse 11 mm., forewings yellow and fuscous. Middle, *mimica* Walsingham, holotype male (BM slide 4479); Molokai, over 3,000 feet; forewing 4.75 mm., white and fuscous. Bottom, *modesta* Walsingham, holotype male (BM slide 4330); Kauai, 3,000 to 4,000 feet; expanse 12 mm.; forewings yellowish and brownish fuscous. These specimens are all illustrated in *Fauna Hawaiiensis*.

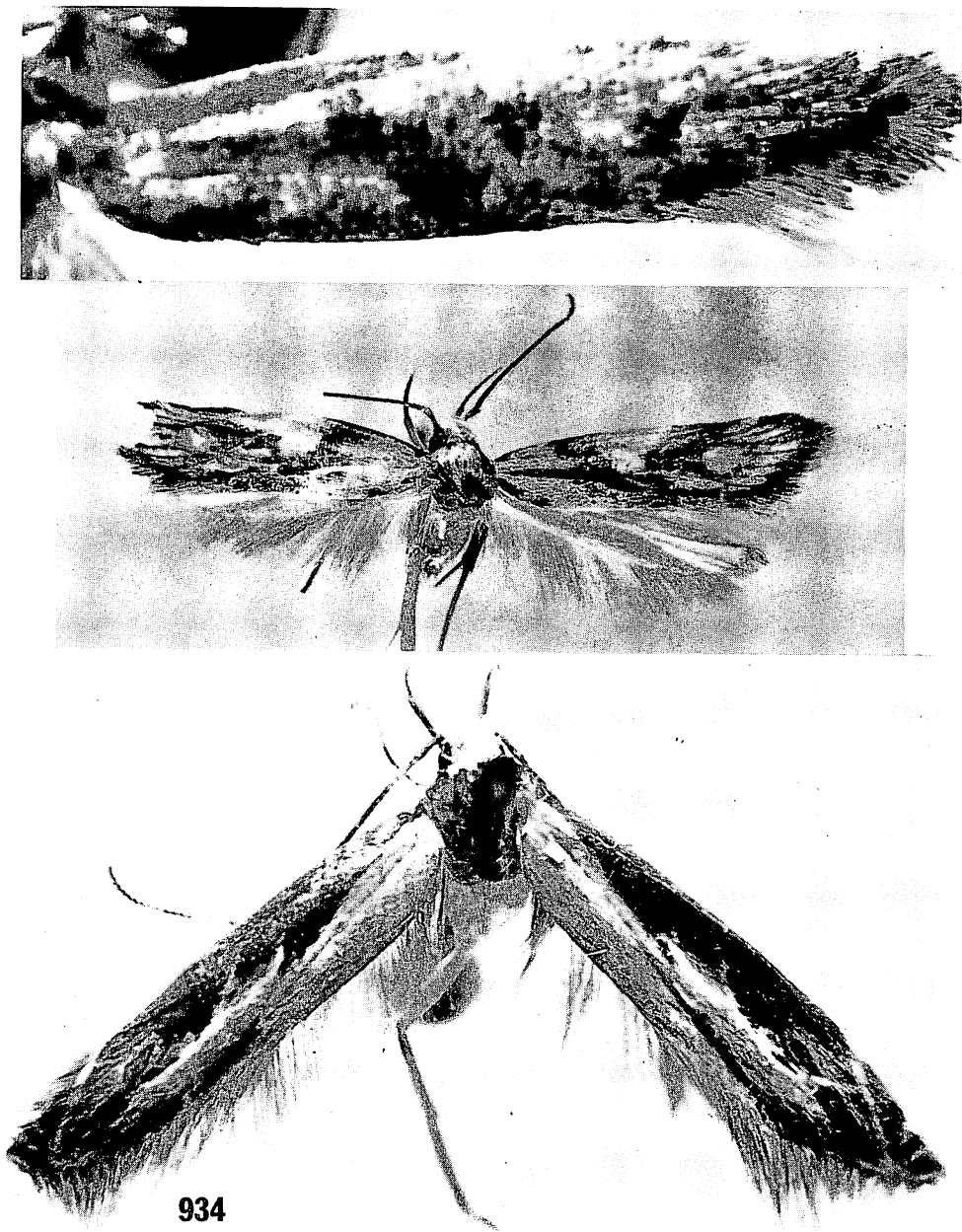


Figure 934—*Hyposmocoma*. Top, (*H.*) *montivolans* (Butler), holotype male (BM slide 4476); mountains near Honolulu; forewing 4.75 mm., mixed greyish, white, and pale and dark fuscous; there is a small metapleural tuft. Middle, (*E.*) *mormopica* (Meyrick) (“*Neelysia*”), holotype female (abdomen lost); Punaluu, Oahu; forewing 6 mm., basically a beautiful yellow with brownish fuscous maculae and two prominent white maculae on the disc. Bottom, (*E.*) *municeps* (Walsingham) (“*Neelysia*”), holotype female (BM slide 4316); Olinda, 4,000 feet, Maui; forewing 7 mm., yellowish and white with fuscous maculae. The specimens at top and bottom are figured in *Fauna Hawaiiensis*.

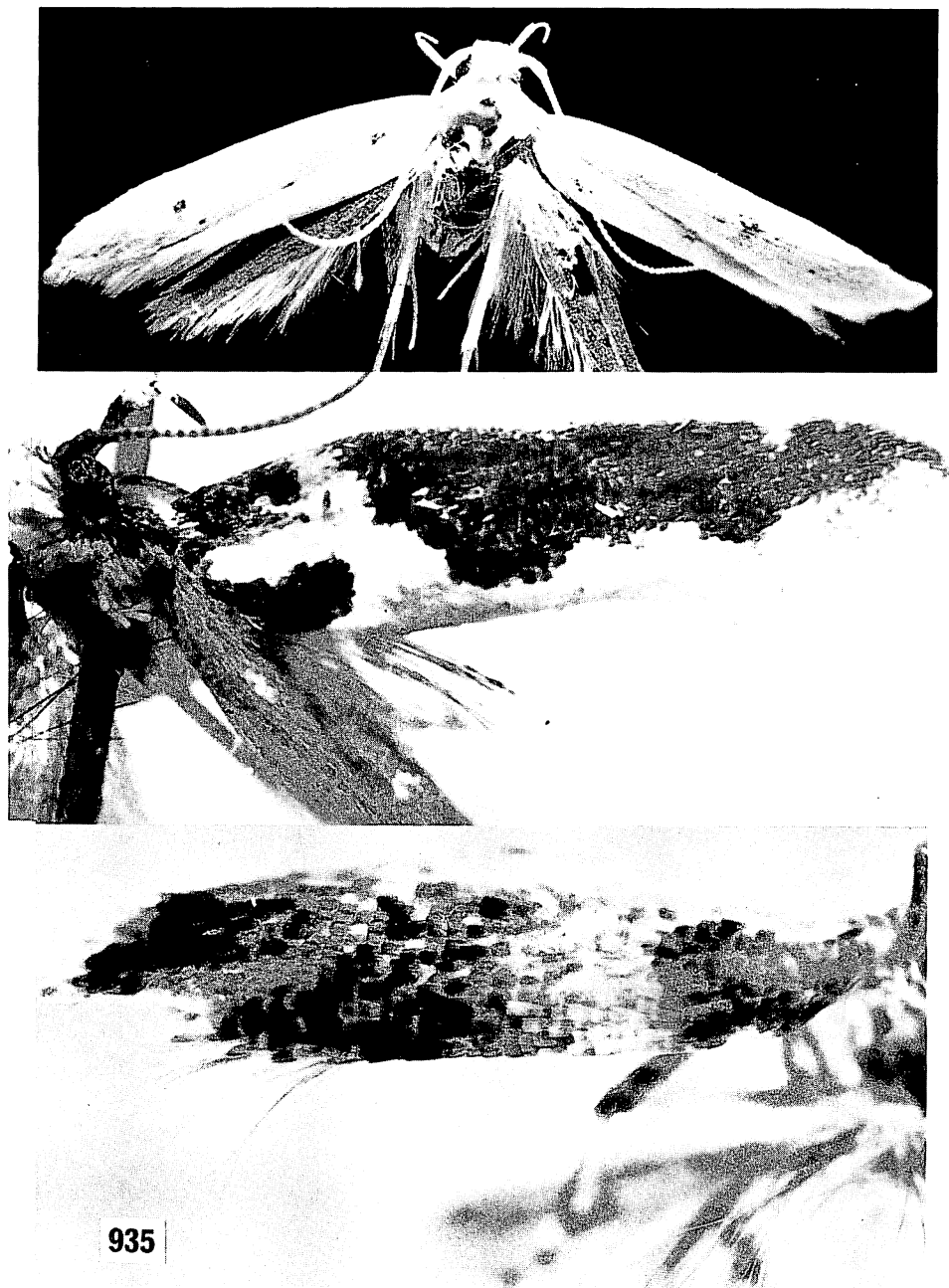


Figure 935—*Hyposmocoma*. Top, (*E.*) *mystodoxa* Meyrick, lectotype male (BM slide 9557 Clarke); Koolau Mts., near Honolulu; forewing 6.5 mm., shining white with a few small black maculae. Middle, (*H.*) *nebulifera* Walsingham, holotype male (BM slide 4091); Koolau Mts., 2,000 feet, near Honolulu; forewing 5 mm., white mixed with some yellow scales and with black. There is a moderate metapleural tuft. This specimen is figured in *Fauna Hawaiiensis*. Bottom, (*H.*) *neckerensis* (Swezey) ("*Petrochroa*"); Gardner Island; forewing 2.5 mm., brownish fuscous and white (this specimen is abraded and faded and has a split in the subcostal area).

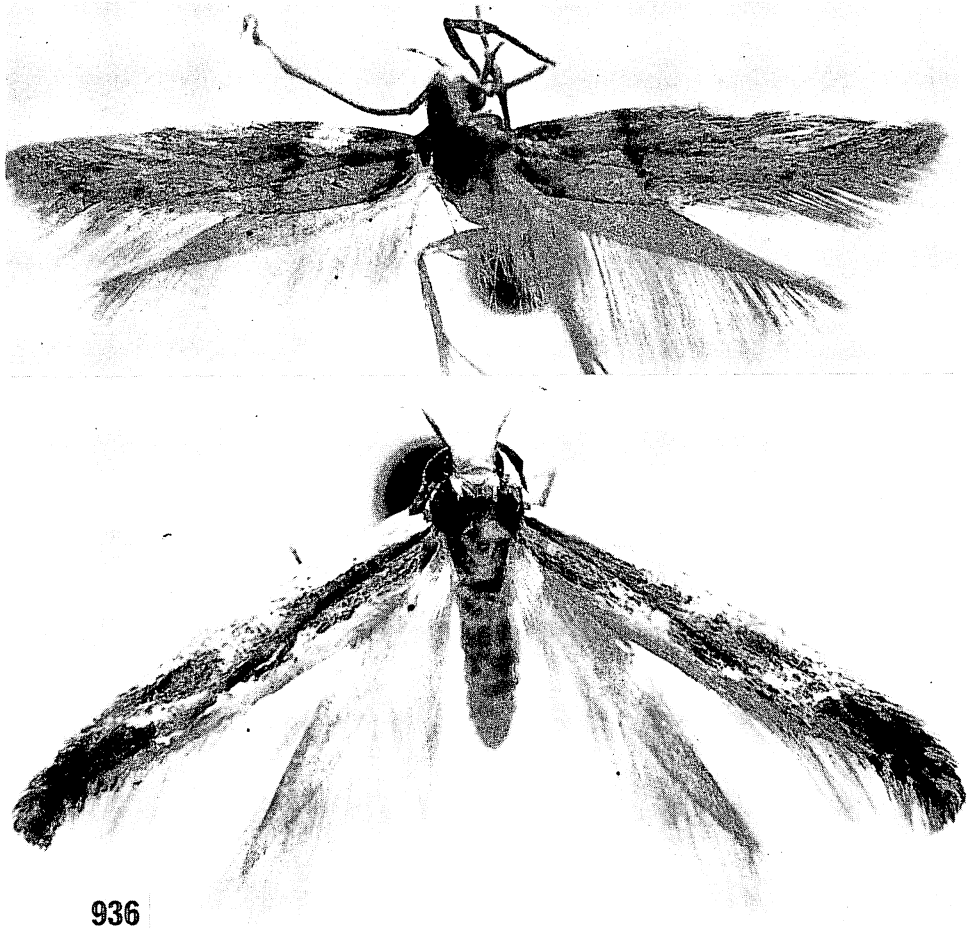


Figure 936—*Hyposmocoma* (*Euperissus*). Top, *nemo* (Walsingham) (“*Aphthonetus*”), holotype male (BM slide 4752); Haleakala, 5,000 feet, Maui; expanse 12 mm.; forewing has whitish background scaling with ferruginous to fuscous areas and maculae. Bottom, *nemoricola* (Walsingham) (“*Neelysia*”), holotype female (BM slide 8069); forest above Pelekunu, Molokai; forewing 5.75 mm., brownish orange to fuscous with the posterior marginal zone mostly white, cream, and yellow. The male has long thoracic brushes which cross over the back of the abdomen. These two specimens are illustrated in *Fauna Hawaiiensis*.



937

Figure 937—*Hyposmocoma* (*Hyposmocoma*). Top, *nephelodes* Walsingham, allotype female (BM slide 4487); Waianac Mts., 3,000 feet, Oahu; forewing 7 mm. long, straw-colored and fuscous. Middle, *niger* Walsingham, holotype male (BM slide 4128); Molokai, about 4,000 feet; expanse 8 mm.; forewings very dark fuscous without a pattern (the pale areas on the right wing are abrasions). There is an incipient tuft on each metapleuron. Bottom, *nigralbida* Walsingham, holotype male (BM slide 4081); Kauai, 3,000 to 4,000 feet; expanse 17.5 mm.; forewings boldly black and white. The middle and bottom specimens are figured in *Fauna Hawaiiensis*.

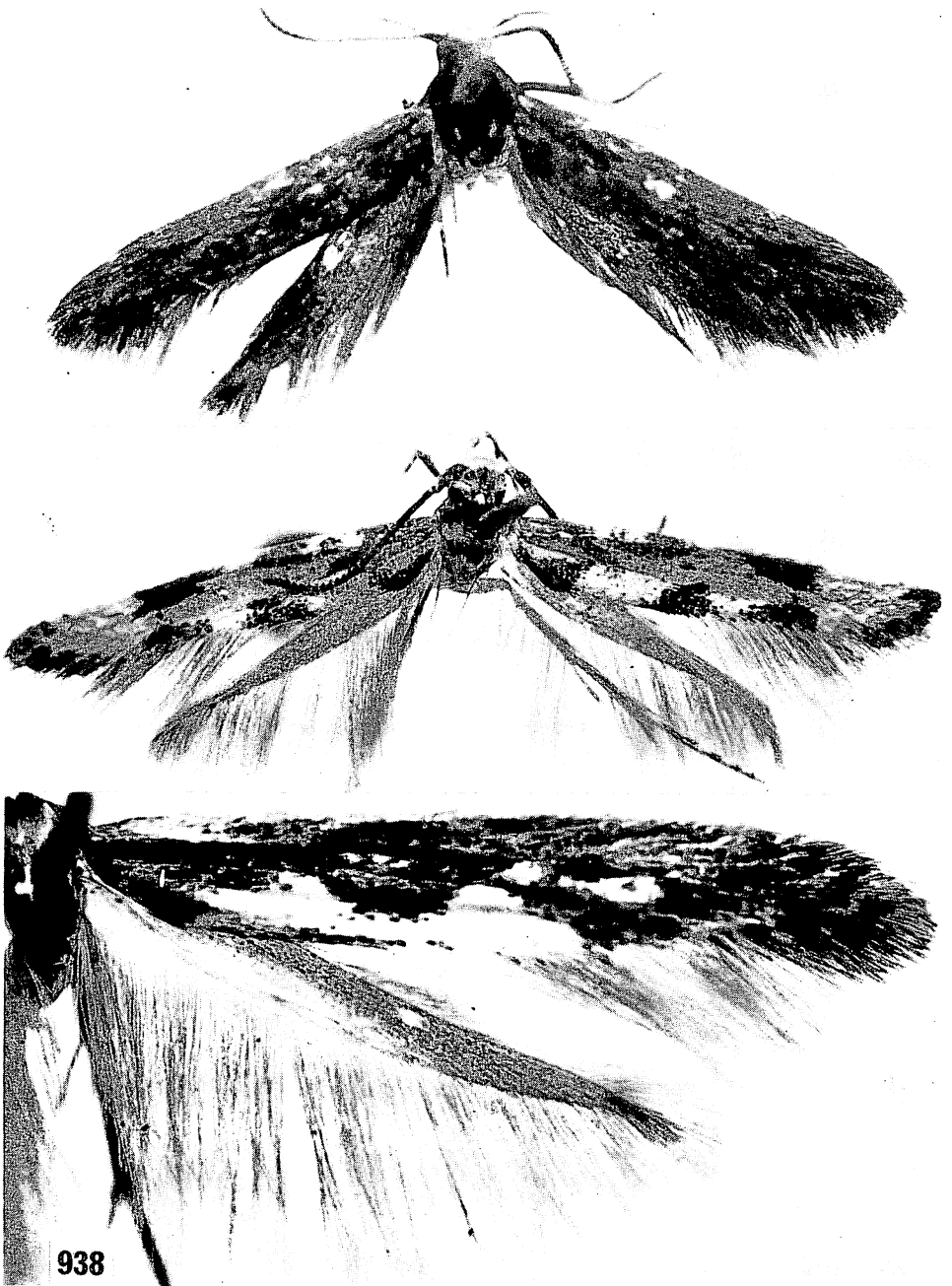
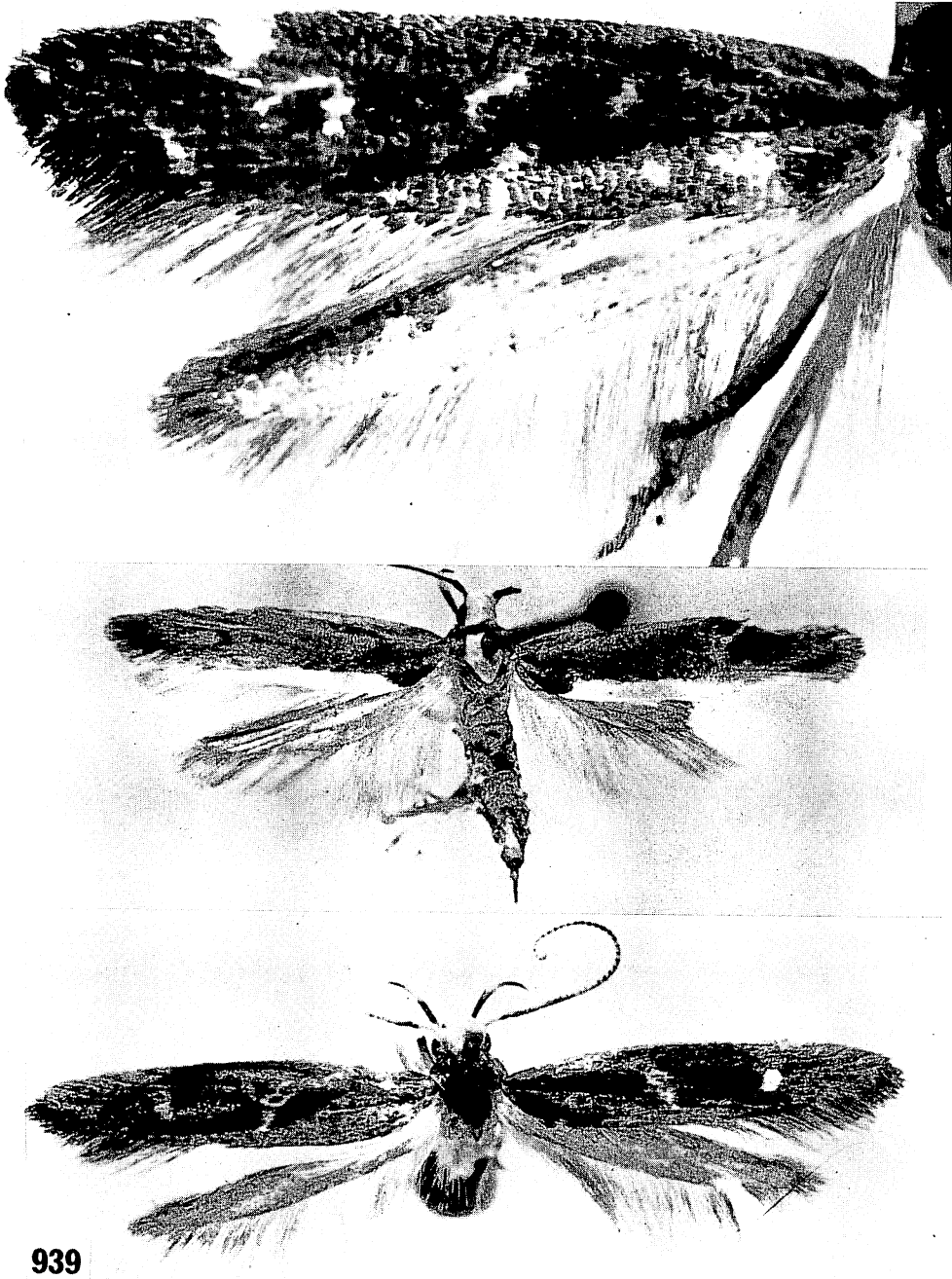


Figure 938—*Hyposmocoma*. Top, (*H. nigrescens* Walsingham, holotype male (BM slide 4126); Kilauea, Hawaii; forewing 5 mm., solidly black with a few pale scales (the pale areas showing in the photograph are abrasions). Middle, (*E. nigrodentata* Walsingham, holotype male (BM slide 4323); Kauai, 3,000 to 4,000 feet; expanse 9.5 mm.; forewings white with dark fuscous maculae. Bottom, (*E. ningorella* (Walsingham) ("*Neelysia*"), holotype male (BM slide 4446); Haleakala, 5,000 feet, Maui; forewing 6.5 mm., brownish orange to fuscous with white maculae. There are long metapleural brushes which extend over the abdomen of the male. These three specimens are illustrated in *Fauna Hawaiiensis*.



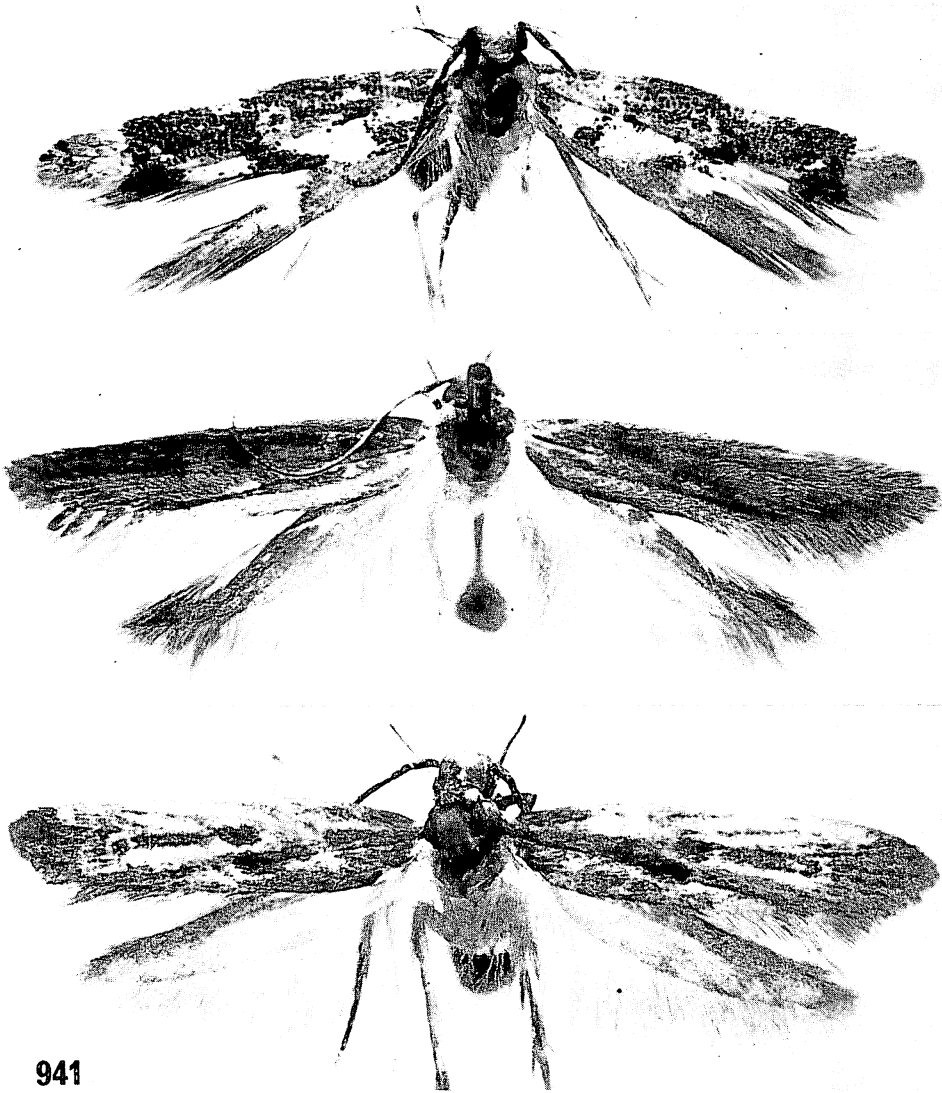


939

Figure 939—*Hyposmocoma* (*Euperissus*). Top, *ningorifera* (Walsingham) (“*Neelysia*”), holotype male (BM slide 4441); Haleakala, 5,000 feet, Maui; forewing 5 mm., dark fuscous with white maculae. Middle, *nipholoncha* Meyrick, holotype female (slide not made); Mt. Tantalus, Oahu; ex dead *Euphorbia* stem; forewing 8 mm., brownish fuscous and white. Bottom, *niveiceps* Walsingham, holotype male (BM slide 4130); Lanai, 3,000 feet; expanse 12 mm.; forewings fuscous with white maculae. The top and bottom specimens are illustrated in *Fauna Hawaiiensis*.



Figure 940—*Hyposmocoma* (*Hyposmocoma*). Top, *nivadorsella* Walsingham, holotype male (BM slide 4082); Kauai, 3000 to 4,000 feet; expanse 15 mm.; forewings black and white. Middle, *notabilis* Walsingham, holotype male (BM slide 4093); Molokai, over 4,000 feet; forewing 9.5 mm., white tinged with yellow, brownish, and fuscous. Bottom, *numida* Walsingham, holotype male (BM slide 4125); Haleakala, 4,000 feet, Maui; expanse 11 mm. Because the submetallic scales have reflected too much light, the photograph does not portray adequately the contrast between the black scaling and the white maculae.

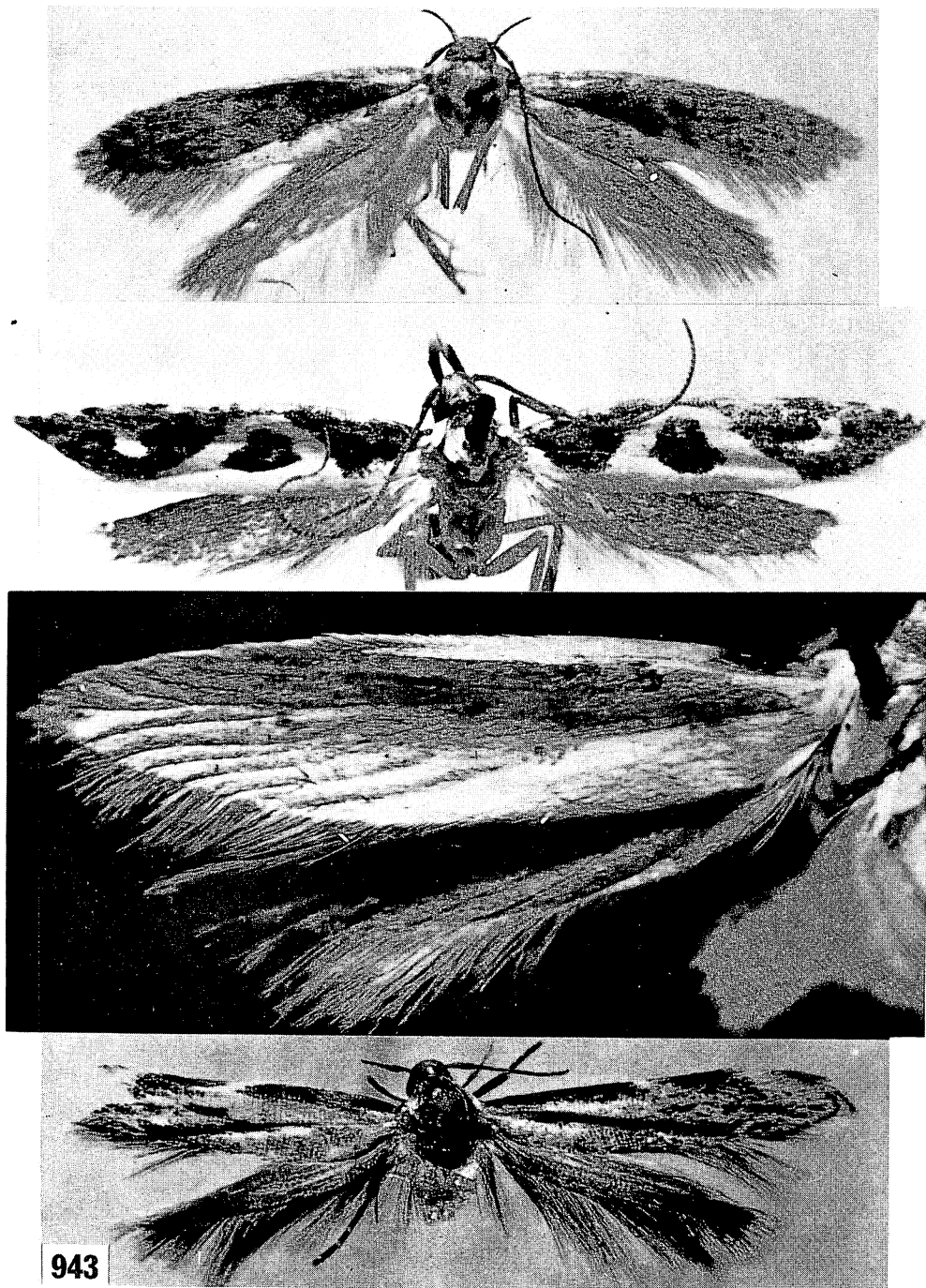


941

Figure 941—*Hyposmocoma* (*Euperissus*). Top, *obliterated* Walsingham, holotype male (BM slide 4324); Kauai, 3,000 to 4,000 feet; expanse 10 mm.; forewings white and fuscous. Middle, *obscura* Walsingham, allotype male (BM slide 4339); Olinda, 4,000 feet, Maui; forewing 8 mm., brownish or brownish fuscous with some yellowish and darker fuscous maculae. Bottom, *ocellata* Walsingham, holotype male (BM slide 4136); Kaholuamano, 4,000 feet, Kauai; expanse 13.5 mm.; forewings brownish fuscous with darker and paler areas. These three specimens are figured in *Fauna Hawaiiensis*.



Figure 942—*Hyposmocoma* (*Hyposmocoma*). Top, *ochreocervina* Walsingham, holotype male (BM slide 4346); Waianae Mts., about 3,000 feet, Oahu; forewing 5 mm., straw-colored and fuscous. Bottom, *ochreociliata* Walsingham, holotype male (BM slide 4357); Kilauea, Hawaii; forewing 7 mm., white with mostly fuscous maculae and yellow fringes. There is a small setal cluster on each metapleuron. These two specimens are figured in *Fauna Hawaiiensis*.



943

Figure 943—*Hyposmocoma*. Top, (*E. ochreovittella* Walsingham, holotype male (BM slide 4334); Kona, 4,000 feet, Hawaii; expanse 15 mm.; forewings with mostly brown dark areas and yellowish pale areas flecked with brown. Note the long yellow brushes projecting from the axils of the hindwings. Second from top, (*E. oculifera* Walsingham, holotype male (BM slide 4080); Kauai, 3,000 to 4,000 feet; expanse 17 mm.; forewings black and white. Third from top, (*E. ossea* Walsingham, holotype male (BM slide 4149); Kona, 4,000 feet, Hawaii; forewing 8.5 mm., nearly white with a few brown maculae (the dark mark at the base of the forewing costa is glue). Bottom, (*H. oxypetra* Meyrick, paratype (damaged, abdomen lost); Palolo, Oahu; expanse 10 mm.; forewings whitish and yellowish or cream-colored with dark brown or fuscous maculae. The three upper specimens are figured in *Fauna Hawaiiensis*.

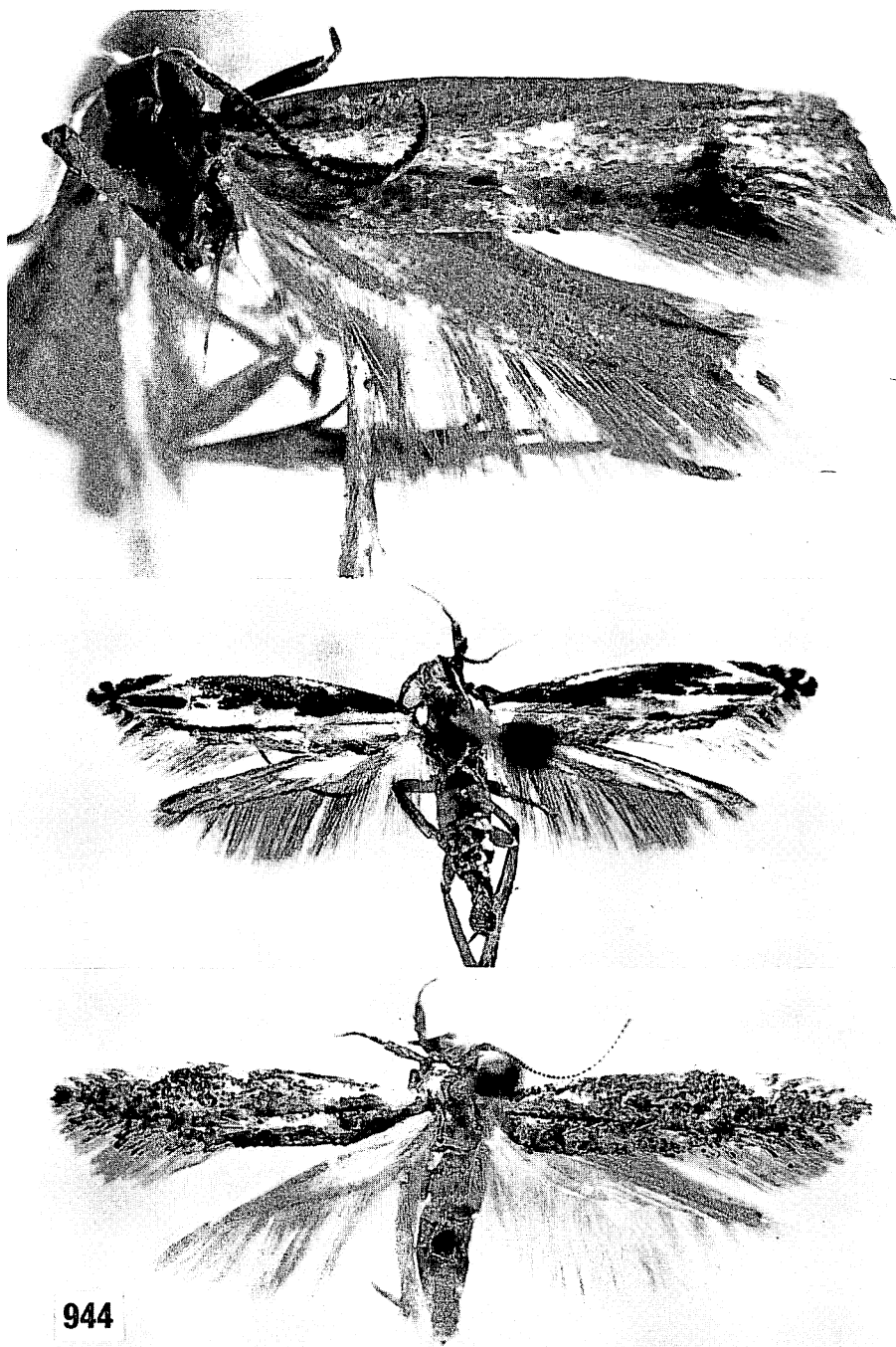


Figure 944—*Hyposmocoma* (*Euperissus*). Top, *pallidipalpis* Walsingham, holotype male (abdomen lost); Molokai, about 4,000 feet; forewing 5.5 mm., mostly concolorous bronze-brown with fuscous maculae (the pale areas on the photograph are light reflections; the moth is difficult to photograph). This specimen is illustrated in *Fauna Hawaiiensis*. Middle, *palmifera* (Meyrick) ("*Neelysia*"), holotype male (slide not made); Pauoa Flats, Oahu; ex dead *Wikstroemia*; forewing 5.5 mm., whitish and yellowish with black maculae. Bottom, *palmivora* Meyrick, holotype female; Kumuwela, Kauai; ex *Pritchardia*; forewing 7.5 mm., whitish ochreous tinged with ferruginous and sprinkled with fuscous scales.

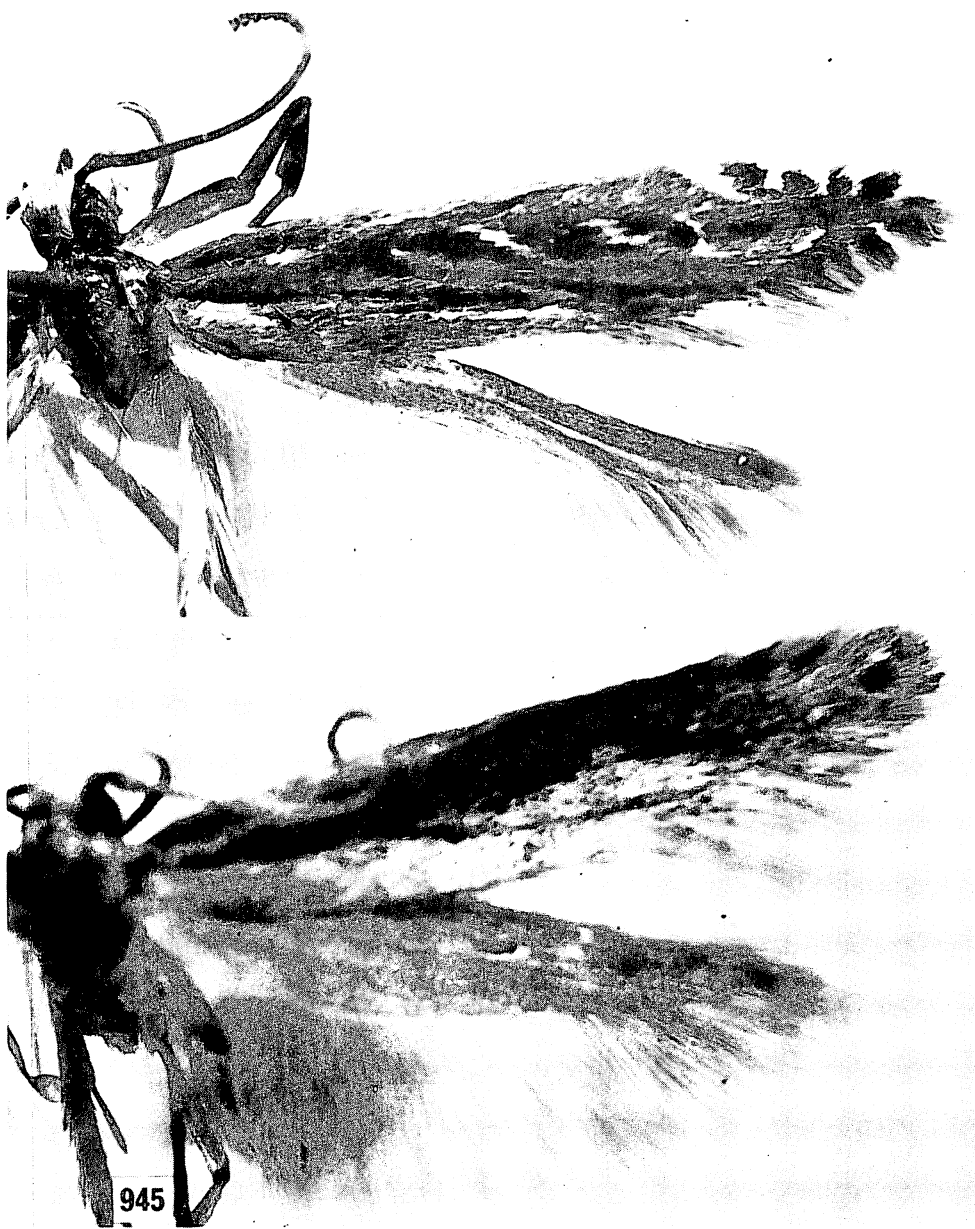


Figure 945—*Hypsmocoma*. Top, (*E.*) *paltodorella* (Walsingham) (“*Neelysia*”), allotype male (BM slide 4438); Kauai, 3,000 to 4,000 feet; forewing 5.5 mm., with various shades of cream-colored, brown, and fuscous squamae. Bottom, (*H.*) *paradoxa* Walsingham, holotype male (BM slide 4348); Kauai Mts., 3,000 to 4,000 feet; forewing 6.5 mm., yellow and fuscous. This specimen is illustrated in *Fauna Hawaiiensis*.

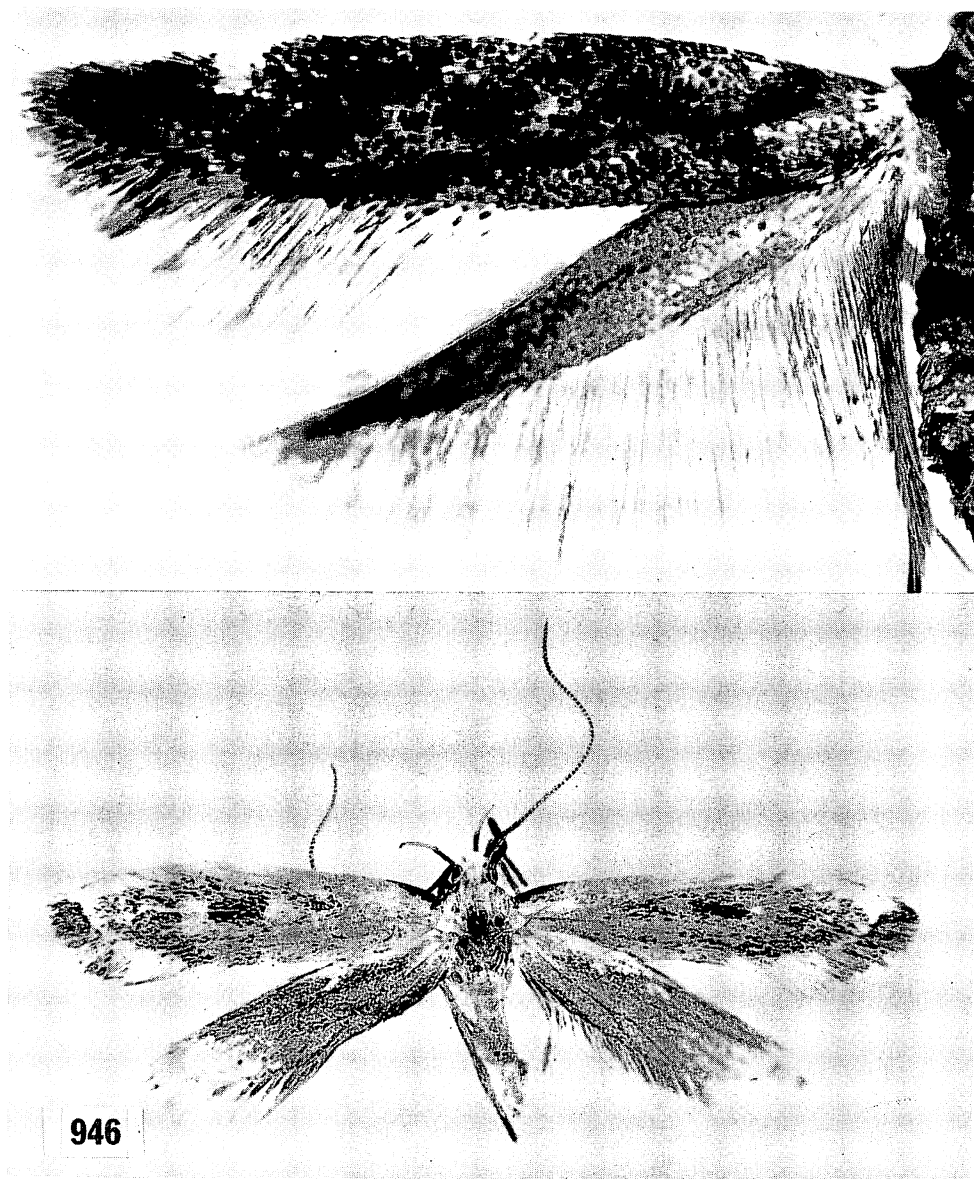
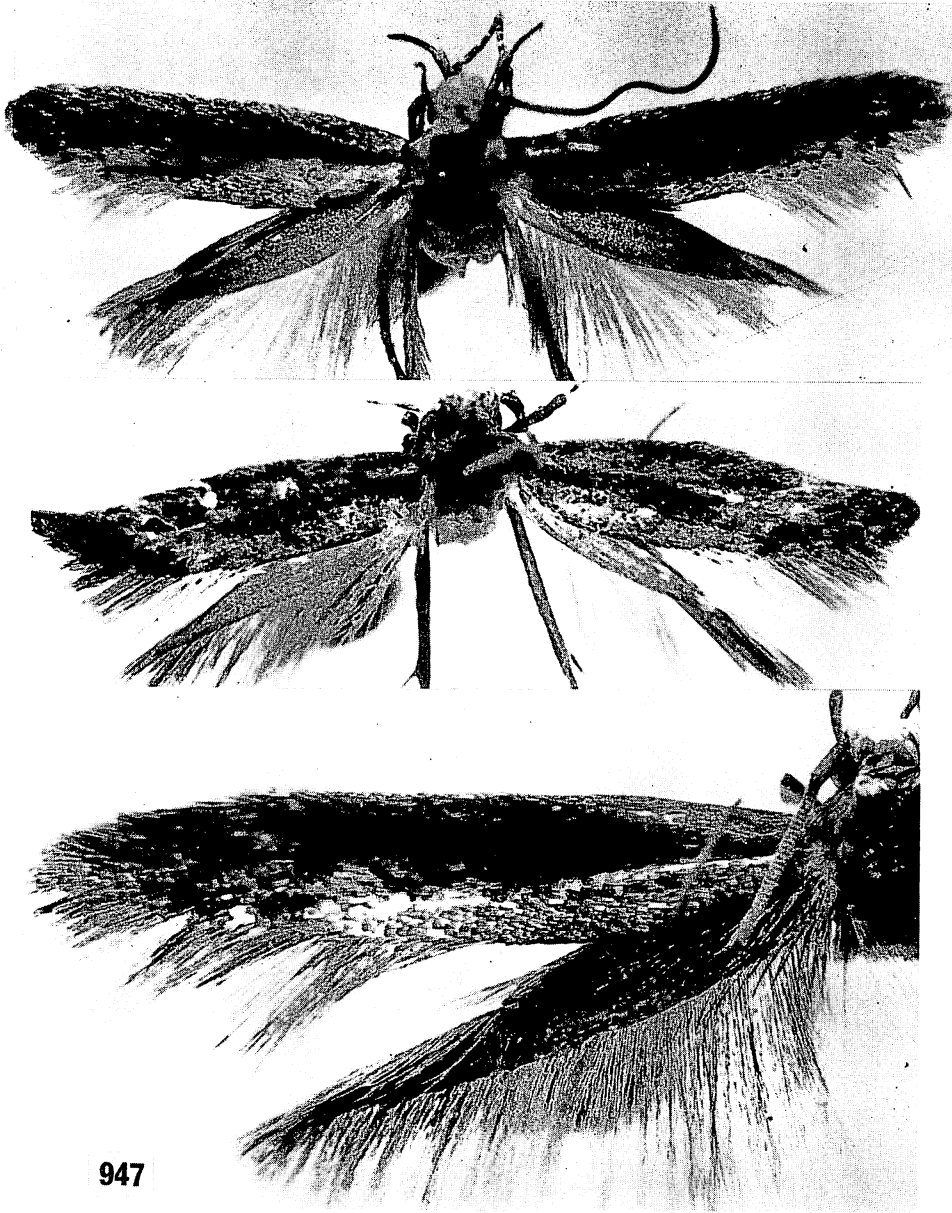


Figure 946—*Hyposmocoma*. Top, (*H.*) *parva* (Butler), holotype female (slide not made); Haleakala, 4,000 feet, Maui; forewing 6 mm., fuscous and white with a basal yellow tinge. This specimen is figured in *Fauna Hawaiiensis*. Bottom, (*E.*) *submitida* Walsingham, color form, male paratype; Kona, 4,000 feet, Hawaii; expanse 21 mm.; forewings whitish to straw-yellow with fuscous maculae. Compare the figure of the holotype on figure 975.





947

Figure 947—*Hyposmocoma*. Top, (*H.*) *partita* Walsingham, holotype male (BM slide 4089); Hilo, 2,000 feet, Hawaii; expanse 12 mm.; white and fuscous (the photograph does not show enough contrast between the pale posterior area and the dark anterior area). Middle, (*E.*) *passerella* (Walsingham) ("*Aphthonetus*"), holotype male (BM slide 4742); Kauai, 3,000 to 4,000 feet; expanse 7.5 mm.; forewings mixed ferruginous, cream-colored, and fuscous. Bottom, (*H.*) *patriciella* Walsingham, holotype male (BM slide 4118); Haleakala, 5,000 feet, Maui; forewing 6 mm., dark fuscous with a white vitta along fold and a few scattered white squamae. All these specimens are illustrated in *Fauna Hawaiiensis*.

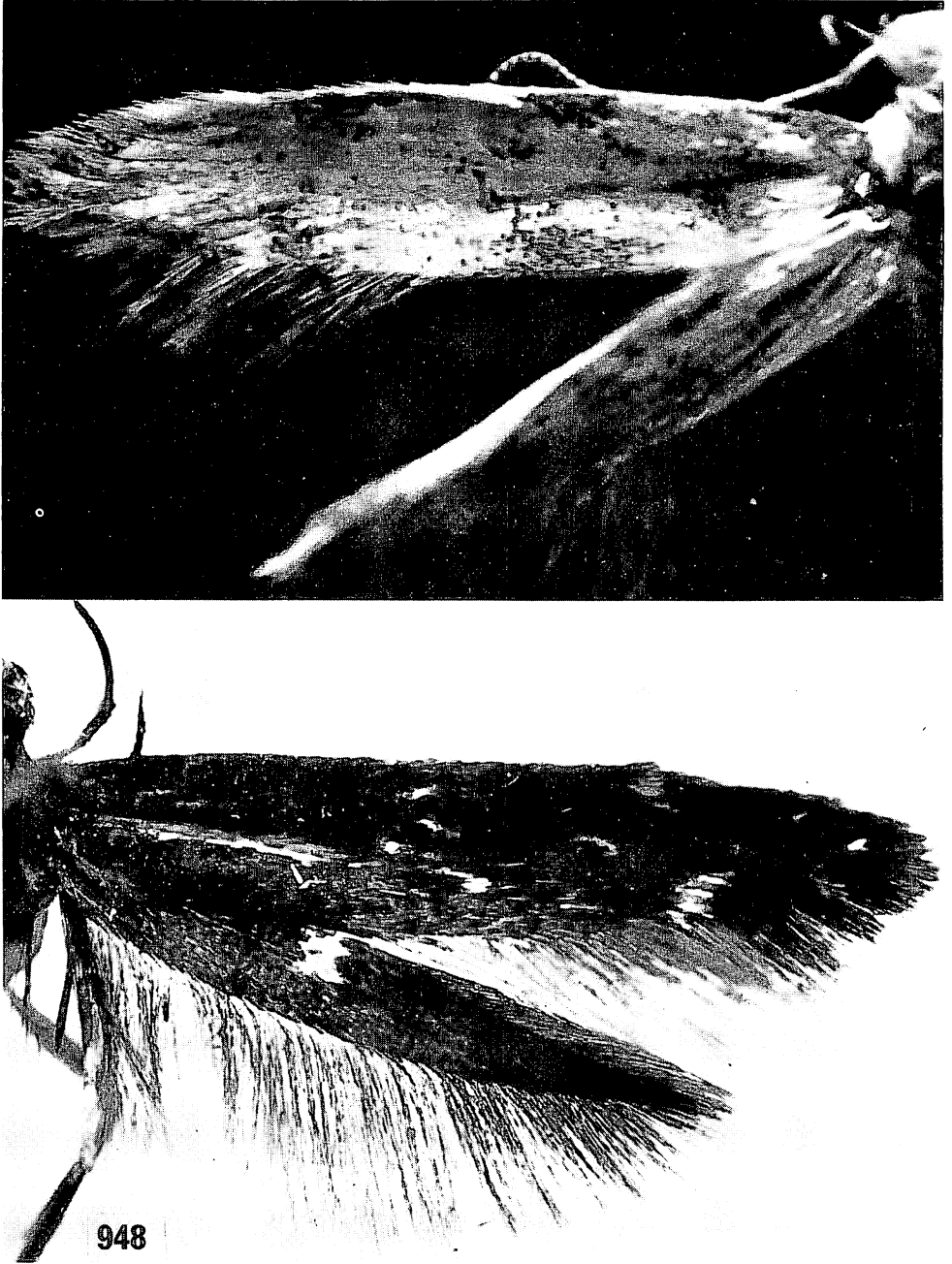
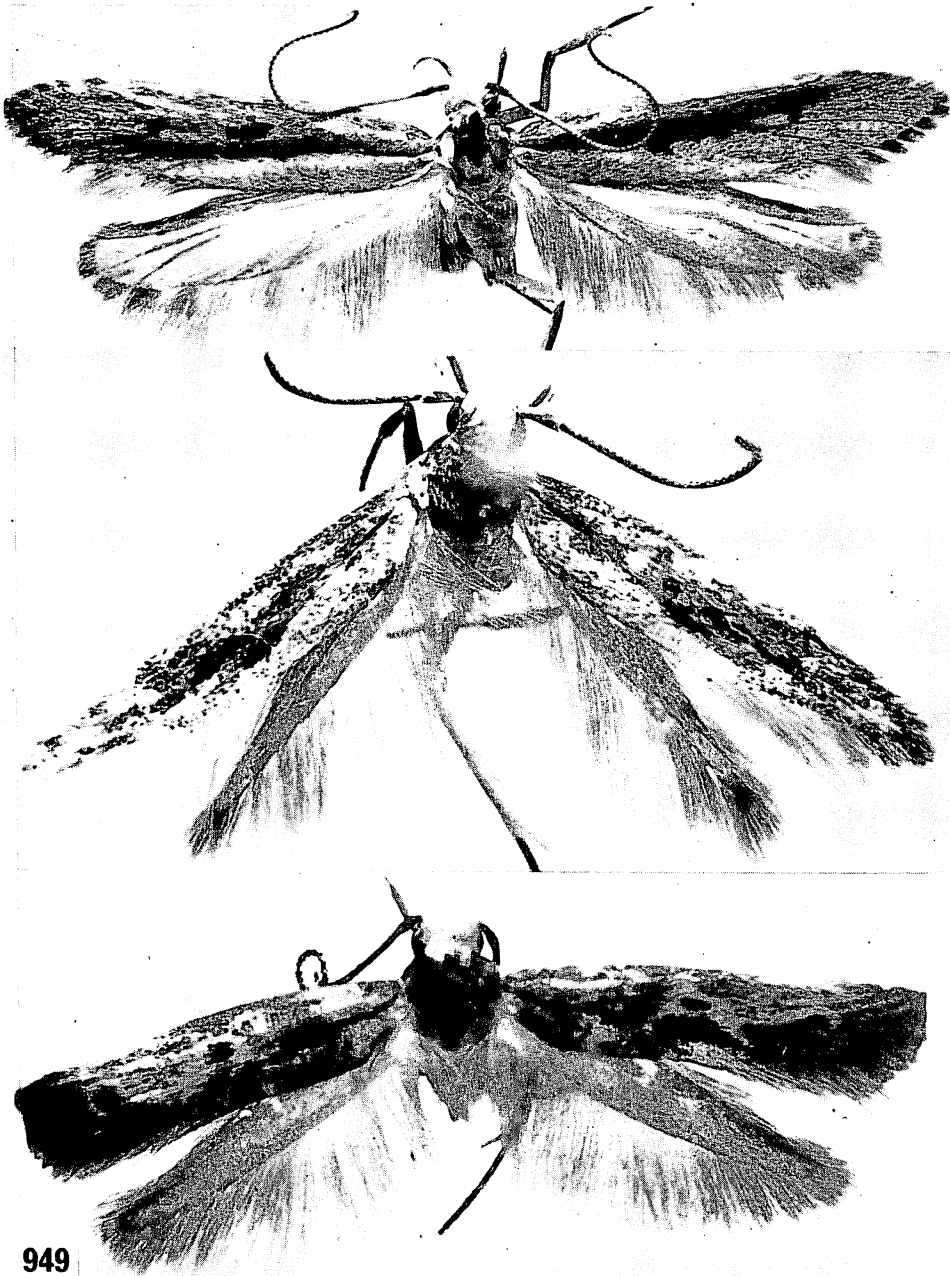
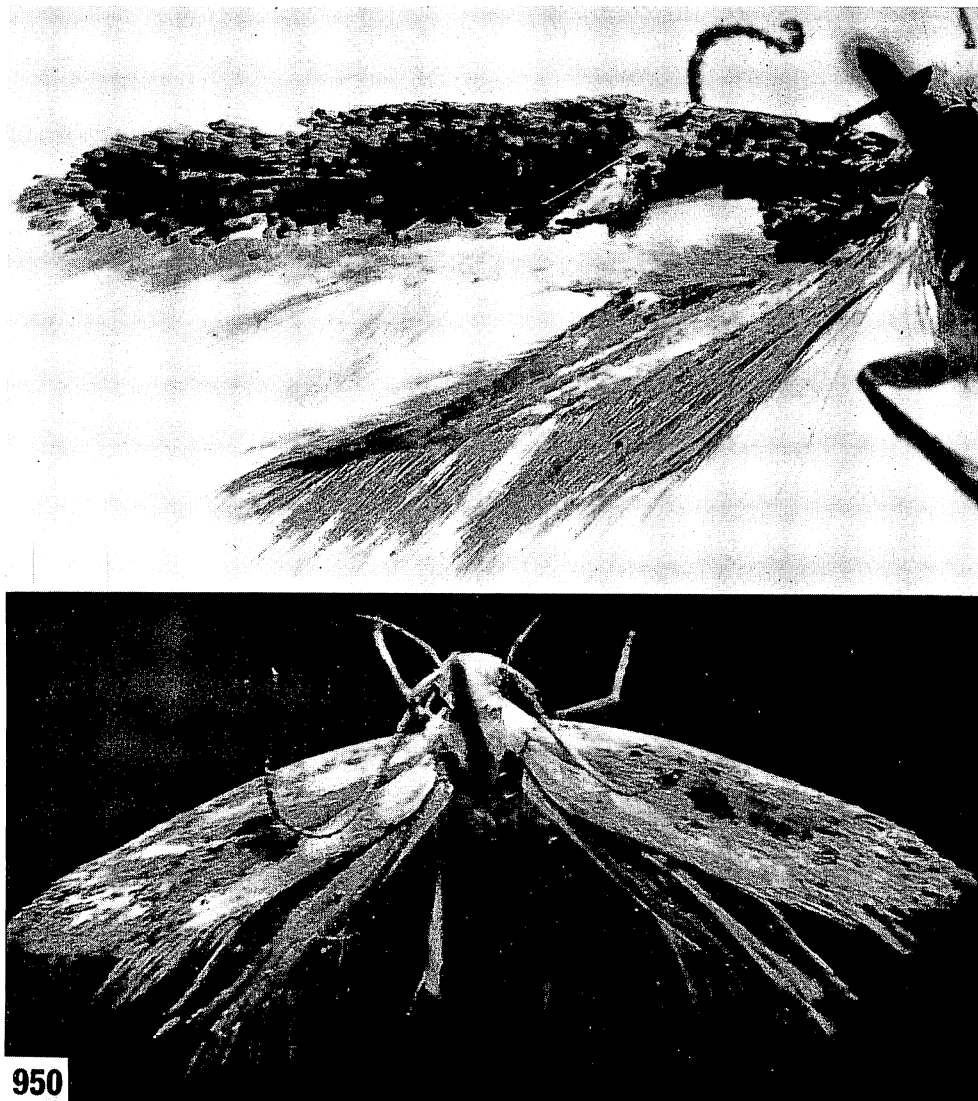


Figure 948—*Hyposmocoma*. Top, (*H. persimilis* Walsingham, holotype male (BM slide 4319); Kona, 4,000 feet, Hawaii; forewing 6.25 mm., white with fuscous maculae. Bottom, (*E. petalifera* (Walsingham) ("*Neelysia*"), holotype male (BM slide 4442); Olinda, 4,000 feet, Maui; forewing 5.25 mm., nearly black with white maculae; hindwing also nearly black (the white area is an abrasion). These specimens are illustrated in *Fauna Hawaiiensis*.



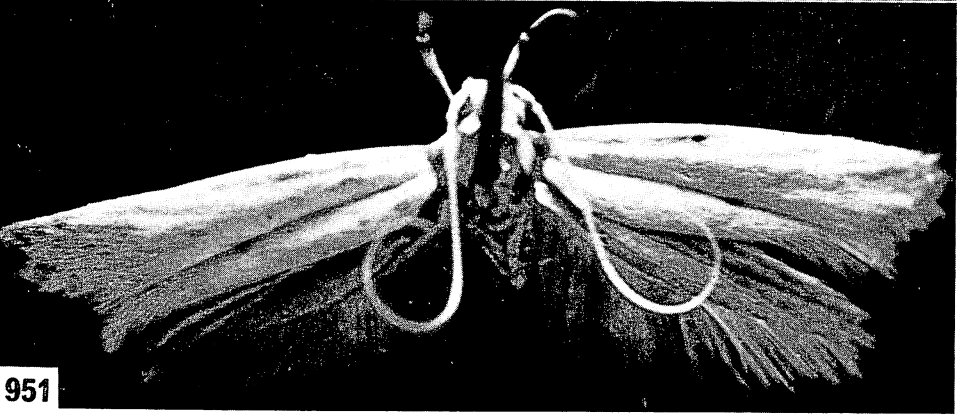
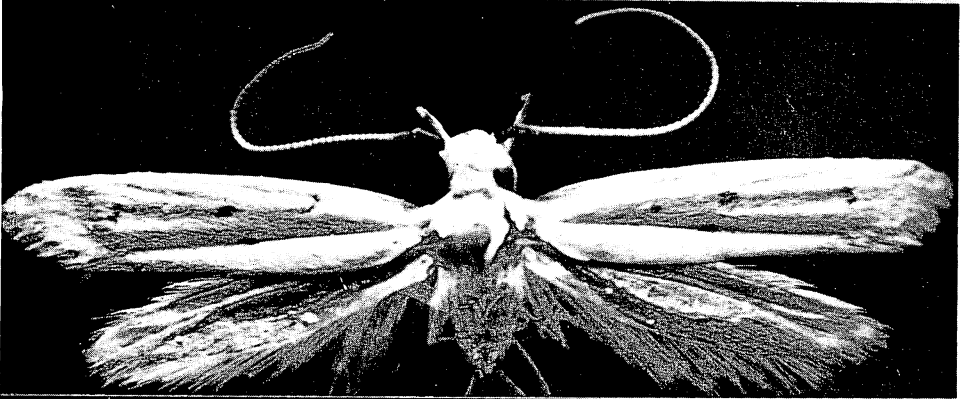
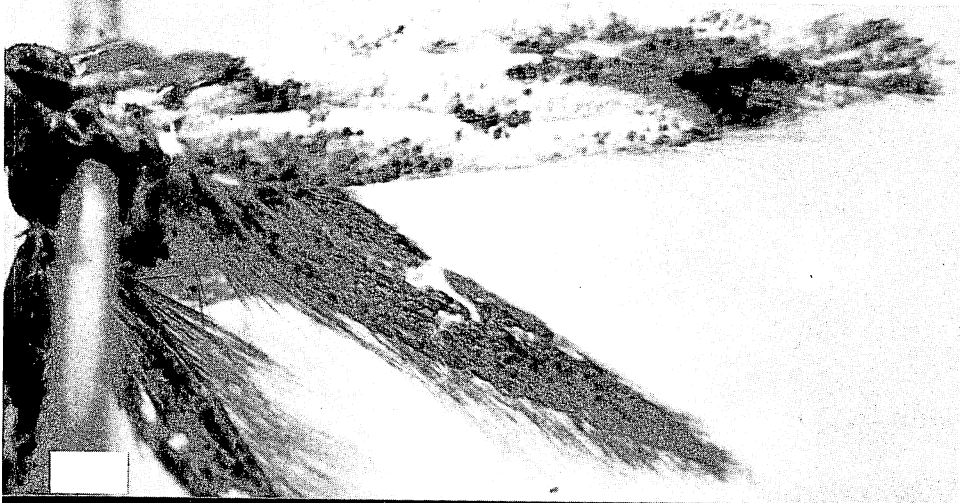
949

Figure 949—*Hyposmocoma*. Top, (*E.*) *petroptilota* (Walsingham), holotype male (BM slide 4431); Kilauea, Hawaii; expanse 20 mm.; forewings pale brownish cinereous sprinkled with fuscous scales and with fuscous maculae. This specimen is illustrated in *Fauna Hawaiiensis*. Middle, (*H.*) *petroschia* Meyrick, lectotype male (BM slide 9571 Clarke); Koolau Mts., Oahu; forewing 4.5 mm., white sprinkled with brown. Bottom, (*E.*) *tricincta* Walsingham, allotype male (abdomen lost); Kona, over 2,000 feet, Hawaii; expanse 11.5 mm.; fuscous and white. There is a small cluster of long scales on each metapleuron.



950

Figure 950—*Hyposmocoma*. Top, (*H. phalacra* Walsingham, allotype male (BM slide 4482); Kauai, 3,000 to 4,000 feet; forewing 4.5 mm., white and fuscous (the diagonal mark from costa to fold near the basal third is a damaged area). Bottom, (*E. phantasmatella* Walsingham, holotype male (abdomen lost); Kauai, 3,000 to 4,000 feet; expanse 10 mm.; forewings pale straw-colored with brown maculae. This specimen is illustrated in *Fauna Hawaiiensis*.



951

Figure 951—*Hyposmocoma* (*Hyposmocoma*). Top, *pharsotoma* Meyrick, holotype male (BM slide 9576 Clarke); Koolau Mts., near Honolulu; forewing 4.25 mm., whitish ochreous sprinkled with fuscous and with fuscous maculae. Middle, *philocharis* (Meyrick) ("*Hyperdasyella*"), holotype male (BM slide 9578 Clarke); Koolau Mts., near Honolulu; expanse 13 mm.; forewings canary yellow with fuscous maculae. Bottom, *picticornis* Walsingham, holotype male (BM slide 4148); Molokai, over 3,000 feet; forewing 7.5 mm., white with brown maculae (the small subcostal black spot near the middle of the right forewing is a hole). This specimen is figured in *Fauna Hawaiiensis*.

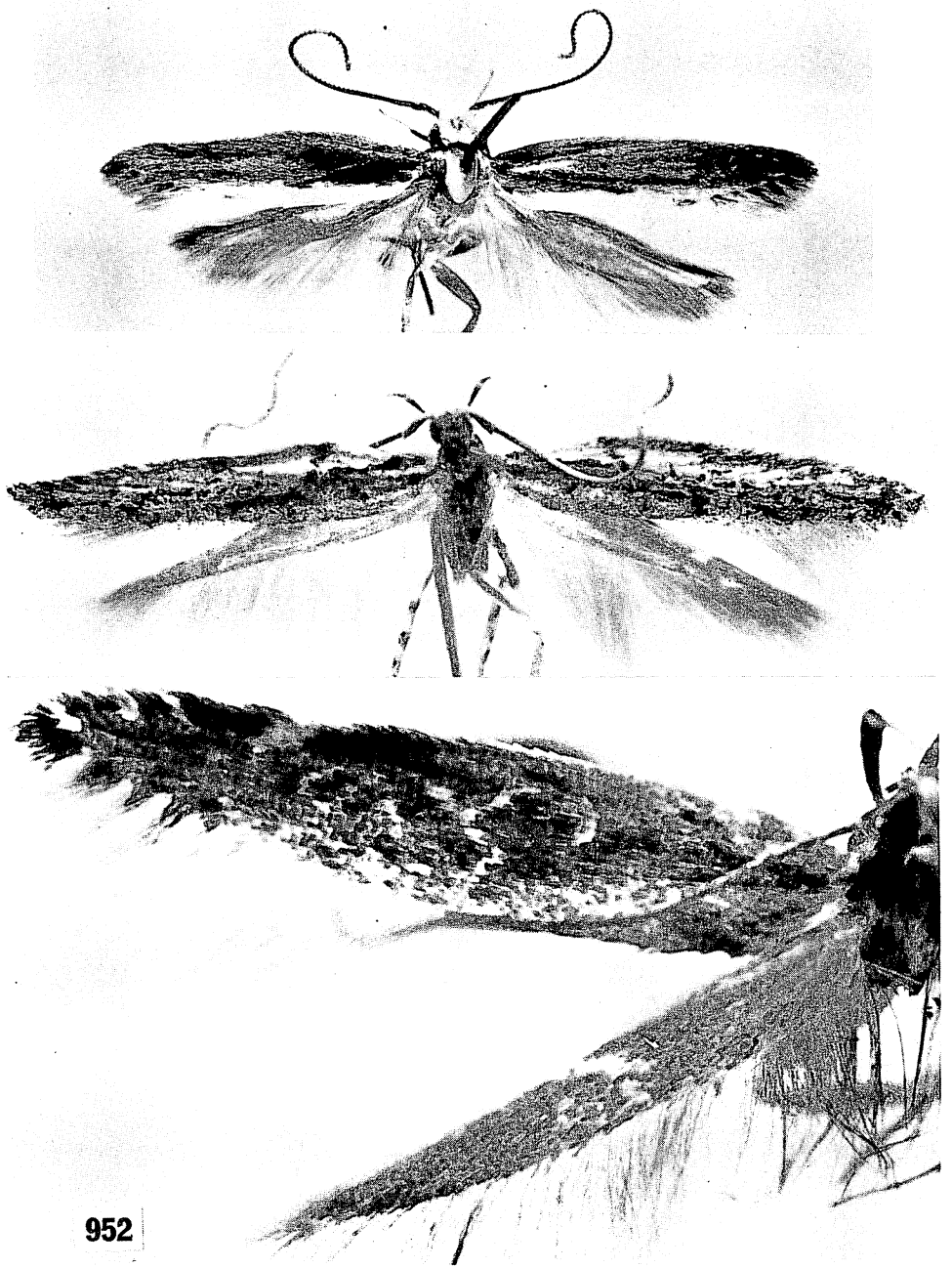


Figure 952—*Hyposmocoma* (*Euperissus*). Top, *pittospori* (Swezey) (“*Semnotrepia*”), holotype male (abdomen lost); Kuliouou, Oahu; ex dead *Pittosporum* wood; forewing 6.5 mm., dark brown to fuscous with a prominent whitish vitta along the posterior edge. Middle, *plumbifer* (Walsingham) (“*Aphthonetus*”), holotype male (BM slide 4748); Kauai, 3,000 to 4,000 feet; expanse 14.5 mm.; forewings white with ferruginous, brownish and fuscous squamae and maculae. Bottom, *pluviella* (Walsingham) (“*Neelysia*”), holotype female (BM slide 4464); Molokai, about 4,000 feet; forewing 5 mm., fuscous with white maculae. The middle and bottom specimens are figured in *Fauna Hawaiiensis*.

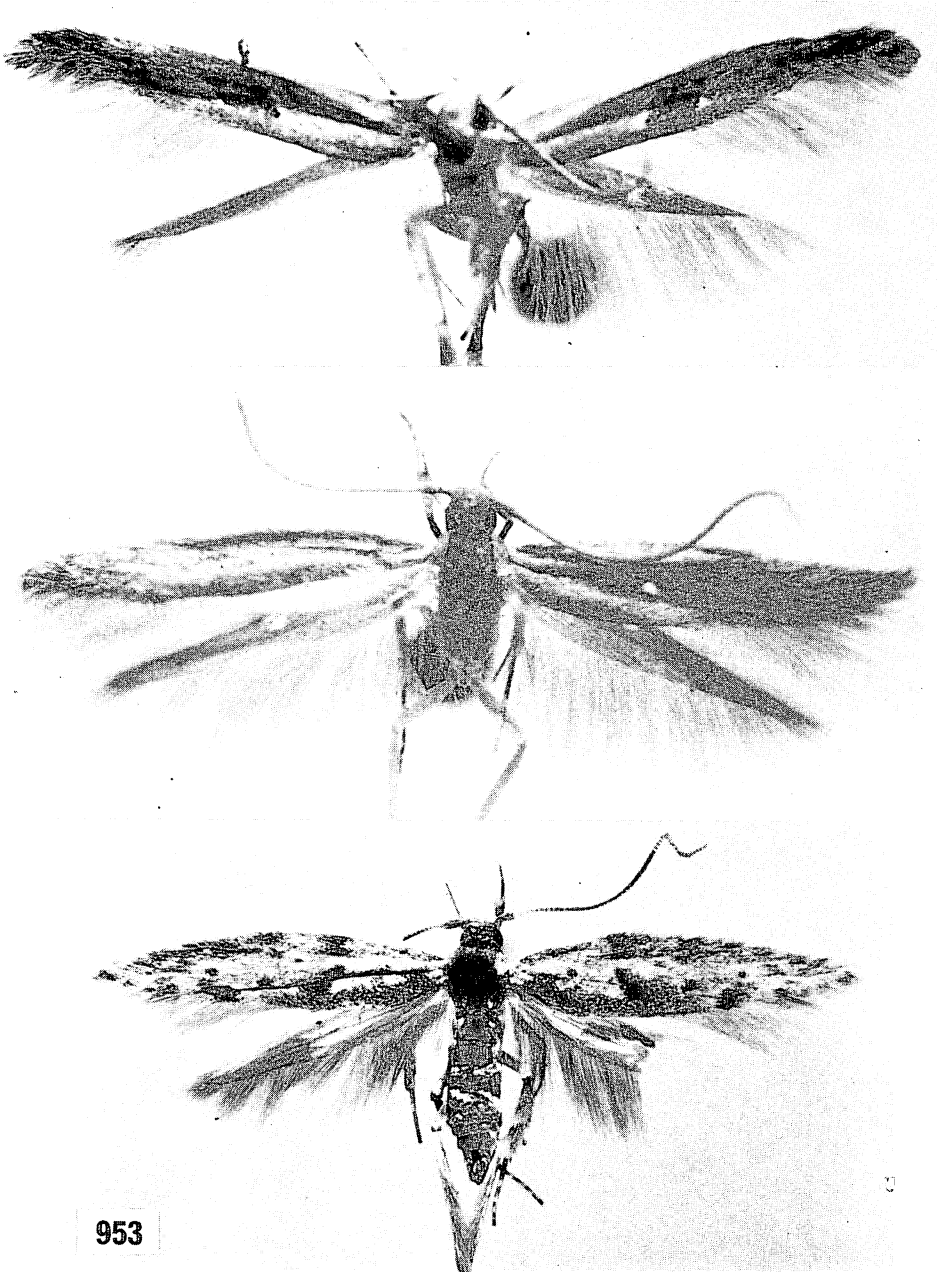


Figure 953—*Hyposmocoma* (*Euperissus*). Top, *poeciloceras* (Walsingham) ("*Neelysia*"), holotype male (BM slide 4445); Haleakala, below 4,000 feet, Maui; expanse 12 mm.; forewings brownish orange with white maculae and some fuscous squamae (the photograph has too much shadow, and this gives a partially inaccurate rendition). A pair of strong yellow brushes from the metapleura cross over the back of the abdomen. Middle, *polia* (Walsingham) ("*Aphthonetus*"), holotype male (BM slide 4750); Kauai, 3,000 to 4,000 feet; expanse 12 mm.; forewings white extensively sprinkled with yellowish-tipped scales (which may appear brownish under low magnification). Bottom, *prae fracta* (Meyrick) ("*Aphthonetus*"), holotype female (slide not made); Kumuweia, Kauai; ex *Pipturus* bark; forewing 7.75 mm., white sprinkled with grey and with greyish and brownish maculae. The top and middle specimens are illustrated in *Fauna Hawaiiensis*.

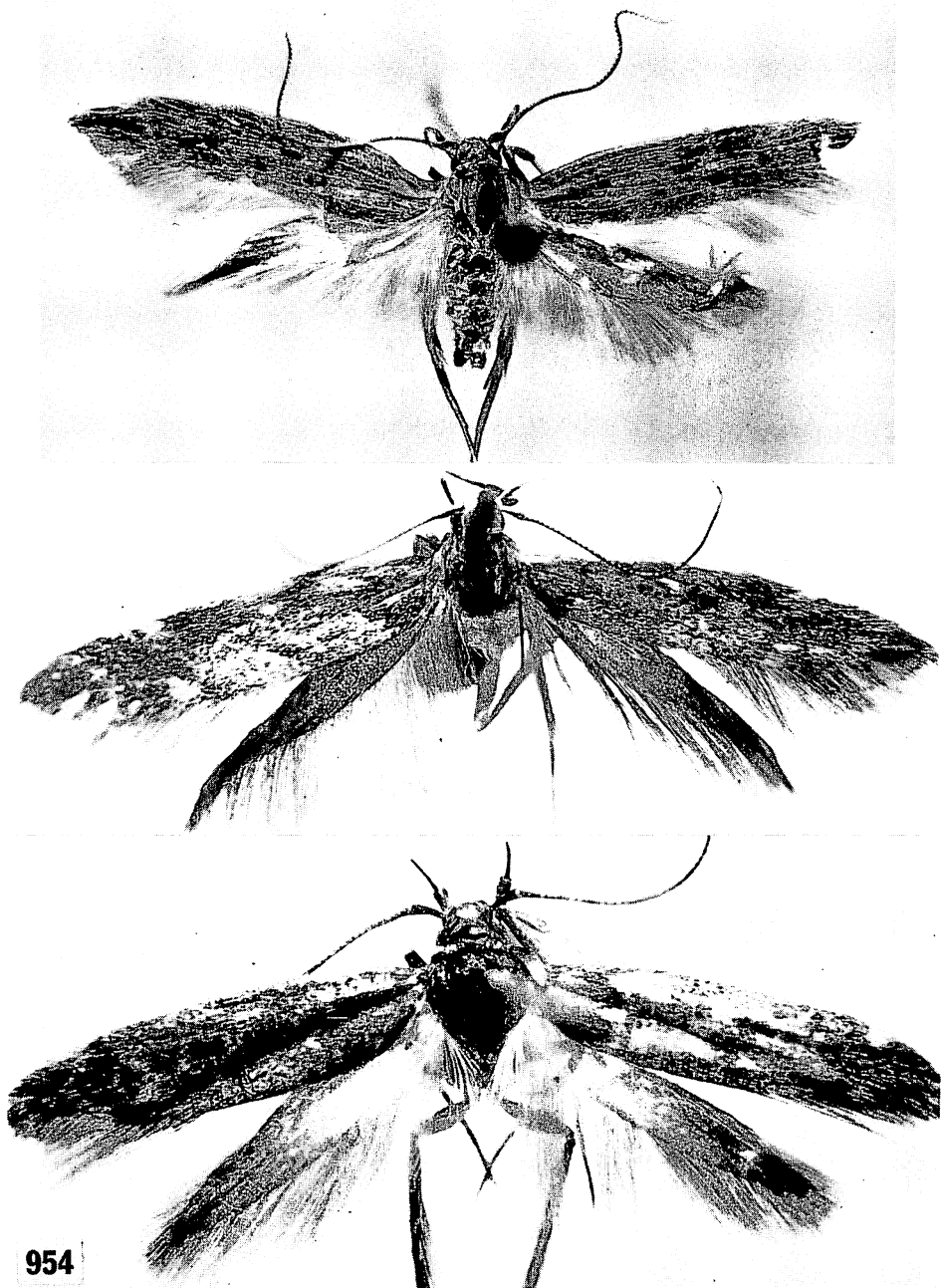


Figure 954—*Hyposmocoma*. Top, (*E.*) *pritchardiae* (Swezey) (“*Bubaloceras*”), holotype male (slide Z-I-18-61-2); Kumuwela, Kauai; ex *Pritchardia*; left forewing 9.5 mm., brownish ochreous with some fuscous squamae and maculae. Middle, (*H.*) *progressa* Walsingham, holotype female (BM slide 4471); Haleakala, under 4,000 feet, Maui; expanse 14 mm.; forewings cream-colored and fuscous. Bottom, (*H.*) *prophanis* Meyrick, lectotype female (BM slide 9570 Clarke); Koolau Mts., near Honolulu; expanse 11 mm.; forewings purplish fuscous with ochreous white maculae.



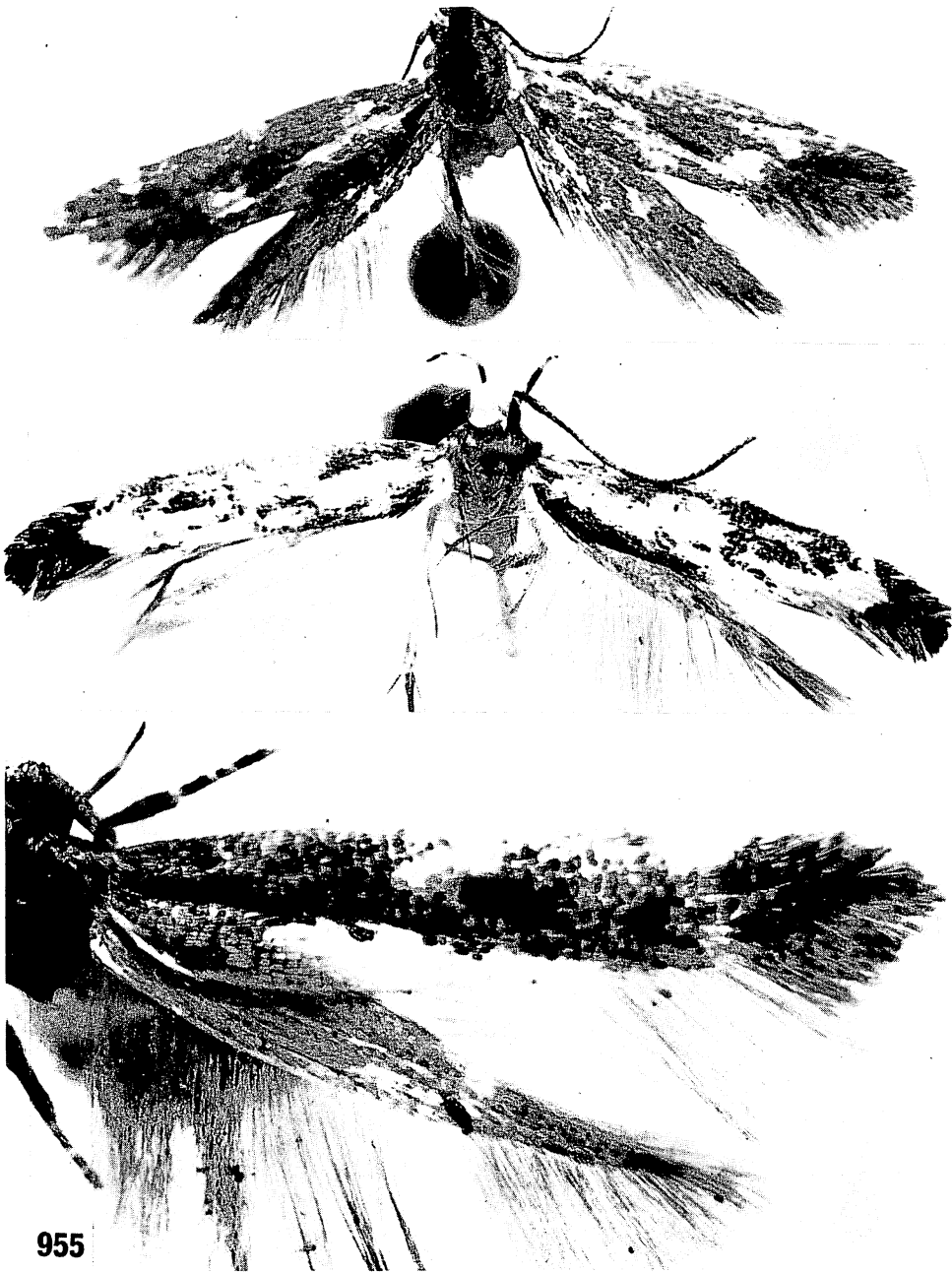


Figure 955—*Hyposmocoma*. Top, (*H. propinqua* Walsingham, holotype male (BM slide 4123); Molokai, 4,000 feet; expanse 9 mm.; the lighting on the forewings is incorrect and does not adequately reveal the contrast between the fuscous background scaling and the white vitta along the fold and the white macula at the apex of the fold. Middle, (*E. psaroderma* (Walsingham) (“*Neelysia*”), holotype male (abdomen lost); Waianae Mts., 3,000 feet, Oahu; expanse 9 mm.; forewings cream-colored and fuscous. Bottom, (*H. pseudolita* Walsingham, holotype male (BM slide 4483); Waianae Mts., Oahu; forewing 4 mm., yellow and fuscous. These three specimens are illustrated in *Fauna Hawaiiensis*.

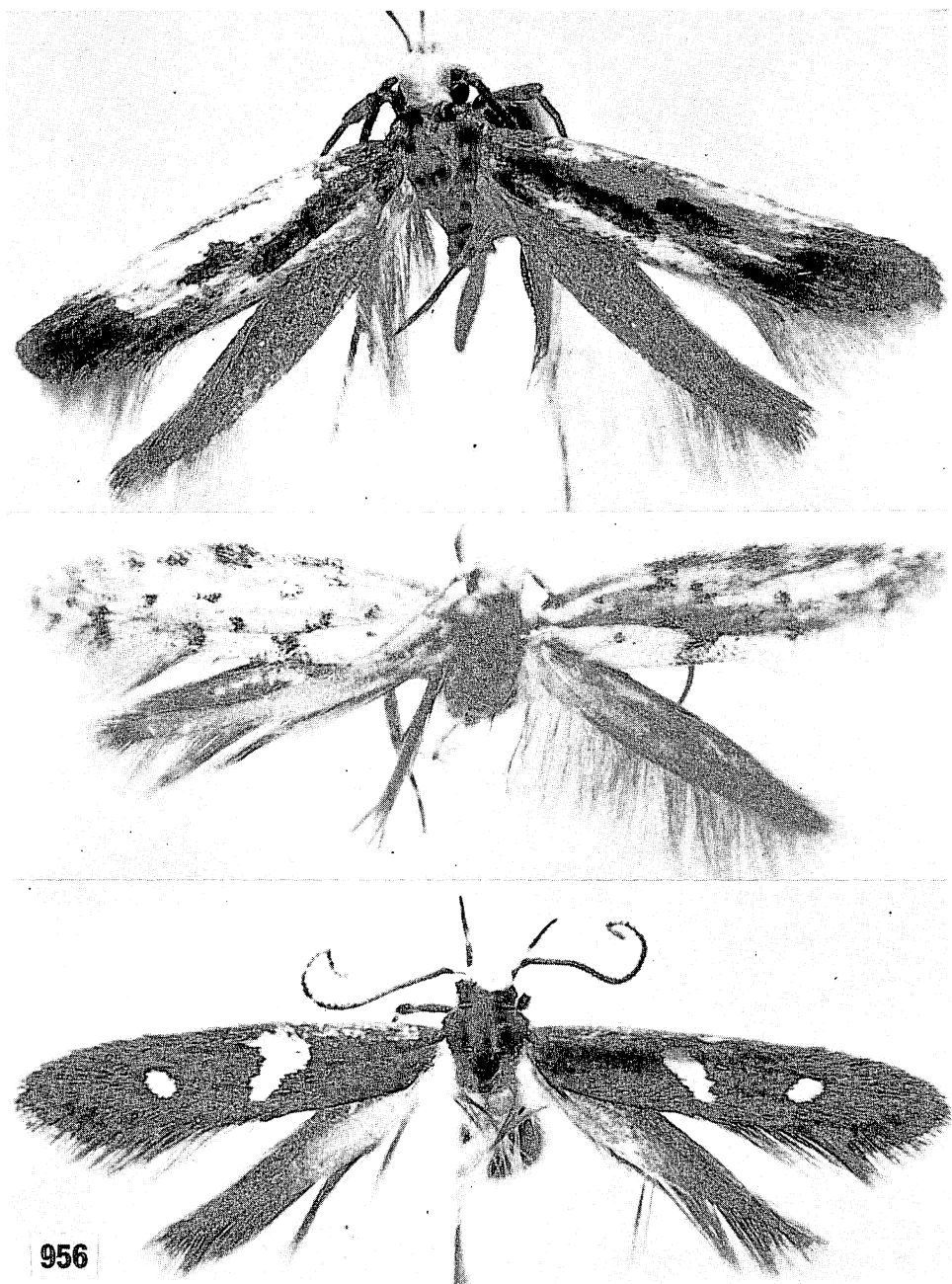


Figure 956—*Hyposmocoma* (*Euperissus*). Top, *pucciniella* Walsingham, holotype male (BM slide 4141); Kilauea, Hawaii; expanse 12 mm. as set; forewings fuscous and white. Middle, *puncticiliata* (Walsingham) ("*Aphthonetus*"), holotype male (BM slide 4755); Kona, 4,000 feet, Hawaii; expanse 15 mm.; forewings white sprinkled with yellow-tipped squamae and clusters of dark fuscous squamae. Bottom, *punctifumella* Walsingham, holotype male (BM slide 4131); expanse 12 mm.; forewings almost black with white maculae (the submedial macula on the left forewing has been enlarged by abrasion). These three specimens are illustrated in *Fauna Hawaiensis*.

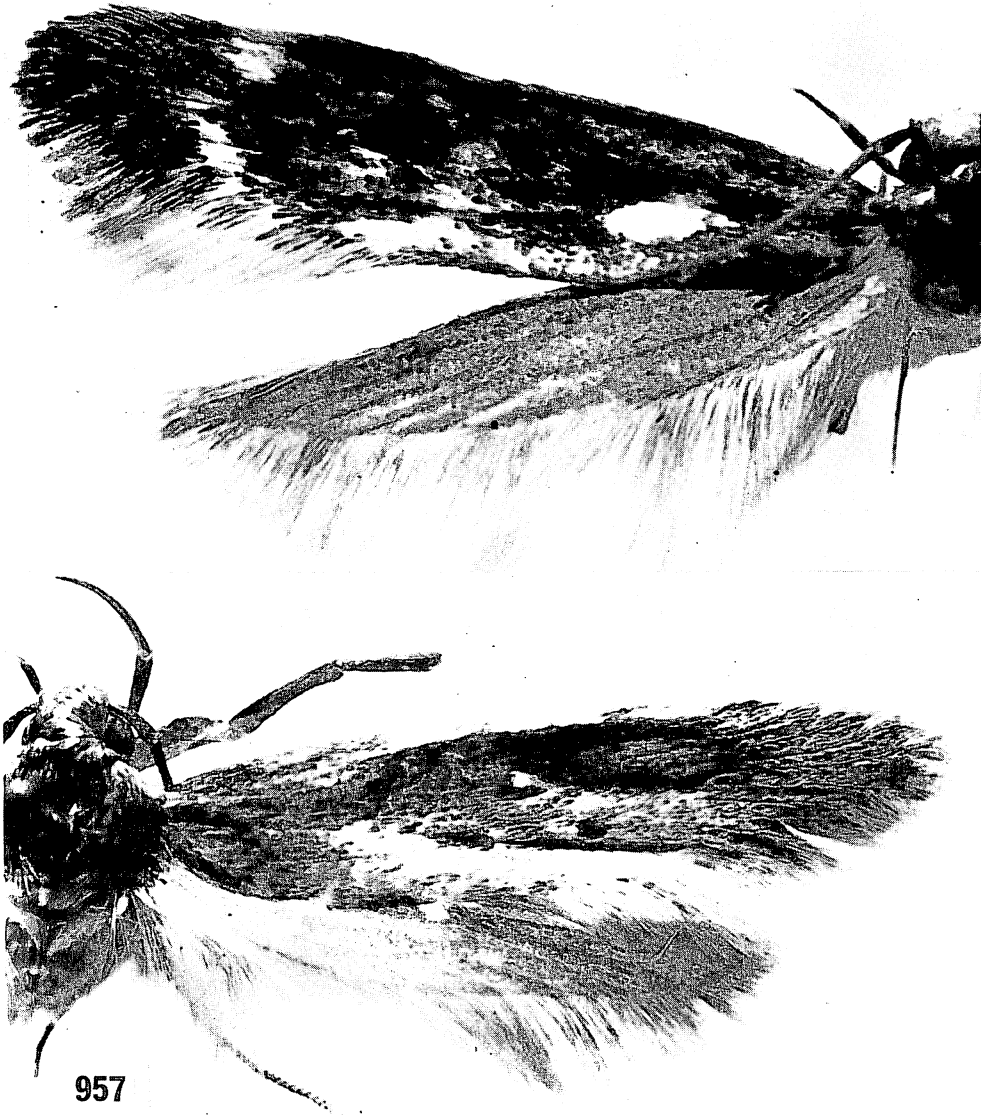


Figure 957—*Hyposmocoma*. Top, (*H.* *punctiplicata* Walsingham, holotype female (abdomen lost); Molokai, above 4,500 feet; forewing 7 mm., fuscous with white maculae. Bottom, (*E.* *quadripunctata* Walsingham, holotype male (abdomen lost); Kauai, 3,000 to 4,000 feet; forewing 8 mm., mostly brownish with dark fuscous maculae. These specimens are illustrated in *Fauna Hawaiiensis*.

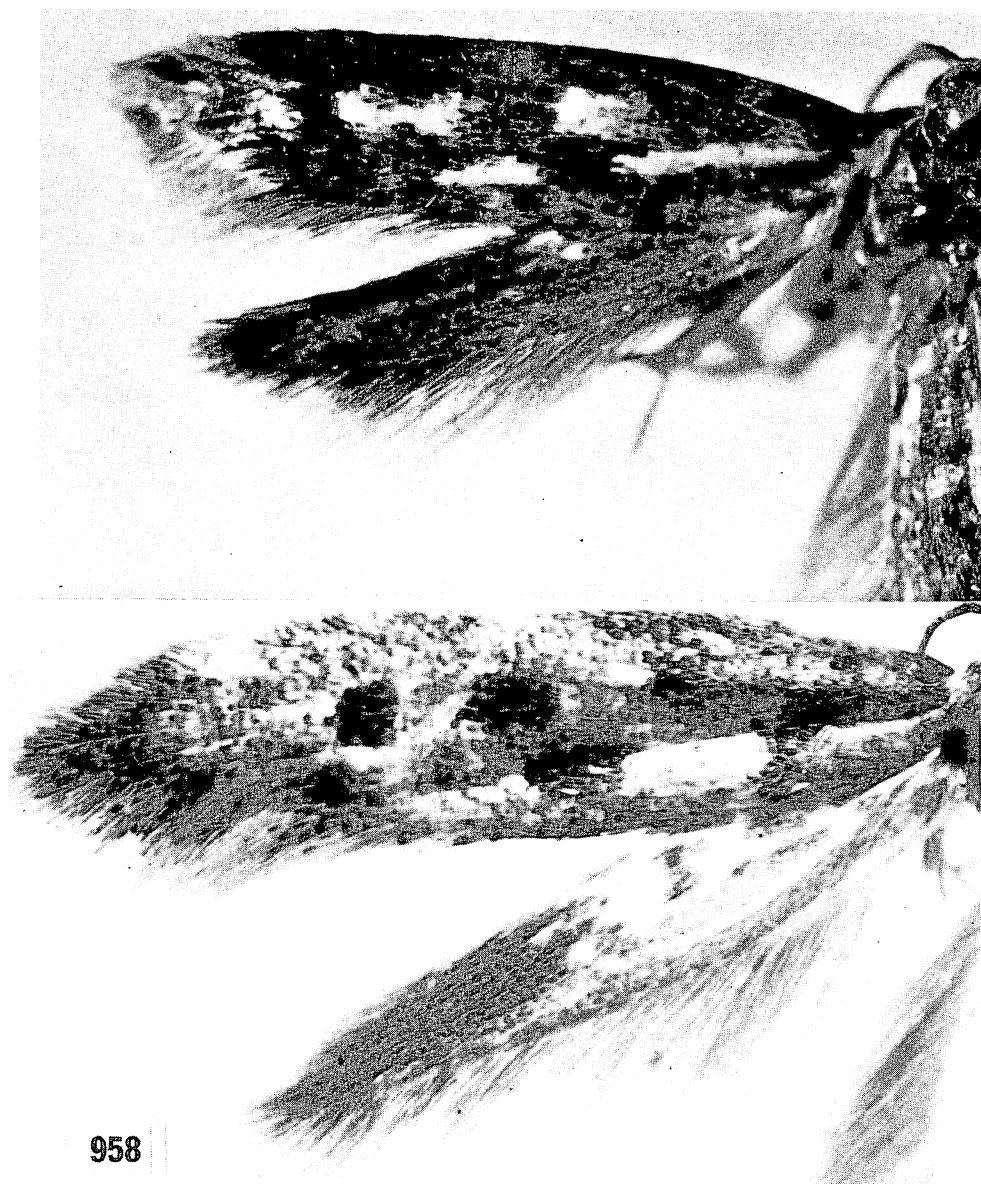


Figure 958—*Hyposmocoma*. Top, (*E.*) *quadristriata* Walsingham, holotype male (abdomen lost); Molokai, about 4,500 feet; forewing 5.5 mm., mostly fuscous with cream-colored maculae. Bottom, (*H.*) *quinquemaculata* Walsingham, holotype male (BM slide 4359); Kona, 4,000 feet, Hawaii; forewing 7.5 mm., white with fuscous maculae and sprinkled with fuscous squamae. These specimens are illustrated in *Fauna Hawaiiensis*.



Figure 959—*Hyposmocoma* (*Euperissus*). Top, *radiatella* Walsingham, allotype male (BM slide 4495); Kona, 4,000 feet, Hawaii; expanse 17 mm.; forewings white with yellowish and fuscous vittae and maculae. Middle, *rediviva* (Walsingham) ("*Neelysia*"), holotype male, (abdomen lost); Kaholuamano, 4,000 feet, Kauai; expanse 11 mm. as set; forewings brownish orange and white with flecks of fuscous. A brush of fine hair extends over abdomen from each metapleuron. This specimen is figured in *Fauna Hawaiiensis*. Bottom, *repandella* (Walsingham) ("*Neelysia*"), allotype male (BM slide 4437); Molokai, above 4,000 feet; forewing 4.5 mm., white and fuscous. There is a cluster of long scales on each metapleuron below the anterior edge of each hindwing.



Figure 960—*Hyposmocoma*. Top, (*H.*) *rhabdophora* Walsingham, holotype female (BM slide 4531); Molokai, above 4,000 feet; forewing 6.5 mm., golden yellow except for a fuscous basal costal vitta. Middle, (*E.*) *roseofulva* Walsingham, holotype male (BM slide 4344); Kauai, 3,000 to 4,000 feet, expanse 17 mm.; forewings brown behind the fold, mostly pinkish costad of the fold, and with brown vitta and maculae (the pale submedial spot on the right forewing is an abrasion). Bottom, (*E.*) *rotifer* (Walsingham) ("*Neelysia*"), holotype female (BM slide 4463); Molokai, 3,000 feet; expanse 10 mm.; forewings mostly fuscous orange or bronze with strongly contrasting white maculae and some fuscous. These three specimens are illustrated in *Fauna Hawaiiensis*.

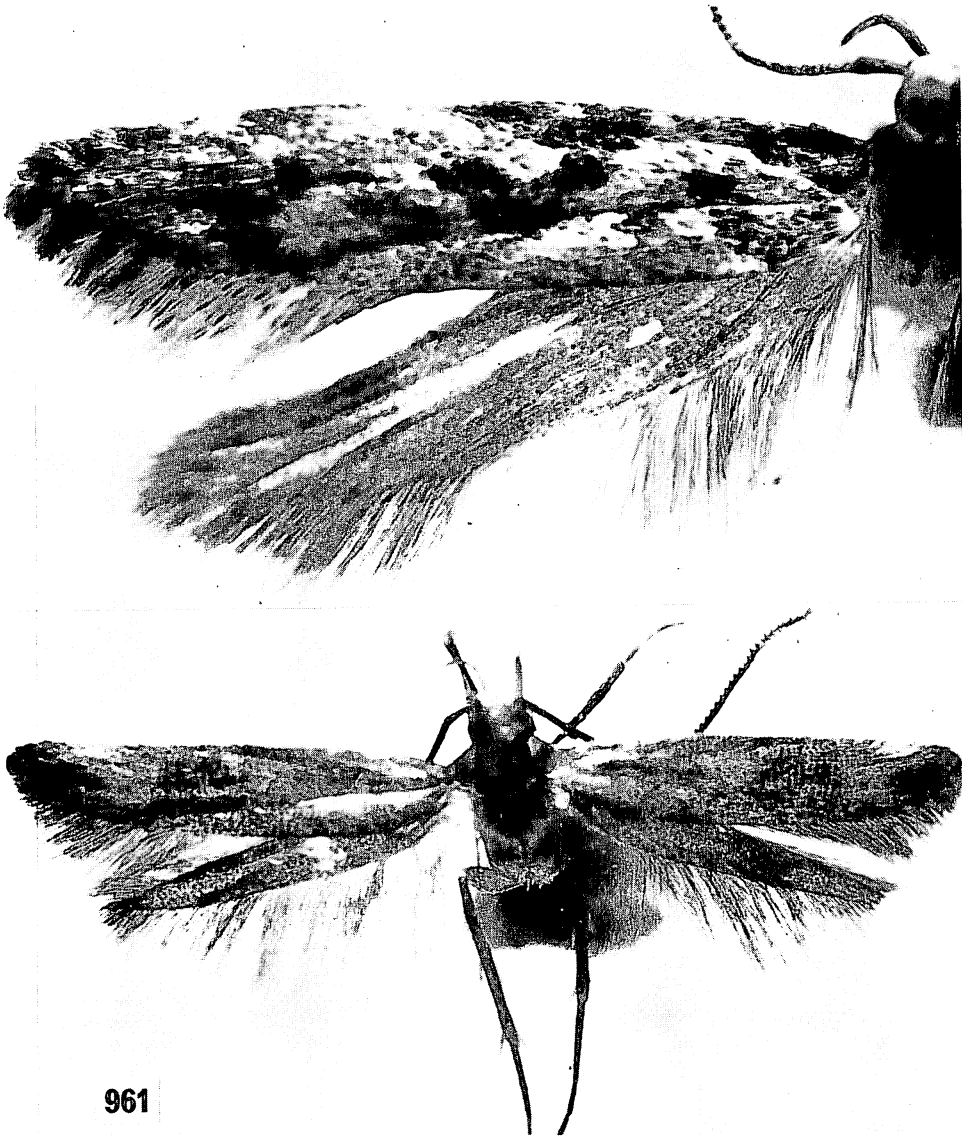


Figure 961—*Hyposmocoma*. Top, (*H.*) *rubescens* Walsingham, allotype male (BM slide 4488); Kauai, 3,000 to 4,000 feet; forewing 7 mm., yellowish and fuscous. Bottom, (*E.*) *rusius* Walsingham, holotype male (BM slide 4351); Molokai, over 3,000 feet; expanse 9 mm.; forewings yellow and brownish fuscous. This specimen is illustrated in *Fauna Hawaiïensis*.

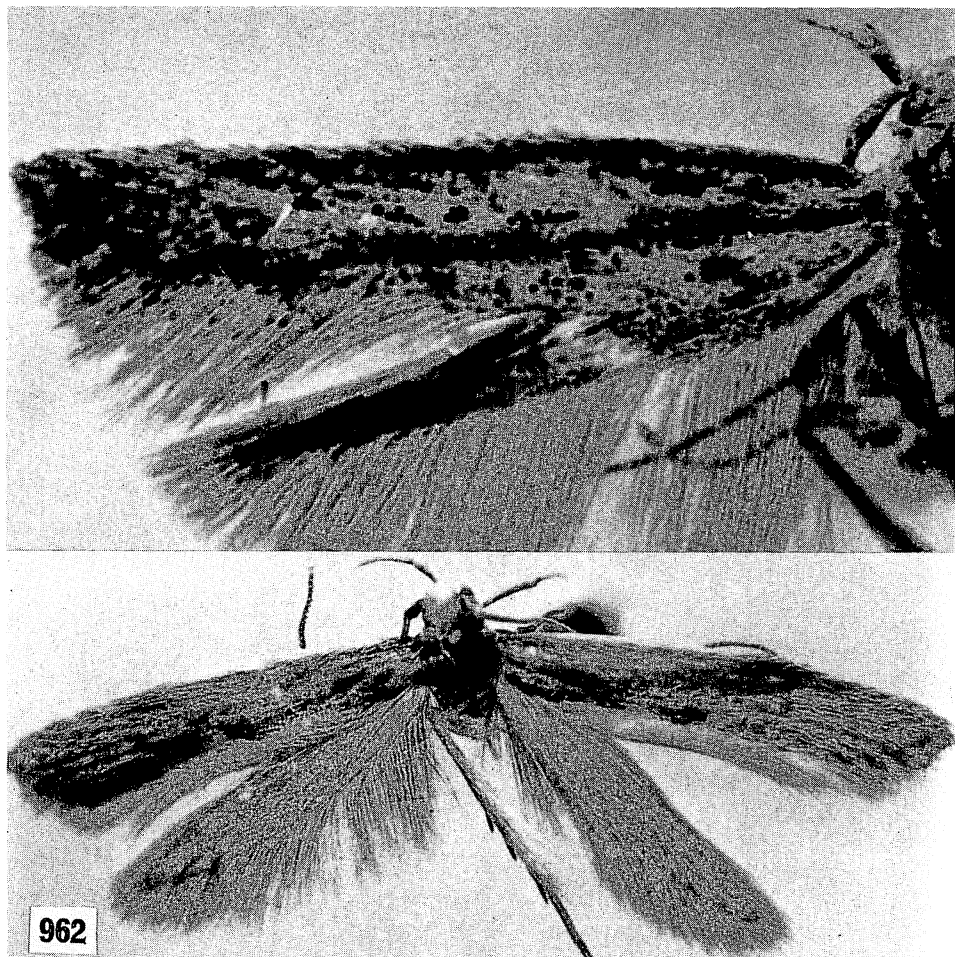


Figure 962—*Hyposmocoma*. Top, (*E.*) *rutella* (Walsingham) (“*Rhinomactrum*”), holotype male (BM slide 4422); Kauai, 3,000 to 4,000 feet; forewing 5.75 mm., ferruginous spotted with white and dark fuscous. This specimen is illustrated in *Fauna Hawaïensis*. Bottom, (*H.*) *sabulella* Walsingham, allotype male (BM slide 4099); Halemanu, 4,000 feet, Kauai; expanse 15 mm.; forewings pale brown with darker brown maculae, with darker brown from base to apex of cell (not visible in the photograph), and with a very pale posterior vitta, as shown.





Figure 963—*Hypsoscocoma*. Top, (*H. saccophora* Walsingham, allotype male (BM slide 4329); Waianac Mts., Oahu; forewing 3.25 mm., fuscous with a few small white and yellowish maculae. Middle, the same, holotype female (BM slide 14301); Mt. Kaala, 3,000 feet, Oahu; ex lichenivorous larva in case on rocks; expanse 8 mm. Bottom, (*E. sagittata* (Walsingham) (*"Aphthonetus"*), holotype male (BM slide 4757); white, cream-colored, and green with prominent black maculae. There is a tuft of long hair from the posterior axil of each hindwing. The middle and bottom specimens are illustrated in *Fauna Hawaiiensis*.

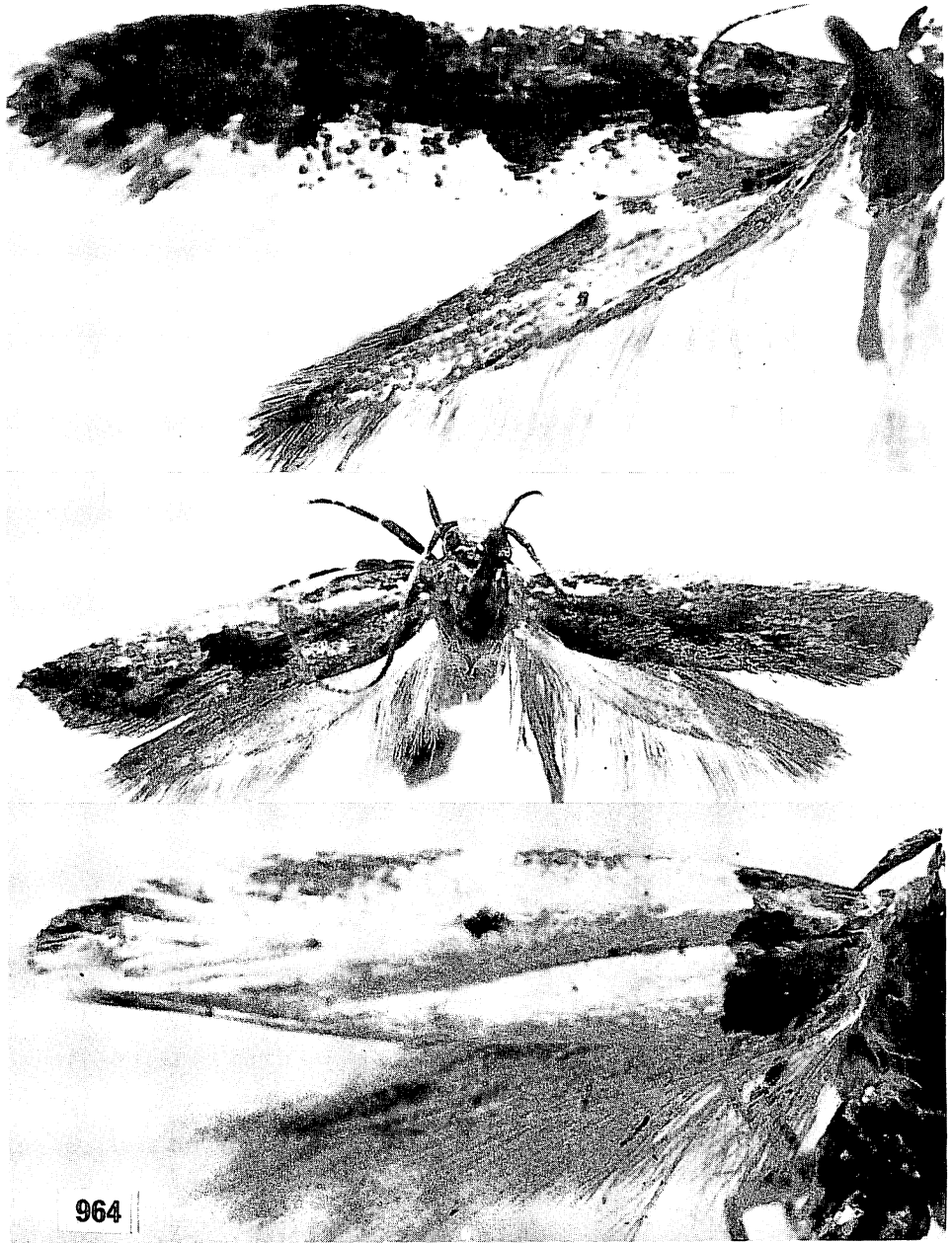
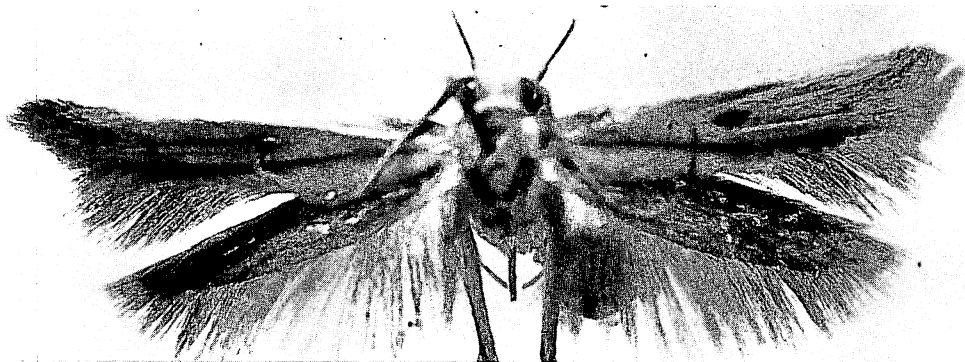


Figure 964—*Hyposmocoma*. Top, (*H.*) *saliaris* Walsingham, allotype male (BM slide 4481); Kona, 4,000 feet; forewing 5 mm., white and fuscous. Middle, (*E.*) *scandens* Walsingham, holotype male (BM slide 4340); Kauai, 3,000 to 4,000 feet; expanse 16 mm.; forewings brown, white, and fuscous. Bottom, (*H.*) *scapulella* (Walsingham) ("*Rhinomactrum*"), holotype female (BM slide 5290); Olaa, Hawaii; forewing 4 mm., creamy white and dark fuscous.



965

Figure 965—*Hyposmocoma*. Top, (*E.*) *scepticella* Walsingham, holotype male (BM slide 4142); Olinda, 4,000 feet, Maui; expanse 13.5 mm.; forewings yellow with fuscous maculae (this is a poor photograph which does not adequately portray this fine yellow species; compare the middle figure of the color form). There is a small tuft of long squamae on each metapleuron. Middle, the color form called *scepticella dubia* Walsingham, holotype male (BM slide 4143); Haleakala, 4,000 feet, Maui; expanse 13 mm.; forewings beautiful yellow with fuscous maculae. The metapleural tufts are similar to those of the typical form. Bottom, (*H.*) *schismatica* Walsingham, allotype female (slide not made); Kaholuamano, 4,000 feet, Kauai; expanse 13 mm.; forewings fuscous and creamy yellow. The top and middle specimens are illustrated in *Fauna Hawaiiensis*.

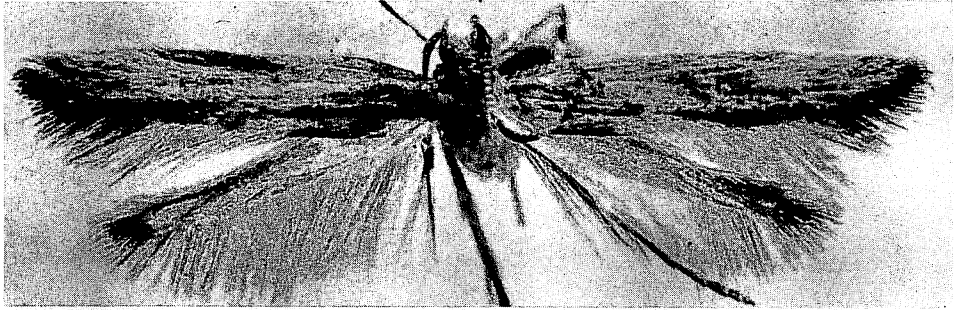


Figure 966—*Hyposmocoma*. Top, (*E. sciurella* (Walsingham) (“*Neelysia*”), holotype male (BM slide 4513); Olinda, 4,000 feet, Maui; expanse 10 mm.; forewings brownish orange with a fuscous macula on the fold. The metapleura are abraded on this specimen. Bottom, (*H. scolopax* Walsingham, holotype male (BM slide 4489); Kauai, 3,000 to 4,000 feet; forewing 7 mm., white and fuscous. These specimens are illustrated in *Fauna Hawaiiensis*.

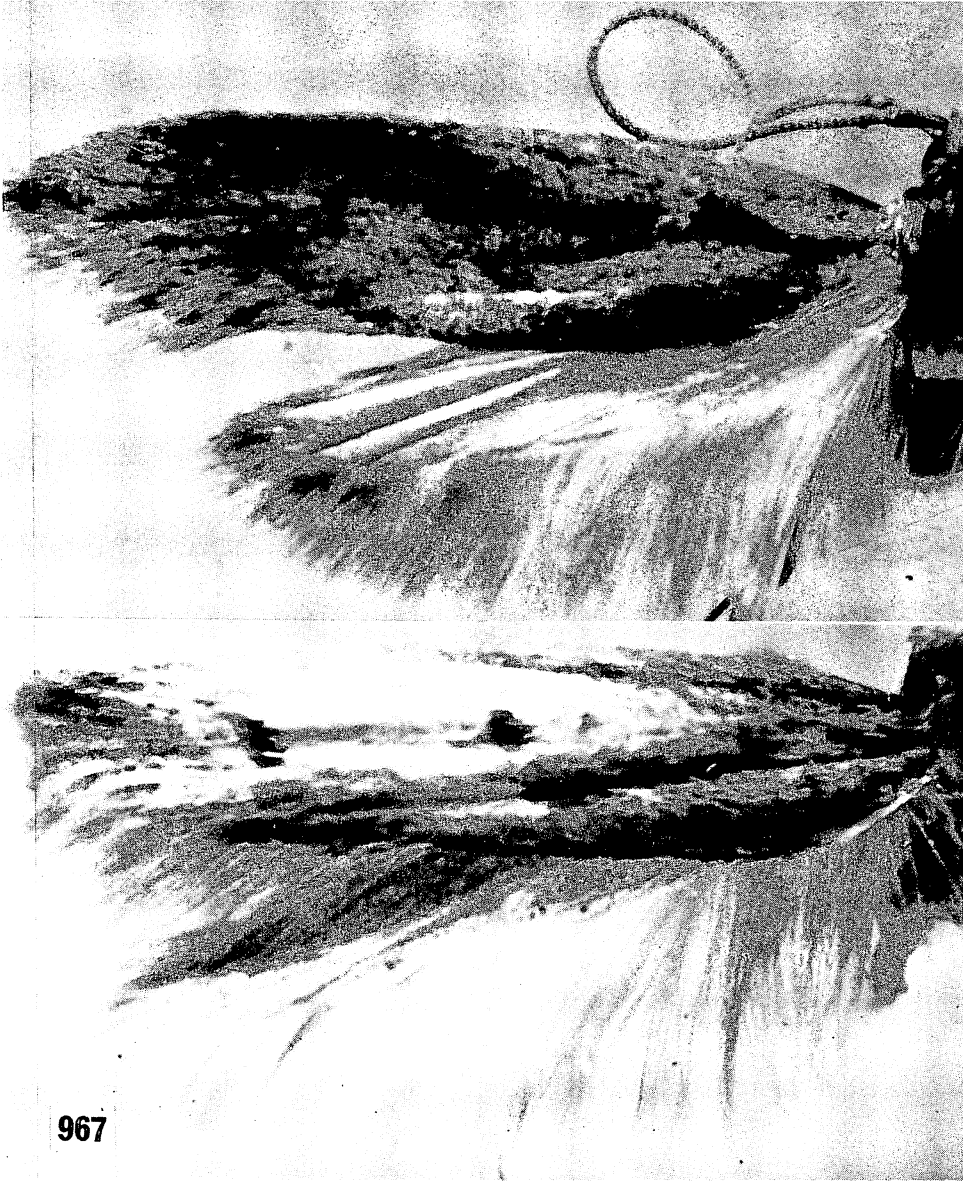
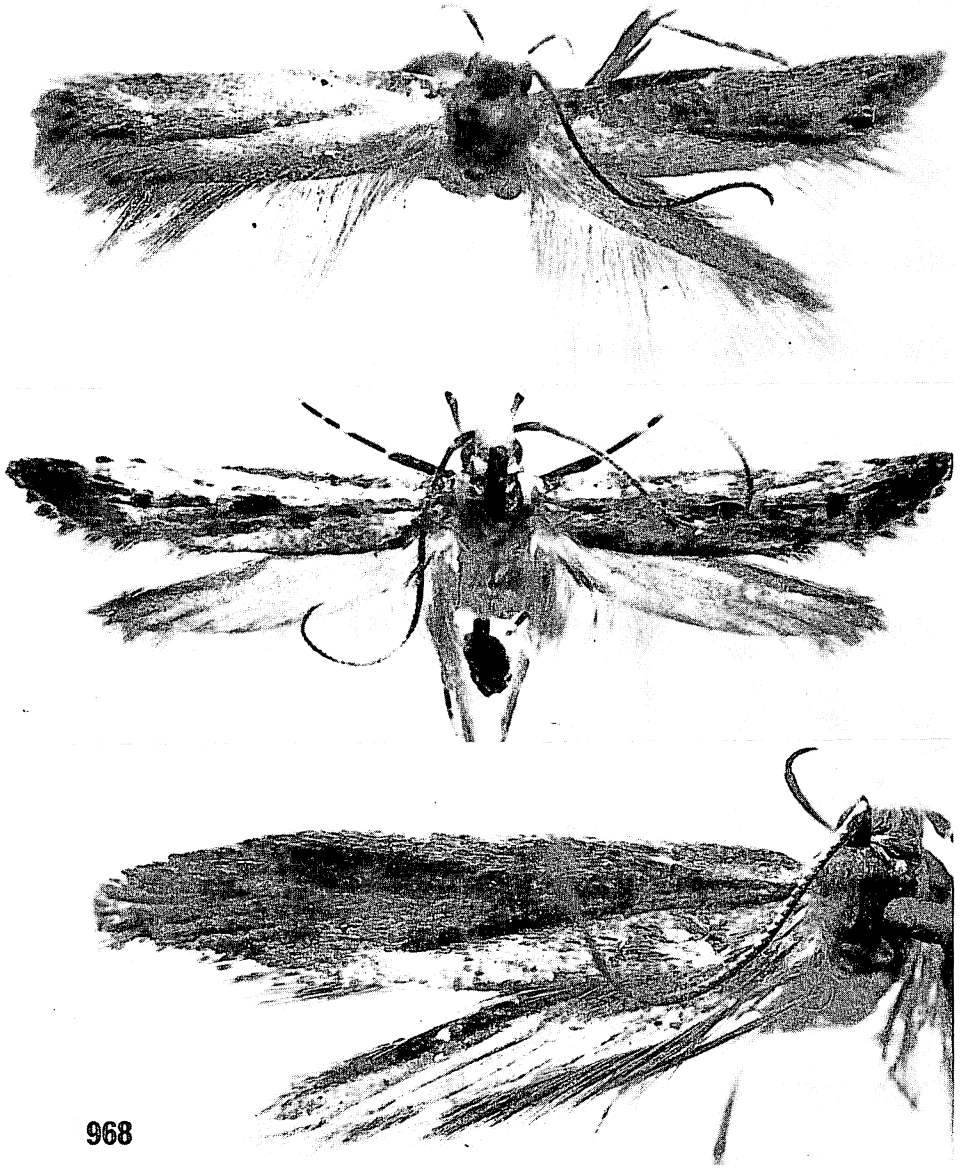


Figure 967—*Hyposmocoma*. Top, (*H.*) *semicolon* (Walsingham) (“*Dysphoria*”), holotype male (BM slide 4395); Kaholuamano, 4,000 feet, Kauai; forewing 9 mm., almost entirely brown. Bottom, (*E.*) *semifuscata* Walsingham, holotype male (BM slide 4140); Kona, 3,000 feet, Hawaii; forewing 6 mm., fuscous and white (the area that appears to be a reflection is made up mostly of pale scales). These specimens are figured in *Fauna Hawaïensis*.



968

Figure 968—*Hyposmocoma*. Top, (*H.* *semifusa* (Walsingham) (“*Neelysia*”), holotype female (BM slide 4469); Molokai, about 4,000 feet; expanse 9 mm., as set; forewings brownish or brownish orange shaded with fuscous. Middle, (*E.* *semiustus* (Walsingham) (“*Hyperdasylella*”), holotype male (BM slide 4426); Kauai, 3,000 to 4,000 feet; expanse 18.5 mm.; forewings pale brownish with darker brown to fuscous maculae. The underside of the forewing has a prominent cluster of long, erectile hairs, some of which can be seen projecting from beneath the costa near basal third. Bottom, (*H.* *sideritis* Walsingham, allotype male (BM slide 4338); Olinda, 4,000 feet, Maui; forewing 6 mm., all brown. The top and middle specimens are illustrated in *Fauna Hawaiiensis*.

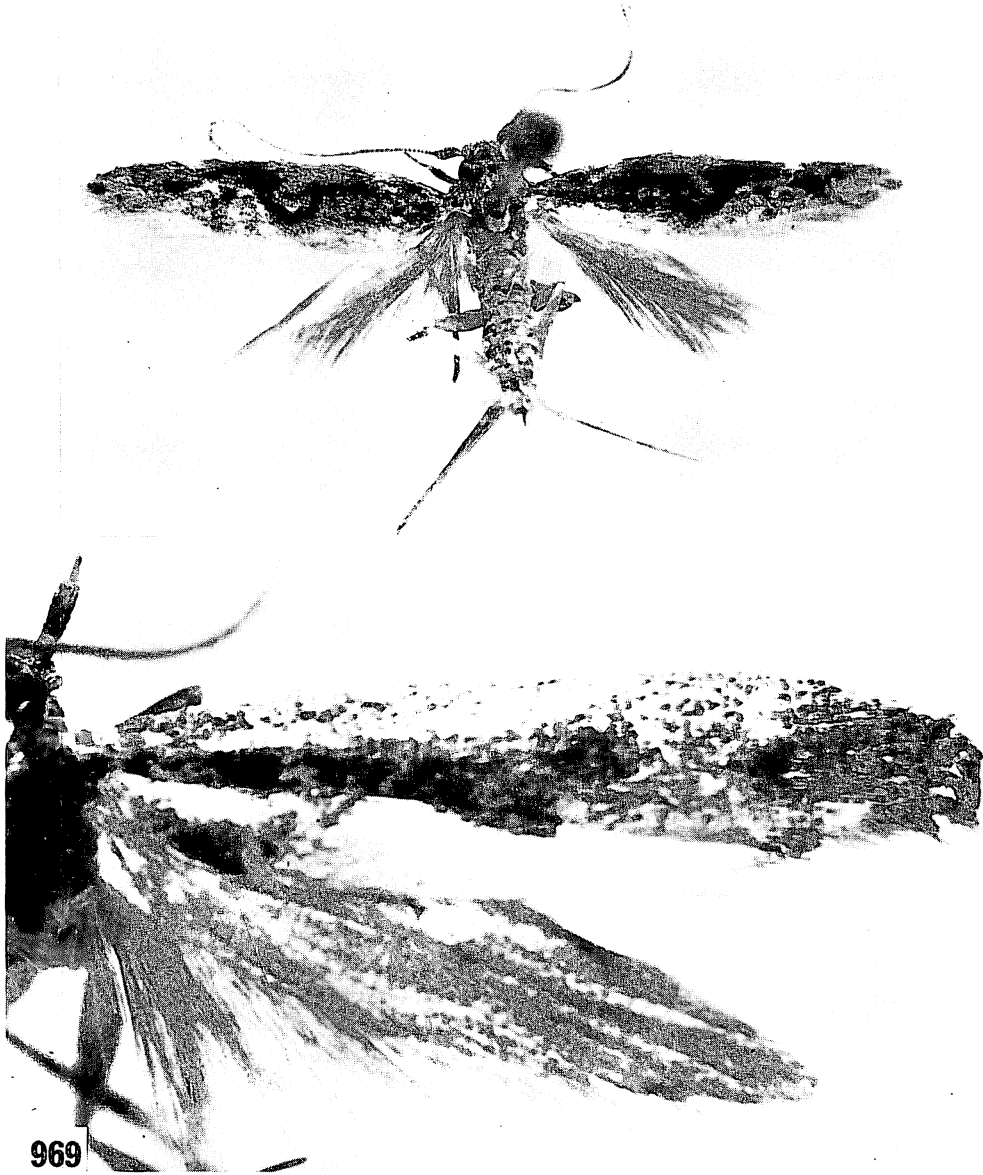


Figure 969—*Hyposmocoma*. Top, (*E.*) *sideroxylovi* (Swezey) (“*Aphthonetus*”), holotype female; Puu Peahinaia, Koolau Mts., Oahu; forewing 6.5 mm., mostly dark brown with whitish ochreous and ochreous areas and maculae. Bottom, (*H.*) *similis* Walsingham, holotype male (BM slide 4355); Kona, 4,000 feet, Hawaii; forewing 6.5 mm., white and fuscous. This specimen is figured in *Fauna Hawaiiensis*.

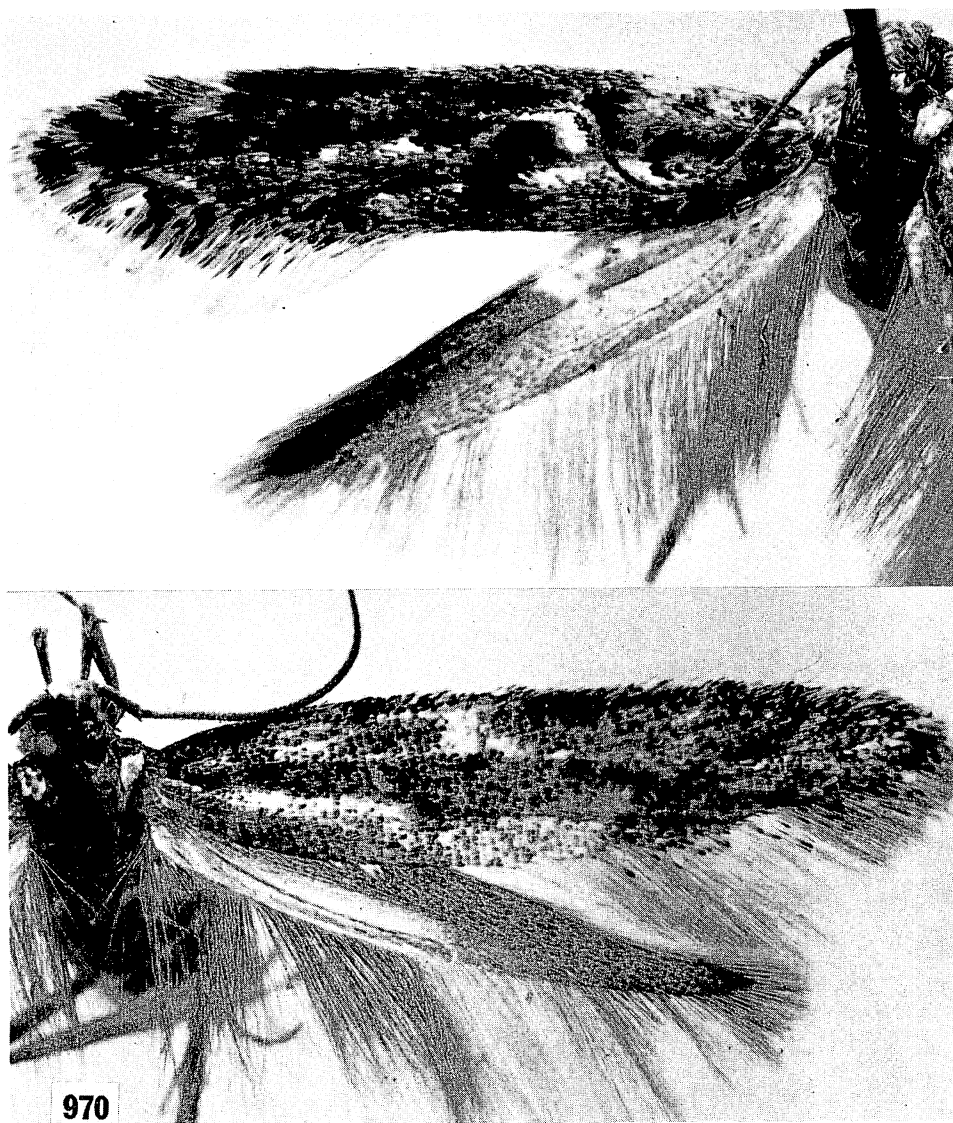
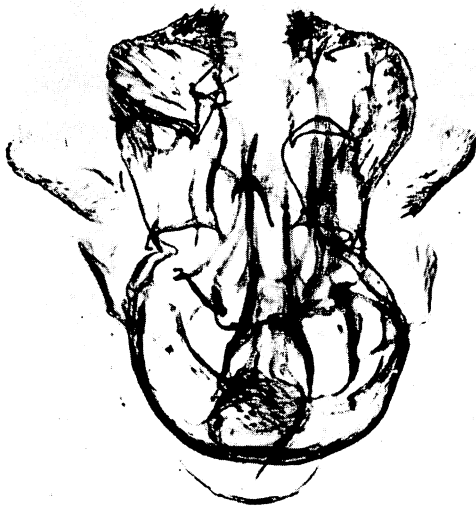
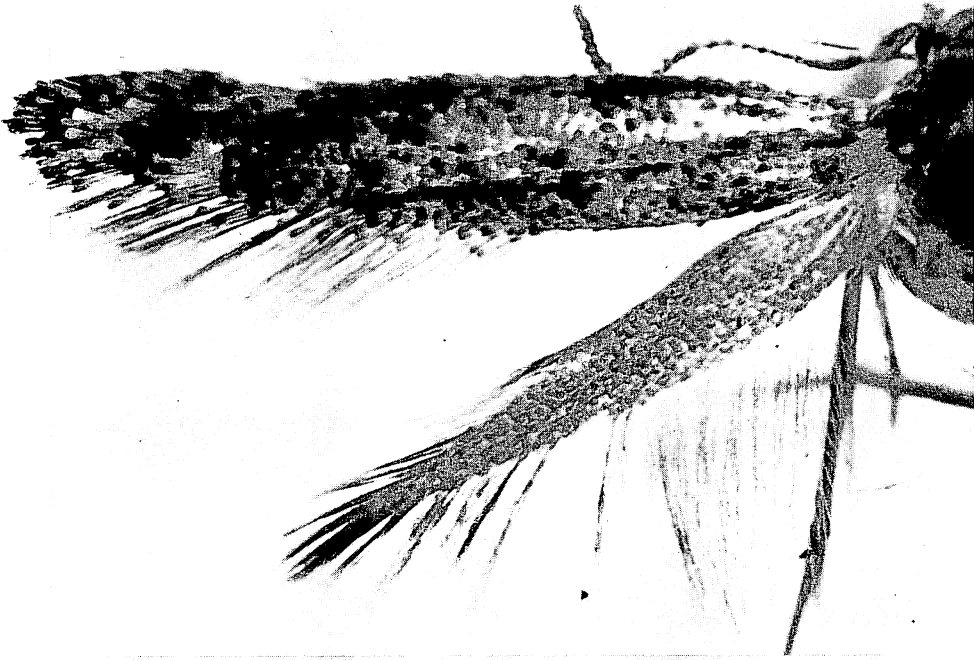


Figure 970—*Hyposmocoma*. Top, (*H. somatodes* Walsingham, holotype male (BM slide 5490); Kilauea, Hawaii; forewing 7 mm., white, yellowish, and fuscous (the white macula about a third of the distance from the base costad of the fold and in the curve of the antenna is a hole). There is a moderate metapleural tuft. This photograph is much too dark and does not show enough contrast in color; the background scaling is paler than is indicated here. Bottom, (*E. spurcata* (Walsingham) ("*Aphthonetus*"), holotype male (BM slide 4747); Haleakala, 5,000 feet, Maui; forewing 7.5 mm., mixed white and fuscous. The metapleura bear feeble tufts of a few long hairs. These specimens are figured in *Fauna Hawaiiensis*.

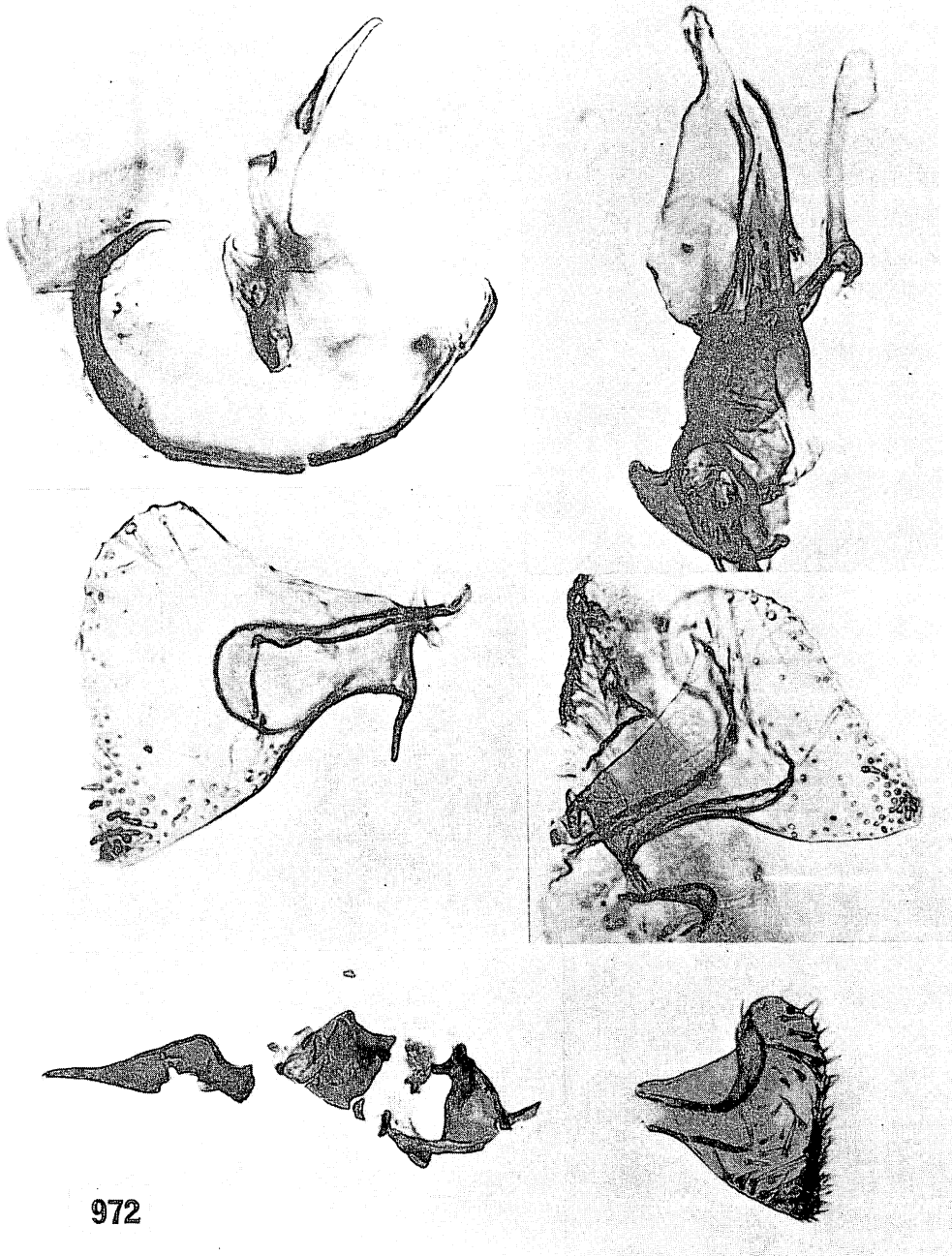




971

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Figure 971—*Hyposmocoma* (*E.*) *sordidella* (Walsingham). Top, holotype male (BM slide 5232), Kauai, 3,000 to 4,000 feet; forewing 4.5 mm., greyish white with pale and dark fuscous squamae (the pale area near the base of the forewing is a reflection, not pale scaling, and the two pale preapical fascia do not show clearly in this photograph). Below, male genitalia. Because of the convexity of the genitalia, not all of the parts are clearly defined, so that a misleading impression may be conveyed by this illustration. This specimen (BM slide 5232b) has been remounted; see figure 972. Compare the "*Aphthonetus*" *exsul* group of male genitalia.



972

Figure 972—*Hyposmocoma (E.) sordidella* (Walsingham), male genitalia. Top and middle, holotype (BM slide 5232b); Kauai, 3,000 to 4,000 feet. Top left, tegumen and brachia from beneath. Top right, aedeagus and adhering anellar lobes. Middle left, right valva. Middle right, left valva and crushed genital flap. The bottom two figures are from the paratype (BM slide 7258) and show the tegumen, brachia, and a valva. The slide was crushed in shipment, and the parts were recovered from the fragments and remounted.

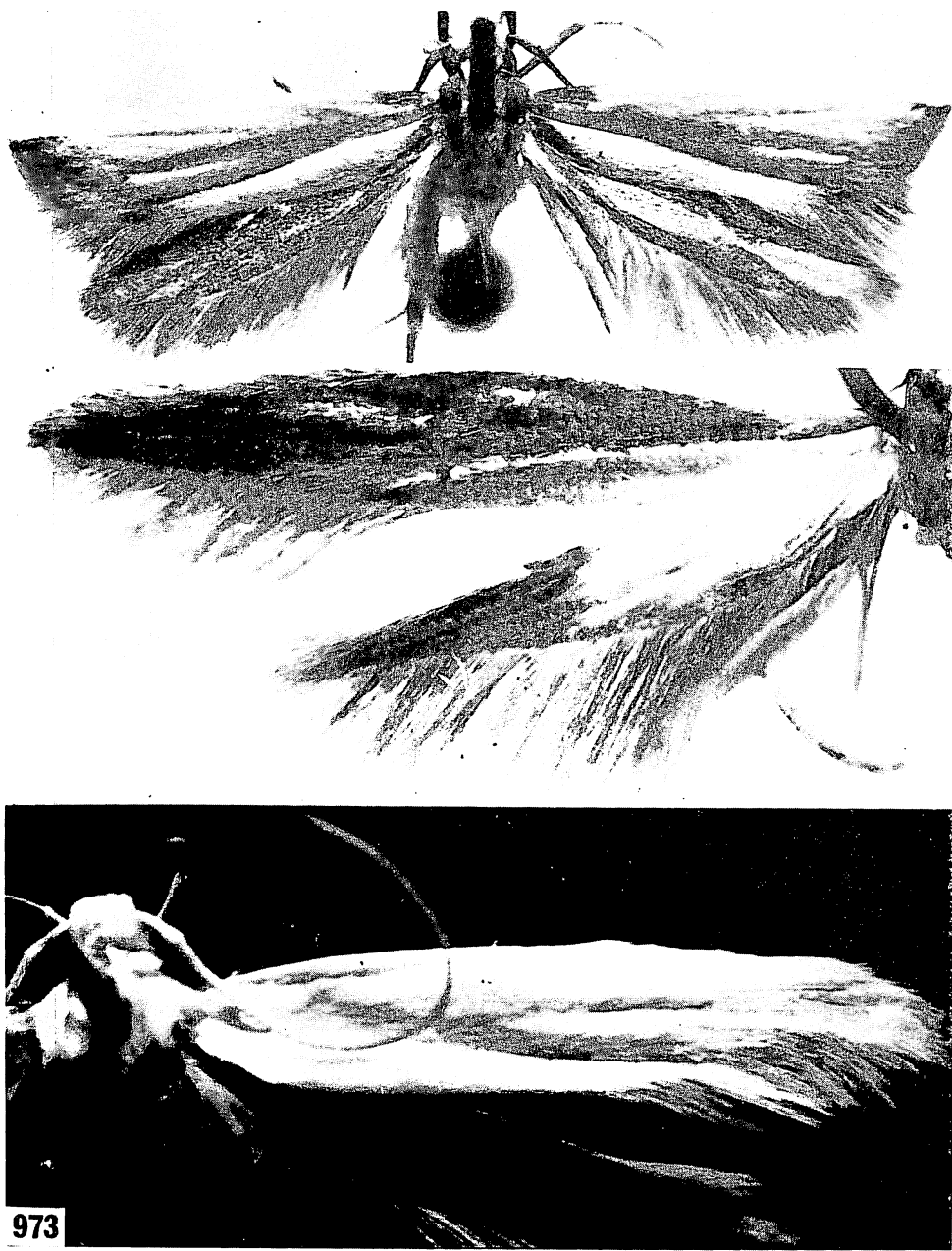


Figure 973—*Hyposmocoma*. Top, (*E.*) *stigmatella* Walsingham, allotype male (BM slide 4144); Molokai, about 4,500 feet; expanse 13 mm.; forewings yellow with fuscous maculae. Middle, (*H.*) *straminella* Walsingham, allotype male (BM slide 4115); Kona, 4,000 feet, Hawaii; forewing 6.5 mm., whitish with a dark medial vitta (this photograph gives a misleading impression because what appear to be a pale vitta along the fold and a pale vitta beyond the middle are actually reflections; the submedial pale macula is an abrasion). Note the heavy subcostal brush on the hindwing (mostly out of focus). Bottom, (*E.*) *subargentea* Walsingham, holotype male (BM slide 4150); Kauai, 3,000 to 4,000 feet; forewing 8 mm., mostly white. This specimen is illustrated in *Fauna Hawaiiensis*.

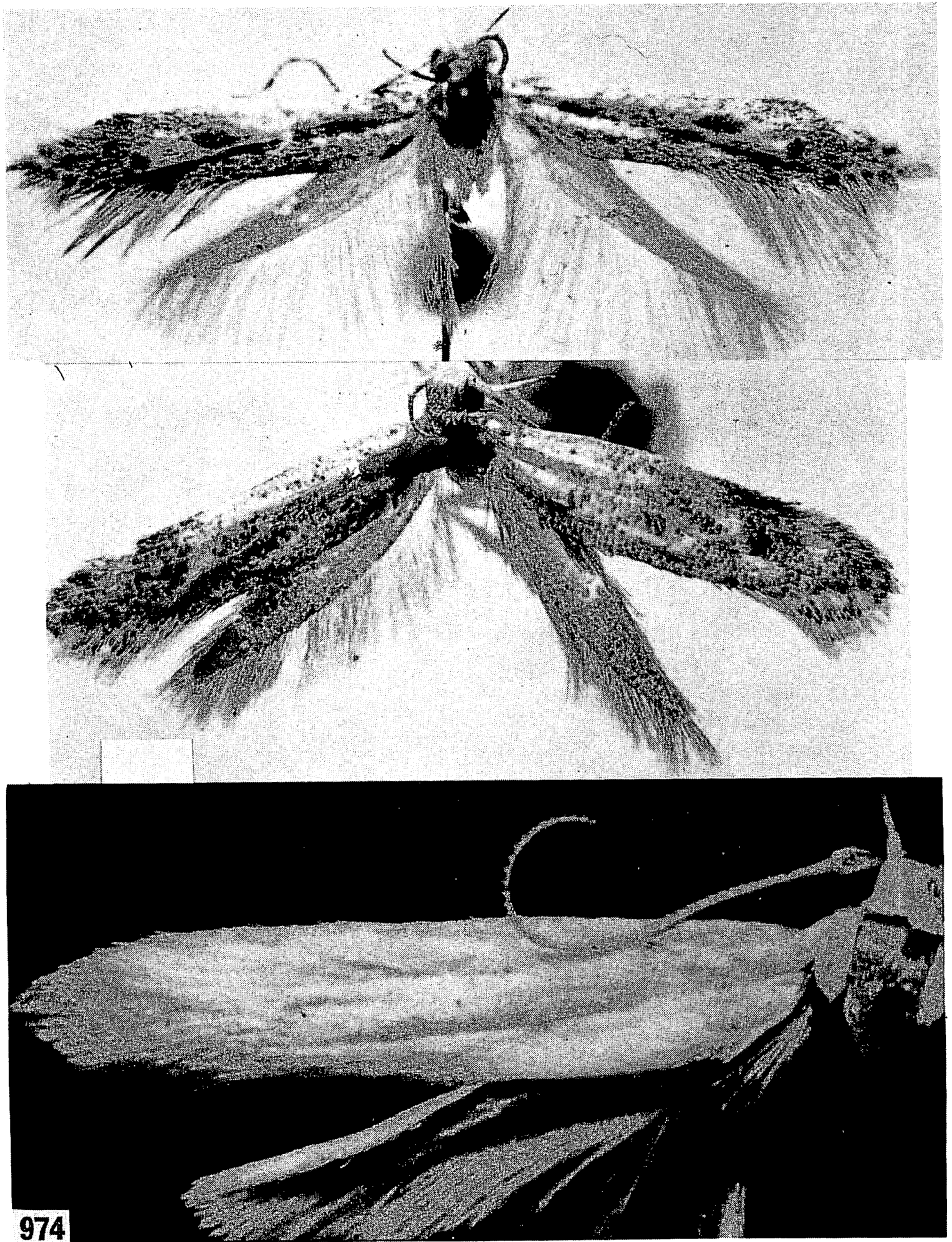


Figure 974—*Hyposmocoma*. Top, (*E.* *subaurata* (Walsingham) (“*Neelysia*”), holotype male (BM slide 4443); Kaholuamano, 4,000 feet, Kauai; expanse 12 mm.; forewings with yellow and fuscous squamae with white and fuscous maculae. Each metapleuron bears a strong, dark-tipped brush (the dark apex of the left one can be seen near the left coxa). Middle, (*H.* *subcitrella* Walsingham, allotype male (BM slide 5231); Kaholuamano, 4,000 feet, Kauai; forewing 4.25 mm., white, cream-colored, and fuscous. This specimen was reared from the larval case shown in figure 801. Bottom, (*E.* *subburnea* (Walsingham), holotype male (BM slide 4394); Molokai, about 4,000 feet; forewing 8.5 mm., creamy white with some small yellow and fuscous maculae. The top and bottom specimens are illustrated in *Fauna Hawaïensis*.

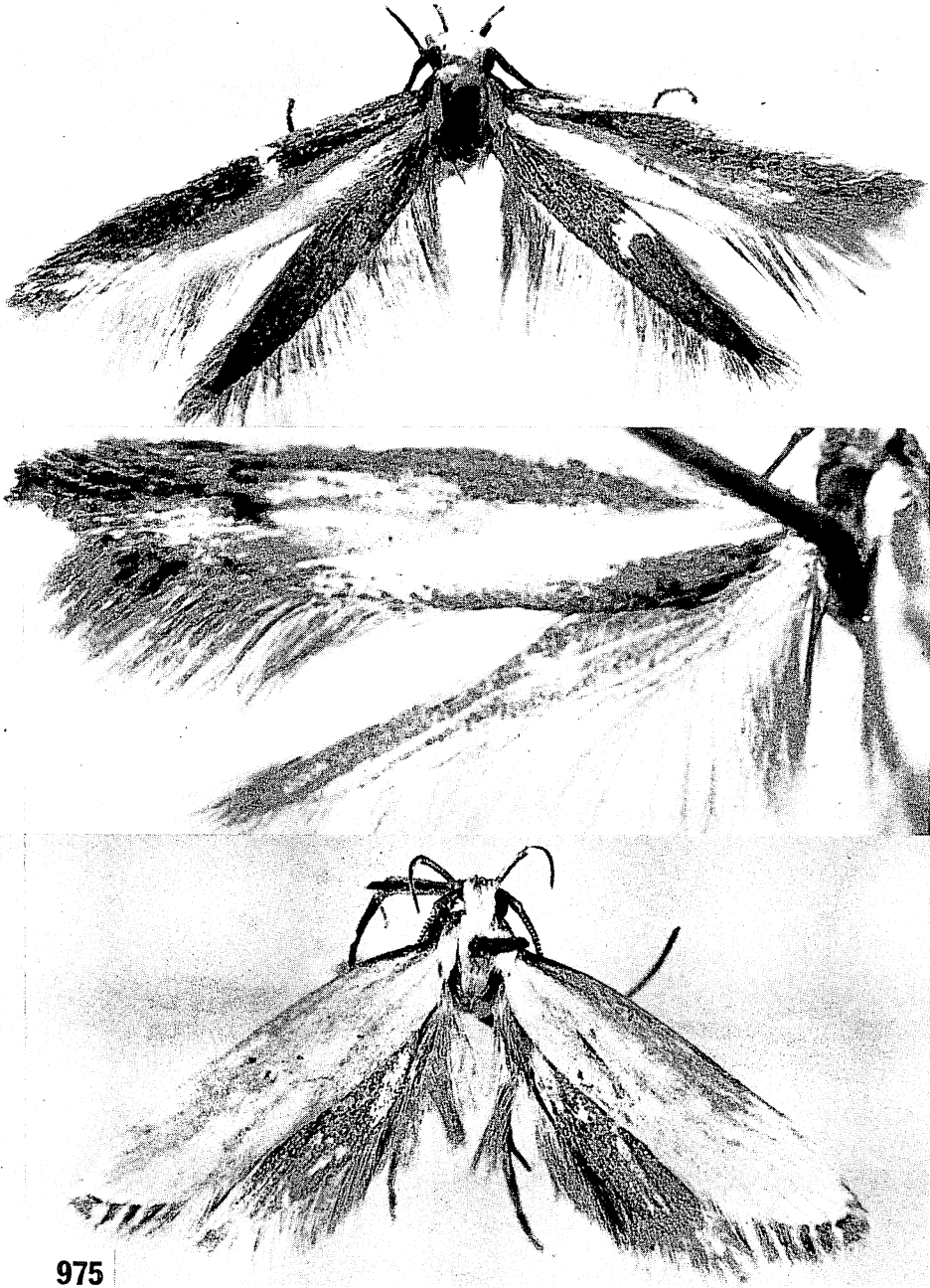


Figure 975—*Hyposmocoma*. Top, (*H.*) *subflavidella* Walsingham, holotype male (BM slide 4106); Haleakala, 5,000 feet, Maui; forewing 6 mm., anterior part brown or brownish fuscous, posterior part mostly straw-colored or cream-colored giving a strongly vittate appearance (the pale costal spot on the left forewing and the pale area near the middle of the hindwing are abrasions). Middle, (*E.*) *sublimata* Walsingham, holotype female (BM slide 4533); Haleakala, 5,000 feet, Maui; forewing 6.5 mm., mostly creamy white shaded on each edge with brown. Bottom, (*E.*) *subnitida* Walsingham, holotype male (BM slide 4502); Kilauea, Hawaii; forewing 9 mm., mostly yellow and straw-colored (compare the photograph of the color form in figure 946). The middle and bottom specimens are illustrated in *Fauna Hawaiiensis*.

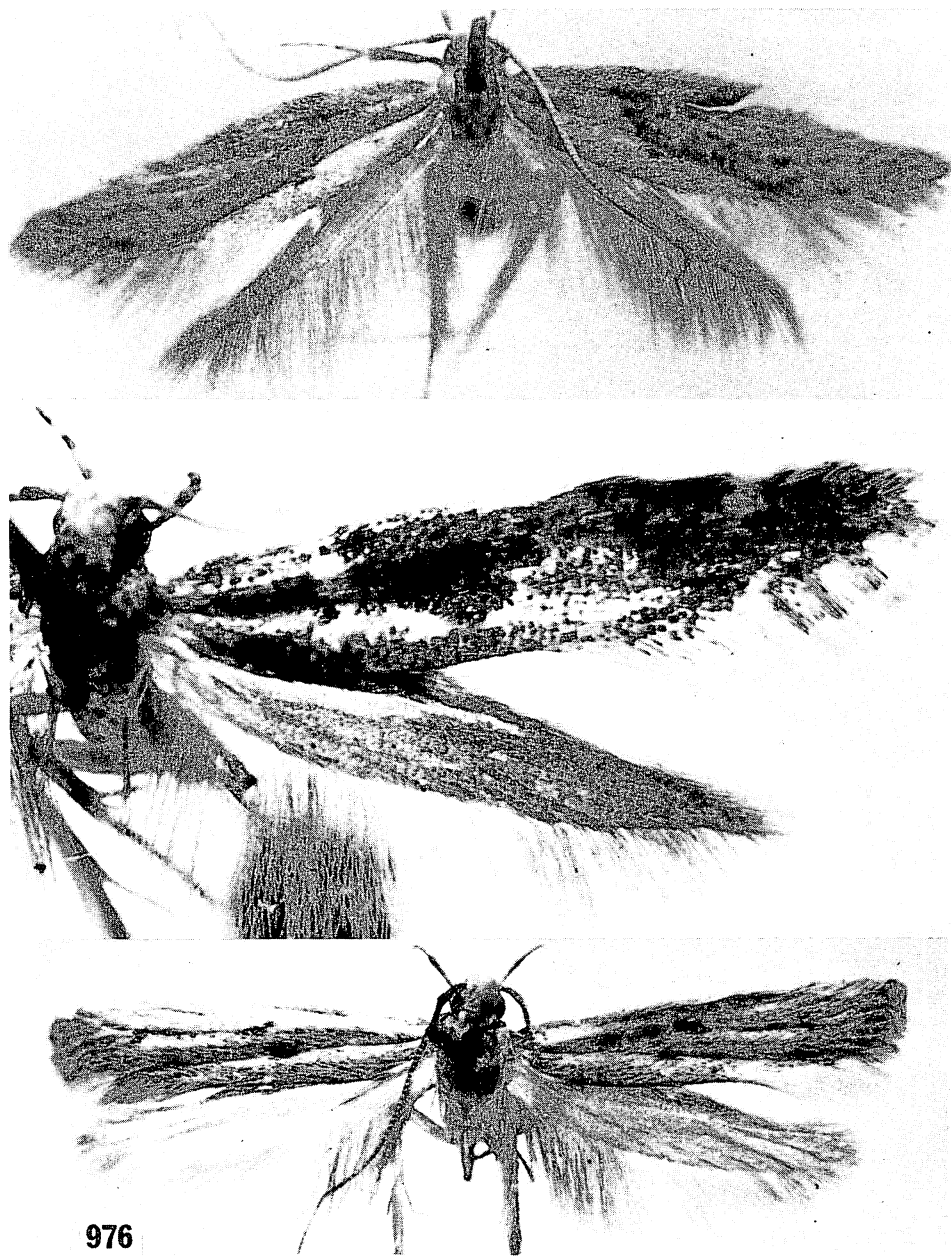
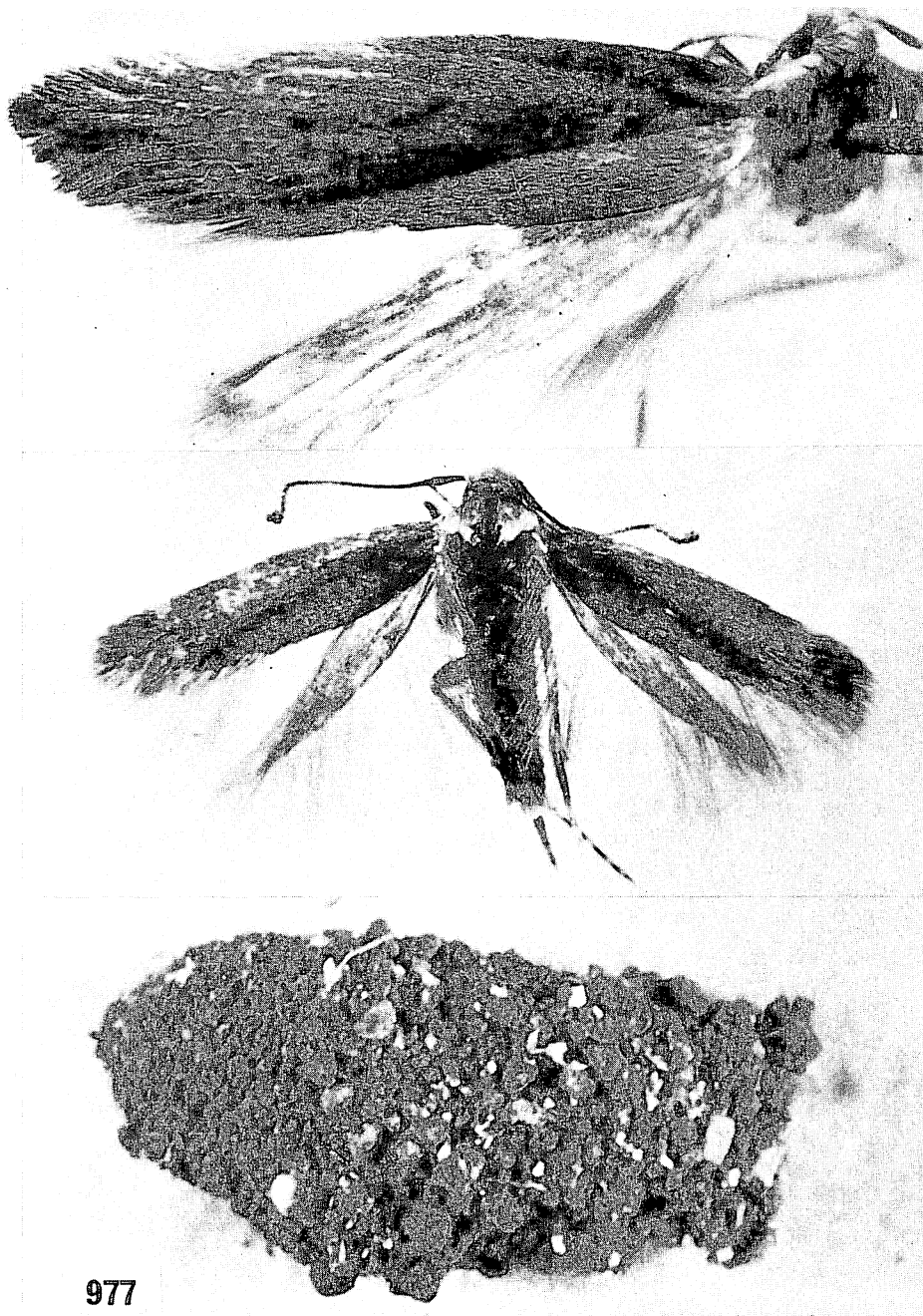


Figure 976—*Hyposmocoma*. Top, (*E.*) *subocellata* (Walsingham) (“*Aphthonetus*”), holotype male (BM slide 4751); Haleakala, 5,000 feet, Maui; forewing 7.5 mm., with background scaling that generally has yellowish- or brownish-tipped white squamae but also has extensive areas of more yellow, brownish, and fuscous squamae. Middle, (*H.*) *subscolopax* Walsingham, holotype male (BM slide 5488); Kilauea, Hawaii; forewing 6.5 mm. (strongly curled on this specimen), white, yellowish, and fuscous. There is a small cluster of a few long scales on each metapleuron. Bottom, (*E.*) *subsericea* Walsingham, holotype male (BM slide 4345); Molokai, 4,000 feet; expanse 17 mm.; forewings straw-colored, yellow and fuscous. These three specimens are illustrated in *Fauna Hawaiiensis*.



977

Figure 977—*Hyposmocoma* (*Hyposmocoma*). Top, *sudorella* Walsingham, holotype male (BM slide 4335); Kauai, 3,000 to 4,000 feet; forewing 8 mm., almost entirely brown with a few scattered dark maculae. This specimen is illustrated in *Fauna Hawaiiensis*. Middle, *swezeyi* (Busck) ("Petrochroa"), female; Kaimuki, Oahu; forewing 3.5 mm., fuscous with a pale subapical fascia. Bottom, the larval case from which the above specimen of *swezeyi* emerged; 4 mm. long; covered with red soil particles.



Figure 978—*Hyposmocoma* (*Hyposmocoma*). Top, *syrhaptes* Walsingham, holotype male (BM slide 4347); Kauai, 3,000 to 4,000 feet; forewing 5.5 mm., yellow and fuscous. Bottom, *tarsimaculata* Walsingham, holotype male (BM slide 4356); Kauai, 3,000 to 4,000 feet; forewing 7 mm., white with black maculae; there is a small tuft on each metapleuron. These specimens are illustrated in *Fauna Hawaiiensis*.



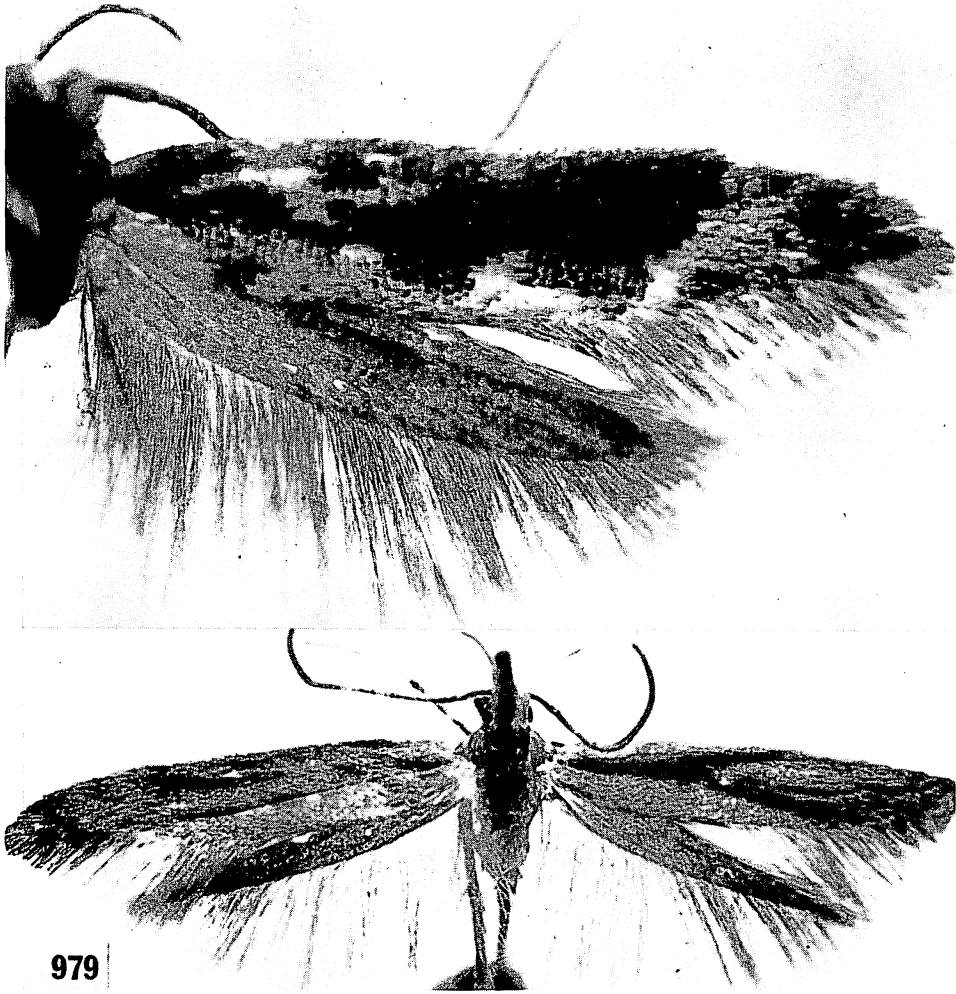


Figure 979—*Hyposmocoma*. Top, (*H. tenuipalpis* Walsingham, holotype male (BM slide 4085); above Pelekunu, Molokai; forewing 7.5 mm., fuscous and white with some yellow squamae. Bottom, (*E. terminella* (Walsingham) ("*Neelysia*"), holotype male (BM slide 4449); Haleakala, 5,000 feet, Maui; expanse 11 mm., forewings dark brown flecked with yellow. These two specimens are illustrated in *Fauna Hawaïensis*.

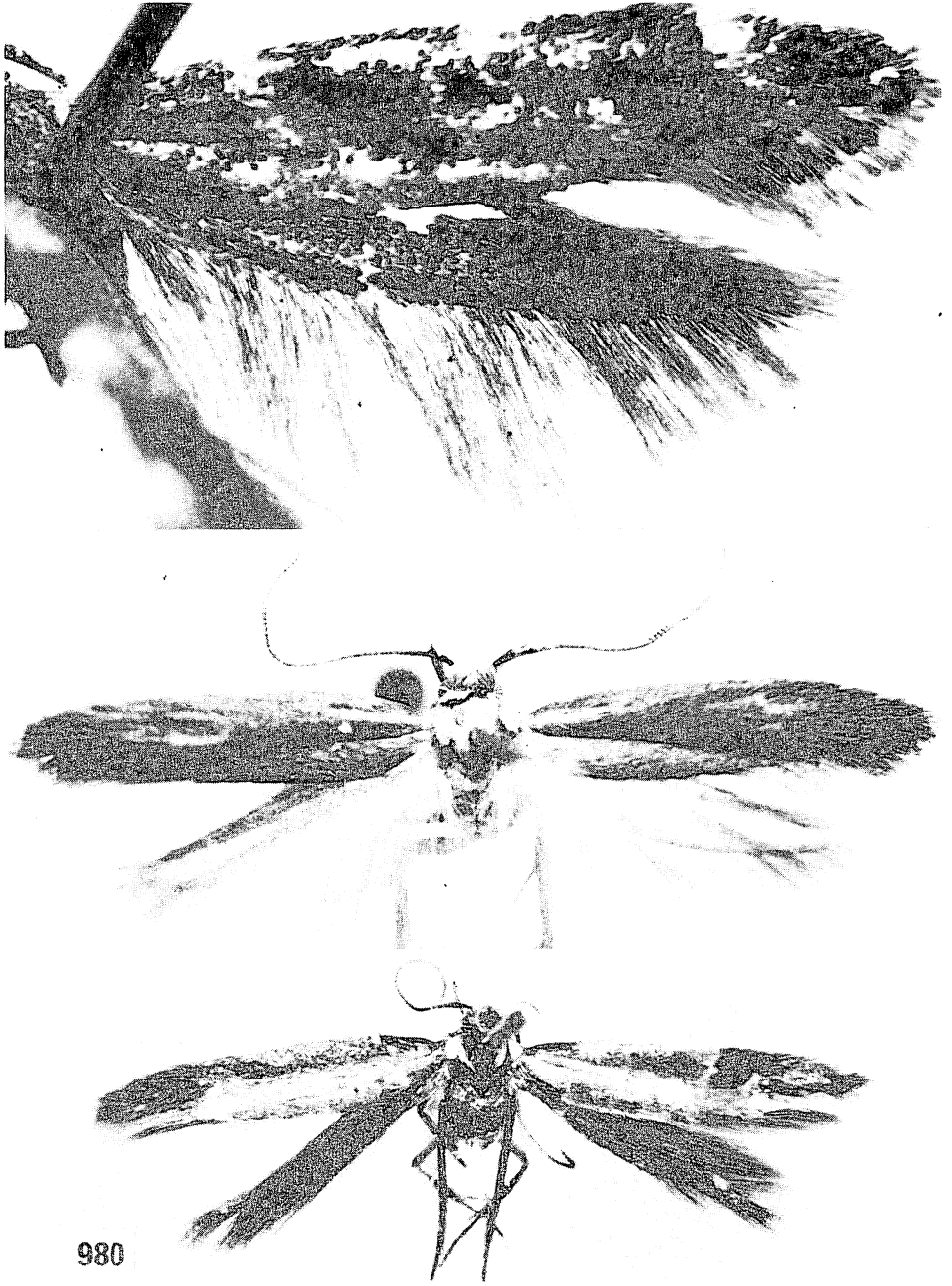


Figure 980—*Hyposmocoma*. Top, (*H.*) *tetraonella* Walsingham, holotype male (BM slide 5489); Kona, 4,000 feet, Hawaii; forewing 5 mm., white, yellowish, and fuscous (the photograph is too dark, and the pale costal area at about the basal third is an abrasion). This specimen is illustrated in *Fauna Hawaiiensis*. Middle, (*E.*) *thermoxyla* Meyrick, lectotype male (BM slide 9567 Clarke); Koolau Mts., near Honolulu; expanse 16 mm.; forewings brown to purplish brown. Bottom, (*H.*) *thialma* Meyrick, holotype female (abdomen lost); Olinda, Maui; forewing 5.25 mm., brownish fuscous with a broad cream-colored, yellow, and white vitta from base to apex.



981

Figure 981—*Hyposmocoma*. Top, (*H.*) *thoracella* Walsingham, holotype male (BM slide 4104); Lanai, 2,000 feet; forewing 6 mm., bronzy brown and white. Bottom, (*E.*) *tigrina* (Butler) ("Neelysia"), holotype male (BM slide 4434); Haleakala, Maui; forewing 4.5 mm., mostly yellow with fuscous maculae and a white vitta along the fold. These specimens are illustrated in *Fauna Hawaiiensis*.

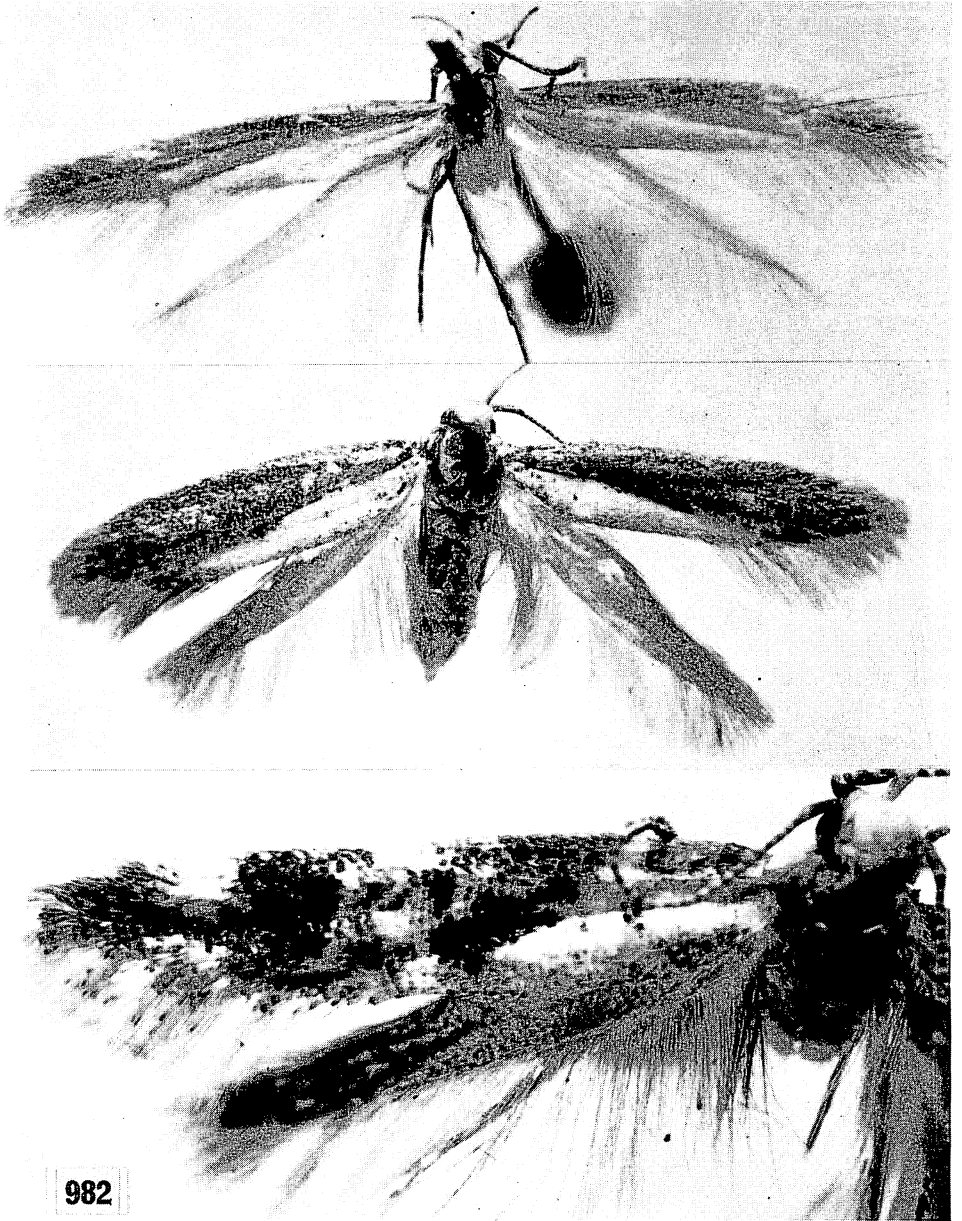
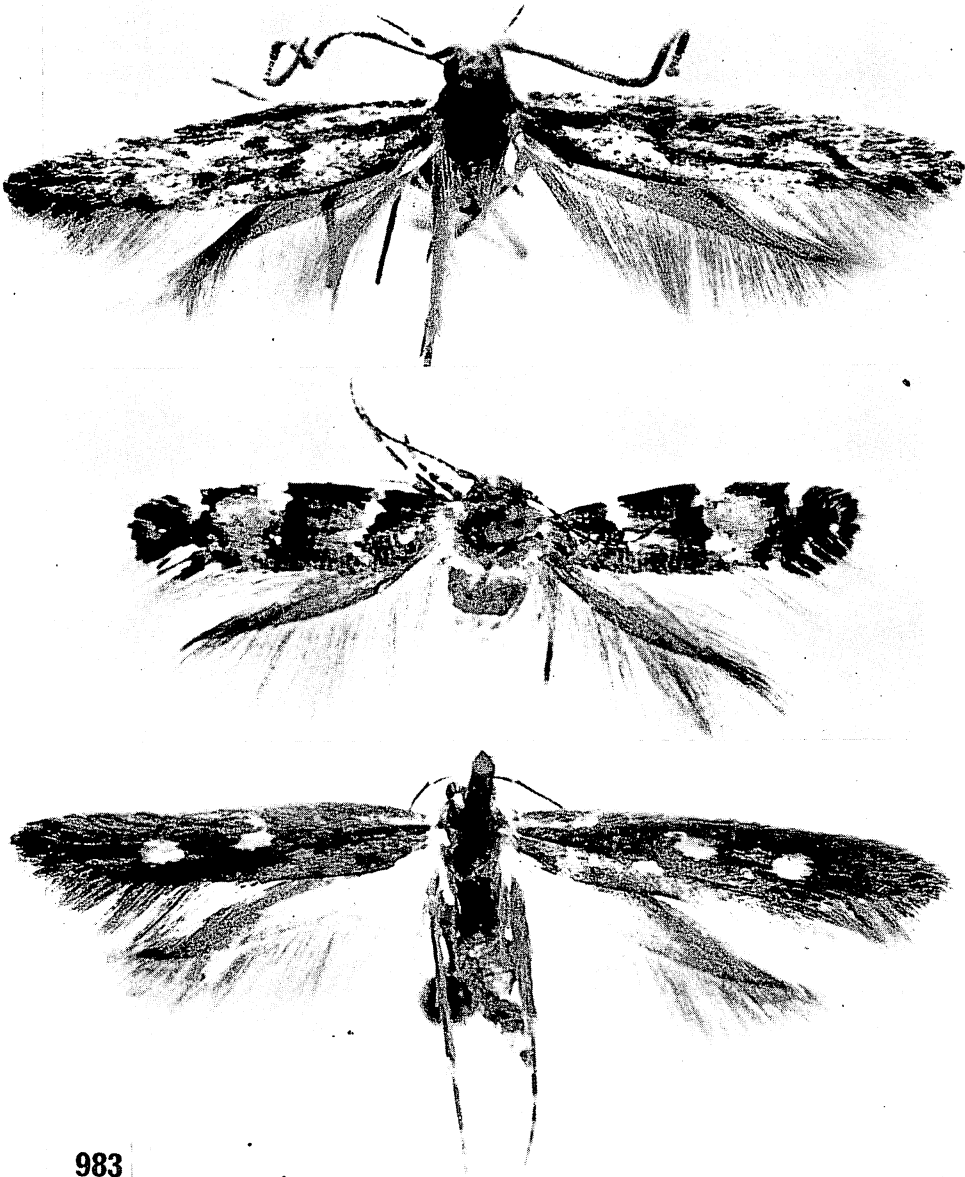


Figure 982—*Hyposmocoma*. Top, (*E.*) *tischeriella* (Walsingham) (“*Neelysia*”), holotype male (BM slide 4458); Kaholuamano, 4,000 feet, Kauai; expanse 11 mm.; forewings mostly orange (the photograph is inadequate). There is a brush from the posterior axil of each hindwing and another on each metapleuron beneath the anterior corner of the hindwing base. Middle, (*H.*) *tomentosa* Walsingham, holotype female (BM slide 7068); Kona, 3,000 feet, Hawaii; expanse 13.5 mm.; forewings white and fuscous. Bottom, (*H.*) *torella* Walsingham, holotype male (BM slide 4485); Molokai; forewing 5.5 mm., white, yellow, and fuscous. These specimens are illustrated in *Fauna Hawaiensis*.



983

Figure 983—*Hyposmocoma*. Top, (*E.* *trichophora* (Walsingham) (“*Aphthonetus*”), holotype male (BM slide 4749); Kauai, 3,000 to 4,000 feet; expanse 12 mm.; forewings have white, yellowish, brownish, and fuscous scaling and maculae. Middle, (*H.* *trifasciata* (Swezey) (“*Petrochroa*”), holotype female (abdomen lost); Laupahochoe, Hawaii; ex larval case found on a rock; forewing 2.5 mm., with an unusual pattern: black with grey and fuscous at base and with white fasciae, the first of which is followed by an orange area and the second by a larger orange area. Bottom, (*E.* *trilunella* Walsingham, holotype female (slide not made); Haleakala, 5,000 feet, Maui; expanse 16 mm., forewings fuscous with white maculae. The top and bottom specimens were illustrated in *Fauna Hawaïensis*.

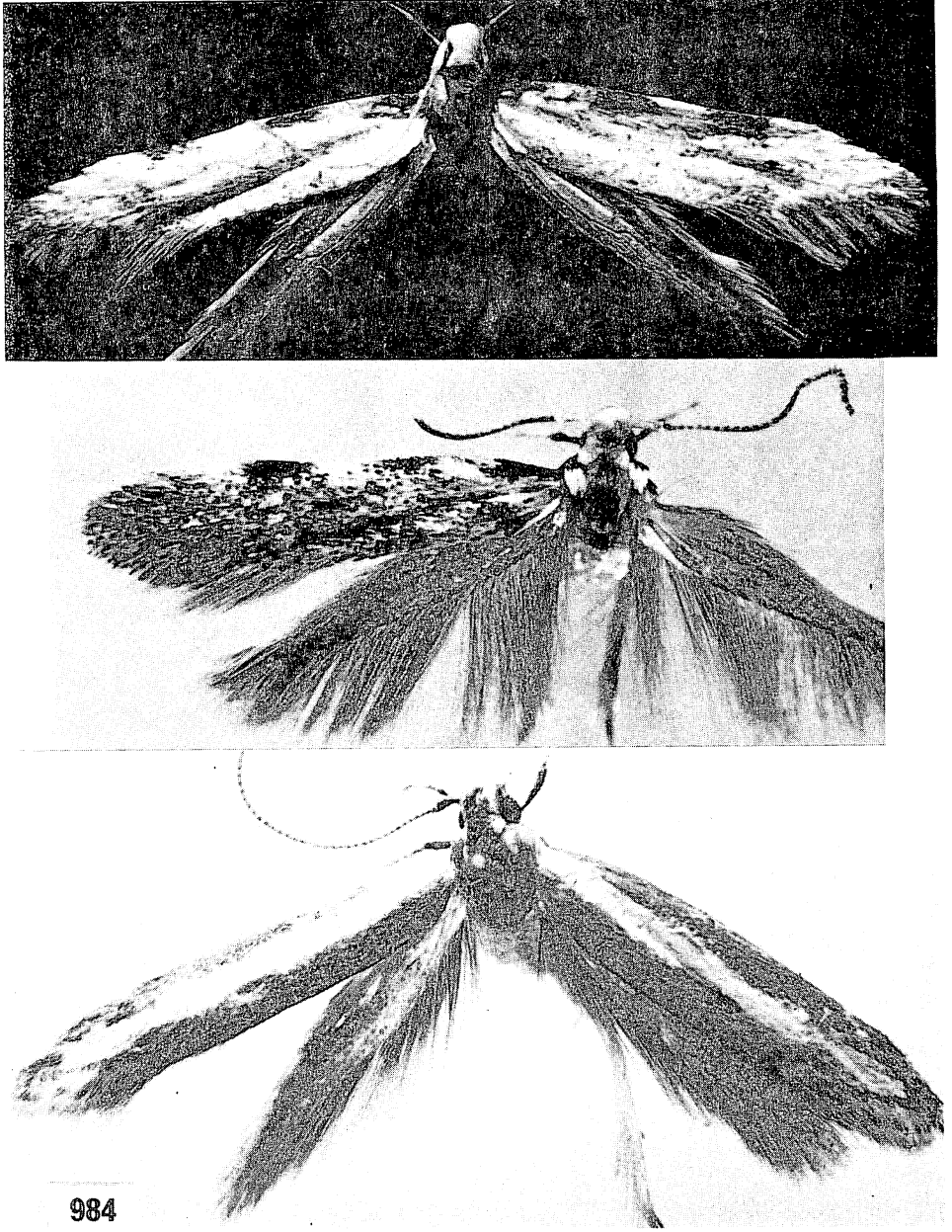


Figure 984—*Hyposmocoma* (*Hyposmocoma*). Top, *trimaculata* Walsingham, holotype male (BM slide 4320); Waianae Mts., 2,000 feet, Oahu; expanse 10 mm.; forewings almost white with brown and fuscous maculae. Middle, *trimelanota* Meyrick, holotype male; Kilauea, Hawaii; forewing 5 mm., white sprinkled with dark brown and fuscous scaling and maculae and with three dark costal maculae. Bottom, *tripartita* Walsingham, holotype male (BM slide 4103); Molokai, 4,000 feet; forewing 6.5 mm., brown and white. The top and bottom specimens are figured in *Fauna Hawaiiensis*.

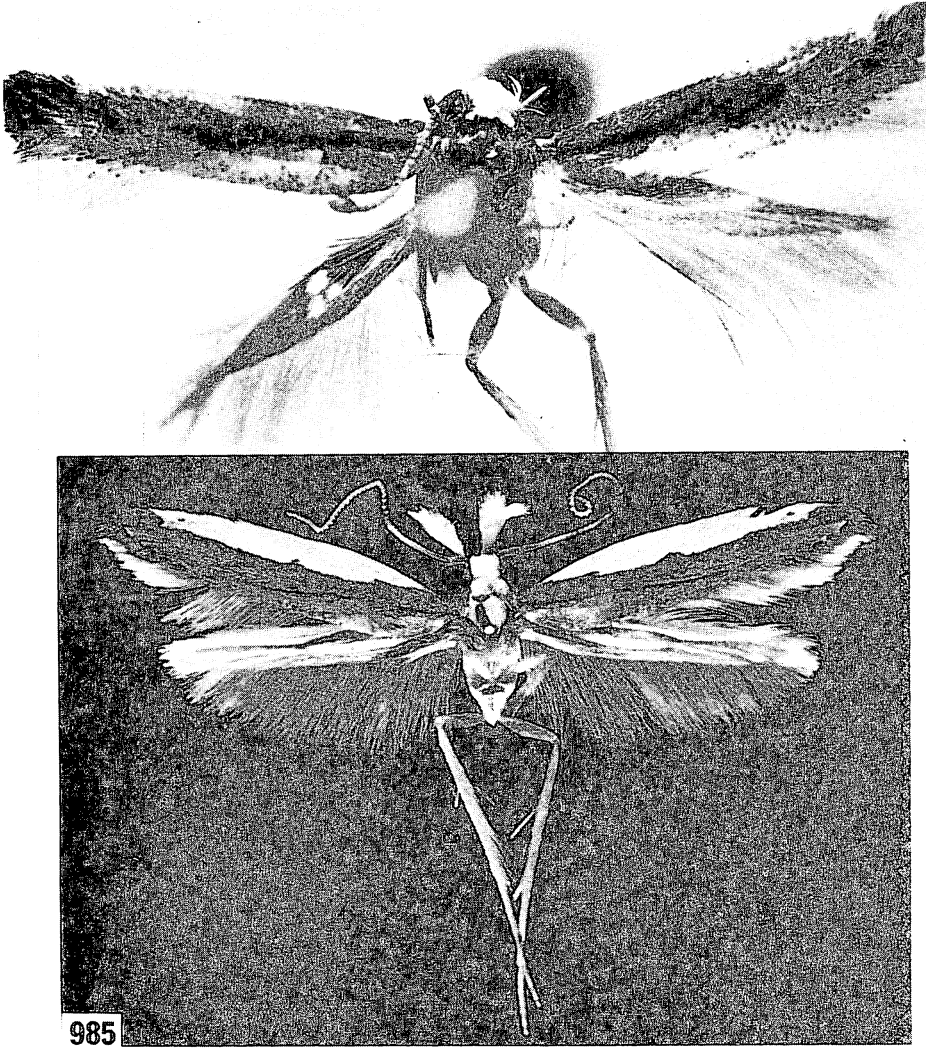


Figure 985—*Hypsmocoma*. Top, (*H.*) *triptila* Meyrick, lectotype male (BM slide 9577 Clarke); Koolau Mts., Oahu; expanse 12.5 mm.; forewings brown and white with fuscous maculae. Note the subcostal brush on the left hindwing. Bottom, (*E.*) *trivittella* (Swzcy) ("*Eulhypsmocoma*"), lectotype (here designated; (an abdomen is glued to the mount; no slide made); near Lihue, Kauai; forewing 7 mm., with three vittae: the costal one is white, the submedial one is pale brown, and the posterior one is pinkish. Note the large labial palpal brushes. This is a beautiful species.

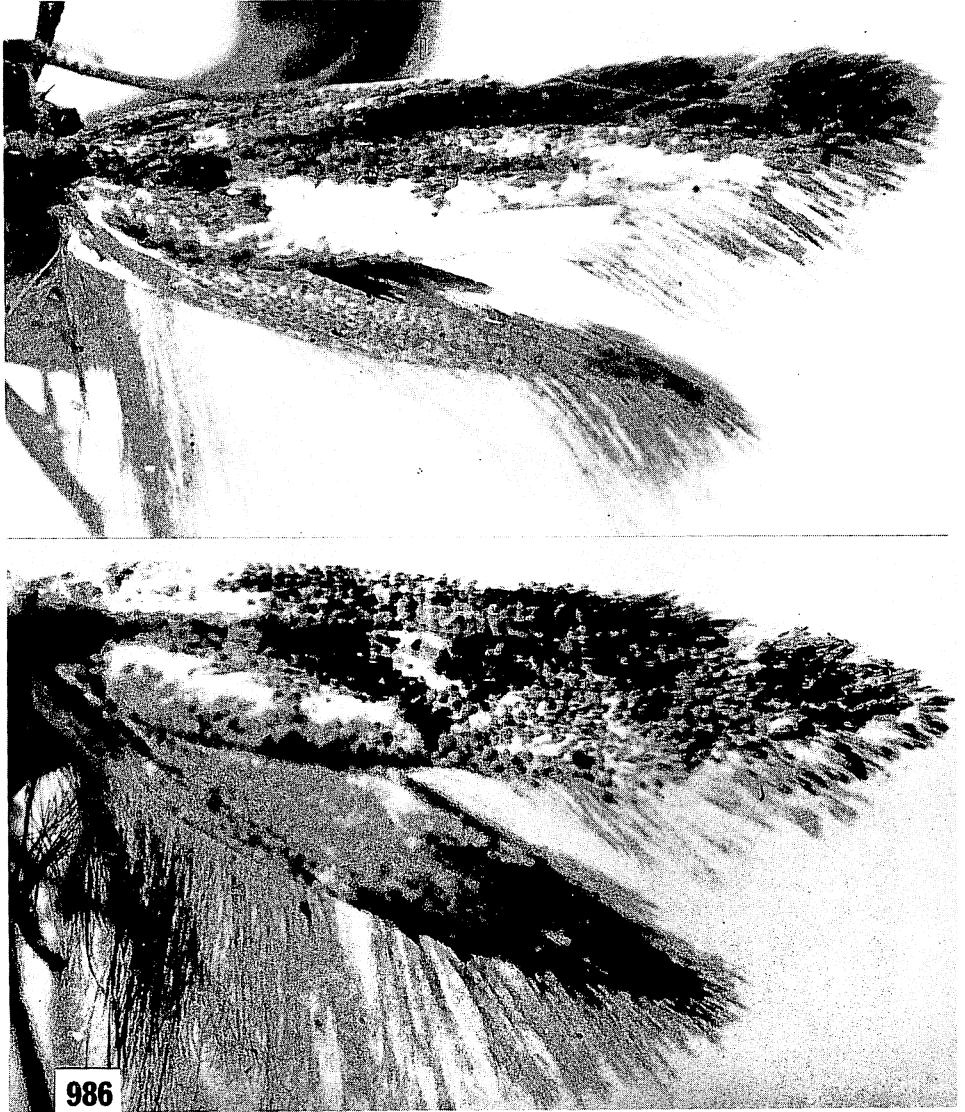


Figure 986—*Hyposmocoma* (*Hyposmocoma*). Top, *trossulella* Walsingham, holotype male (BM slide 4090); Waianae Mts., about 2,000 feet, Oahu; forewing about 5 mm., white or cream-colored and fuscous. This specimen is illustrated in *Fauna Hawaiiensis*. Bottom, *turdella* Walsingham, allotype female (BM slide 4491); Lanai, 2,000 feet; forewing 5.5 mm., white and pale brown to fuscous (the pale spot near the middle of the forewing is an abrasion).



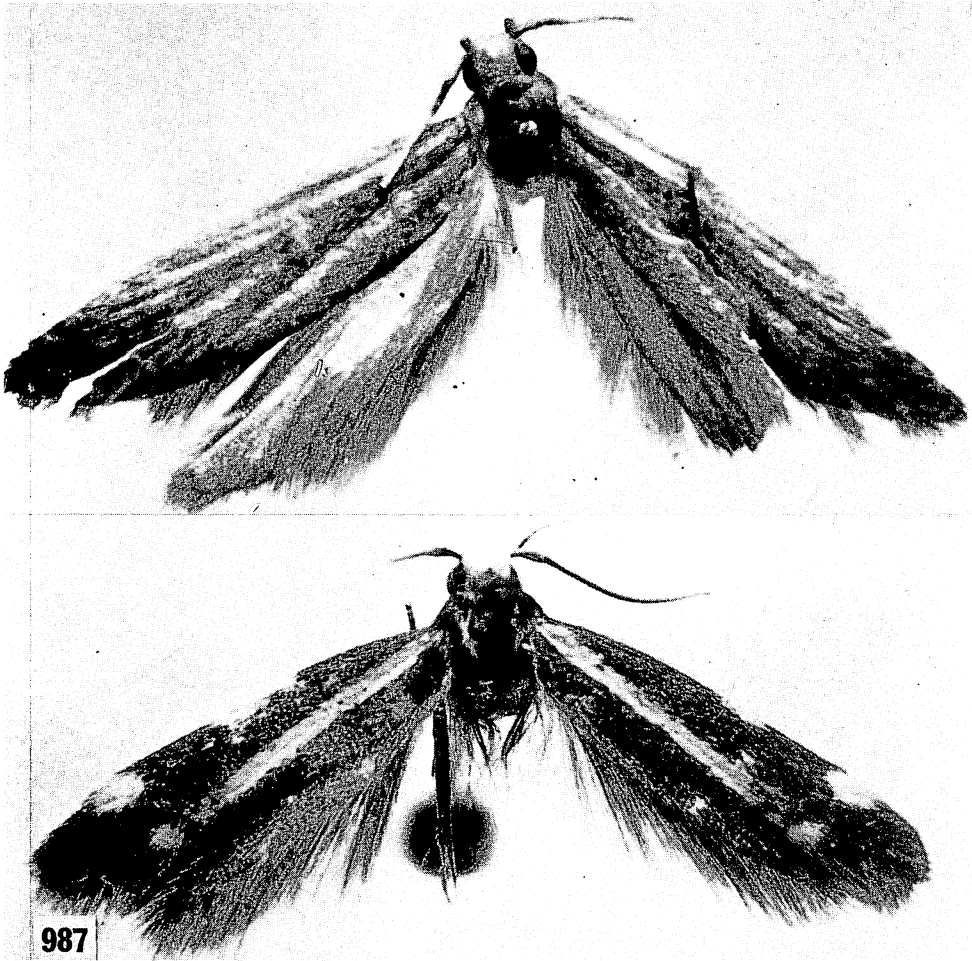


Figure 987—*Hyposmocoma*. Top, (*E.*) *unicolor* (Walsingham) (“*Hyperdasylella*”), holotype male (BM slide 4425); Molokai, above 4,500 feet; forewing 9.5 mm., reddish brown with some small dark maculae. Bottom, (*H.*) *unistriata* Walsingham, holotype male (BM slide 4120); above Pelekunu, Molokai; forewing 6 mm., fuscous and white. This specimen is illustrated in *Fauna Hawaiiensis*.

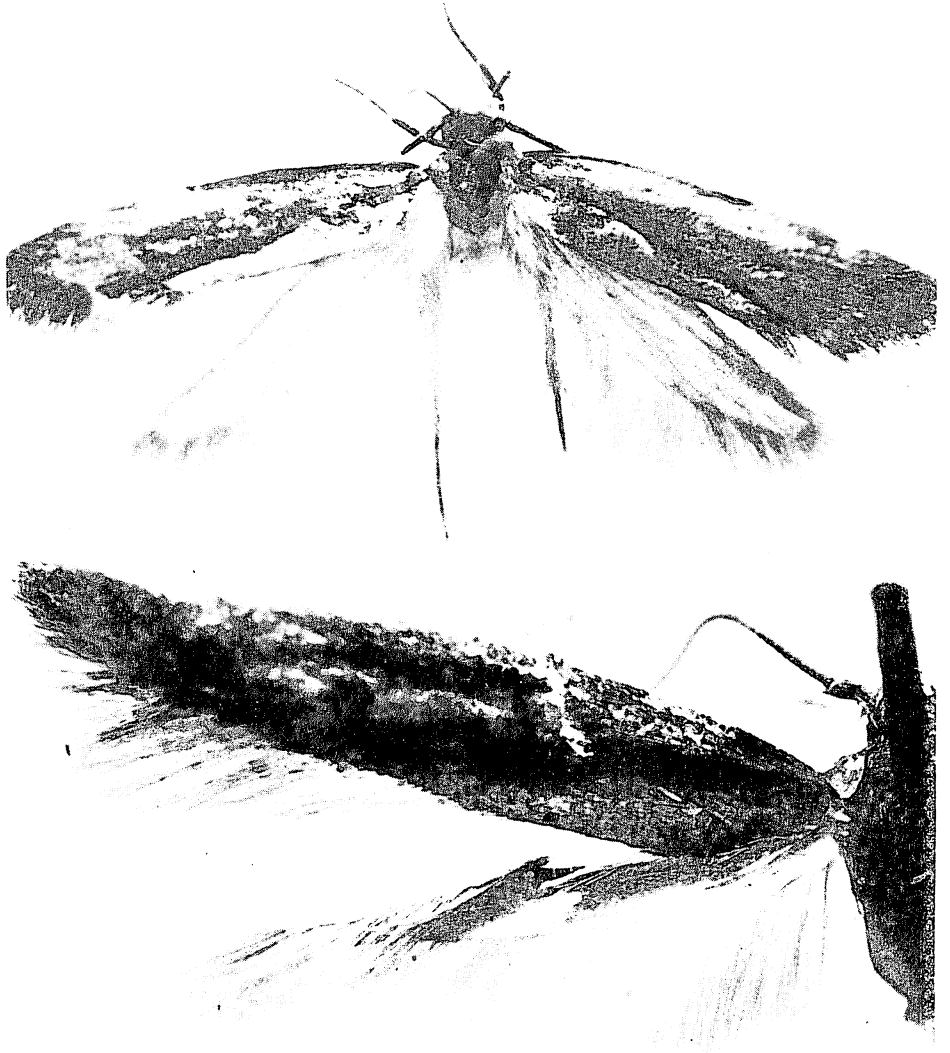
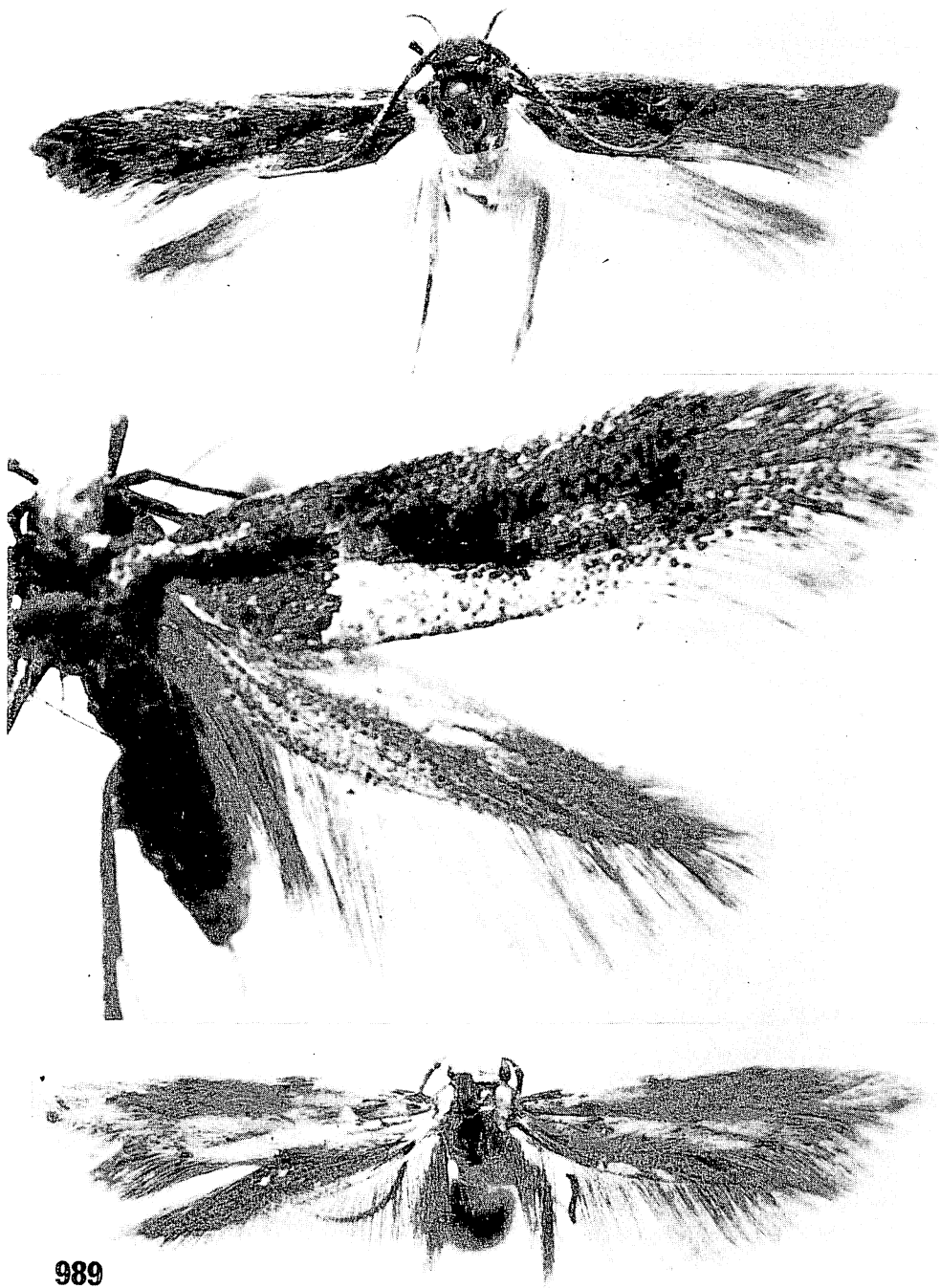
**988**

Figure 988—*Hyposmocoma*. Top, (*H.*) *vermiculata* Walsingham, holotype male (BM slide 4133); Kilauea, Hawaii; expanse 14 mm.; forewings fuscous with darker and paler maculae. Bottom, (*E.*) *veterella* (Walsingham) ("Aphthonetus"), holotype female (BM slide 4715); Halemanu, 4,000 feet, Kauai; forewing 5.5 mm., white and brownish fuscous (the photograph is partly out of focus, poorly illuminated, and too dark). These specimens were used for the *Fauna Hawiianensis* illustrations.



989

Figure 989—*Hyposmocoma*. Top, (*H.*) *vicina* Walsingham, holotype male (BM slide 4336); Waianae Mts., 1700 feet, Oahu; expanse 15 mm.; forewings a brown shade of fuscous with yellowish areas. Middle, (*H.*) *vinicolor* Walsingham, holotype female (slide not made); Waianae Mts., 3,000 feet, Oahu; forewing 6 mm., brownish, fuscous, and white. Bottom, (*H.*) *virgata* Walsingham, allotype male (BM slide 4111); Molokai, about 4,000 feet; expanse 12.5 mm.; forewings golden yellow with fuscous maculae (the photograph is somewhat misleading). The top and middle specimens are illustrated in *Fauna Hawaiiensis*.

(Continued from page 1224.)

**Hyposmocoma (Euperissus) agnetella** (Walsingham), **new combination** (figs. 780, palpus; 809, wing venation; 868, moth; 1003, male genitalia; 1219, female genitalia).

*Neelysia agnetella* Walsingham, 1907b:538, pl. 17, fig. 10.

Endemic. Maui (type locality: Olinda, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) albocinerea** (Walsingham), **new combination** (figs. 785, palpus; 816, wing venation; 869, moth; 1016, male genitalia, abdomen; 1215, female genitalia).

*Aphthonetus albocinerea* Walsingham, 1907b:527, pl. 16, fig. 17.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

It would appear from the original description that all 31 specimens of the type series are females, but at least one of the paratypes is a male whose genitalia I have figured.

**Hyposmocoma (Euperissus) alticola** Meyrick (figs. 824, wing venation; 870, moth; 1034, male genitalia; 1228, female genitalia).

*Hyposmocoma alticola* Meyrick, 1915a:343.

Endemic. Oahu (type locality: Koolau Mountains, near Honolulu).

Hostplant: unknown.

The more or less L-shaped valvae of this species are typical of the *Neelysia* group to which it should be assigned.

**Hyposmocoma (Euperissus) anthinella** (Walsingham), **new combination** (figs. 780, palpus; 809, wing venation; 871, moth; 1003, 1004, male genitalia).

*Neelysia anthinella* Walsingham, 1907b:535, pl. 17, fig. 4.

Endemic. Lanai (type locality: holotype male, 2,000 feet; allotype female, 3,000 feet).

Hostplant: unknown.

A microscope slide preparation (BM 7710) of the allotype female was made, but the preparation is inadequate for photography because of decomposition of the abdomen and attack by mold.

**Hyposmocoma (Euperissus) argentea** Walsingham (figs. 783, palpus; 826, wing venation; 872, moth; 1040, male genitalia; 1207, 1228, female genitalia).

*Hyposmocoma argentea* Walsingham, 1907b:596, 734, pl. 21, fig. 17.

Endemic. Molokai (type locality: about 4,000 feet).

Hostplant: unknown.

The female has a narrow, elongate, dentate signum on the bursa copulatrix. In his supplementary remarks on page 734 of *Fauna Hawaiiensis*, Walsingham records this species from the northwest Koolau Mountains of Oahu. I have

not studied any Oahu material and prefer not to accept the Oahu record until it can be verified. There are no specimens from Oahu in the *Fauna Hawaiiensis* collection in the British Museum. Perhaps Walsingham's page 734 statement contains an error.

**Hyposmocoma (Euperissus) argomacha** Meyrick (figs. 872, moth; 796, abdomen, female genitalia; 866c, wing venation).

*Hyposmocoma argomacha* Meyrick, 1935a: 67.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: *Smilax*.

The elongate, whitish larvae bore the dead stems of the hostplant and do not make cases.

The holotype is a female. The male paratype lacks its abdomen. These specimens are now in the Bishop Museum.

**Hyposmocoma (Euperissus) argyresthiella** (Walsingham), **new combination** (figs. 781, palpus; 810, wing venation; 873, moth; 1004, male genitalia; 1219 female genitalia).

*Neelysia argyresthiella* Walsingham, 1907b: 544, pl. 17, fig. 22.

Endemic. Kauai, Oahu, Molokai, Hawaii [type locality: Kaawaloa, Kona, above 2,000 feet, holotype male (abdomen lost); Kona, 4,000 feet, allotype female].

Hostplant: the larvae, presumably found on Oahu, of what was determined as this species by Dr. Swezey, have been reared from silken tunnels in moss. I have not compared the Swezey material with the types.

This species was originally labeled by Walsingham as belonging to *Hyposmocoma*, but it was described in *Fauna Hawaiiensis* as a *Neelysia*. The male has a pair of long brushes which arise from the metapleura and cross over the abdomen. I have not verified the extensive distribution, and material from the various islands should be studied with great care because of the possibility that more than one species is involved.

**Hyposmocoma (Euperissus) arundinicolor** (Walsingham), **new combination** (figs. 770, wing venation; 783, palpus, 873, moth; 990, male genitalia; 1207, 1214 female genitalia).

*Hyperdasys arundinicolor* Walsingham, 1907b: 641, pl. 24, fig. 23.

*Hyperdasyyella arundinicolor* (Walsingham) Fletcher, 1940: 18.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) aspersa** (Butler), **new combination** (figs. 785, palpus; 818 wing venation; 873, moth; 1215, female genitalia).

*Laverna aspersa* Butler, 1882: 44.

*Aphthonetus aspersa* (Butler) Walsingham, 1907b: 529, pl. 16, fig. 22.

Endemic. Oahu (type locality: mountains near Honolulu; Blackburn's code numbers on the female holotype are "82.9 106").

Hostplant: unknown.

I have not seen the male.

**Hyposmocoma (Euperissus) auroargentea** Walsingham (figs. 827, wing venation; 874, moth; 1041 male genitalia; 1229, female genitalia).  
*Hyposmocoma auroargentea* Walsingham, 1907*b*:570, pl. 19, fig. 16.

Endemic. Maui (type locality: Haleakala, 5,000 feet or higher).  
Hostplant: unknown.

**Hyposmocoma (Euperissus) barbata** Walsingham (figs. 778, 784, palpus; 875, moth; 1229, female genitalia).  
*Hyposmocoma barbata* Walsingham, 1907*b*:635, pl. 24, fig. 12.

Endemic. Molokai (type locality: above 3,000 feet).  
Hostplant: unknown.

Only the female holotype is known, and, without the male, I cannot place the species in a species group. Walsingham noted that the hairy labial palpi agree with the *Aphthonetus* group "but vein 6 is separate in the forewings and 6 and 7 of the hindwings are not stalked." I have not made a slide preparation of the wings.

**Hyposmocoma (Euperissus) basivittata** (Walsingham), **new combination** (figs. 780, palpus; 810, wing venation; 876, moth; 1005, male genitalia; 1220, female genitalia).

*Neelysia basivittata* Walsingham, 1907*b*:539, pl. 17, fig. 12.

Endemic. Maui (type locality: Haleakala, 5,000 feet).  
Hostplant: unknown.

**Hyposmocoma (Euperissus) bitincta** (Walsingham), **new combination** (figs. 785, palpus; 818, wing venation; 877, moth; 1015, 1017, abdomen; 1017, male genitalia; 1215, female genitalia).

*Aphthonetus bitincta* Walsingham, 1907*b*:521, pl. 16, fig. 3.

Endemic. Kauai?, Oahu? (according to Swezey, 1954:6, but specimens not examined by me), Maui (type locality: Haleakala, 4,000 feet, holotype male; 5,000 feet, allotype female).

Hostplant: larvae in dead bark of *Acacia koa* (record based upon Oahu specimens determined by Swezey).

I have questioned the Kauai and Oahu records, because I have not studied the genitalia of such specimens and have not compared them with the Maui types.

**Hyposmocoma (Euperissus) brevistrigata** Walsingham (figs. 783, palpus; 828, wing venation; 878, moth; 1051, male genitalia; 1230, female genitalia).

*Hyposmocoma brevistrigata* Walsingham, 1907*b*:633, pl. 24, fig. 8.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).  
Hostplant: unknown.

This moth was not correctly associated with its allies in *Fauna Hawaiiensis*. It belongs with the atypical *Neelysia* group associated with *mactella*. The only

female I have seen is damaged. The valvae of the male genitalia are small and subtriangular. The males have a well-developed brush of long yellowish hairs, which end in darker, wine-colored apices, on each side of the metathorax beneath the anterior axil of the hindwing. On each side of the abdomen at the ends of the metathoracic brushes is a patch of elongate, raised scales. This combination recalls that found in such species as (*Neelysia*) *mactella* and its associates; see the discussion under *mactella*, below. The abdominal squamae are not as large as on *exaltata* and its allies. Although Walsingham mentioned the fact that the males of this species lack subcostal brushes on the hindwings, he overlooked, or at least did not mention, the well-developed and conspicuous brushes of long hairs on the metapleura.

**Hyposmocoma (Euperissus) caecinervis** Meyrick (figs. 806, pupa; 824, wing venation; 878, moth; 1053, male genitalia; 797, female genitalia).  
*Hyposmocoma caecinervis* Meyrick, 1928c:103.

Endemic. Oahu (type locality: Mt. Kaala).

Hostplant: *Smilax sandwicensis*. The larvae bore in the dead stems.

**Hyposmocoma (Euperissus) catapyrrha** (Meyrick), **new combination** (fig. 880, moth).

*Euperissus catapyrrha* Meyrick, 1935a:64.

Endemic. Maui (type locality: Olinda).

Hostplant: *Rubus hawaiiensis*.

The only known specimen of this moth was reared from a larva found by Dr. Swezey in the pith of a dead stem. It has, most unfortunately, lost its abdomen.

**Hyposmocoma (Euperissus) centralis** Walsingham (figs. 787, palpus, 881, moth; 1055, male genitalia).

*Hyposmocoma centralis* Walsingham, 1907b:636, pl. 24, fig. 15.

Endemic. Kauai (type locality: behind Lihue, 4,000 feet).

Hostplant: unknown.

Only the male holotype is known. Walsingham noted that the right hindwing has a branch on vein 4; the hindwing thus has an abnormal nine veins.

**Hyposmocoma (Euperissus) centronoma** Meyrick (figs. 881, moth; 794, female genitalia).

*Hyposmocoma centronoma* Meyrick, 1935a:66.

Endemic. Oahu (type locality: Kawaihapai).

Hostplant: *Metrosideros*.

This moth is known from one female which was bred from a larva found by Dr. Swezey feeding on the bark of the hostplant.

**Hyposmocoma (Euperissus) chilonella chilonella** Walsingham (figs. 806, pupa; 807, wing venation; 882, moth; 1055, 1056, male genitalia; 1196, female genitalia).

*Hyposmocoma chilonella* variety *chilonella* Walsingham, 1907b:637, pl. 24, fig. 17.

Endemic. Kauai (type locality: 3,000 to 4,000 feet), Oahu, Maui, Hawaii.

Hostplants: *Acacia koa*, *Aleurites moluccana*, *Cheirodendron gaudichaudii*, *Coprosma foliosa*, *Coprosma* species, *Metrosideros*, *Pipturus*, *Rubus hawaiiensis*, *Smilax sandwicensis*.

Parasites: *Pycnophion fuscipennis* Perkins, *Scleroderma chilonellae* Bridwell, *Sympiesis* ("Ophelinus") *mauiensis* (Ashmead).

The whitish larvae bore in dead wood or pith.

I have not had opportunity to study the supposed forms of this species in sufficient detail. The genitalia I have examined appear to display certain differences in some structures, but I do not have enough evidence to ascertain whether these differences are more than individual. Studies of series of examples from various localities, as well as studies in the field, are now required. Both sexes of this complex have the brush of hairs on the vannal areas of the hind-wings strongly developed.

Walsingham called the four forms of this species that he recognized "varieties", and he said (1907b:639):

The descriptions of the varieties of this species show a wide range of difference in intensity and distribution of color. I had originally regarded them as distinct, but the intergradations are numerous and it appears to me to be one of the rare instances in which a species ranging over several of the islands fails to establish for itself any recognisable local form. The size as well as the colour of the specimens is very variable and this difference is to be found in connection with each separate pattern or peculiarity. If anyone had before him the varieties described above without the intermediate gradations he would undoubtedly regard them as distinct species, but in the absence of a knowledge of their life-histories it seems preferable to describe them as varieties rather than species.

These forms may be color varieties, or species, or a mixture of the two categories. They cannot be called subspecies because they do not appear to conform to the current definition of subspecies. They must be considered either forms of a variable species or as separate species. At this preliminary writing, I believe that a complex of species is involved here. It is not impossible that some of the specimens considered by Walsingham to represent connecting intergrades between these forms may really be themselves distinct forms. Thus, a series of distinct species, perhaps sibling species, may be confused in this complex.

The ostium of *chilonella chilonella* differs from that of *venosa*. The bursa copulatrix of *chilonella* is distinctly constricted (figure 1196), whereas that of *venosa* is elongated and not constricted and is thus different from *chilonella*. These differences indicate full species. The ostium and the bursa copulatrix of *triozellata*, however, are like those of *chilonella*. Differences observable in the shapes of the genital flaps, valvae, lobes of the anellus, and left brachia, for example, of the male genitalia are confusing and difficult to evaluate from the few examples examined, but some of these differences may indicate different species. It would appear possible that several species are involved with possibly similar color varieties.

Because I cannot at this time clarify the problems involved here, I shall leave the group as Walsingham left it. Although I realize that names of varieties have, under current nomenclatorial usage, no official standing, elimination of the names given by Walsingham from this list would further



obfuscate the situation and would result in a loss of identity of the information assembled for them. I have, therefore, let them stand as Walsingham used them, and I leave the solution of the problems involved to a future generation or to a time when additional specimens can be assembled for study.

**Hyposmocoma (Euperissus) chilonella percondita** Walsingham (figs. 882, moth; 1056, male genitalia; 1249, female genitalia).

*Hyposmocoma chilonella* variety *percondita* Walsingham, 1907b:638, pl. 24, fig. 19.

Endemic. Kauai, Hawaii (type locality: Kilauea).

Hostplant: unknown, but presumed to be dead wood.

The only places where this form has been reported are at opposite ends of the main island group. I collected at light, at Kokee, Kauai, specimens of what appeared to be this form, but more study of specimens from the two localities is required.

**Hyposmocoma (Euperissus) chilonella triocellata** Walsingham (figs. 787, palpus; 883, moth; 1055, 1057, 1058, male genitalia; 1231, female genitalia).

*Hyposmocoma chilonella* variety *triocellata* Walsingham, 1907b:637, pl. 24, fig. 16.

*Hyposmocoma ocellata*, misspelling by Swezey, 1929:300.

Endemic. Kauai, Oahu, Molokai (type locality: about 4,000 feet), Hawaii.

Hostplants: *Cheirodendron*, *Hibiscus*, *Pipturus*, *Pittosporum*, *Rubus hawaiiensis*, *Wikstroemia*.

Parasite: *Scleroderma* species.

The whitish larvae have been found boring in dead wood.

I am not sure that this form has such an extensive range as recorded. Certain differences are observable in the genitalia of the few examples studied, but I do not know how to evaluate them. See figures 1057 and 1058, for example. Sibling species may be involved in the complex.

**Hyposmocoma (Euperissus) chilonella venosa** Walsingham (figs. 883, moth; 1059, male genitalia; 1231, female genitalia).

*Hyposmocoma chilonella* variety *venosa* Walsingham, 1907b:638, pl. 24, fig. 18.

Endemic. Kauai (type locality: 3,000 to 4,000 feet), Molokai, Hawaii.

Hostplant: *Wikstroemia*.

The whitish larvae bore in dead wood.

As figure 1059 demonstrates, there are differences between the male genitalia of the holotype from Kauai and a paratype from Molokai. Are these differences more than individual? Here, again, sibling species may be involved. Detailed studies of long series of specimens from different localities are required before such problems can be solved.

**Hyposmocoma (Euperissus) chloraula** Meyrick (figs. 824, wing venation; 884, moth; 1058, male genitalia).

*Hyposmocoma chloraula* Meyrick, 1928c:103.

Endemic. Kauai (type locality: Summit Camp).

Hostplant: *Astelia*.

The larva is a borer in dead stems. This species, an ally of *fulvida*, is noteworthy because it has a lily as its hostplant.

**Hyposmocoma (Euperissus) cleodorella** (Walsingham), **new combination** (figs. 780, palpus; 810, wing venation; 885, moth; 1005, male genitalia).

*Neelysia cleodorella* Walsingham, 1907b:535, pl. 17, fig. 3.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) columbella** (Walsingham), **new combination** (figs. 818, wing venation; 886, moth; 1017, male genitalia, abdomen).

*Aphthonetus columbella* Walsingham, 1907b:521, pl. 16, fig. 4.

Endemic. Molokai (type locality: above 3,000 to 4,000 feet).

Hostplant: unknown.

The female studied had such a decomposed abdomen that it was impossible to make a preparation worthy of illustration.

**Hyposmocoma (Euperissus) complanella** (Walsingham), **new combination** (figs. 780, palpus; 811, wing venation; 887, moth; 1006, male genitalia).

*Neelysia complanella* Walsingham, 1907b:546, pl. 17, fig. 25.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

Two males only are known.

**Hyposmocoma (Euperissus) confusa** (Walsingham), **new combination** (figs. 888, moth; 1017, male genitalia, abdomen).

*Aphthonethus confusa* Walsingham, 1907b:523, pl. 16, fig. 8.

Endemic. Maui (type locality: Olinda, 4,000 feet).

Hostplant: unknown.

I have only seen the unique male holotype.

**Hyposmocoma (Euperissus) coprosmae** (Swezey), **new combination** (figs. 889, moth; 996, male genitalia; 1198, female genitalia).

*Semnoprepia coprosmae* Swezey, 1920b:382.

Endemic. Oahu (type locality: Malamalama, Mt. Konahuanui).

Hostplant: *Coprosma longifolia*.

Parasite: *Scleroderma semnoprepiae* Bridwell.

The larvae of this genus [*Semnoprepia*] are elongate and whitish and usually feed in dead wood: but the larvae of this species were found in the live wood and were quite abundant in the trees of the locality. The injury by them caused dead places in the tree trunks and branches, and a very rough, gnarled appearance where the growing of the tree had partially overgrown the injuries. Pieces of branches containing larvae were brought in, and the moths issued November 20 to December 14 [the branches had been collected on October 8, 1916]. A series of 18 *Sclerodermus semnoprepia* Bridwell also issued from this material, and cutting up [sic] some of the wood, it was demonstrated that this parasite had bred on the larvae. . . . (Swezey, 1920b:382-383.)

**Hyposmocoma (Euperissus) corticolor** (Walsingham), **new combination** (figs. 819, wing venation; 890, moth; 1018, male genitalia).  
*Aphthonetus corticolor* Walsingham, 1907*b*:519, pl. 15, fig. 27.

Endemic. Maui (type locality: Olinda, 4,000 feet).

Hostplant: unknown.

Dr. Swezey (1910*f*:114) reported that he had collected one specimen of this species in the Waianae Mountains of Oahu, but, not having confirmed the determination, I have not accepted his record.

**Hyposmocoma (Euperissus) cristata** (Butler), **new combination** (figs. 760, head, wing venation; 892, moth; 792, 995, male genitalia; 1224, female genitalia).

*Euperissus cristatus* Butler, 1881:402, fig. 1. Walsingham 1907*b*:643, 735, pl. 24, fig. 26. The type-species of *Euperissus*.

Endemic. Oahu (type locality: mountains near Honolulu; the Blackburn field code number is 81.7 over 72), Molokai, Hawaii.

Hostplant: *Freycinetia* ("ieie").

This species is often abundant. The slender, white larvae bore in the pith of the dead stems, and pupation takes place within the burrows. Its true distribution is unknown.

See the details above under the discussion of the name *Euperissus* where there are notes on some of the characters of this fine species. See also the discussion under the similar species *fulvogrisea* below.

**Hyposmocoma (Euperissus) cryptogamiella** (Walsingham), **new combination** (figs. 770, head and wing venation; 792, 991, 992, male genitalia; 893, moth; 1214, female genitalia).

*Hyperdasys cryptogamiellus* Walsingham, 1907*b*:642, pl. 24, fig. 25. The type-species of *Hyperdasys*.

*Hyperdasyyella cryptogamiella* (Walsingham) Fletcher, 1940:18. The type-species of *Hyperdasyyella*, a replacement name for *Hyperdasys*, a homonym.

Endemic. Kauai, Oahu, Molokai, Lanai, Hawaii (type locality: Olaa, holotype male; Kilauea, allotype female).

Hostplants: *Acacia koa*, *Clermontia*, *Lantana*, *Metrosideros*, *Sophora*.

The larvae are naked stem-borers.

I have not confirmed the widespread distribution and hostplant range reported for this species. A comparative study of specimens from various localities remains to be done.

**Hyposmocoma (Euperissus) cuprea** (Walsingham), **new combination** (figs. 780, palpus; 811, wing venation; 893, moth; 1006, male genitalia; 1220, female genitalia).

*Neelysia cuprea* Walsingham, 1907*b*:532, pl. 16, fig. 27.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) diffusa** (Walsingham), **new combination** (figs. 764, head, wing venation; 894, moth; 1019, male genitalia, abdomen; 1216, female genitalia).

*Aphthonetus diffusa* Walsingham, 1907b:527, pl. 16, fig. 19. The type-species of *Aphthonetus*.

Endemic. Kauai, Maui (type locality: Olinda, 4,000 feet).

Hostplant: unknown.

Walsingham described this species from a series of 25 specimens: one from Maui and 24 from Kauai. I do not know what led him to select the single Maui example as the holotype and to designate the long series of Kauai specimens as paratypes instead of selecting a holotype and an allotype from Kauai. He did not designate a female type. Walsingham's action was unfortunate, because *diffusa* is the type-species of *Aphthonetus*. It would appear logical to have firmly established the type-species on the good series of Kauai specimens. I believe that there may be reason to doubt that the Kauai specimens are exactly the same as the Maui holotype. There appear to be some slight differences in the male genitalia, and the basal parts of the processes on the seventh tergite differ. This problem must be given attention in the future.

**Hyposmocoma (Euperissus) digressa** (Walsingham), **new combination** (figs. 819, wing venation; 894, moth; 1018, male genitalia, abdomen).

*Neelysia digressa* Walsingham, 1907b:522, pl. 16, fig. 6.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

I have not seen a female.

**Hyposmocoma (Euperissus) discolor** Walsingham (figs. 781, palpus; 895, moth; 1234, female genitalia).

*Hyposmocoma discolor* Walsingham, 1907b:633, pl. 24, fig. 9.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

Only the female holotype is known.

**Hyposmocoma (Euperissus) divergens** (Walsingham), **new combination** (figs. 785, palpus; 895, moth; 1018, male genitalia).

*Aphthonetus divergens* Walsingham, 1907b:520, pl. 16, fig. 2.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

This moth is known only from the male holotype. Walsingham considered it to be "nearly allied to *corticicolor*". This is not true; the species belong to different species groups.

**Hyposmocoma (Euperissus) dorsella** Walsingham (figs. 783, palpus; 897, moth; 1069, male genitalia).

*Hyposmocoma dorsella* Walsingham, 1907b:605, 734, pl. 22, fig. 7.

Endemic. Oahu (type locality: Waianae Mountains, 3,000 feet).

Hostplant: unknown.

Dr. Swezey (1913:236) recorded this species from a single specimen taken at light at Kilauea, Hawaii in August, 1911. Although I have not studied the specimen, I have deleted Hawaii from the distribution of this species because it is probable that an error in identification was made. The moth was described from one male from the Mt. Kaala region of Oahu, and Walsingham (1907:734) later recorded it from the northwest Koolau Mountains of Oahu.

**Hyposmocoma (Euperissus) ekaha** Swezey (figs. 772, head, wing venation; 778, palpus; 897, moth; 1030, male genitalia; 1212, female genitalia).

*Hyposmocoma ekaha* Swezey, 1910*d*:105, pl. 3, figs. 3, 4.

*Euhyposmocoma ekaha* (Swezey) Swezey, 1913*f*:277. Type-species of *Euhyposmocoma*.

*Euhyposmocoma akaha* Swezey, 1915*d*:67, misspelling.

*Euhyposmocoma asplenii* (Meyrick manuscript) T. B. Fletcher, 1929:89.

Endemic. Oahu (type locality: Halawa Valley).

Hostplant: *Asplenium nidus* ("ekaha", bird's nest fern).

Parasite: *Coccygomimus punicipes* (Cresson) [= *Ephialtes hawaiiensis* (Cameron)].

"This moth occurs wherever the fern is found in the mountain valleys of Oahu." (Swezey, 1954:86) The larvae "feed on the under surface of the frond, leaving the upper epidermis intact, which dries and gives the frond the appearance of having numerous dead patches. The older larvae also bore into the rachis, and each has a tunnel of silk and frass extending out onto the frond to its feeding place. It apparently hides in the bored rachis except when out feeding." (Swezey, 1910*d*:105.)

Dr. Swezey described the larva and pupa as follows (1910*d*:106):

The full-grown larva is pale yellowish; head pale yellowish brown, eyes black; cervical shield pale yellow; tubercles brownish, "ii" [D2] a little farther apart dorsally than "i" [D1], "iii" [SD1] above spiracle, "iv + v" [L1-L2] below spiracle; setae pale brown; spiracles concolorous.

Pupae were found in the rachis, also in a pendant portion of the silken tunnel which was on surface of frond. The pupa is 8 mm.; medium brown; antenna-, wing- and leg-cases extend to about middle of 6th abdominal segment, attached throughout; spiracles a little elevated by the segments being slightly bulging conically at the sides; a cluster of hooked bristles at cremaster fastened into silk of cocoon.

Although Dr. Swezey stated clearly in his description of *Euhyposmocoma* that this species, *ekaha*, is the type-species of the genus, T. B. Fletcher, in his well-known list of the generic names of the Microlepidoptera (1929:89), gives *asplenii* Meyrick as the type-species of *Euhyposmocoma*. I called Fletcher's attention to this in 1941, and he replied that he had obtained the name *asplenii* from a manuscript of Meyrick, and he said that "Meyrick would have considered the vernacular name 'ekaha' as barbarous and non-classical and renamed the species *asplenii*, which was an unpublished ms. name, until, most unfortunately, I published it in my list (where it was, of course, merely a *nomen nudum*)." It was the common practice of Meyrick to rename species when he did not consider that the names given were classically correct.

The only other species included in Swezey's *Euhyposmocoma* was *trivittella*. The vestiture of the labial palpi of these two species is unusually expanded, as illustrated, and these species are thus easily identified. They form a species group but not a separate genus.

**Hyposmocoma (Euperissus) elegans** (Walsingham), **new combination** (figs. 816, wing venation; 897, moth; 1020, male genitalia, abdomen).  
*Aphthonetus elegans* Walsingham, 1907b: 530, pl. 16, fig. 23.

Endemic. Maui (type locality: Olinda, Haleakala, 4,000 feet).

Hostplant: unknown.

The female is unknown.

**Hyposmocoma (Euperissus) eleuthera** (Walsingham), **new combination** (figs. 785, palpus; 817, wing venation; 898, moth; 1216, female genitalia).

*Aphthonetus eleuthera* Walsingham, 1907b: 522, pl. 16, fig. 7.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

Only two females are known.

**Hyposmocoma (Euperissus) emendata** Walsingham (figs. 833, wing venation; 898, moth; 1069, male genitalia; 1234, female genitalia).

*Hyposmocoma emendata* Walsingham, 1907b: 587, pl. 20, fig. 28.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) empetra** (Meyrick), **new combination** (figs. 785, palpus; 817, wing venation; 899, moth, 1020, male genitalia; 1199, female genitalia).

*Aphthonetus empetra* Meyrick, 1915a: 399.

Endemic. Oahu (type locality: Koolau Mountains)

Hostplant: unknown.

**Hyposmocoma (Euperissus) enixa** Walsingham (figs. 833, wing venation; 900, moth; 1071, male genitalia).

*Hyposmocoma enixa* Walsingham, 1907b: 586, pl. 20, fig. 24.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

The female is unknown. Walsingham correctly associated the species with *adolescens*, but it is not allied to *fulvida* with which he also compared it.

**Hyposmocoma (Euperissus) ensifer** Walsingham (figs. 834, wing venation; 900, moth; 1069, male genitalia).

*Hyposmocoma ensifer* Walsingham, 1907b: 588, pl. 21, fig. 1.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

Only males have been seen.

**Hyposmocoma (Euperissus) epicharis** Walsingham (figs. 787, palpus; 900, moth).

*Hyposmocoma epicharis* Walsingham, 1907*b*:639, pl. 24, fig. 20.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

This large, beautifully yellow moth is known only from the female holotype, the abdomen of which has been lost.

**Hyposmocoma (Euperissus) erebogramma** (Meyrick), **new combination** (fig. 901, moth).

*Neelysia erebogramma* Meyrick, 1935*a*:64.

Endemic. Oahu (type locality: Kahuku).

Hostplant: *Hesperomannia*.

The unique male holotype, now in the Bishop Museum, has lost its abdomen. Meyrick said that the head is dark fuscous, but he failed to note that the face is white—only the dorsum of the head is dark. The white penultimate segment of the labial palpus contrasts sharply with the dark terminal segment.

**Hyposmocoma (Euperissus) erismatias** Meyrick (figs. 901, moth; 1072, male genitalia; 1235, female genitalia).

*Hyposmocoma erismatias* Meyrick, 1928*c*:102.

Endemic. Oahu (type locality: Nuuanu).

Hostplant: *Euphorbia*.

The larvae are stem borers. The holotype is now in the Bishop Museum.

**Hyposmocoma (Euperissus) exaltata** (Walsingham), **new combination** (figs. 780, palpus; 811, wing venation; 902, moth; 1007, male genitalia; 1220, female genitalia).

*Neelysia exaltata* Walsingham, 1907*b*:542, pl. 17, fig. 17.

Endemic. Maui (type locality: Haleakala, probably in the Olinda Forest region).

Hostplant: unknown.

Walsingham originally labeled this species as a *Hyposmocoma*, but he described it in *Neelysia*.

See the discussion of the metapleural brushes under *mactella* below.

**Hyposmocoma (Euperissus) exornata** Walsingham (figs. 834, wing venation; 902, moth; 1073, male genitalia; 1235, female genitalia; col. pl. 5:6).

*Hyposmocoma exornata exornata* Walsingham, 1907*b*:550, pl. 18, fig. 4.

Endemic. Hawaii (type locality: Kona, 4,000 feet, male holotype; Kilauea, female allotype).

Hostplant: unknown.

See the comments under *flavicosta* below; the latter may represent a form of *exornata*.

**Hyposmocoma (Euperissus) exsul** (Walsingham), **new combination** (figs. 785, palpus; 819, wing venation; 903, moth; 1021, male genitalia; 1216, female genitalia).

*Aphthonetus exsul* Walsingham, 1907b:526, pl. 16, fig. 16.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

One would conclude from the original description that the type series contained only females, because only the female is mentioned by Walsingham. Both sexes are, however, represented.

Walsingham wrongly supposed this species to be allied to *subocellata*, but the species belong to different subgenera. Walsingham also stated that it was allied to *Aphthonetus "suffusa"*, but there was no *Aphthonetus "suffusa"* described. This was a *lapsus calami* for some other species name.

**Hyposmocoma (Euperissus) falsimella** Walsingham (figs. 903, moth; 1074, male genitalia).

*Hyposmocoma falsimella* Walsingham, 1907b:606, pl. 22, fig. 9.

Endemic. Maui (type locality: Haleakala, above 5,000 feet).

Hostplant: unknown.

This moth is known only from the male holotype. Walsingham wrongly considered this species and *fallacella* to be close associates, but *falsimella* belongs to *Euperissus* and *fallacella* belongs to *Hyposmocoma sensu stricto*. The species are thus far removed from one another in relationship. Walsingham said that *falsimella* "is closely allied to *fallacella*, from which it differs essentially in lacking the subcostal hair-pencil and in its darker palpi." He could not, of course, have arrived at such a conclusion had he studied the genitalia or understood the significance of the different vestiture on the vannus of the hindwing.

**Hyposmocoma (Euperissus) ferruginea** (Swezey), **new combination** (figs. 904, moth; 997, male genitalia).

*Semnoprepia ferruginea* Swezey, 1915e:94.

Endemic. Oahu (type locality: Mt. Olympus).

Hostplant: *Cheirodendron*.

This moth is a large, beautiful, orange-brown species whose palpi are very long and slender and may be curved up over the head to reach the tegulae. The unique male holotype is in the Bishop Museum.

Dr. Swezey found the whitish larvae boring in dead twigs and branches. He described the pupa as follows (1915e:94): "12 mm.; pale reddish brown; antenna-sheaths, wing-sheaths and posterior leg-sheaths extend to near the apex of 5th abdominal segment; segments 4, 5 and 6 movable; cremaster blunt, with 6 or 8 hooked bristles."

**Hyposmocoma (Euperissus) flavicosta** (Walsingham), **new status** (figs. 902, moth; 1073, male genitalia).

*Hyposmocoma exornata* variety *flavicosta* Walsingham, 1907b:551, pl. 18, fig. 5.

Endemic. Hawaii (type locality: Kilauea).



Hostplant: unknown.

This form may represent only a color variety of *exornata* as Walsingham originally described it. There are, however, differences in the male genitalia that indicate that it may be a distinct species. Only one male of each form has been examined, and, pending further study of additional specimens, I have tentatively chosen to consider it a species instead of a synonym.

**Hyposmocoma (Euperissus) fluctuosa** (Walsingham), **new combination** (figs. 784, palpus; 820, wing venation; 906, moth; 1021, male genitalia; col. pl. 6:4).

*Aphthonetus fluctuosa* Walsingham, 1907b:519, pl. 15, fig. 28.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

The female is unknown.

**Hyposmocoma (Euperissus) fractivittella** Walsingham (figs. 907, moth; 1236, female genitalia).

*Hyposmocoma* (?) *fractivittella* Walsingham, 1907b:593, pl. 21, fig. 11.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Walsingham noted that in the forewings of the unique female holotype veins 4 and 5 are stalked, and he considered that this species "probably belongs to a new genus" for that reason. He also said, "It would be unwise to found a new genus in this group on a single [female] which may be merely of abnormal structure." This species, of course, does not represent a distinct genus.

**Hyposmocoma (Euperissus) fugitiva** (Walsingham), **new combination** (figs. 820, wing venation; 907, moth; 1015, abdomen; 1022, male genitalia, abdomen).

*Aphthonetus fugitiva* Walsingham, 1907b:518, pl. 15, fig. 25.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

The female is unrecorded.

**Hyposmocoma (Euperissus) fulvida** Walsingham (figs. 781, palpus; 835, wing venation; 908, moth; 1078, 1079, male genitalia; 1207, 1237, female genitalia).

*Hyposmocoma fulvida* Walsingham, 1907b:608, pl. 22, fig. 14.

Endemic. Kauai, Molokai (type locality: between 3,000 and 4,000 feet).

Hostplant: unknown.

This moth is an ally of *chloraula*. Also, see the notes under *ochreovittella*. It is not an ally of *ocellata* as Walsingham thought. It is possible that it is rather widely distributed, although now we know it only from the two islands. It belongs to the group that has the strongly sclerotized ductus ejaculatorius (see figure 1079). It has a modest cluster of very long hair on the metapleuron beneath the posterior axis of the hindwing.

**Hyposmocoma (Euperissus) fulvocervina** Walsingham (figs. 783, palpus; 836, wing venation; 908, moth; 1080, male genitalia; 1237, female genitalia).

*Hyposmocoma fulvocervina* Walsingham, 1907b:610, pl. 22, fig. 19.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) fulvogrisea** (Walsingham), **new combination** (figs. 771, head and wing venation; 793, 996 male genitalia; 908, moth; 1198, female genitalia).

*Semnoprepia fulvogrisea* Walsingham, 1907b:644, pl. 24, fig. 27. Type-species of *Semnoprepia*.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

I have deleted the records for this species from Oahu because I am not sure that the Oahu specimens belong to the same species as the Kauai holotype. Dr. Swezey recorded it from Oahu where he found what he considered to be larvae of this species boring in the dead flower stalk of *Pritchardia*, in dead leaf sheaths of bamboo, and in dead *Pelea*.

There appear to be only slight differences between the male genitalia of this species and those of *cristata*, and it is extraordinarily similar to *cristata* in color pattern. However, the hindwing of the male *fulvogrisea* does not have the dense fringe of hairs and long scales along the posterior margin of the cell from the base to vein 2 on the dorsal surface but this structure is strongly developed on *cristata*. Also, whereas the mass of hair on the hindwing between veins 1a and 1c is comparatively short on *fulvogrisea*, it is conspicuously long and extends across vein 2 on *cristata*.

**Hyposmocoma (Euperissus) fuscudentata** (Walsingham), **new combination** (figs. 780, palpus; 812, wing venation; 909, moth).

*Neelysia fuscudentata* Walsingham, 1907b:534, pl. 17, fig. 2.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

Only two females of this species are known.

**Hyposmocoma (Euperissus) fuscifusa** (Walsingham), **new combination** (figs. 780, palpus; 812, wing venation; 909, moth; 1006, male genitalia; 1220, female genitalia).

*Neelysia fuscifusa* Walsingham, 1907b:538, pl. 17, fig. 9.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) fuscopurpurata** Zimmerman, **new name, new combination** (figs. 909, moth; 998, male genitalia).

*Semnoprepia fuscopurpurea* Swezey, 1915e:94.

Endemic. Oahu (type locality: Mt. Olympus).

Hostplant: unknown.

The merging of *Semnoprepia* and *Hyposmocoma* makes necessary the replacement of Swezey's name *fuscopurpurea*, which is preoccupied in *Hyposmocoma* by the *fuscopurpurea* of Walsingham.

The male holotype is now in Bishop Museum.

**Hyposmocoma (Euperissus) hirsuta** (Walsingham), **new combination** (figs. 785, palpus; 820, wing venation; 912, moth; 1216, female genitalia).  
*Aphthonetus hirsuta* Walsingham, 1907b:528, pl. 16, fig. 19.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Only two females are known.

**Hyposmocoma (Euperissus) homopyrrha** (Meyrick), **new combination** (figs. 866, wing venation; 912, moth; 1198, female genitalia).

*Phthoraula homopyrrha* Meyrick, 1935a:65. Type-species of *Phthoraula*.

Endemic. Oahu (type locality: Nuuanu).

Hostplant: *Metrosideros*.

The unique type specimen was bred by Dr. Swezey from a larva found in dead wood. It is now in the Bishop Museum.

The labial palpi are very long and slender and curve up far above the top of the head. Measured along their greatest chords (on the female holotype), segment two equals five units, and segment three (terminal) equal 6.5 units compared with the height of the eye which is 2.1 units. The terminal segment is almost needlelike.

Meyrick erected the generic name *Phthoraula* for this species principally because of the loss of vein 8 (7?) in the forewings of the unique holotype. Although this character is unusual, it is not of generic importance in this instance. As we now know, the wing venation is subject to great variation and instability in *Hyposmocoma*. Additional information concerning this species is given above under *Phthoraula* in the discussion of the generic synonyms of *Hyposmocoma*.

**Hyposmocoma (Euperissus) humerella** (Walsingham), **new combination** (figs. 785, palpus; 821, wing venation; 913, moth; 1022, male genitalia; 1217, female genitalia).

*Aphthonetus humerella* Walsingham, 1907b:528, pl. 16, fig. 20.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) incongrua** (Walsingham), **new combination** (figs. 780, palpus; 817, wing venation; 915, moth; 1008, male genitalia).

*Neelysia incongrua* Walsingham, 1907b:546, pl. 17, fig. 27.

Endemic. Maui (type locality: Haleakala, 5,000 to 6,000 feet).

Hostplant: unknown.

The abdomen of the allotype female was so decomposed that it was impossible to make a usable slide preparation of the genitalia (BM slide 7725).

**Hyposmocoma (Euperissus) inflexa** Walsingham (figs. 779, palpus; 915, moth; 1087, male genitalia).

*Hyposmocoma inflexa* Walsingham, 1907*b*:632, pl. 24, fig. 7.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

Only the male holotype is known. It has a long, heavy brush on each metapleuron beneath the posterior axis of each hindwing and a small cluster of long hair on the anterior margin.

**Hyposmocoma (Euperissus) insinuatix** Meyrick (figs. 838, wing venation; 916, moth; 1091, male genitalia).

*Hyposmocoma insinuatix* Meyrick, 1928*c*:103.

Endemic. Molokai (type locality: Kainalu, 2,000 to 3,000 feet).

Hostplant: *Smilax sandwicensis*.

The larvae bore in the dead wood; no case is made. The species was described from two males. The holotype is in the Bishop Museum.

**Hyposmocoma (Euperissus) jugifera** Meyrick (figs. 917, moth; 1091, male genitalia).

*Hyposmocoma jugifera* Meyrick, 1928*c*:102.

Endemic. Oahu (type locality: Mt. Tantalus).

Hostplants: *Acacia koa*, *Pelea*.

The larvae bore in dead wood; no case is formed.

The male holotype is now in the Bishop Museum, and there are only fragments of one example in the Meyrick collection in the British Museum.

**Hyposmocoma (Euperissus) kauaiensis** (Walsingham), **new combination** (figs. 785, palpus; 821, wing venation; 918, moth; 1023, male genitalia; 1217, female genitalia).

*Aphthonetus kauaiensis* Walsingham, 1907*b*:518, pl. 15, fig. 26.

Endemic. Kauai (type locality: Halemanu, 4,000 feet).

Hostplant: unknown.

Walsingham considered this species to be allied to *mediocris*, but the moths belong to different species groups.

Dr. Swezey recorded this species from Oahu and Maui, but his data are based upon misidentifications. His Oahu material may be designated as new species 14.

**Hyposmocoma (Euperissus) new species 14** (fig. 1023, male genitalia).

*Aphthonetus* species misidentified as *kauaiensis* by Swezey, 1910*e*:139; 1954:6.

Endemic. Oahu (and Maui?).

Hostplant: *Acacia koa*.

Dr. Swezey said that he found the species on Oahu and Maui. I have not studied specimens from Maui and cannot confirm that the species ranges to Maui.

Dr. Swezey first mentioned the larval habit of this species in 1910*e*:139

(there listed as *kauaiensis*), and in 1954:6 he said, "This tiny moth has been reared from the phyllodes of koa. The larvae feed at the tips of new phyllodes where they are folded by webbing to produce a hiding place for the larvae, which occur singly. . . . The rearing records are from koa on Oahu and Maui."

**Hyposmocoma (Euperissus) latiflua** Meyrick (figs. 11-A, *d*, antenna; 781, palpus; 804, 806, pupa; 838, wing venation; 919, moth; 1094, male genitalia; 1202, female genitalia).

*Hyposmocoma latiflua* Meyrick, 1915a:344. Swezey, 1932:201, pl. 13, fig. 6.

Endemic. Oahu (type locality: Koolau Mountains, above Honolulu).

Hostplant: *Pittosporum cauliflorum*.

Dr. Swezey (1932:201) said:

This species was described from a single specimen collected by Perkins in the Koolau Mts., about 1900 or 1901. [this is an error; the holotype male was collected in 1908]. It was not rediscovered until 26 specimens were reared from larvae found by the writer feeding on leaves of *Pittosporum cauliflorum* on the ridge leading up to Puu Kalena, Waianae Mts., Oahu, December 29, 1929. The larvae were feeding singly on the under surface of the leaves beneath a frass-covered web. The upper surface of the epidermis was left intact and showed as a dead spot in the leaf. Pupation took place in a cocoon in the same place where larva fed. The pupa is brown, about 5 mm. long; the wing and antenna sheaths extend to apex of 7th abdominal segment; cremaster rounded obtuse, with 8 erect hooked bristles on dorsal part.

The female has two signa in the bursa copulatrix. The male has a long brush of hair from the posterior margin of each metapleuron beneath the posterior axis of the wing and a small cluster of hair on each metapleuron beneath the anterior axis of the hindwing. Compare *fulvida* and associates which have the ductus ejaculatorius heavily sclerotized.

**Hyposmocoma (Euperissus) lichenalis** (Walsingham), **new combination** (figs. 785, palpus; 816, wing venation; 920, moth; 1203, female genitalia).

*Aphthonetus lichenalis* Walsingham, 1907b:522, pl. 16, fig. 5.

Endemic. Lanai (type locality: 2,000 feet).

Hostplant: unknown.

The female holotype has lost its abdomen. Only two females are known.

**Hyposmocoma (Euperissus) lignicolor** (Walsingham), **new combination** (figs. 767, head and wing venation; 793, male genitalia; 921, moth; 1008, male genitalia; 1221, female genitalia).

*Neelysia lignicolor* Walsingham, 1907b:533, pl. 17, fig. 1. The type-species of *Neelysia*.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

The extensive type series requires detailed study; it is possible that more than one species is involved.

**Hyposmocoma (Euperissus) limata** Walsingham (figs. 922, moth; 1096, male genitalia).

*Hyposmocoma limata* Walsingham, 1907b:568, pl. 19, fig. 12.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Euperissus) longitudinalis** Walsingham (figs. 786, palpus; 924, moth; 1208, 1242, female genitalia; 1354, wing venation; col. pl. 5:8).

*Hyposmocoma longitudinalis* Walsingham, 1907*b*:636, pl. 24, fig. 14.

Endemic. Hawaii (type locality: allotype male, Kona, 4,000 feet; holotype female, Kaawaloa, Kona, 2,000 feet).

Hostplant: unknown.

This species was originally described as occurring on Oahu (two specimens), Molokai (one specimen), and Hawaii (four specimens), but from the material I have seen, I now restrict it to the type island of Hawaii. Unfortunately, the male allotype has lost its abdomen, and I have not seen the male genitalia. An examination of the male genitalia of the two paratypes from Oahu reveals a distinct species (BM slide 5437) which has long spurs on the valvae and a strong pseuduncus. A male paratype from Molokai (BM slide 5436) represents a third species; it lacks genital valvae spurs and the pseuduncus. One of these species is designated as new species 20 in *Hyposmocoma sensu stricto*, and the other placed in *Euperissus* as new species 21.

The three species, *longitudinalis* and new species 20 and 21, have a distinctive color pattern (which is also shared by some other species), and at first sight it would appear that they are all the same species, as Walsingham and Durrant considered them. When one examines the color patterns carefully, however, subtle differences are revealed, but with such a small series of specimens (seven) now available for study it is almost impossible to determine from an examination of the color patterns alone whether the external differences observable are individual or specific. Astonishingly, although the series of specimens from the different islands were all considered to belong to one species, not only are there at least three species involved, but the type series includes species representing both subgenera as I have divided the genus *Hyposmocoma*. The true *longitudinalis* from the island of Hawaii belongs to *Euperissus* as does the Molokai new species 21, but the Oahu new species 20 is a well-developed member of *Hyposmocoma sensu stricto*.

**Hyposmocoma (Euperissus) new species 21** (figs. 789, 1106, male genitalia).

*Hyposmocoma* species confused with the paratypes of *longitudinalis* by Walsingham, 1907*b*:636 (BM slide 5436, male genitalia).

Endemic. Molokai (above 3,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) lugens** Walsingham (figs. 925, moth; 1094, male genitalia; 1242, female genitalia).

*Hyposmocoma lugens* Walsingham, 1907*b*:586, pl. 20, fig. 25.

Endemic. Maui (type locality: 5,000 feet).

Hostplant: unknown.

This is, as the male genitalia demonstrate, a member of the typical *Neelysia* subgroup although it was originally placed incorrectly by Walsingham. There is a cluster of long hairs on each metapleuron, but they do not form long brushes.

**Hyposmocoma (Euperissus) lunifer** Walsingham (figs. 925, moth; 1243, female genitalia).

*Hyposmocoma lunifer* Walsingham, 1907b:584, pl. 20, fig. 20.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

Only the female is known.

**Hyposmocoma (Euperissus) mactella** (Walsingham), **new combination** (figs. 780, palpus; 812, wing venation; 927, moth; 1009, male genitalia; 1221, female genitalia).

*Neelysia mactella* Walsingham, 1907b:545, pl. 17, fig. 23.

Endemic. Kauai (type locality: 3,000 to 4,000 feet), Oahu, Molokai.

Hostplant: unknown.

The male has a strongly developed brush on each metapleuron just beneath the base of the wing. These brushes cross over the middle of the dorsum of the abdomen to end between a large mass of greatly enlarged abdominal scales which arise from each side of the abdomen and overlap the middle of the abdomen. It may appear at times that the hairs of the brushes end in huge scalelike lobes. The same structures are found in other species that were originally described in *Neelysia*, such as *exaltata*, *argyresthiella*, and probably also on *poeciloceros* and *tischeriella* which have the thoracic brushes. I have seen none of these with intact abdomens, and, although they probably do, I cannot be positive that the enlarged abdominal scales occur on the two latter species. A rather similar development occurs on *Euperissus brevistrigata*, but the abdominal scales are not so enlarged. See also *Euperissus ochreovittella*. The metapleural brushes and the enlarged abdominal scales do not occur on the following species which were also described in *Neelysia*: *agnetella*, *anthinella*, *cleodorella*, *cuprea*, *lignicolor*, *paltodorella*, and *tigrina*.

The male genital tegumen has a dorsal thickening of the sclerotization which suggests a tendency toward the development of a dorsal flange such as that found on *subaurata*, but it is different from the uncuslike process of *subaurata*.

The above-mentioned characters appear to be correlated with differences in the male genitalia and wing shape. For example, *mactella* has a narrowly pointed hindwing and vein 2 is missing from the forewing (other species also have the same characters). However, *agnetella* and associated species have hindwings that are more broadly rounded apically, and vein 2 is partly present in the forewings. *Euperissus brevistrigata* has sharply pointed hindwings, but vein 2 in the forewing is fully developed. These features require detailed study, and no doubt they will be of use in developing a key to the species of this huge assemblage.

The spermatophore (BM slide 7723) is long and wirelike and about twice the length of the corpus bursae.

**Hyposmocoma (Euperissus) maestella** Walsingham (figs. 786, palpus; 843, wing venation; 927, moth; 1117, male genitalia; 1243, female genitalia).

*Hyposmocoma maestella* Walsingham, 1907b:610, pl. 22, fig. 18.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) malacopa** Meyrick (figs. 781, palpus; 838, wing venation; 928, moth; 1118, male genitalia).

*Hyposmocoma malacopa* Meyrick, 1915a:343.

Endemic. Oahu (type locality: Koolau Mts.)

Hostplant: unknown.

I have seen, in the British Museum, only the two male specimens originally described by Meyrick. The metapleura appear to lack brushes.

**Hyposmocoma (Euperissus) margella** (Walsingham), **new combination** (figs. 784, palpus; 929, moth; 999, male genitalia).

*Semnoprepia margella* Walsingham, 1907b:645, pl. 25, fig. 1.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Euperissus) mediocris** (Walsingham), **new combination** (figs. 821, wing venation; 930, moth; 1015, 1024, abdomen; 1024, male genitalia; 1217, female genitalia).

*Aphthonetus mediocris* Walsingham, 1907b:517, pl. 15, fig. 24.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) mormopica** (Meyrick), **new combination** (fig. 934, moth).

*Neelysia mormopica* Meyrick, 1935a:64.

Endemic. Oahu (type locality: Punaluu).

Hostplant: unknown.

The unique female holotype, now in the Bishop Museum, has lost its abdomen.

**Hyposmocoma (Euperissus) municeps** (Walsingham), **new combination** (figs. 780, palpus; 934, moth; 1221, female genitalia).

*Neelysia municeps* Walsingham, 1907b:537, pl. 17, fig. 7.

Endemic. Kauai, Maui (type locality: Olinda, 4,000 feet).

Hostplant: unknown.

This moth has been recorded thus far only from the widely separated islands of Kauai and Maui. I presume that it occurs on other islands, unless a group of similar-appearing sibling species is involved. The male is evidently not represented in collections. Until males from the several islands are studied little more can be said regarding the populations.

**Hyposmocoma (Euperissus) mystodoxa** Meyrick (figs. 776, wing venation; 781, palpus; 935, moth; 1125, male genitalia).

*Hyposmocoma mystodoxa* Meyrick, 1915a:344.

Endemic. Oahu (type locality: Koolau Mountains, near Honolulu).

Hostplant: unknown.

This moth was described from two males (now in the British Museum).



**Hyposmocoma (Euperissus) nipholoncha** Meyrick (figs. 939, moth; 1204, female genitalia).

*Hyposmocoma nipholoncha* Meyrick, 1935a:66.

Endemic. Oahu (type locality: Mt. Tantalus).

Hostplant: *Euphorbia*.

The naked larvae are stem-borers.

Only two specimens of this species are known: the female holotype, now in the Bishop Museum, and a paratype which has lost its abdomen.

Meyrick said that the head is snow-white. He failed to note that this applies only to the dorsal aspect. Laterally, in front of the eyes, and on the lower part of the face the squamae are golden brown in sharp contrast to the dorsal white scaling. Meyrick said that the tegulae are dark brownish fuscous, but I would call them brown.

**Hyposmocoma (Euperissus) niveiceps** Walsingham (figs. 939, moth; 1139, male genitalia; col. pl. 6:1).

*Hyposmocoma niveiceps* Walsingham, 1907b:583, pl. 20, fig. 18.

Endemic. Molokai, Lanai (type locality: 2,000 to 3,000 feet).

Hostplant: unknown.

I have only seen males.

**Hyposmocoma (Euperissus) obliterated** Walsingham (figs. 779, palpus; 941, moth; 1142, male genitalia; 1247, female genitalia).

*Hyposmocoma obliterated* Walsingham, 1907b:601, pl. 21, fig. 27.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

The male has a long, dark-tipped brush from the anterior corner of each metapleuron.

**Hyposmocoma (Euperissus) obscura** Walsingham (figs. 849, wing venation; 941, moth; 1142, male genitalia; 1247, female genitalia).

*Hyposmocoma obscura* Walsingham, 1907b:609, pl. 22, fig. 16.

Endemic. Maui (type locality: Olinda, Haleakala, 4,000 feet).

Hostplant: unknown.

The male does not have a long brush on the metapleuron.

**Hyposmocoma (Euperissus) ocellata** Walsingham (figs. 849, wing venation; 941, moth; 1143, male genitalia; 1248, female genitalia).

*Hyposmocoma ocellata* Walsingham, 1907b:586, pl. 20, fig. 26.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

Walsingham wrongly allied this species to *fulvida*, to which it cannot be closely associated. It belongs with *adolescens* and associates.

**Hyposmocoma (Euperissus) ochreovittella** Walsingham (figs. 781, palpus; 850, wing venation; 943, moth; 1144, male genitalia).

*Hyposmocoma ochreovittella* Walsingham, 1907b:606, pl. 22, fig. 10. (In *Fauna Hawaiiensis*, a misprint refers to pl. 12 instead of 22.)

I have not seen the female. The ventral surface of the male forewing bears a heretofore overlooked, remarkable, thornlike process developed from vein 3 (see figure 776). I assume this to be a character confined to the males. The thorn is a less developed form of the even more astonishing structure found on the singular *Euperissus sordidella*. See the expanded discussion under that species.

**Hyposmocoma (Euperissus) nemo** (Walsingham), **new combination** (figs. 785, palpus; 936, moth; 1025, male genitalia).

*Aphthonetus nemo* Walsingham, 1907b:526, pl. 16, fig. 15.

Endemic. Maui (type locality: 5,000 feet).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Euperissus) nemoricola** (Walsingham), **new combination** (figs. 781, palpus; 936, moth; 1009, male genitalia; 1221, female genitalia).

*Neelysia nemoricola* Walsingham, 1907b:544, pl. 17, fig. 21.

Endemic. Molokai (type locality: forest above Pelekunu).

Hostplant: unknown.

The type pair bear labels that indicate that Walsingham originally considered this moth to be a *Hyposmocoma*, although he described it in *Neelysia*.

**Hyposmocoma (Euperissus) nigrodentata** Walsingham (figs. 848, wing venation; 938, moth; 1140, male genitalia; 1247, female genitalia).

*Hyposmocoma nigrodentata* Walsingham, 1907b:600, pl. 21, fig. 26.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

The metapleura of the males examined are abraded, but they appear to lack brushes.

**Hyposmocoma (Euperissus) ningorella** (Walsingham), **new combination** (figs. 782, palpus; 938, moth; 1010, male genitalia; 1222, female genitalia; 1354, wing venation).

*Neelysia ningorella* Walsingham, 1907b:543, pl. 17, fig. 20.

Endemic. Maui (type locality: Haleakala, 5,000 feet or above).

Hostplant: unknown.

The holotype male has a brush of long hairs on the thorax beneath each hindwing. It bears a "*Hyposmocoma*" label, thus indicating that Walsingham changed his mind regarding its generic assignment in his final arrangement of the group.

**Hyposmocoma (Euperissus) ningorifera** (Walsingham), **new combination** (figs. 813, wing venation; 939, moth; 1010, male genitalia).

*Neelysia ningorifera* Walsingham, 1907b:540, pl. 17, fig. 14.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

The abdomen of the female allotype is lost.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

The male has a long, strong, conspicuous, yellow brush which arises from the metathorax at the posterior axil of each hindwing. This brush extends to the fifth abdominal segment. There is also a cluster of long scales on the anterior margin of the metapleuron. The female has a shorter tuft which extends hardly beyond the apex of the coxa. These structures show plainly in figure 943. There are no enlarged squamae on the abdomen (see the discussion under *mactella* above). Walsingham said, "The limbal hair-pencil arises on the upper side of the wing but is sometimes folded underneath; this structure does not occur in *fulvida*, *quadripunctata* and *vicina*, three allied species, which it is difficult otherwise to distinguish from *ochreovittella*." It would appear that Walsingham mistakenly thought that the yellow metapleural brushes belonged to the hairy area on the dorsal vannal surface of the hindwing. See the discussion under *mactella* above.

I have not seen the female genitalia. The female allotype has lost its abdomen. The paratypes are all males.

**Hyposmocoma (Euperissus) oculifera** Walsingham (figs. 850, wing venation; 943, moth; 1145, male genitalia).

*Hyposmocoma oculifera* Walsingham, 1907b:551, pl. 18, fig. 6.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Only males have been seen.

**Hyposmocoma (Euperissus) ossea** Walsingham (figs. 851, wing venation; 943, moth; 1145, male genitalia).

*Hyposmocoma ossea* Walsingham, 1907b:595, pl. 21, fig. 16.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

Two males only are known.

**Hyposmocoma (Euperissus) pallidipalpis** Walsingham (fig. 944, moth).

*Hyposmocoma pallidipalpis* Walsingham, 1907b:591, pl. 21, fig. 8.

Endemic. Molokai (type locality: about 4,000 feet).

Hostplant: unknown.

The unique male holotype has lost its abdomen.

**Hyposmocoma (Euperissus) palmifera** (Meyrick), **new combination** (figs. 944, moth; 1011, male genitalia; 1222, female genitalia; 1354, wing venation).

*Neelysia palmifera* Meyrick, 1935a:63.

Endemic. Oahu (type locality: Pauoa Flats), Hawaii?

Hostplants: *Acacia koa* (in branches affected with rust galls), *Pteralyxia* (in dead twigs), *Sophora tomentosa* (in old pods), *Wikstroemia* (holotype from dead wood).

The Hawaii records are from *Acacia* and *Sophora* as determined by Dr. Swezey. He also reared what he determined to be this moth from *Pteralyxia* in Haleauau Valley, Waianae Mountains, Oahu. I have not examined this material.

The holotype is now in the Bishop Museum.

**Hyposmocoma (Euperissus) palmivora** Meyrick (figs. 863, wing venation; 924, moth; 1248, female genitalia).

*Hyposmocoma palmivora* Meyrick, 1928c:104.

Endemic. Kauai (type locality: Kumuwela, 4,000 feet).

Hostplant: *Pritchardia eriophora*.

The naked larvae were found by Dr. Swezey "feeding amongst the abundant yellowish cottony tomentum on undersides of leaves. . . ." (Meyrick, 1928:104.)

A female paratype (Busck slide 136) has 13 veins in the forewing—veins 3 and 4 are connate and 5 and 5' are connate. The moth was described from a series of eight females; I have not seen the male. The holotype is now in the Bishop Museum.

**Hyposmocoma (Euperissus) paltodorella** (Walsingham), **new combination** (figs. 813, wing venation; 945, moth; 1011, male genitalia; 1222, female genitalia).

*Neelysia paltodorella* Walsingham, 1907b:537, pl. 17, fig. 8.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) passerella** (Walsingham), **new combination** (figs. 785, palpus; 947, moth; 1025, male genitalia).

*Aphthonetus passerella* Walsingham, 1907b:520, pl. 16, fig. 1.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Only the holotype male was found.

**Hyposmocoma (Euperissus) petalifera** (Walsingham), **new combination** (figs. 813, wing venation; 948, moth; 1011, male genitalia; 1205, female genitalia).

*Neelysia petalifera* Walsingham, 1907b:541, pl. 17, fig. 8.

Endemic. Maui (type locality: Olinda, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) petroptilota** (Walsingham), **new combination** (figs. 786, palpus; 807, wing venation; 949, moth; 1000, 1001, male genitalia).

*Semnoprepia petroptilota* Walsingham, 1907b:645, pl. 24, fig. 28.

Endemic. Kauai, Oahu, Maui, Hawaii (type locality: Kilauea).

Hostplants: dead wood of *Metrosideros* and *Pelea*.

The type series includes only males. I have not studied specimens from all

of the islands from which this moth has been recorded, and I am not sure that only one species is involved in the records. It was described from Hawaii and Maui, and Dr. Swezey reported it from Oahu and Kauai. The hostplant records may also be subject to question, because they apply to material collected on islands other than the type island of Hawaii. The species may, however, be widely distributed over the islands.

Dr. Swezey (1910e:141) found the naked white larvae of "*Semnoprepia*" *fulvogrisea*, *petroptilota*, "*Euperissus*" *cristatus*, and "*Hyposmocoma*" *chilonella*, all of which feed in dead wood, to be "quite similar".

**Hyposmocoma (Euperissus) phantasmatella** Walsingham (figs. 950, moth; 1250, female genitalia; 1353, wing venation).

*Hyposmocoma phantasmatella* Walsingham, 1907b:595, pl. 21, fig. 15.

Endemic. Kauai (type locality: holotype male, 3,000 to 4,000 feet; allotype, Kaholuamano, 4,000 feet).

Hostplant: unknown.

The male holotype has lost its abdomen, and I did not have another male to illustrate the all-important male genitalia.

**Hyposmocoma (Euperissus) philocharis** (Meyrick), **new combination** (figs. 783, palpus; 951, moth; 993, male genitalia).

*Hyperdasys philocharis* Meyrick, 1915a:344.

*Hyperdasyyella philocharis* (Meyrick) T. B. Fletcher, 1940:18.

Endemic. Oahu (type locality: Koolau Mountains, near Honolulu).

Hostplant: unknown.

Meyrick (1915a:344) said, "Neither in this species nor in typical *cryptogamiellus* do I see any 'limbal hairpencil' as described. I may add that the 'limbus' as defined and employed by Walsingham and Durrant is in my view merely the dorsum, neither more nor less; the great variation in form of the hindwings sometimes obscures the original triangular form, which is essentially identical with that of the forewings." Meyrick did not fully understand the structure Walsingham referred to, and his criticism displays this lack of understanding. Walsingham's "limbal" area is the anal or vannal area (see the discussion of *Euperissus* above where the synonymy of the old generic names in this group is considered).

I have seen only the unique male holotype which is in the British Museum.

**Hyposmocoma (Euperissus) pittospori** (Swezey), **new combination** (figs. 952, moth; 999, male genitalia).

*Semnoprepia pittospori* Swezey, 1920b:382.

*Diplosara pittospori* (Swezey) Swezey, 1954:169.

Endemic. Oahu (type locality: Kuliouou).

Hostplant: *Pittosporum*.

Parasite: *Scleroderma semnoprepiae* Bridwell.

I do not know why Dr. Swezey used *Diplosara* for this species in his 1954 report. He said, "This species has been collected only as larvae in dead wood of *Pittosporum* at Kuliouou Valley, Oahu; adults were reared."

**Hyposmocoma (Euperissus) plumbifer** (Walsingham), **new combination** (figs. 785, palpus; 952, moth; 1025, male genitalia).

*Aphthonetus plumbifer* Walsingham, 1907*b*:524, pl. 16, fig. 10.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

This moth was described from a unique male—I have seen no other specimens.

**Hyposmocoma (Euperissus) pluviella** (Walsingham), **new combination** (figs. 780, palpus; 814, wing venation; 952, moth; 1223, female genitalia).

*Neelysia pluviella* Walsingham, 1907*b*:540, pl. 17, fig. 13.

Endemic. Molokai (type locality: about 4,000 feet).

Hostplant: unknown.

This moth is known from only two females.

**Hyposmocoma (Euperissus) poeciloceras** (Walsingham), **new combination** (figs. 784, palpus; 814, wing venation; 953, moth; 1011, male genitalia; 1223, female genitalia).

*Neelysia poeciloceras* Walsingham, 1907*b*:542, pl. 17, fig. 18.

Endemic. Maui (type locality: Haleakala, 4,000 feet, allotype male; 5,000 feet, holotype female).

Hostplant: unknown.

Walsingham originally labeled this species as a *Hyposmocoma*, but he described it as a *Neelysia*.

**Hyposmocoma (Euperissus) polia** (Walsingham), **new combination** (figs. 785, palpus; 821, wing venation; 953, moth; 1026, male genitalia, abdomen; 1199, female genitalia).

*Aphthonetus polia* Walsingham, 1907*b*:525, pl. 16, fig. 13.

Endemic. Kauai (type locality: holotype male, 3,000 to 4,000 feet; allotype female, Halemanu, 4,000 feet).

Hostplant: unknown.

The detached abdomen supposedly of the female allotype was found in a gelatin capsule. In such an instance there is always the possibility that an error in association has been made so that caution is advised.

**Hyposmocoma (Euperissus) praefracta** (Meyrick), **new combination** (figs. 822, wing venation; 953, moth; 1217, female genitalia).

*Aphthonetus praefracta* Meyrick, 1935*a*:63.

Endemic. Kauai (type locality: Kumuwela).

Hostplant: unknown.

I have not seen the male genitalia of this species. The holotype (now in the Bishop Museum) and the two paratypes in Honolulu are females. The one specimen in the Meyrick collection in the British Museum has lost its abdomen.

**Hyposmocoma (Euperissus) pritchardiae** (Swezey), **new combination**  
(figs. 954, moth; 1002, male genitalia; 1213, female genitalia).

*Bubaloceras pritchardiae* Swezey, 1933b:303.

Endemic. Kauai (type locality: Kumuwela).

Hostplant: *Pritchardia eriophora*.

Swezey observed the larvae "feeding in the abundant fulvous cottony tomentum, with which the spathe and other parts of inflorescence . . . is clothed. The moths are about the color of this cottony substance." The holotype is now in the Bishop Museum.

**Hyposmocoma (Euperissus) psaroderma** (Walsingham), **new combination** (figs. 780, palpus; 955, moth).

*Neelysia psaroderma* Walsingham, 1907b:536, pl. 17, fig. 6.

Endemic. Oahu (type locality: Waianae Mountains, 3,000 feet).

Hostplant: unknown.

The unique male holotype has lost its abdomen.

**Hyposmocoma (Euperissus) pucciniella** Walsingham (figs. 853, wing venation; 956, moth; 1156, male genitalia; 1250, female genitalia).

*Hyposmocoma pucciniella* Walsingham, 1907b:589, pl. 21, fig. 4.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

**Hyposmocoma (Euperissus) puncticiliata** (Walsingham), **new combination** (figs. 785, palpus; 816, wing venation; 956, moth; 1026, male genitalia, abdomen; 1218, female genitalia).

*Aphthonetus puncticiliata* Walsingham, 1907b:529, pl. 16, fig. 21.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) punctifumella** Walsingham (figs. 956, moth; 1156, male genitalia).

*Hyposmocoma punctifumella* Walsingham, 1907b:584, pl. 20, fig. 19.

Endemic. Maui (type locality: Olinda, 4,000 feet).

Hostplant: unknown.

This is a strikingly marked species. Only the male holotype is known.

**Hyposmocoma (Euperissus) quadripunctata** Walsingham (figs. 957, moth; 1251, female genitalia; 1353, wing venation).

*Hyposmocoma quadripunctata* Walsingham, 1907b:607, pl. 22, fig. 11.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

The male holotype has lost its abdomen.

**Hyposmocoma (Euperissus) quadristriata** Walsingham (fig. 958, moth).*Hyposmocoma quadristriata* Walsingham, 1907b:581, pl. 20, fig. 11.

Endemic. Molokai (type locality: about 4,500 feet).

Hostplant: unknown.

The unique male holotype has lost its abdomen.

**Hyposmocoma (Euperissus) radiatella** Walsingham (figs. 854, wing venation; 959, moth; 1156, 1158, male genitalia; 1209, 1251, female genitalia).*Hyposmocoma radiatella* Walsingham, 1907b:634, 735; pl. 24, fig. 11.

Endemic. Kauai, Oahu, Molokai, Hawaii (type locality: Kona, 4,000 feet, allotype male; 3,000 feet, holotype female).

Hostplant: unknown.

There may be a complex of similar forms included under this name. My study of the few available specimens has been inconclusive, and further investigations of series of specimens from the various islands are required.

**Hyposmocoma (Euperissus) rediviva** (Walsingham), **new combination** (figs. 814, wing venation; 959, moth; 1012, male genitalia; 1223, female genitalia).*Neelysia rediviva* Walsingham, 1907b:543, pl. 17, fig. 6.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet, holotype male; mountains 3,000 to 4,000 feet, female allotype).

Hostplant: unknown.

Walsingham originally labeled this species as a *Hyposmocoma*, but he described it in *Neelysia*. Note the strong, specialized setae on the costal margins of the male genital valvae which may indicate a trend in the direction of the *Hyposmocoma sensu stricto* developments.**Hyposmocoma (Euperissus) repandella** (Walsingham), **new combination** (figs. 815, wing venation; 959, moth; 1012, male genitalia; 1223, female genitalia).*Neelysia repandella* Walsingham, 1907b:536, pl. 17, fig. 5.

Endemic. Molokai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) roseofulva** Walsingham (figs. 784, palpus; 854, wing venation; 960, moth; 1159, male genitalia; 1209, 1252, female genitalia).*Hyposmocoma roseofulva* Walsingham, 1907b:611, pl. 22, fig. 21.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

This moth has an unusually long, slender, distal labial palpal segment; it is longer than the remainder of the palpus (figure 784). It would appear that Walsingham considered this species to be allied to *carnea*. However, it belongs to *Euperissus*; *carnea* is a member of *Hyposmocoma sensu stricto*.



**Hyposmocoma (Euperissus) rotifer** (Walsingham), **new combination**  
(figs. 780, palpus; 960, moth; 1205, female genitalia).

*Neelysia rotifer* Walsingham, 1907b:539, pl. 17, fig. 11.

Endemic. Molokai (type locality: 3,000 feet).

Hostplant: unknown.

The unique holotype is a female, not a male as stated in the original description.

**Hyposmocoma (Euperissus) rusius** Walsingham (figs. 779, palpus; 961, moth; 1161, male genitalia).

*Hyposmocoma rusius* Walsingham, 1907b:614, pl. 22, fig. 28.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

Only the male holotype is known. Although this species was originally placed in *Hyposmocoma*, its male genitalia indicate that it is a member of the typical *Neelysia* group. There is a cluster of long hairs on the anterior dorsal corner of each metapleuron, but they do not form a long brush.

**Hyposmocoma (Euperissus) rutilella** (Walsingham), **new combination**  
(figs. 765, head, wing venation; 962, moth; 1162, male genitalia).

*Rhinomactrum rutilellum* Walsingham, 1907b:531, pl. 16, fig. 25. Type-species of *Rhinomactrum*.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Only the male holotype is known. It appears not to have any metapleural brushes.

**Hyposmocoma (Euperissus) sagittata** (Walsingham), **new combination**  
(figs. 785, palpus; 822, wing venation; 963, moth; 1027, male genitalia, abdomen; 1218, female genitalia).

*Aphthonetus sagittata* Walsingham, 1907b:530, pl. 16, fig. 24.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) scandens** Walsingham (figs. 856, wing venation; 964, moth; 1169, male genitalia; 1253, female genitalia; col. pl. 6:5).

*Hyposmocoma scandens* Walsingham, 1907b:609, pl. 22, fig. 17.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) scepticella** Walsingham (figs. 781, palpus; 856, wing venation; 965, moth; 1168, male genitalia; 1253, female genitalia).

*Hyposmocoma scepticella* variety *scepticella* Walsingham, 1907b:590, pl. 21, fig. 6.

*Hyposmocoma scepticella* variety *dubia* Walsingham, 1907b:590, pl. 21, fig. 5.

**New synonym.** (Figs. 965, moth; 1168, male genitalia).

Endemic. Maui (type locality: Olinda, 4,000 feet).  
Hostplant: unknown.

Walsingham separated three examples with differences in color pattern under the varietal name *dubia*. These specimens came from the same area as the type series of *scepticella*. A separate name does not appear to be required for the color form. When a larger series of specimens is examined, it may be found that the species is more variable than is shown by the few specimens in the type series. Hence, I have reduced the name *dubia* to synonymy.

**Hyposmocoma (Euperissus) sciurella** (Walsingham), **new combination** (figs. 966, moth; 1013, male genitalia).

*Neelysia sciurella* Walsingham, 1907b:546, pl. 17, fig. 26.

Endemic. Maui (type locality: Olinda, 4,000 feet).  
Hostplant: unknown.  
Only the male holotype is known.

**Hyposmocoma (Euperissus) semifuscata** Walsingham (figs. 759, 857, head, wing venation; 967, moth; 1168, male genitalia; 1254, female genitalia).

*Hyposmocoma semifuscata* Walsingham, 1907b:589, pl. 21, fig. 3.

Endemic. Hawaii (type locality: Kona, above 2,000 feet to 4,000 feet).  
Hostplant: unknown.

**Hyposmocoma (Euperissus) semiusta** (Walsingham), **new combination** (figs. 770, wing venation; 786, palpus; 968, moth; 993, male genitalia; 1214, female genitalia).

*Hyperdasys semiustus* Walsingham, 1907b:640, pl. 24, fig. 22.

*Hyperdasyyella semiusta* (Walsingham) Fletcher, 1940:18.

Endemic. Oahu, Kauai (type locality: 3,000 to 4,000 feet).  
Hostplant: rotten wood of *Acacia koa*.

This moth was described from Kauai only. The Oahu record and the hostplant record are those of Dr. Swezey.

**Hyposmocoma (Euperissus) sideroxyloni** (Swezey), **new combination** (figs. 822, wing venation; 969, moth; 1027, male genitalia; 1218, female genitalia).

*Aphthonetus sideroxyloni* Swezey, 1932:200, pl. 13, fig. 7.

Endemic. Oahu (type locality: ridge above Puu Peahinaia, Koolau Mountains).

Hostplant: *Pouteria (Sideroxylon) sandwicensis*.

Dr. Swezey found the larvae feeding "on the under surface of the leaf protected by a frass-covered web."

On a slide preparation of a male paratype (figure 822; Busck slide 153), vein 5 is missing in the hindwing. Thus, the hindwing has only seven veins, and the cell appears open between veins 4 and 7. The forewing has the typical venation of the *Aphthonetus* group, but the abdomen of the male lacks the caudal processes of the *Aphthonetus* group.

The holotype is now in the Bishop Museum.

**Hyposmocoma (Euperissus) sordidella** (Walsingham), **new combination** (figs. 775, head, wing venation; 777, wing process; 971, moth, male genitalia; 972, male genitalia).

*Stigmatophora? sordidella* Walsingham, 1907b:516, pl. 15, fig. 23.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

This extraordinary species displays one of the most singular characters yet to be reported on the wings of Lepidoptera. On the forewing vein 3 has become free from the membrane and has been developed as an astonishing thornlike process which protrudes from the scaling on the underside of the wing (see figures 775 and 777). Most unfortunately, this remarkable species is known only from two male specimens collected by Dr. Perkins in June, 1894. Evidently none have been collected since. Additional specimens of both sexes are required to enable its proper elucidation. At present, we cannot tell whether the thornlike process on the forewing is confined to the male or whether the female has an indication of such a process. I believe that it will be found to be a sexual character confined to the male. Walsingham overlooked the organ, although he called attention to "a small tuft of raised scales at the end of the cell." What is the function of this peculiar structure?

The venation is shown in figure 775. It will be noted that the cell in the forewing is unusually narrow. In the hindwings the discocellulars (the transverse veins closing the distal end of the cell) are obsolescent, and the apex of the cell is thus ill defined (at least in this one specimen). Veins 4 and 5 are evidently fused (or one has been lost), and there are therefore only seven veins in the hindwing. A similar condition is found on (*Aphthonetus*) *sideroxyloxi*. These details are probably at least in part confined to the male, and they may be subject to considerable individual variation. The venation is, however, of the basic "*Aphthonetus*" type.

The male genitalia are of the type found in the "*Aphthonetus*" *exsul* or "*Rhinomactrum*" subgroup of *Euperissus* species and demonstrate the close affinity of this noteworthy species to its Hawaiian associates in this subgroup.

It might be considered that *sordidella* represents a distinctive new genus if one were familiar only with existing literature. But when the moth is studied with a knowledge of the astonishing structural radiation in *Hyposmocoma* as a whole, one can only conclude that this species displays one of the extremes of sexual modification in a bewildering species swarm. This conclusion is strengthened when (*Euperissus*) *mystodoxa* is studied. In that species the same vein in the forewing of the male demonstrates a similar but less advanced form of modification (figure 776). The wings of *mystodoxa* are much more generalized than are the more highly modified wings of *sordidella*. Moreover, the male genitalia demonstrate that the two species belong to two species groups of *Euperissus*, and this reveals that the "thorns" on the forewings are independent developments. What other astounding modifications and developments may be revealed when we obtain a more complete knowledge of the magnificent Hawaiian fauna?

It is of interest to compare the different development on the forewings of male *Asymphorodes dimorpha* (figure 745).

**Hyposmocoma (Euperissus) spurcata** (Walsingham), **new combination** (figs. 785, palpus; 970, moth; 1029, male genitalia, abdomen).

*Aphthonetus spurcata* Walsingham, 1907b:523, pl. 16, fig. 9.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Euperissus) stigmatella** Walsingham (figs. 858, wing venation; 973, moth; 1175, male genitalia; 1255, female genitalia).

*Hyposmocoma stigmatella* Walsingham, 1907b:591, pl. 21, fig. 7.

Endemic. Molokai (type locality: above 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) subargentea** Walsingham (figs. 973, moth; 1176, male genitalia).

*Hyposmocoma subargentea* Walsingham, 1907b:596, pl. 21, fig. 18.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Euperissus) subaurata** (Walsingham), **new combination** (figs. 817, wing venation; 974, moth; 1013, male genitalia; 1224, female genitalia).

*Neelysia subaurata* Walsingham, 1907b:541, pl. 17, fig. 16.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

The male genitalia of this species are unusually divergent and appear abnormal for the group. There is an extraordinary reduction of the valvae, and they have become rather similar in form to the long, slender, right lobe of the anellus. On the tegumen there is an unusual, broad, flangelike, sclerotized process extending over the base of the left brachium in the form of a truncated, spatulate uncus. I have not noticed such a process elsewhere in *Hyposmocoma*, but an incipient stage of such a development may be evident on such species as *mactella* (figure 1009), for example. The wings are basically similar to *mactella*—the hindwings are sharply pointed and there is no remnant of vein 2 in the forewings. The aedeagus appears to be unusual. The eighth sternite and the attachment of the genital flaps are atypical as well.

Unfortunately, only one male is known. The slide mount of its genitalia was made before I examined the specimen, and I have been unable to make an adequate study of this strange species. The slide of the female genitalia is unsatisfactory, and I cannot ascertain the structure of various parts. It too, however, appears unusual for this group. Obviously, this divergent species requires much further study.

**Hyposmocoma (Euperissus) subburnea** (Walsingham), **new combination** (figs. 769, head, wing venation; 974, moth; 1002, male genitalia).

*Bubaloceras subburneum* Walsingham, 1907b:549, pl. 18, fig. 3. Type-species of *Bubaloceras*.

Endemic. Molokai (type locality: above 4,000 feet).

Hostplant: unknown.

This moth was described from the unique male holotype. The dilated basal antennal segment with its well-developed pecten led Walsingham to erect a new generic name for it. However, since the development of the first antennal segment and the pecten is subject to much variation in *Hyposmocoma*, this species should not be separated from its obvious allies.

**Hyposmocoma (Euperissus) sublimata** Walsingham (fig. 975, moth).

*Hyposmocoma sublimata* Walsingham, 1907b:568, pl. 19, fig. 13.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

Only the female holotype is known.

**Hyposmocoma (Euperissus) subnitida** Walsingham (figs. 787, palpus; 859, wing venation; 946, moth, paratype, color form; 975, moth, holotype; 1178, male genitalia; 1256, female genitalia).

*Hyposmocoma subnitida* Walsingham, 1907b:639, pl. 24, fig. 21.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

**Hyposmocoma (Euperissus) subocellata** (Walsingham), **new combination** (figs. 785, palpus; 822, wing venation; 976, moth; 1028, male genitalia, abdomen).

*Aphthonetus subocellata* Walsingham, 1907b:526, pl. 16, fig. 14.

Endemic. Maui (type locality: Haleakala, 4,000 to 5,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) subsericea** Walsingham (figs. 783, palpus; 976, moth; 1179, male genitalia).

*Hyposmocoma subsericea* Walsingham, 1907b:611, pl. 22, fig. 22.

Endemic. Kauai?, Molokai (type locality: 4,000 feet), Lanai?

Hostplant: unknown.

This moth was originally described from the male holotype from Molokai, one female from Lanai, one female from Kauai, and a male and one other specimen (which I have not examined) from Hawaii. The male paratype from Hawaii represents a distinct species, as my illustration demonstrates, and I have deleted Hawaii from the recorded range. I have also questioned the Kauai and Lanai records. The species from Hawaii confused with *subsericea* is listed tentatively below as new species 29.

**Hyposmocoma (Euperissus) new species 29** (fig. 1180, male genitalia).

*Hyposmocoma* species misidentified as a male paratype of *subsericea* by Walsingham, 1907b:611 (BM slide 7511).

Endemic. Hawaii (Kilauea).

Hostplant: unknown.

**Hyposmocoma (Euperissus) sudorella** Walsingham (figs. 860, wing venation; 977, moth; 1181, male genitalia; col. pl. 6:3).

*Hyposmocoma sudorella* Walsingham, 1907b:607, pl. 22, fig. 12.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

I have not seen the female. The metapleuron of the male has a modest cluster of long hair scales on the anterior margin. The species belongs to the *fulvida* group.

**Hyposmocoma (Euperissus) terminella** (Walsingham), **new combination** (figs. 780, palpus; 979, moth; 1014, male genitalia).

*Neelysia terminella* Walsingham, 1907b:547, pl. 18, fig. 1.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Euperissus) thermoxyla** Meyrick (figs. 783, palpus; 863, wing venation; 980, moth; 1186, male genitalia).

*Hyposmocoma thermoxyla* Meyrick, 1915a:343.

Endemic. Oahu (type locality: Koolau Mountains, near Honolulu).

Hostplant: unknown.

This moth was described from two males. I have not seen the female genitalia. The male metapleuron has a cluster of long hairs on the anterior margin.

**Hyposmocoma (Euperissus) tigrina** (Butler), **new combination** (figs. 767, wing venation; 780, palpus; 981, moth; 1014, male genitalia).

*Chrysoclista tigrina* Butler, 1881:406.

*Neelysia tigrina* (Butler) Walsingham, 1907b:533, pl. 16, fig. 28.

Endemic. Maui (type locality: Haleakala).

Hostplant: "beaten from 'Koa' trees on Haleakala" (Blackburn's field note).

**Hyposmocoma (Euperissus) tischeriella** (Walsingham), **new combination** (figs. 780, palpus; 815, wing venation; 982, moth; 1014, male genitalia; 1224, female genitalia).

*Neelysia tischeriella* Walsingham, 1907b:545, pl. 17, fig. 24.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Euperissus) trichophora** (Walsingham), **new combination** (figs. 785, palpus; 983, moth; 1029, male genitalia, abdomen).

*Aphthonetus trichophora* Walsingham, 1907b:524, pl. 16, fig. 11.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Only the male holotype is known. Walsingham said that this species is "closely allied to *plumbifer*, but separable by its more hairy tibiae and the absence of the black and chestnut markings." The species are not allied, however, and they belong to different species groups. This species has the true *Aphthonetus*-type abdominal processes on the male which are lacking on *plumbifer*.

**Hyposmocoma (Euperissus) tricincta** Walsingham (figs. 862, wing venation; 949, moth; 1188, male genitalia; 1258, female genitalia).

*Hyposmocoma tricincta* Walsingham, 1907*b*:588, pl. 21, fig. 2.

Endemic. Hawaii (type locality: Kona, 2,000 feet).

Hostplant: unknown.

The male allotype has lost its abdomen.

**Hyposmocoma (Euperissus) trilunella** Walsingham (figs. 862, wing venation; 983, moth; 1258, female genitalia).

*Hyposmocoma trilunella* Walsingham, 1907*b*:583, pl. 20, fig. 17.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

Only females of this species are known.

**Hyposmocoma (Euperissus) trivitella** (Swezey), **new combination** (figs. 985, moth; 1030, male genitalia).

*Euhypsocoma trivitella* Swezey, 1913*f*:278.

Endemic. Kauai (type locality: near the head of Grove Farm Ditch).

Hostplants: *Elaphoglossum reticulatum*, *Elaphoglossum gorgoneum*.

Parasites: *Echthromorpha agrestoria fuscator* (Fabricius), *Pnigalio externa* (Timberlake).

The larvae bore tunnels in the fern fronds. Dr. Swezey described the larva and pupa as follows (1913*f*:278):

Full-grown larva 8 mm.; dirty whitish yellow; head very pale brownish, much retracted into segment 2 [ = prothorax]; eyes dark brown; cervical shield concolorous; tubercles concolorous, "i" [D1] and "ii" [D2] almost in a longitudinal line, "iii" [SD1] close above spiracle and a little anterior of it, "iv-v" [L1-L2] below spiracles and farther from it than "iii" [SD1] is; setae long, pale; spiracles minute, circular, pale. . . .

Pupa 7 mm., light yellowish-brown; eyes black; wing-sheaths and antennae-sheaths extend to apex of seventh abdominal segment; a cluster of bristles at apex of abdomen hooked into silk cocoon. The pupa is formed within the mine in a slight cocoon covered with pellets of frass.

In 1954:86, Dr. Swezey reported that "they have been found only on the east side of the Kauai mountains, behind Lihue and along the summit camp trail."

There are two female specimens on the mount designated as type by Dr. Swezey. I designate the specimen figured herein as the lectotype and the second specimen on the mount as paralectotype.

I am indebted to the late T. Bainbrigg Fletcher who many years ago called my attention to the error in the construction of the specific name. Dr. Swezey meant to refer to the three vittae on the forewings, which he mentioned in his original description, and the name should have been spelled *trivittella*. It was originally spelled *trivitella*, which would refer to "three lives", and the name would have no meaning in this instance. I would prefer to correct the obvious spelling error, but Swezey repeated the misspelling in other publications, and evidently a correction now would not be acceptable under the Code.

The other species formerly associated with *trivitella* in *Euhypsocoma* is *ekaha* Swezey, and the distinctive palpi (see figures 772 and 778) set these two species apart from other *Hyposmocoma*. It is probable that there are undiscovered species in this complex.

**Hyposmocoma (Euperissus) unicolor** (Walsingham), **new combination** (figs. 987, moth; 994, male genitalia; 1214, female genitalia; 1353, wing venation).

*Hyperdasys unicolor* Walsingham, 1907b:642, pl. 24, fig. 24.

*Hyperdasylella unicolor* (Walsingham) Fletcher, 1940:18.

Endemic. Kauai?, Oahu?, Molokai (type locality: allotype male, above 4,500 feet; holotype female, forest above Pelekunu).

Hostplants: Dr. Swezey found what he considered to be larvae of this species in the dead wood of *Acacia koa*, *Alectryon*, *Bidens*, *Cheirodendron*, *Clermontia*, *Elaeocarpus bifidus*, *Freycinetia*, *Diospyros* (*Maba*), and *Wikstroemia*.

This species was described from one male and one female from Molokai. I have questioned Dr. Swezey's Kauai and Oahu records. I have not examined all of his specimens so that I do not know whether they all represent *unicolor* or whether more than one species is involved. All of the hostplant records are also Dr. Swezey's, and they may include details of more than one species.

**Hyposmocoma (Euperissus) veterella** (Walsingham), **new combination** (figs. 785, palpus; 988, moth; 1218, female genitalia).

*Aphthonetus veterella* Walsingham, 1907b:525, pl. 16, fig. 12.

Endemic. Kauai (type locality: Halemanu, 4,000 feet).

Hostplant: unknown.

Only the female holotype is known.

**Hyposmocoma (Euperissus) vicina** Walsingham (figs. 865, wing venation; 989, moth; 1193, male genitalia; 1210, 1259, female genitalia).

*Hyposmocoma vicina* Walsingham, 1907b:607, pl. 22, fig. 13.

Endemic. Oahu (type locality: Waianae Mountains, 1700 feet).

Hostplant: the type series was taken on the trunks of "more or less decayed" *Acacia koa*.

The male has a small yellow brush on the metapleuron beneath the anterior axil of the hindwing.

**Hyposmocoma (Euperissus) new species 35.**

Endemic. Hawaii (Kipuka Ki).

Hostplant: *Sapindus*.

I have seen a series of specimens reared from the bark of the hostplant by C. J. Davis and K. Kawamura which appear to represent a new species in the "*Aphthonetus*" group of *Euperissus*.

Subgenus **HYPOSMOCOMA** Butler, *sensu stricto*

*Hyposmochoma* Butler, 1881:399. Type-species: *Hyposmochoma Blackburnii* Butler, 1881:400, monotypic. Walsingham, 1907b:549.

*Hyposmocoma*: Walsingham, 1907b:549, emendation (see p. 1079). See Zimmerman, 1969, and Melville, 1971, regarding the emendation.

*Diplosara* Meyrick, 1883a:35. Type-species: *Scardia lignivora* Butler, 1879b:273, monotypic. Walsingham, 1907b:646. **New synonym.**

*Agonismus* Walsingham, 1907b:512. Type-species: *Agonismus flavipalpis* Walsing-



ham, 1907b:512, by original designation. **New synonym.**

*Petrochroa* Busck, 1914b:104. Type-species: *Petrochroa swezeyi* Busck, 1914b:105, by original designation. **New synonym.**

For a summary of the characters of this group, see the key to subgenera on p. 1221.

**Hyposmocoma (Hyposmocoma) abjecta** (Butler) (figs. 823, wing venation; 867, moth; 1032 (was this specimen correctly identified?) male genitalia; 1226, female genitalia).

*Laverna abjecta* Butler, 1881:404.

*Hyposmocoma abjecta* (Butler) Walsingham, 1907b:559, 734, pl. 18, fig. 22.

Endemic. Oahu (type locality: none given in the original description. The Blackburn code numbers on the holotype are "77.43", and beneath the card there is what appears to be "L" or "1" over "48"; Butler refers to this in his original description as "No. 48". Could the 48 be an error for 43? Perhaps the "77.43" refers to the 43rd species captured in 1877).

Hostplants: dead *Freyinetia* "and other sticks".

The larva forms "a regular elongate oblong-oval, brown case covered with frass and bits of rotten wood." (Swezey, 1910e:140.)

There may be some confusion regarding this species. It was described from one female whose place of capture remains unknown to me because I lack a key to the Blackburn code numbers. However, one specimen collected by Blackburn bears another code that indicates Oahu, and another Blackburn specimen bears a very small label bearing a ruled "+" mark on the upper and lower surfaces. This could be an early reference to the Waianae Mountains, but it is not the code Blackburn usually used for specimens collected in the Waianae Mountains. Perhaps the small label does not refer to one of Blackburn's collecting areas. See Volume 6 of *Insects of Hawaii* for an explanation of one of the Blackburn codes.

The two specimens mentioned above are labeled "Blackburn 1899". This refers to the date when Meyrick obtained the specimens from Blackburn and not to their date of capture. Blackburn left Hawaii in 1882. Meyrick gave the specimens to Walsingham for inclusion in *Fauna Hawaiiensis*.

Walsingham, in *Fauna Hawaiiensis*, included three specimens taken by Perkins at 2,000 feet in the Waianae Mountains. My figure of the male genitalia is from a specimen collected by Swezey on Pacific Heights in the Koolau Mountains behind Honolulu. I have not compared the moth, from which the genitalia were removed, with the holotype. Dr. Swezey's observations were probably made in the Koolau Mountains. I have compared specimens, including their male genitalia, from the Waianae Mountains and the Koolau Mountains, and they appear to be the same. They all have a short subcostal brush on the hindwing. However, another specimen in the British Museum series, wrongly determined by Durrant as *abjecta*, and collected by Dr. Perkins in the northwest Koolau Mountains, July, 1901, (Walsingham specimen 29138), has a long, heavy, cream-colored, subcostal brush on the hindwing—it represents a different species.

**Hyposmocoma (Hyposmocoma) adjacens** (Walsingham), **new status** (figs. 884, moth; 1196, female genitalia).

*Hyposmocoma cincta* variety *adjacens* Walsingham, 1907b:567, pl. 19, fig. 8.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Only the female holotype is known. Although this form appears to be closely related to *cincta*, there are differences between the one female of this species and the unique female holotype of *cincta*. This leads me to consider that there are probably two species involved instead of a species and a "variety" as described by Walsingham. Additional specimens, including males, are required to enable a firm decision to be made.

**Hyposmocoma (Hyposmocoma) admirationis** Walsingham (figs. 823, wing venation; 867, moth; 1033, male genitalia).

*Hyposmocoma admirationis* Walsingham, 1907b:580, pl. 20, fig. 10.

Endemic. Molokai (type locality: above 3,000 to 4,000 feet).

Hostplant: unknown.

This belongs to a cluster of species that includes *albonivea*, *alveata*, *carbonenotata*, *hygroscopta*, *irregularis*, probably *oxyptera*, *persimilis*, *propinqua*, *somatodes*, *subscolopax*, *tetraonella*, *torella*, *trimaculata*, and *turdella*. Although *alveata* is typical of this species group within *Hyposmocoma sensu stricto*, it was described by Meyrick as a *Neelysia*, which belongs to subgenus *Euperissus*.

**Hyposmocoma (Hyposmocoma) advena** Walsingham (figs. 868, moth; 1226, female genitalia).

*Hyposmocoma advena* Walsingham, 1907b:569, pl. 19, fig. 14.

Endemic. Molokai (type locality: 4,000 feet).

Hostplant: unknown.

Only the female holotype is known.

**Hyposmocoma (Hyposmocoma) albifrontella** Walsingham (figs. 869, moth; 1035, male genitalia).

*Hyposmocoma albifrontella* Walsingham, 1907b:565, pl. 19, fig. 5.

Endemic. Molokai (type locality: about 4,000 feet).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Hyposmocoma) albonivea** Walsingham (figs. 825, wing venation; 869, moth; 1015, abdomen; 1036, male genitalia; 1227, female genitalia).

*Hyposmocoma albonivea* Walsingham, 1907b:599, pl. 21, fig. 23.

Endemic. Oahu (type locality: Waianae Mountains).

Hostplant: unknown.

This species was described from one female. Dr. Swezey found the male, and it lacks a subcostal brush on the hindwing. I have compared moths collected by Dr. Swezey with the holotype, and they are closely similar. I include a figure of the male genitalia from one of his specimens collected at Punaluu in the Koolau Mountains.

The female genitalia are unusual and are similar to those of *carbonenotata*, for example. The ovipositor is very short, and it has an unusual T-shaped or Y-shaped dorsal sclerite at the apex (such a structure is also found in *alveata*, *carbonenotata*, *hygroscopa*, *persimilis*, and probably other members of the *admirationis* group). See *admirationis* for a list of allied species.

**Hyposmocoma (Hyposmocoma) alliterata** Walsingham (figs. 801, larval case; 826, wing venation; 870, moth; 1037, 1038 male genitalia; 1226, female genitalia; col. pl. 7: 7).

*Hyposmocoma alliterata* Walsingham, 1907b: 600, 734, pl. 21, fig. 25.

Endemic. Oahu, Molokai (type locality: above 3,000 to 4,000 feet), Maui, Hawaii.

Hostplants: feeds amongst lichens on trees trunks of *Acacia koa*, *Aleurites moluccana*, *Boehmeria*, *Manihot glaziovii* (ceara rubber), *Prosopis*, *Sophora*.

Parasite: *Euderus metallicus* (Ashmead).

This species is thought to range from the lowlands to the highlands, where it is most abundant. Its larvae are at times common on the trunks of living trees. "Larvae in a broad, flat, rounded-oval case coming to a point in front. The case really is not so broad, but has a broad extension on sides and rear made of a single layer of round bits of epidermis from the bark, forming a mosaic of the coloration of the bark of the tree on which it lives, and thus not seen by the casual observer" (Swezey, 1910e:140). Swezey (1954:6) describes the "broad extension" on the case as an "extending flange" and notes that this flange distinguishes the case from that of *empedota*. A cluster of sibling species may be confused here.

**Hyposmocoma (Hyposmocoma) alveata** (Meyrick), **new combination** (figs. 780, palpus; 809, wing venation; 870, moth; 1003, male genitalia; 1219, female genitalia).

*Neelysia alveata* Meyrick, 1915a: 339.

Endemic. Oahu [type locality: Koolau Mountains (Mt. Tantalus area?)]

Hostplant: unknown.

Unlike the species placed originally in *Neelysia*, this species has three long spurs near the apices of the valvae. It was erroneously associated with the *Neelysia* group which belong to subgenus *Euperissus*. In the forewings, vein 2 is strong, but vein 6 is weak. This evidently led Meyrick to place the species in *Neelysia*. The male has a subcostal brush on the hindwing, but no member of the *Neelysia* group has a subcostal brush. The male genitalia of *alveata* are closely similar to those of *admirationis* and its associates, but, strangely, *alveata* lacks a pseuduncus. See the notes under *admirationis* for a list of associated species.

**Hyposmocoma (Hyposmocoma) anisoplecta** Meyrick (figs. 871, moth; 1039, male genitalia).

*Hyposmocoma anisoplecta* Meyrick, 1935a: 67.

Endemic. Oahu (type locality: Mt. Kaala).

Hostplant: unknown.

Meyrick had before him three specimens from Mt. Kaala, Oahu, and one female from Maui when he described this species. Only fragments of the specimen from Maui remain in Meyrick's collection in the British Museum. It is probable that the Maui female represents a different species, and I have, therefore, deleted Maui from the reported range of this species. The holotype is now in the Bishop Museum.

**Hyposmocoma (Hyposmocoma) arenella** Walsingham (figs. 782, palpus; 826, wing venation; 871, moth; 1040, male genitalia; 1228, female genitalia).

*Hyposmocoma arenella* Walsingham, 1907*b*:627, pl. 23, fig. 25.

Endemic. Hawaii (type locality: holotype male, Kona, 2,000 feet; allotype female, 3,000 feet).

Hostplant: unknown.

Dr. Swezey (1926*b*:75) recorded this species from Nihoa Island on the basis of four "poor specimens". His determination was incorrect—the Nihoa specimens represent a different species. See *Hyposmocoma* Leeward Island species 5, above.

**Hyposmocoma (Hyposmocoma) argentifera** (Walsingham), **new combination** (figs. 763, wing venation; 778, palpus; 872, moth; 1215, female genitalia).

*Agonismus argentiferus* Walsingham, 1907*b*:513, pl. 15, fig. 17.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

Only two females of *argentifera* are known.

**Hyposmocoma (Hyposmocoma) atrovittella** Walsingham (fig. 874, moth).

*Hyposmocoma atrovittella* Walsingham, 1907*b*:555, pl. 18, fig. 14.

Endemic. Hawaii (type locality: Olaa).

Hostplant: unknown.

Only the male holotype is known, and it has lost its abdomen.

**Hyposmocoma (Hyposmocoma) auripennis** (Butler) (figs. 827, wing venation; 874, moth; 1041, male genitalia; 1228, female genitalia).

*Gracilaria auripennis* Butler, 1881:404.

*Hyposmocoma auripennis* (Butler) Walsingham, 1907*b*:571, pl. 19, fig. 18.

Endemic. Maui (type locality: Haleakala. Blackburn's code label on the holotype bears the numbers "81.7 121").

Hostplant: *Acacia koa*.

The male has a small pseuduncus.

**Hyposmocoma (Hyposmocoma) auropurpurea** Walsingham (figs. 779, palpus; 827, wing venation; 875, moth; 1041, male genitalia).

*Hyposmocoma auropurpurea* Walsingham, 1907*b*:614, pl. 23, fig. 1.

*Hyposmocoma atropurpurea*, misspelling by Swezey, 1913*a*:198.

Endemic. Oahu (type locality: Waianae Mountains).

Hostplant: unknown.

Swezey (1913a:198) recorded it from above Punaluu in the Koolau Mountains.

**Hyposmocoma (Hyposmocoma) bacillella** Walsingham (figs. 800, larval case; 828, wing venation; 875, moth; 1039, male genitalia).

*Hyposmocoma bacillella* Walsingham, 1907b:601, pl. 21, fig. 28.

Endemic. Kauai (type locality: "Halemanu and Kaholuamano", 4,000 feet).

Hostplant: *Metrosideros*.

The larva lives in an elongate conical case, with overlapping lip at the anterior end, the narrower posterior end being obtuse and the whole case having much the appearance of a piece of birch bark, but somewhat darker on the upper than on the under side, the division between the darker and lighter portions being straight and clearly defined. For pupation the case is attached by a short, stiff, thick silken stem from the middle of its underlip to the midrib of the leaf. The case is suspended parallel with the plane of the leaf, two or three fine silk threads attaching its anal extremity to the leaf. (Walsingham, 1907b:602.)

**Hyposmocoma (Hyposmocoma) bella** Walsingham (figs. 876, moth; 1033, male genitalia).

*Hyposmocoma bella* Walsingham, 1907b:614, pl. 22, fig. 27.

Endemic. Kauai (type locality: Halemanu, 4,000 feet).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Hyposmocoma) belophora** Walsingham (figs. 876, moth; 1043, male genitalia).

*Hyposmocoma belophora* Walsingham, 1907b:631, pl. 24, fig. 4.

Endemic. Oahu (type locality: near the head of Kawailoa Gulch).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Hyposmocoma) bilineata** Walsingham (figs. 828, wing venation; 877, moth; 1229, female genitalia).

*Hyposmocoma bilineata* Walsingham, 1907b:573, pl. 19, fig. 22.

Endemic. Oahu (type locality: Waianae Mountains, 2,000 to 3,000 feet).

Hostplant: unknown.

The holotype is a female, not a male as stated in *Fauna Hawaiiensis*. All specimens seen are females. This species may prove to be a member of the group which includes *thiatma*, but without male specimens no conclusion can be reached.

**Hyposmocoma (Hyposmocoma) blackburnii** Butler (figs. 758, head, wing venation; 800, larval case (does this belong to *blackburnii*?); 877, moth; 1044, male genitalia; 1230, female genitalia).

*Hyposmochoma blackburnii* Butler, 1881:400.

*Hyposmocoma blackburnii* Butler, Walsingham, 1907b:559, 734, pl. 18, fig. 23. The type-species of *Hyposmocoma*.

Endemic. Maui [type locality: "Occurring at about 4000 feet above sea

level on Haleakala, Maui; various localities. I think it is connected with dead wood." (Blackburn, in Butler, 1881:400.) The holotype probably came from near Olinda. It bears the Blackburn field data code 81.7 over 123].

Hostplants: in dead wood of *Acacia koa* (and other trees?).

There is much confusion concerning this species in collections and in literature. It has also been recorded from Kauai and Oahu, and doubtfully from Molokai and Hawaii, but I have deleted those islands from its distribution which I have here restricted to the type island of Maui. My study of the series of specimens under this name in the *Fauna Hawaiiensis* collection has revealed that eight or more species have been mixed under this one name!

There is a series of similar-appearing species distributed throughout the islands. The differences in the male genitalia between these species are remarkable, considering that the specimens were all supposed to be one species. There are collections with several undescribed species in this complex from Oahu and several from Kauai. I have seen others from Molokai and Hawaii. It is probable that all of the main islands have clusters of new species which may outwardly resemble the type of *blackburnii* rather closely, but I have had no opportunity to prepare reports upon them. It will take much detailed fieldwork to elucidate the species of this complex, and I regret deeply that I cannot now contribute further to our knowledge of these moths. They deserve concentrated study in the field and in the laboratory.

Following are listed seven apparently new species of the *blackburnii* species group which I have examined, and the male genitalia of six of these species are illustrated. Comparison of these illustrations of genitalia with the figure of typical *blackburnii* and other species in this complex such as *belophora*, *evanescens*, *haleakalae*, and *lacertella* will reveal immediately the extraordinary range of variation on a common theme in a closely interrelated group of *Hyposmocoma*.

**Hyposmocoma (Hyposmocoma) new species 1** (fig. 1045, male genitalia).

*Hyposmocoma* species heretofore confused with *blackburnii* (BM male genitalia slide 5512).

Endemic. Kauai (Kaholuamano, 4,000 feet).

Hostplant: unknown.

The thumblike costal process of the left valva is much farther distad on this species than on others of this complex. The pseuduncus is very broad.

**Hyposmocoma (Hyposmocoma) new species 2** (fig. 1046, male genitalia).

*Hyposmocoma* species heretofore confused with *blackburnii* (BM male genitalia slide 5511).

Endemic. Kauai (Halemanu, 4,000 feet).

Hostplant: unknown.

Note the costal process on the right valva, the broad, apically emarginate process on the left valva, the position of the spur adjacent to its base, and the extraordinary angled second spur.

**Hyposmocoma (Hyposmocoma) new species 3** (fig. 1047, male genitalia).

*Hyposmocoma* species heretofore confused with *blackburnii* (BM male genitalia slide 5505).

Endemic. Kauai (3,000 to 4,000 feet).

Hostplant: unknown.

The left valva approaches the form of typical *blackburnii*, but the costal process is longer than the adjacent costal spurs, whereas it is distinctly shorter than the spurs on *blackburnii*. Note also the major differences at the apex of the right valva.

**Hyposmocoma (Hyposmocoma) new species 4** (fig. 1048, male genitalia).

*Hyposmocoma* species heretofore confused with *blackburnii* (BM male genitalia slide 5506).

Endemic. Oahu (Waianae Mountains, 2,000 feet).

Hostplant: unknown.

The right valva has an angular costal expansion near the basal third; it lacks a long terminal spur. The left valva lacks a long costal process, and the margins of abdominal sternites 4, 5, and 6 are sclerotized. This species may not belong in such close association with *blackburnii* as it is placed here.

**Hyposmocoma (Hyposmocoma) new species 5** (fig. 1049, male genitalia).

*Hyposmocoma* species heretofore confused with *blackburnii* (BM male genitalia slide 5507).

Endemic. Oahu (Waianae Mountains, about 2,000 feet).

Hostplant: unknown.

This moth approaches the species listed below from Kilauea, Hawaii, but the process of the left valva is distinct, the spur nearest it is in a different position, and the spurs are much longer, as illustrated.

**Hyposmocoma (Hyposmocoma) new species 6.**

"*Hyposmocoma* sp.? (? *blackburnii* Btl.)" Walsingham, 1907b:561. Walsingham specimen 26402.

Endemic. Molokai (4,500 feet).

Hostplant: unknown.

This species, represented by one female, appears to be another new species in the *blackburnii* complex, but I cannot be positive of its status until the male is found.

**Hyposmocoma (Hyposmocoma) new species 7** (fig. 1050, male genitalia).

"*Hyposmocoma* sp.? (? *blackburnii* Btl.)" Walsingham, 1907b:561. Walsingham specimen number 27418 (BM male genitalia slide 5513).

Endemic. Hawaii (Kilauea).

Hostplant: unknown.

Although the male genitalia may at first sight appear to be rather similar to new species 5, examination will reveal major differences, as illustrated. Walsingham (1907b:561) said of this species: "A single specimen, in-

separable in appearance from *blackburnii*, differs in having veins 4 and 5 of the hindwings connate in one wing and short-stalked in the other. The specimen is doubtless abnormal, and being unique it might be rash to name it *blackburnii*, since no similar variation in neuration has been found in the long series from Kauai, Oahu and Maui.”

**Hyposmocoma (Hyposmocoma) butalidella** Walsingham (figs. 829, wing venation; 878, moth; 1051, male genitalia; 1230, female genitalia).

*Hyposmocoma butalidella* Walsingham, 1907b:578, pl. 20, fig. 5.

Endemic. Maui (type locality: Haleakala, 7,000 feet).

Hostplant: unknown.

See *malornata* for notes on allies of this species.

**Hyposmocoma (Hyposmocoma) calva** Walsingham (figs. 879, moth; 797, female genitalia).

*Hyposmocoma calva* Walsingham, 1907b:617, pl. 23, fig. 7.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

Walsingham described this species from two specimens. Although both sexes are represented, the female is not mentioned in the original description. Unfortunately, the male holotype has lost its abdomen.

**Hyposmocoma (Hyposmocoma) candidella** (Walsingham), **new status** (figs. 926, moth; 1109, male genitalia; 1231, female genitalia).

*Hyposmocoma lupella* variety *candidella* Walsingham, 1907b:564, pl. 19, fig. 2.

Endemic. Hawaii (type locality: Kona, 4,000 feet, holotype male; 3,000 feet, allotype female).

Hostplant: *Acacia koa*?

This moth was considered by Walsingham to be a “variety” of *lupella*, but the differences between the genitalia of the two forms lead me to consider them distinct species. This species has been recorded from Kauai, Molokai, Maui, Lanai, and the type locality of Kona, Hawaii. The genitalia of paratypes from Kauai (wing venation on figure 829), Molokai, and Lanai display differences that indicate that a series of species is involved. No male from Maui has been examined, but I presume that the Maui population is also distinct. I presume, moreover, that an allied form is also represented on Oahu. It is probable that a species swarm is involved here, and I have deleted all locality records except the type locality from the distribution of *candidella*.

Case-making larvae formerly thought to be of this species have been found in or under dead bark of *Acacia koa* on Maui, but these specimens probably belong to an allied species and not to typical *candidella*.

**Hyposmocoma (Hyposmocoma) new species 8** (fig. 1110, male genitalia).

*Hyposmocoma* species confused with *candidella* by Walsingham, 1907b:564.

Endemic. Kauai (type locality: Halemanu, 4,000 feet).



Hostplant: unknown.

This species, represented by a paratype of *candidella* (BM slide 7338), has a very different aedeagus from *candidella*, and the lobes of the anellus and the valvae differ.

**Hyposmocoma (Hyposmocoma) new species 9** (fig. 1111, male genitalia).

*Hyposmocoma* species confused with *candidella* by Walsingham, 1907b:564.

Endemic. Molokai (over 3,000 feet).

Hostplant: unknown.

This species is based on another paratype of *candidella* (BM slide 7337). It has a remarkable, sinuous aedeagus which is strikingly distinct from the aedeagus of any other species I have seen.

**Hyposmocoma (Hyposmocoma) new species 10** (fig. 1112, male genitalia).

*Hyposmocoma* species confused with *candidella* by Walsingham, 1907b:564.

Endemic. Lanai (2,000 feet).

Hostplant: unknown.

The paratype of *candidella* from Lanai (BM slide 7336) represents this species.

**Hyposmocoma (Hyposmocoma) canella** Walsingham (figs. 829, wing venation; 879, moth; 1052, male genitalia; 1207, 1230, female genitalia).

*Hyposmocoma canella* Walsingham, 1907b:602, pl. 22, fig. 1.

*Hyposmocoma tenella*, a misprint and error in determination by Swezey, 1935:94.

Endemic. Kauai, Oahu, Molokai (type locality: 3,000 to over 4,000 feet), Hawaii.

Hostplant: probably lichens.

The larvae are case-makers and have been found on rocks. I have not examined carefully specimens from all of the islands from which this moth has been reported, and I am not sure that it has such a wide distribution.

Although this moth belongs to *Hyposmocoma sensu stricto*, its wing venation shows a strong tendency toward that of the *Aphthonetus* type, although veins 4 and 5 are separate in the forewing. See the legend for figure 1052 for a list of allied forms in this confusing complex. The status of each name requires verification.

**Hyposmocoma (Hyposmocoma) carbonenotata** Walsingham (figs. 830, wing venation; 879, moth; 1053, male genitalia; 1231, female genitalia).

*Hyposmocoma carbonenotata* Walsingham, 1907b:599, pl. 21, fig. 24.

Endemic. Kauai type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

See the comments on the female under *albonivea*, and see the notes under *admirationis* for a list of allied species.

**Hyposmocoma (Hyposmocoma) carnea** Walsingham (figs. 783, palpus; 880, moth; 1054, male genitalia).

*Hyposmocoma carnea* Walsingham, 1907*b*:610, pl. 22, fig. 20.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

It would appear from the original description that Walsingham considered this species to be allied to *Hyposmocoma (Euperissus) roseofulva*, but the species belong to different subgenera.

**Hyposmocoma (Hyposmocoma) cincta** Walsingham (figs. 884, moth; 1232, female genitalia).

*Hyposmocoma cincta cincta* Walsingham, 1907*b*:566, pl. 19, fig. 7.

Endemic. Kauai (type locality: Halemanu, 4,000 feet).

Hostplant: unknown.

This moth is known from the female holotype only. The form called *cincta adjacens* by Walsingham is here treated as a species.

**Hyposmocoma (Hyposmocoma) cinereosparsa** Walsingham (figs. 830, wing venation; 885, moth; 1043, male genitalia; 1232, female genitalia).

*Hyposmocoma cinereosparsa* Walsingham, 1907*b*:603, pl. 22, fig. 3.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

The ostium of the female genitalia is unusual; see figure 1232.

**Hyposmocoma (Hyposmocoma) commensella** Walsingham (figs. 830, wing venation; 886, moth; 1060, male genitalia; 1232, female genitalia).

*Hyposmocoma commensella* Walsingham, 1907*b*:558, pl. 18, fig. 20.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

The stalking of veins 7 and 8 in the forewings is variable in this species. Walsingham (1907*b*:558) said, "This species is the most generalized of the group [not true], veins 7 and 8 of the forewings, which are normally stalked, being in two specimens (28102-3) separated by a small space (almost connate), while in one specimen (28104) these veins are stalked in one wing and approximated in the other." See figure 830.

**Hyposmocoma (Hyposmocoma) communis** (Swezey), **new combination** (figs. 808, wing venation; 887, moth; 1031, male genitalia).

*Petrochroa communis* Swezey, 1946:627.

Endemic. Kauai, Oahu (type locality: Honolulu).

Hostplant: unknown.

This small moth has been commonly taken at lights in the lowlands of Oahu and supposedly at Kokee, Kauai. There are some apparently minor differences in the male genitalia of the Oahu and Kauai specimens which I have examined, and this may indicate that two forms are involved. This species lacks a pseuduncus. It belongs to the *canella* complex.

**Hyposmocoma (Hyposmocoma) conditella** Walsingham (figs. 782, palpus; 831, wing venation; 888, moth; 1061, male genitalia).

*Hyposmocoma conditella* Walsingham, 1907*b*:620, pl. 23, fig. 12.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

I have only seen male specimens. The male abdomen lacks the extraordinary caudal development of the sixth segment as figured for new species 11 (see below).

**Hyposmocoma new species 11** (figs. 885, moth; 1062, male genitalia, abdomen).

Endemic. Oahu (Waianae Mountains, about 3,000 feet; male genitalia from this locality on BM slide 14317).

Hostplant: unknown.

A specimen of this species was placed near *conditella* by Durrant who correctly observed that it differs from *conditella* because the raised scale tufts on the forewings are lacking on *conditella*. There are also other differences; see the figures of the genitalia and abdomen.

**Hyposmocoma (Hyposmocoma) continuella** Walsingham (figs. 889, moth; 1232, female genitalia).

*Hyposmocoma continuella* Walsingham, 1907*b*:577, pl. 20, fig. 2.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) coruscans** (Walsingham), **new combination** (figs. 763, wing venation; 890, moth; 1016, male genitalia).

*Agonismus coruscans* Walsingham, 1907*b*:513, pl. 15, fig. 16.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

Only two males of this small species are recorded.

**Hyposmocoma (Hyposmocoma) corvina** (Butler) (figs. 781, palpus; 831, wing venation; 891, moth; 1063, male genitalia; 1233, female genitalia; col. pl. 7:4).

*Laverna corvina* Butler, 1881:405.

*Hyposmocoma corvina* (Butler) Walsingham, 1907*b*:553, pl. 18, fig. 9.

Endemic. Maui (type locality: Haleakala; the Blackburn code numbers on the type are "81.7 122").

Hostplant: *Acacia koa* (lichens on bark?).

See the notes under *malornata* for a list of allied species. I have deleted the Walsingham records for Molokai because, as my illustrations demonstrate, the Molokai specimens represent an allied but different species. This new species is noted immediately below.

**Hyposmocoma (Hyposmocoma) new species 12** (figs. 1063, 1064, male genitalia).

*Hyposmocoma corvina*, in part, as a misidentification by Walsingham, 1907b: 553 (BM male genitalia slide 2011).

Endemic. Molokai (about 4,000 feet).

Hostplant: unknown.

The type locality of *corvina* is Haleakala, Maui. Those specimens from Molokai that Walsingham determined to be *corvina* represent a different species, as my illustrations reveal.

**Hyposmocoma (Hyposmocoma) costimaculata** Walsingham (figs. 831, wing venation; 891, moth; 1061, male genitalia; 1233, female genitalia).

*Hyposmocoma costimaculata* Walsingham, 1907b:572, pl. 19, fig. 20.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

It is possible that the allotype female is not the same species as the holotype male.

**Hyposmocoma (Hyposmocoma) crossotis** Meyrick (fig. 892, moth).

*Hyposmocoma crossotis* Meyrick, 1915a:342.

Endemic. Oahu (type locality: Koolau Mountains).

Hostplant: unknown.

The unique female holotype, now in the British Museum, has lost its abdomen.

**Hyposmocoma (Hyposmocoma) cupreomaculata** Walsingham (figs. 893, moth; 1233, female genitalia).

*Hyposmocoma cupreomaculata* Walsingham, 1907b:561, pl. 18, fig. 24.

Endemic. Molokai (type locality: 3,000 feet).

Hostplant: unknown.

Only the female holotype is known.

**Hyposmocoma (Hyposmocoma) discella** Walsingham (figs. 799, larval case; 832, wing venation; 894, moth; 1066, male genitalia; 1233, female genitalia).

*Hyposmocoma discella* Walsingham, 1907b:553, pl. 18, fig. 10.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplants: lichens? on the bark of *Cheirodendron* and *Metrosideros*.

The larva makes an "irregular case of silk and frass encrusted with miscellaneous fragments (some of them apparently insect remains)." (Walsingham, 1907b:554.)

This is a member of the *malornata* group, which see.

**Hyposmocoma (Hyposmocoma) divisa** Walsingham (figs. 783, palpus; 832, wing venation; 896, moth; 1065, male genitalia; 1197, female genitalia).

*Hyposmocoma divisa* Walsingham, 1907b:554, pl. 18, fig. 11.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) domicolens** (Butler) (figs. 832, wing venation; 896, moth; 1066, 1067, 1068, male genitalia; 1197, female genitalia).

*Laverna domicolens* Butler, 1881:405.

*Hyposmocoma domicolens domicolens* (Butler) Walsingham, 1907b:562, pl. 18, fig. 26.

Endemic. Molokai?, Maui (type locality: Makawao, about 2,000 feet, "in a house"; the Blackburn code numbers on the holotype are "81.7 124"), Lanai?, Hawaii?

Hostplant: unknown.

I have questioned all locality records except that of the type—Maui. I have not made a study of many specimens from a series of localities. However, I have found that one of Walsingham's specimens under this name from Kona, Hawaii (Walsingham specimen 25370, Busck slide 40 in the Bishop Museum) represents a distinct species, and my figures demonstrate differences in the male genitalia of specimens from Hawaii and Lanai. It is probable that a species "swarm" is involved here.

Walsingham included *suffusa* as a variety of this species, but, as my illustrations demonstrate, *domicolens* and *suffusa* are widely distinct species. The holotype is a female, not a male as stated by Walsingham.

The anterior margins of abdominal sternites three to seven are peculiarly thickened (see figure 1066).

**Hyposmocoma (Hyposmocoma) elegantula** (Swezey), **new combination** (figs. 808, wing venation; 898, moth; 1070, male genitalia).

*Petrochroa elegantula* Swezey, 1934:524.

Endemic. Oahu (type locality: Koko Head).

Hostplant: unknown. Dr. Swezey collected adults at flowers of *Lipochaeta integrifolia*, but the larvae and the hostplant remain unknown.

The species was originally assigned incorrectly to the "Cynodiidae" (Cynodiidae). The male genitalia show close similarity to those of *neckerensis*, but the species have quite distinct color patterns. Both are very small moths for the genus. The metallic-colored scales in the dark apical area of the forewing of *elegantula* look like shining jewels. The yellow macula which joins the base of the dark apical area is conspicuous.

There were three specimens on the single mount that Dr. Swezey labeled type. The specimen figured here (now in the Bishop Museum), is designated lectotype and the other specimens in the type series are now designated paralectotypes.

**Hyposmocoma (Hyposmocoma) empedota** Meyrick (figs. 781, palpus; 833, wing venation; 899, moth; 1071, male genitalia; 1234, female genitalia).

*Hyposmocoma empedota* Meyrick, 1915a:341.

Endemic. Oahu (type locality: Koolau Mountains behind Honolulu, but labeled "Honolulu").

Hostplants: apparently lichenivorous on the bark of *Acacia koa*, *Manihot glaziovii* (ceara rubber), *Prosopis*, and no doubt other trees.

Parasites: *Euderus* ("Omphale", "Secodella") *metallicus* (Ashmead), *Gelis tenellus* (Say), *Lepideupelmus setiger* (Perkins).

The larva is a case-maker. Dr. Swezey (1954:6) has reported that the case does not have the wide flange that the case of *alliterata* has.

The development of the pseuduncuslike organs on the male abdomen is extraordinary. There is a large one on the right side of the seventh segment, a similar long one from the left side of the sixth segment, and much smaller ones on the left side of the seventh segment and the right side of the sixth segment; see figure 1071.

**Hyposmocoma (Hyposmocoma) endryas** Meyrick (figs. 782, palpus; 899, moth).

*Hyposmocoma endryas* Meyrick, 1915a:343.

Endemic. Oahu (type locality: Koolau Mountains).

Hostplant: unknown.

The unique male holotype, now in the British Museum, has lost its abdomen.

**Hyposmocoma (Hyposmocoma) evanescens** Walsingham (figs. 781, palpus; 834, wing venation; 901, moth; 1072, male genitalia; 1235, female genitalia).

*Hyposmocoma evanescens* Walsingham, 1907b:574, pl. 19, fig. 25.

Endemic. Maui (type locality: Haleakala, above 5,000 feet).

Hostplant: unknown.

The male genitalia are closely similar to those of *lacertella*. Yet, the moths are so distinctive in appearance that Walsingham separated them rather widely as species 181 and 200 in his list.

**Hyposmocoma (Hyposmocoma) fallacella** Walsingham (figs. 903, moth; 1074, male genitalia).

*Hyposmocoma fallacella* Walsingham, 1907b:605, pl. 22, fig. 8.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Only the male holotype is known. See the commentary under (*Euperissus falsimella* above).

**Hyposmocoma (Hyposmocoma) ferricolor** Walsingham (figs. 904, moth; 1235, female genitalia).

*Hyposmocoma ferricolor* Walsingham, 1907b:575, pl. 19, fig. 26.

Endemic. Hawaii (type locality: Hualalai, 5,000 feet).

Hostplant: unknown.

Walsingham thought it possible that this is a form of *domicolens*, but the genitalia demonstrate that the species are fully distinct. Only the female holotype is known.

**Hyposmocoma (Hyposmocoma) fervida** Walsingham (figs. 782, palpus; 905, moth; 1236, female genitalia).

*Hyposmocoma fervida* Walsingham, 1907b:626, pl. 23, fig. 23.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

Only the female holotype is known.

**Hyposmocoma (Hyposmocoma) filicivora** Meyrick (fig. 905, moth, larval case).

*Hyposmocoma filicivora* Meyrick, 1935a:68.

Endemic. Oahu (type locality: Konahuanui).

Hostplant: *Cibotium chamissoi*.

The larva makes a flat case. It lives in the hollows of dead treefern fronds.

The holotype and one paratype, both of which lack abdomens, are now in the Bishop Museum and the Hawaii State Department of Agriculture collections, respectively.

**Hyposmocoma (Hyposmocoma) flavipalpis** (Walsingham), **new combination** (figs. 762, head, wing venation; 906, moth; 1211, female genitalia).

*Agonismus flavipalpis* Walsingham, 1907b:512, pl. 15, fig. 15. The type-species of *Agonismus*.

Endemic. Maui (type locality: Haleakala, 4,000 feet).

Hostplant: unknown.

This moth is known only from the female.

**Hyposmocoma (Hyposmocoma) fractinubella** Walsingham (figs. 835, 1351, male and female wing venation, respectively; 906, moth; 1075, male genitalia; 1236, female genitalia).

*Hyposmocoma fractinubella* Walsingham, 1907b:592, pl. 21, fig. 10.

Endemic. Maui (type locality: Olinda, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) fractistriata** Walsingham (figs. 748, palpus; 835, wing venation; 907, moth; 1076, male genitalia; 1236, female genitalia).

*Hyposmocoma fractistriata* Walsingham, 1907b:635, pl. 24, fig. 13.

Endemic. Oahu (type locality: Waianae Mountains).

Hostplant: unknown.

There is an unusual comb of spines on the fourth abdominal tergite of the male in addition to a strong pseuduncus on the seventh tergite. In the male there is a subbasal cluster of slanting, erect, elongate squamae and a few erect hairs on the hindwing vannus, but these are not similar to the *Euperissus* development—they are entirely subbasal and none reaches the wing margin. This cluster of modified vestiture may be obscure and give the appearance that it has been roughened by partial abrasion. This species is definitely a member of subgenus *Hyposmocoma*, and the nature of this modified hindwing

vestiture is so different from that of *Euperissus* that one should not be confused by it.

Walsingham included two specimens from Lanai in his paratype series, but they represent a new species. I have deleted Lanai from the range of this species, and the Lanai species may be designated as new species 13 (see below).

**Hyposmocoma (Hyposmocoma) new species 13** (fig. 1077, male genitalia).

*Hyposmocoma* misidentified as *fractistriata*, paratype, by Walsingham, 1907b:635 (BM male genitalia slide 7599).

Endemic. Lanai.

Hostplant: unknown.

Although this species resembles *fractistriata*, the male genitalia are distinct. It lacks the comb of abdominal spines and a pseuduncus, which features are conspicuously developed on *fractistriata*.

**Hyposmocoma (Hyposmocoma) fuscopurpurea** Walsingham (figs. 836, wing venation; 910, moth; 1081, male genitalia; 1237, female genitalia).

*Hyposmocoma fuscopurpurea* Walsingham, 1907b:582, pl. 20, fig. 14.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) fuscotogata** Walsingham (figs. 910, moth; 1237, female genitalia).

*Hyposmocoma fuscotogata* Walsingham, 1907b:634, pl. 24, fig. 10.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

Only the female holotype is known.

**Hyposmocoma (Hyposmocoma) geminella** Walsingham (figs. 782, palpus; 836, wing venation; 910, moth; 1081, male genitalia; 1238, female genitalia).

*Hyposmocoma geminella* Walsingham, 1907b:594, pl. 21, fig. 13.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) genitalis** Walsingham (figs. 911, moth; 1082, male genitalia; 1200, 1238, female genitalia; 1351, wing venation).

*Hyposmocoma genitalis* Walsingham, 1907b:592, pl. 21, fig. 9.

Endemic. Maui (type locality: 4,000 feet).

Hostplant: unknown.

The seventh abdominal segment of the female is unusual; see figure 1238.

**Hyposmocoma (Hyposmocoma) haleakalae** (Butler) (figs. 837, wing venation; 911, moth; 1083, male genitalia; 1238, female genitalia).

*Chrysoclista? haleakalae* Butler, 1881:407.

*Hyposmocoma haleakalae* (Butler) Walsingham, 1907b:573, pl. 19, fig. 23.



Endemic. Maui (type locality: Haleakala, about 4,000 feet; Blackburn's code on the type label is "81.7 126").

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) hemicasis** Meyrick (figs. 911, moth; 1084, male genitalia; 795, female genitalia).

*Hyposmocoma hemicasis* Meyrick, 1935a:68.

Endemic. Oahu (type locality: Mt. Kaala).

Hostplant: unknown.

The holotype is now in the Bishop Museum.

**Hyposmocoma (Hyposmocoma) humerovittella** Walsingham (figs. 913, moth; 1084, male genitalia).

*Hyposmocoma humerovittella* Walsingham, 1907b:566, pl. 19, fig. 6.

Endemic. Oahu (type locality: Waianae Mountains, 3,000 feet).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Hyposmocoma) hygroscopa** Meyrick (figs. 913, moth; 1085, male genitalia; 1201, female genitalia; col. pl. 7:6).

*Hyposmocoma hygroscopa* Meyrick, 1935a:66.

Endemic. Kauai (type locality: Halemanu).

Hostplants: lichens? on *Eucalyptus* and *Pandanus* (and no doubt other trees).

The larva builds a case. Larvae have been found on bark and on a *Pandanus* leaf.

There is one female in the Meyrick collection in the British Museum, although Meyrick stated that he had only males. The male holotype (now in the Bishop Museum) and two paratypes in Honolulu are in fragments. They were damaged, together with specimens of other species, during shipment from Meyrick to Honolulu.

See *admirationis* for a list of allied species and see the notes under *oxypetra*.

**Hyposmocoma (Hyposmocoma) illuminata** Walsingham (figs. 837, wing venation; 914, moth; 1080, 1086, male genitalia; 1238, female genitalia).

*Hyposmocoma illuminata* Walsingham, 1907b:570, pl. 19, fig. 17.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

See the comments in the legend to figure 1080.

**Hyposmocoma (Hyposmocoma) impunctata** Walsingham (figs. 914, moth; 1087, male genitalia).

*Hyposmocoma impunctata* Walsingham, 1907b:575, pl. 19, fig. 27.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Hyposmocoma) indicella** Walsingham (figs. 837, wing venation; 915, moth; 1080, 1088, male genitalia; 1208, 1239, female genitalia).

*Hyposmocoma indicella* Walsingham, 1907b:577, pl. 20, fig. 3.

Endemic. Maui (type locality: Haleakala, 5,000 feet and above).

Hostplant: unknown.

See the comments in the legend for figure 1080.

**Hyposmocoma (Hyposmocoma) intermixta** Walsingham (figs. 916, moth; 1239, female genitalia).

*Hyposmocoma intermixta* Walsingham, 1907b:593, pl. 21, fig. 12.

Endemic. Molokai (type locality: about 4,000 feet).

Hostplant: unknown.

I have seen only the unique female holotype.

**Hyposmocoma (Hyposmocoma) inversella** Walsingham (figs. 779, palpus; 916, moth; 1239, female genitalia).

*Hyposmocoma inversella* Walsingham, 1907b:615, pl. 23, fig. 2.

Endemic. Oahu (type locality: Waianae Mountains, 2,000 feet).

Hostplant: unknown.

Only the female is known.

**Hyposmocoma (Hyposmocoma) iodes** Walsingham (figs. 782, palpus; 839, wing venation; 917, moth; 1089, male genitalia; 1239, female genitalia).

*Hyposmocoma iodes* Walsingham, 1907b:621, pl. 23, fig. 14.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) irregularis** Walsingham (figs. 782, palpus; 917, moth; 1090, male genitalia).

*Hyposmocoma irregularis* Walsingham, 1907b:626, pl. 23, fig. 22.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

See the notes under *admirationis* for a list of allied species. Only one male has been collected.

**Hyposmocoma (Hyposmocoma) lacertella** Walsingham (figs. 839, wing venation; 918, moth; 1092, male genitalia; 1240, female genitalia).

*Hyposmocoma lacertella* Walsingham, 1907b:582, pl. 20, fig. 16.

Endemic. Maui (type locality: holotype male, Haleakala, 5,000 feet; allotype female, Olinda, Haleakala, 4,000 feet).

Hostplant: unknown.

The male genitalia are similar to those of *evanescens*, but the moths are conspicuously different in external appearance.

**Hyposmocoma (Hyposmocoma) lactea** Walsingham (figs. 839, wing venation; 918, moth; 1093, male genitalia; 1240, female genitalia).  
*Hyposmocoma lactea* Walsingham, 1907b:597, pl. 21, fig. 19.

Endemic. Kauai (type locality: holotype male, Halemanu, 4,000 feet; allotype female, mountains 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) lacticretella** Walsingham (figs. 919, moth; 1240, female genitalia).

*Hyposmocoma lacticretella* Walsingham, 1907b:597, pl. 21, fig. 20.

Endemic. Maui (type locality: Olinda, 4,000 feet).

Hostplant: unknown.

Only the female holotype is known.

**Hyposmocoma (Hyposmocoma) lebetella** Walsingham (figs. 840, wing venation; 920, moth; 1095, male genitalia; 1240, female genitalia).

*Hyposmocoma lebetella* Walsingham, 1907b:557, pl. 18, fig. 18.

Endemic. Maui (type locality: Olinda, Haleakala, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) leporella** Walsingham (figs. 840, wing venation; 920, moth; 1096, male genitalia; 1241, female genitalia).

*Hyposmocoma leporella* Walsingham, 1907b:558, pl. 18, fig. 21.

Endemic. Kauai (type locality: holotype male, mountains 3,000 to 4,000 feet; allotype female, Lihue, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) lignivora** (Butler), **new combination** (figs. 761, head, wing venation; 778, palpus; 803, larval case; 805, pupa; 921, moth; 1097, male genitalia, abdomen, larval case; 1098, 1099, male genitalia; 1225, female genitalia).

*Scardia lignivora* Butler, 1879b:273.

*Diplosara lignivora* (Butler) Meyrick, 1883a:35. Sharp, 1899:429, fig. 207, lateral aspect of moth. Walsingham, 1907b:647, pl. 25, fig. 2. Clarke, 1965a:498, pl. 245, illustrates wings, venation, head, and male genitalia. Type-species of *Diplosara*.

Endemic. Oahu (type locality: "Bred from larvae feeding on very rotten wood, in mountain forest; Oahu"—Blackburn's field note. Blackburn's original label on the holotype reads, "Sandw. Isl. 79.8 No. 56), Molokai.

Hostplants: the larvae are common in rotten wood and under dead bark of various trees, native and introduced, including *Pisonia*, *Tetraplasandra*, and *Wikstroemia*.

True *lignivora* appears to occur on Oahu and Molokai, but associated distinct forms evidently also occur on Molokai and perhaps on Oahu. It has also been recorded or determined by other workers from Kauai, Lanai, Maui, and Hawaii. I have found, however, that a series of undescribed forms is

involved under this name. A special study of this interesting and divergent complex is required.

This is a common and widely distributed moth on Oahu, and it is attracted frequently to light in the damp areas of the lowlands. The larvae live in large brown cases which are familiar to many collectors, although they may not know to what moth the cases belong. The cases are often found in large numbers beneath the bark of dead trees.

This moth and its associates, although somber colored, are among the most distinctive of *Hyposmocoma*. It is the type of Meyrick's family Diplosaridae, 1915a:339. The wing venation is subject to great variation, and the venation of opposite sides of the same individual may be conspicuously different. For example, veins 4 and 5 in the hindwings may be separate, connate, or variably stalked. This may cause considerable confusion to workers, unfamiliar with the variability, who may be accustomed to consider such differences as generic. The forewings have conspicuous tufts of raised scales on the dorsal surfaces.

On the seventh abdominal tergite of the male there is a broad, transverse, caudal band or comb of numerous, modified, persistent, spinelike squamae unlike anything found on this abdominal segment on any other species of this great genus (see figure 1097). The third segment of the labial palpus is expanded on the upper side with hairs and scales in a most distinctive way (see figures 761, 778). This feature, when not abraded, serves as an easily observable diagnostic feature for this species group. No other *Hyposmocoma* has such vestiture on the palpi.

There is in the British Museum a female of an allied species from Hilo, Hawaii, 2,000 feet, from whose ovipositor protrudes a "chain" of eggs. These eggs, the only ones I have examined in *Hyposmocoma*, are very coarsely reticulated.

The *lignivora* species group has what may be called strongly *Hyposmocoma* type male genitalia with protuberances on the costal margins of the valvae and large spurs and typical subgenus *Hyposmocoma* female genitalia, and thus by genital characters it falls obviously into *Hyposmocoma sensu stricto*. However, much to my astonishment, it has conspicuous vannal hair tufts on the hindwings similar to strongly typical *Euperissus* species. Thus, it is a confusing "rule breaker". I have not yet found any other species group that combines so clearly the characters of the two subgenera of *Hyposmocoma*.

The vannal hair tuft definitely consists of long, fine, sharply pointed hairs. The tuft occurs on the vannus of the hindwings of both sexes of *lignivora*, and on the several new species closely allied to it. These fine hairs overlap the cilia (fringe) just as they do in typical *Euperissus*. It is not similar to the mat of elongate, mostly hairlike scales found on the males (only) of *marginenotata* and *vermiculata*, the discussion of which unusual developments is to be found under the *marginenotata* heading below. Because of the typical subgenus *Hyposmocoma* characters of the male and female genitalia and the fact that the larvae make cases, I now place this species group in *Hyposmocoma sensu stricto*. However, these divergent moths might be considered to belong to a subgenus called *Diplosara* when a more definitive classification of *Hyposmocoma* is prepared.

This was the first endemic species of Hawaiian Microlepidoptera to be described (Butler, 1879b).

**Hyposmocoma (Hyposmocoma) new species 15.**

*Hyposmocoma* species confused with *lignivora* by Walsingham, 1907b:647 (Walsingham specimen 27837; BM male genitalia slide 5518).

Endemic. Kauai (Kaholuamano, 4,000 feet).

Hostplant: unknown.

The costae of the valvae lack the wide dorsal expansions of *lignivora*, and the spurs are narrower and do not have expanded apices as do those of *lignivora*. The caudal band of stiffer, persistent, modified, spinelike squamae on the seventh tergite of *lignivora* appears reduced or absent on this species as it is on species 16 and 17. In gross aspect, the genitalia resemble the photograph of the genitalia of species 17 (figure 1099).

**Hyposmocoma (Hyposmocoma) new species 16.**

*Hyposmocoma* species confused with *lignivora* by Walsingham, 1907b:647 (Walsingham specimen 28735; BM male genitalia slide 5520).

Endemic. Hawaii (Kilauea).

Hostplant: unknown.

This form differs from *lignivora* in the same ways as does species 15. It is possible that it is not specifically distinct from 15. The left brachium, the right anellar lobe, and the valvae differ in shape, but the range of variation of such characters remains to be determined.

**Hyposmocoma (Hyposmocoma) new species 17** (fig. 1099, male genitalia).

*Hyposmocoma* species confused with *lignivora* by Walsingham, 1907b:647 (Walsingham specimen 28733; BM male genitalia slide 2004).

Endemic. Hawaii (Kilauea).

Hostplant: unknown.

This form is close to species 15 and 16 and differs as they do from typical *lignivora*. Its valvae differ in shape from species 15 and 16.

Numbers 15, 16, and 17 are closely allied forms. They may represent local forms of one species, or they may represent slightly differentiated sibling species. I regret that I cannot extend my study in an attempt to elucidate the problems involved. Much more material must be collected and detailed field studies made before anyone can begin to understand this subcomplex.

The female genitalia shown on figure 1225 (Busck slide 55) may belong to new species 16 or 17.

**Hyposmocoma (Hyposmocoma) lineata** Walsingham (figs. 840, wing venation; 922, moth; 1100, male genitalia; 1241, female genitalia).

*Hyposmocoma lineata* Walsingham, 1907b:579, pl. 20, fig. 8.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

This species is closely similar to *ludificata*, but it lacks the subcostal brush on the hindwing which is well developed on *ludificata*.

**Hyposmocoma (Hyposmocoma) liturata** Walsingham (figs. 782, palpus; 801, larval case; 841, wing venation; 922, moth; 1101, 1102, 1103, male genitalia; 1241, female genitalia).

*Hyposmocoma liturata* Walsingham, 1907b:622, pl. 23, fig. 15.

Endemic. Oahu, Hawaii (type locality: Kona, 4,000 feet).

Hostplants: lichens? on rocks and on *Pipturus*.

Parasites: *Coccygomimus punicipes* (Cresson), *Euderus metallicus* (Ashmead), *Gelis tenellus* (Say).

The larvae make lichen-covered cases.

Walsingham included two specimens in his type series from above 4,000 feet on Molokai. He said, "The Molokai specimens, which are slightly paler, can only be regarded as varieties of this species." These Molokai specimens, however, represent a new species. Specimens from Oahu appear to agree with the type, and the species may be widely distributed. The Molokai form in question may be designated temporarily as new species 18.

**Hyposmocoma (Hyposmocoma) new species 18** (fig. 1104, male genitalia).

*Hyposmocoma* species confused with *liturata* by Walsingham, 1907b:622 (BM male genitalia slide 7501).

Endemic. Molokai (above 4,000 feet).

Hostplant: unknown.

The male genital valvae and the lobes of the anellus are differently shaped from those of *liturata*, as may be seen in the illustration.

**Hyposmocoma (Hyposmocoma) lixiviella** Walsingham (figs. 779, palpus; 841, wing venation; 923, moth; 1100, male genitalia; 1208, 1241, female genitalia).

*Hyposmocoma lixiviella* Walsingham, 1907b:623, pl. 23, fig. 18.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

The type series consists of a mixture of more than one species. This was clearly demonstrated by an examination of the male genitalia of the holotype (BM slide 4480) and a paratype (BM slide 5473) and slide-mounted preparations of the wings whose venations also differ. See new species 19 below.

**Hyposmocoma (Hyposmocoma) new species 19** (figs. 841, wing venation; 1100, male genitalia).

*Hyposmocoma* species confused as a paratype of *lixiviella* by Walsingham, 1907b:624 (BM slides 5473a, male wings; 5473b, male genitalia).

Endemic. Kauai (3,000 to 4,000 feet).

Hostplant: unknown.

This species is very different from *lixiviella*, and it belongs near *numida* in the *mimema* group, as my illustrations demonstrate. The spurs on the male genital valvae are broad and flat on this species, the left valva bears an unusual process extending from near the base of the dorsal margin, and from the top of the process there extends an unusually long spur. There are two subterminal

spurs on the left valva and three on the right valva, and each spur is broader than its mesal neighbor. Also, this species has a pseuduncus which *lixiviella* lacks.

**Hyposmocoma (Hyposmocoma) longisquamella** (Walsingham), **new combination** (figs. 774, head, wing venation; 923, moth; 1212, female genitalia).

*Elachista longisquamella* Walsingham, 1907b:514, pl. 15, fig. 19.

*Petrochroa nigrella* Swezey, 1940:465. **New synonym.** (Fig. 923, moth).

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

This tiny species has nothing to do with the genus *Elachista* to which it was originally assigned by Walsingham. It was described from two females.

Swezey's *nigrella* (which was described from specimens collected from low vegetation growing among broken lava on the Mauna Loa Trail about five miles from the Volcano House) proves, upon comparing a paratype with the holotype of *longisquamella*, to be a synonym.

**Hyposmocoma (Hyposmocoma) new species 20** (figs. 790, 1105, male genitalia; 842, wing venation).

*Hyposmocoma* species confused with *longitudinalis* by Walsingham, 1907b:636 (BM male genitalia slide 5437; wing slide 8490).

Endemic. Oahu (Waialua Beach and gulch leading into Opaepa at about 2,000 feet).

Hostplant: unknown.

This species was confused as a member of the type series of *longitudinalis*, but that species belongs to subgenus *Euperissus*! See the discussion under (*Euperissus*) *longitudinalis*.

**Hyposmocoma (Hyposmocoma) lucifer** Walsingham (figs. 924, moth; 1242, female genitalia; col. pl. 6:8).

*Hyposmocoma lucifer* Walsingham, 1907b:574, pl. 19, fig. 24.

Endemic. Molokai (type locality: above 4,000 feet).

Hostplant: unknown.

Only the female holotype is known.

**Hyposmocoma (Hyposmocoma) ludificata** Walsingham (figs. 842, wing venation; 924, moth; 1107, male genitalia; 1242, female genitalia).

*Hyposmocoma ludificata* Walsingham, 1907b:579, pl. 20, fig. 7.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

There are some enlarged, specialized, dorsal squamae on the hindwing posterior to the subcostal brush. It is closely similar to *lineata*, but *ludificata* has a strong, yellow, subcostal brush on the hindwing, whereas *lineata* lacks this structure.

**Hyposmocoma (Hyposmocoma) lupella** Walsingham (figs. 782, palpus; 842, wing venation; 926, moth; 1108, male genitalia; 1243, female genitalia).

*Hyposmocoma lupella lupella* Walsingham, 1907b:563, pl. 18, fig. 28.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown, but the larvae are expected to be found on dead wood. The larvae, although they remain unknown, are presumed to be case-makers.

This moth has been recorded from Molokai by Swezey and Bryan (1929:300) who unfortunately reported it from a single larval case found in *Freycinetia*. I have deleted this record, because I do not believe that it can be proven to apply to this species.

Walsingham described three "varieties" of *Hyposmocoma lupella*, namely *lupella*, *candidella*, and *suffusella*. We may call this group the *Hyposmocoma lupella* complex. A study of the genitalia of a number of specimens, in which I have been ably assisted by my friend J. D. Bradley, reveals differences that indicate that a series of species is involved. I have, therefore, elevated *candidella* and *suffusella* to specific status. Further discussion may be found under those species headings.

**Hyposmocoma (Hyposmocoma) malornata** Walsingham (figs. 843, 845, wing venation; 928, moth; 1119, 1120, 1121, 1122, 1123, 1125, male genitalia; 1244, female genitalia).

*Hyposmocoma malornata* Walsingham, 1907b:619, pl. 23, fig. 10.

*Hyposmocoma metrosiderella*, in part, by misidentification, Walsingham, 1907b:616.

*Hyposmocoma quinquemaculata*, as a misidentification by Swezey, 1926b:76.

Endemic. Necker, Nihoa, Kauai, Oahu, Molokai, Maui (type locality: Olinda, 4,000 feet), Hawaii.

Hostplant: unknown. I believe that the larva is a case-maker, and it may feed on lichens.

This is evidently a widely spread, variable, and confusing species (or a cluster of sibling species?). It has been reported as abundant at lights at Kilauea, Hawaii, and elsewhere. The holotype, illustrated here, is an example of one of the dark forms. Evidently, some specimens, especially from dryer areas, are paler. The Necker and Nihoa Island records are new and are based upon specimens misidentified by Swezey (1926b:76) and on specimens collected at light by J. W. Beardsley in September, 1964.

Walsingham confused specimens of *malornata* in his type series of *metrosiderella*. I have illustrated the male genitalia and wing venation of one of his paratypes of *metrosiderella* (BM slide 7508). It can easily be seen that the paratype is not *metrosiderella*.

The male genitalia of the *malornata* complex are distinctive, as my several illustrations indicate. The dorsal, sclerotized flaplike or flangelike process on the seventh abdominal tergite, the strongly developed pseuduncus, and the strongly lobed lateral margin of the left genital valva are noteworthy.

Other members of what may be called the *malornata* complex are *corvina*, *discella*, *divisa*, *nividorcella*, *partita*, *similis*, and possibly some others, including



some undescribed species. This is a confusing cluster of forms, and I have not determined whether some of them represent only varieties or synonyms, or whether they are fully distinct species. It would appear that a number of sibling species is also involved. Long study will be required to resolve the many associated problems.

Dissection of one of the members of the type series of *malornata* from Kauai reveals a distinct species that may be temporarily referred to as new species 22.

**Hyposmocoma (Hyposmocoma) new species 22** (fig. 1124, male genitalia).

*Hyposmocoma* misidentified as *malornata* "homotype" by Walsingham, 1907b:619 (BM male genitalia slide 7503).

Endemic. Kauai (3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) marginotata** Walsingham (figs. 843, wing venation; 929, moth; 1118, male genitalia; 1244, female genitalia).

*Hyposmocoma marginotata* Walsingham, 1907b:585, pl. 20, fig. 22.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

The male genitalia of the holotype of this species and those of the holotype of *vermiculata* are confusingly similar; it would appear at first sight that they represent only one species. Surprisingly, however, the male of *marginotata* has a well-developed subcostal brush on the hindwing whereas the male of *vermiculata* lacks a brush. Walsingham described the brush as "greyish", but I consider it mostly pale yellowish.

This species and its associate *vermiculata* are highly unusual and confusing. Although the hindwings of the female are normal for *Hyposmocoma sensu stricto*—the vannus is clothed only with imbricated, prostrate squamae and there is no long fine hair along vein 1b—the male of each species has a large, conspicuous area or mat of very elongate, slender, flattened, expanded-tip squamae (not fine, sharp-pointed true hairs). This might easily cause one to conclude that the males of the species belong to subgenus *Euperissus* if one examined only the hindwings of the male and failed to distinguish between the fine, sharp-pointed true hairs of *Euperissus* and the elongated, flattened, blunt-tipped squamae of *marginotata* and *vermiculata*. The male genitalia are of the subgenus *Hyposmocoma* type with long, well-developed spurs on the valvae, but the pseuduncus is not developed. See also the discussion in the key to the subgenera of *Hyposmocoma*.

**Hyposmocoma (Hyposmocoma) mediella** Walsingham (figs. 844, wing venation; 930, moth; 1126, male genitalia; 1244, female genitalia).

*Hyposmocoma mediella* Walsingham, 1907b:565, 734, pl. 19, fig. 3.

Endemic. Oahu (type locality: Waianae Mountains).

Hostplant: unknown.

This moth evidently occurs on both mountain ranges of Oahu.

**Hyposmocoma (Hyposmocoma) mediospurcata** Walsingham (figs. 844, wing venation; 931, moth; 1227, male genitalia; 1244, female genitalia).  
*Hyposmocoma mediospurcata* Walsingham, 1907b:567, pl. 19, fig. 9.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) mesorectis** Meyrick (figs. 779, palpus; 931, moth; 1128, male genitalia).

*Hyposmocoma mesorectis* Meyrick, 1915a:342.

Endemic. Oahu (type locality: Koolau Mountains).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Hyposmocoma) metallica** Walsingham (figs. 779, palpus; 844, wing venation; 932, moth; 1127, male genitalia; 1245, female genitalia).

*Hyposmocoma metallica* Walsingham, 1907b:576, pl. 20, fig. 1.

Endemic. Hawaii (type locality: holotype male, about 5,000 feet; allotype female, Kilauea).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) metrosiderella** Walsingham (figs. 784, palpus; 802, larval case; 932, moth; 1129, male genitalia; 1245, female genitalia; 1351, wing venation).

*Hyposmocoma metrosiderella* Walsingham, 1907b:616, pl. 23, fig. 5.

Endemic. Kauai (type locality: "Halemanu and Kaholuamano", 4,000 feet).

Hostplant: *Metrosideros*.

The larva makes "a rough case of frass with a loose lip. The case is somewhat flattened, pouch-shaped, with a short obtuse curved attenuation posteriorly, the middle is widened and the whole case is of a dull dark brownish and fuscous colour." (Walsingham, 1907:616.)

This moth was described from a series of specimens from Kauai, Oahu, and Maui, but the type series is a mixture of species. At least one of the male paratypes from Oahu belongs to, or very near, *malornata* (see figures 1123, 845). I have, therefore, deleted Oahu and Maui from the recorded distribution of the species.

**Hyposmocoma (Hyposmocoma) mimema** Walsingham (figs. 779, palpus; 845, wing venation; 933, moth; 1130, male genitalia).

*Hyposmocoma mimema* Walsingham, 1907b:613, pl. 22, fig. 26.

Endemic. Maui (type locality: Haleakala, below 4,000 to 5,000 feet).

Hostplant: unknown.

Only two males have been seen. It is not allied to *syrrhaptus* as Walsingham appears to have suggested, but compare *numida*, *pseudolita*, *swezeyi*, *triptila*, and new species 23.

**Hyposmocoma (Hyposmocoma) new species 23** (fig. 1131, male genitalia).

Endemic. Nihoa Island.

Hostplant: unknown.

This is a small white and fuscous species with a forewing length of about 3.4 mm. Several specimens were captured at light in September, 1964, by J. W. Beardsley. This species belongs in association with the *mimema* group which includes such species as *numida*, *pseudolita*, *swezeyi*, and *triptila*, although it is strongly differentiated from each of those species.

The hindwing of the male bears a pale subcostal brush. As will be noted from the illustration, the left genital valva of the male bears most extraordinary, broad, enlarged spurs. Two of the spurs are subapical, and the third, even larger, spur arises from a strong process near the middle of the costal margin of the valva. It is noteworthy that the right lobe of the anellus is longer than the left, although some other species have a similar development. The very slender right brachium should also be noted.

**Hyposmocoma (Hyposmocoma) mimica** Walsingham (figs. 845, wing venation; 933, moth; 1132, male genitalia; 1208, 1245, female genitalia).

*Hyposmocoma mimica* Walsingham, 1907b:622, pl. 23, fig. 16.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

Dr. Swezey (1926b:76) recorded this species from Necker Island from "36 poor specimens", but he made an error in identification. The Necker Island specimens represent another species which is allied to *saccophora* and is discussed under that species heading.

Walsingham (1907b:623) said, "It approaches so nearly in appearance to *Hyposmocoma liturata*, in a parallel series of variations, that the separation of the species would be almost impossible without the character found only in the males." The character he referred to is the presence of a subcostal brush on the hindwing of the male of *liturata* and its absence on *mimica*. However, the male genitalia demonstrate that the species are not closely allied.

**Hyposmocoma (Hyposmocoma) modesta** Walsingham (figs. 846, wing venation; 933, moth; 1132, male genitalia; 1245, female genitalia).

*Hyposmocoma modesta* Walsingham, 1907b:604, pl. 22, fig. 5.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) montivolans** (Butler) (figs. 779, palpus; 802, larval case; 805, pupa; 846, wing venation; 934, moth; 1133, male genitalia).

*Laverna parda?* Butler, variety *montivolans* Butler, 1882:44.

*Hyposmocoma montivolans* (Butler) Walsingham, 1907b:620, pl. 23, fig. 13.

Endemic. Oahu (type locality: mountains near Honolulu; Blackburn's field label numbers are 82.9 162").

Hostplant: lichens?

“The larva feeds on lichens on rocks, living in a silk-lined accumulation of frass, [the case] is slightly pointed toward its anal extremity, the opening at the anterior end being large and straight.” (Walsingham, 1907*b*:621.)

I have not seen the female.

**Hyposmocoma (Hyposmocoma) nebulifera** Walsingham (figs. 784, palpus; 846, wing venation; 935, moth; 1134, male genitalia).

*Hyposmocoma nebulifera* Walsingham, 1907*b*:555, 734, pl. 18, fig. 15.

Endemic. Oahu (type locality: mountains near Honolulu, 2,000 feet).

Hostplant: unknown.

I have only seen the male.

**Hyposmocoma (Hyposmocoma) neckerensis** (Swezey), **new combination** (figs. 808, wing venation; 935, moth; 1135, male genitalia).

*Petrochroa neckerensis* Swezey, 1926*b*:78.

Endemic. Necker (type locality), Gardner Island.

Hostplant: unknown.

The male genitalia of *neckerensis* show close similarity to those of *elegantula*, and the species appear to be closely allied. The moths of the type series have been abraded, and the material available for study is poor. See the discussion under *elegantula* above.

The holotype is now in the Bishop Museum.

**Hyposmocoma (Hyposmocoma) nephelodes** Walsingham (figs. 782, palpus; 847, wing venation; 937, moth; 1136, 1137, male genitalia; 1246, female genitalia).

*Hyposmocoma nebulifera* Walsingham, 1907*b*:628, 735, pl. 23, fig. 26; homonym, not of Walsingham, 1907*b*:555.

*Hyposmocoma nephelodes* Walsingham, 1908*b*:109; replacement name.

Endemic. Oahu (type locality: Waianae Mountains, holotype female, allotype male), Maui?

Hostplant: unknown (“beaten from dead boughs”).

“When combining tentative MS. genera, abandoned through the occurrence of intermediate forms, the idionym *nebulifera* was inadvertently included *twice* in the genus *Hyposmocoma*. The dionym *Hyposmocoma nebulifera* must be employed to designate no. 147, while, for no. 293, which requires a new name, **nephelodes** nn. is suggested.” (Walsingham, 1908*b*:109.)

As my illustrations of the male genitalia demonstrate, there are considerable differences in the shapes of the male genital valvae of the holotype from Oahu and a paratype from Maui. I have not determined whether this is individual variation or whether it indicates that different species are represented.

**Hyposmocoma (Hyposmocoma) niger** Walsingham (figs. 937, moth; 1137, male genitalia).

*Hyposmocoma niger* Walsingham, 1907*b*:582, pl. 20, fig. 15.

Endemic. Molokai (type locality: about 4,000 feet).

Hostplant: unknown.

This moth is known only from the male holotype.

**Hyposmocoma (Hyposmocoma) nigralbida** Walsingham (figs. 847, wing venation; 937, moth; 1138, male genitalia; 1246, female genitalia).

*Hyposmocoma nigralbida* Walsingham, 1907*b*:551, pl. 18, fig. 7.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

The sclerotized processes of the sixth and seventh segments of the male abdomen are extraordinary, as the illustration demonstrates. The valvae are rather similar to those of *liturata*, but that species has no processes on the sixth abdominal segment (see figures 1101, 1103, 1138).

**Hyposmocoma (Hyposmocoma) nigrescens** Walsingham (figs. 847, wing venation; 938, moth; 1139, male genitalia).

*Hyposmocoma nigrescens* Walsingham, 1907*b*:581, pl. 20, fig. 13.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

I have seen only male specimens.

**Hyposmocoma (Hyposmocoma) nividorsella** Walsingham (figs. 848, wing venation; 940, moth; 1140, male genitalia; 1246, female genitalia).

*Hyposmocoma nividorsella* Walsingham, 1907*b*:552, pl. 18, fig. 8.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) notabilis** Walsingham (figs. 786, palpus; 848, wing venation; 940, moth; 1141, male genitalia; 1247, female genitalia).

*Hyposmocoma notabilis* Walsingham, 1907*b*:556, pl. 18, fig. 17.

Endemic. Molokai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

This species has been known from one pair collected by Dr. Perkins on Molokai, but Dr. Swezey told me that he found the species on Mt. Tantalus, Oahu, in 1909. He also reported (1910*e*:140): "Larva in a nearly smooth subcylindrical case bulged in the middle. Among fibrous matter at base of palm leaves." I presume that the palm was *Pritchardia* and that the material referred to was that collected in 1909. Without study of the specimens in question, I do not wish to accept these data as applying to *notabilis* and have removed the Oahu data from the records of this species.

Fullaway (1914*b*:19–20) recorded this species from Laysan Island on the basis of "larval case only, and it had emergence hole of a parasite." I consider this an unfortunate, erroneous, and careless record.

**Hyposmocoma (Hyposmocoma) numida** Walsingham (figs. 940, moth; 1141, male genitalia).

*Hyposmocoma numida* Walsingham, 1907*b*:581, pl. 20, fig. 12.

Endemic. Maui (type locality: Haleakala, 4,000 feet).

Hostplant: unknown.

This moth is known only from the male holotype.

**Hyposmocoma (Hyposmocoma) ochreocervina** Walsingham (figs. 779, palpus; 849, wing venation; 942, moth; 1143, male genitalia; 1248, female genitalia).

*Hyposmocoma ochreocervina* Walsingham, 1907b:612, pl. 22, fig. 23.

Endemic. Oahu (type locality: Waianae Mountains, about 3,000 feet).  
Hostplant: unknown, but the moths were beaten from *Metrosideros*.

**Hyposmocoma (Hyposmocoma) ochreociliata** Walsingham (figs. 781, palpus; 850, wing venation; 942, moth; 1144, male genitalia; 1248, female genitalia).

*Hyposmocoma ochreociliata* Walsingham, 1907b:618, pl. 23, fig. 9.

Endemic. Hawaii (type locality: Kilauea).  
Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) oxypetra** Meyrick (figs. 866, wing venation; 943, moth).

*Hyposmocoma oxypetra* Meyrick, 1935a:65.

Endemic. Oahu (type locality: Pacific Heights, Honolulu).  
Hostplant: unknown.

The female holotype, now in the Bishop Museum, has lost its abdomen and right hindwing. Dr. Swezey considered that a deformed specimen he reared from a larval case found on a *Pandanus* leaf on Kauai also belonged to this species, but I have not accepted his records. A male abdomen glued to the Swezey specimen proves to be closely similar to that of *hygroscopa* Meyrick, a Kauai species, with which he may have confused it.

In his original description, Meyrick said, "Head whitish—centrally suffused brownish." This is confusing because the lower part of the face above the proboscis is white and a patch of scales above each eye is white; otherwise, the entire top of the head is clothed with dark scales. The mesotibiae are brown, narrowly edged by white beneath and at apex, and they have a diagonal white submedial fascia. The hind legs are lost from the female holotype. The larval case is somewhat similar to that of *trimaculata*? as on figure 799 (middle of bottom figure).

**Hyposmocoma (Hyposmocoma) paradoxa** Walsingham (figs. 779, palpus; 1351, wing venation; 945, moth; 1146, male genitalia; 1249, female genitalia).

*Hyposmocoma paradoxa* Walsingham, 1907b:613, pl. 22, fig. 25.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).  
Hostplant: unknown.

Originally, this moth was also reported from Molokai, but Walsingham's type series is mixed, and I have deleted the Molokai record. As figure 1146 demonstrates, the Molokai paratype examined represents a distinct species which may be designated temporarily as new species 24.

**Hyposmocoma (Hyposmocoma) new species 24** (figs. 851, wing venation; 1146, male genitalia).

*Hyposmocoma* confused as a paratype of *paradoxa* from Molokai by Walsingham, 1907b:613; BM male genitalia slide 7502).

Endemic. Molokai (above 3,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) parda** (Butler) (figs. 779, palpus; 946, moth; 1147, male genitalia; 1209, 1249, female genitalia).

*Laverna parda* Butler, 1881:406.

*Hyposmocoma parda* (Butler) Walsingham, 1907b:623, pl. 23, fig. 17.

Endemic. Maui (type locality: Haleakala, about 4,000 feet; Blackburn's field code numbers on the holotype are "81.7 125"), Hawaii.

Hostplant: unknown. Blackburn thought that it was "apparently connected with dead wood." It is a close ally of *saliaris*.

**Hyposmocoma (Hyposmocoma) partita** Walsingham (figs. 947, moth; 1148, male genitalia; col. pl. 7:5).

*Hyposmocoma partita* Walsingham, 1907b:554, pl. 18, fig. 12.

Endemic. Hawaii (type locality: Hilo, 2,000 feet).

Hostplant: unknown.

This is a close ally of *malornata*. The male genitalia of the unique holotype resemble *malornata*, but the moths are differently colored.

Dr. Swezey told me that in 1906 he had reared the species from a dead twig of an unidentified plant on Mt. Tantalus, Oahu, and that no larval case was made. However, I do not believe that Swezey's material was correctly identified. The larva of *partita* is probably a case-maker. Dr. Beardsley told me that the single specimen reared by Dr. Swezey, formerly in the collection of the Hawaiian Sugar Planters' Experiment Station, is now in fragmentary condition and has lost its abdomen. I have, therefore, deleted Oahu from the record of this species.

**Hyposmocoma (Hyposmocoma) patriciella** Walsingham (figs. 947, moth; 1149, male genitalia).

*Hyposmocoma patriciella* Walsingham, 1907b:577, pl. 20, fig. 4.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

Walsingham (1907b:578) stated that there is a "mealy patch on the under side of the forewings", but I cannot see such an area. I believe that he was confused by the strong iridescence in certain lights. What he called purple appears to me to be brown with strong iridescence. Observations made with the aid of a hand lens might have misled Walsingham. Only the male holotype is known.

**Hyposmocoma (Hyposmocoma) persimilis** Walsingham (figs. 798, female genitalia; 851, wing venation; 948, moth; 1149, male genitalia).

*Hyposmocoma persimilis* Walsingham, 1907b:598, pl. 21, fig. 21.

Endemic. Hawaii (type locality: Kona).

Hostplant: unknown.

The holotype is a male. The specimen designated as the female type (allotype) is also a male.

**Hyposmocoma (Hyposmocoma) petroscia** Meyrick (figs. 779, palpus; 852, wing venation; 949, moth; 1148, 1149, male genitalia).

*Hyposmocoma petroscia* Meyrick, 1915a:340.

Endemic. Oahu (type locality: Koolau Mountains).

Hostplant: unknown.

Although Meyrick said that he had both sexes when he described the species, the six specimens in the type series are all males. I have not seen the female.

**Hyposmocoma (Hyposmocoma) phalacra** Walsingham (figs. 779, palpus; 852, wing venation; 950, moth; 1151, male genitalia; 1249, female genitalia).

*Hyposmocoma phalacra* Walsingham, 1907b:625, pl. 23, fig. 20.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) pharsotoma** Meyrick (figs. 951, moth; 1147, 1150, male genitalia).

*Hyposmocoma pharsotoma* Meyrick, 1915a:341.

Endemic. Oahu (type locality: Koolau Mountains, near Honolulu).

Hostplant: unknown.

The male genitalia of this species have a greatly reduced tegumen. The species is known only from the male holotype.

**Hyposmocoma (Hyposmocoma) picticornis** Walsingham (figs. 786, palpus; 951, moth; 1151, 1152, 1153, male genitalia; 1250, female genitalia).

*Hyposmocoma picticornis* Walsingham, 1907b:594, pl. 21, fig. 14.

Endemic. Molokai (type locality: above 3,000 feet).

Hostplant: unknown.

This moth was described from specimens from Molokai and Maui. The specimens from Maui differ somewhat from the Molokai specimens, and they may tentatively be distinguished as the subspecies below.

**Hyposmocoma (Hyposmocoma) new subspecies of picticornis?** (figs. 788, metapleural sense organ; 852, wing venation; 1154, male genitalia).

Endemic. Maui (Olinda, Haleakala, 4,000 feet).

Hostplant: unknown.



The male and female paratypes of *picticornis* from Maui are distinguishable from the typical specimens from Molokai. If the differences observed are not individual, the Maui material represents either a new subspecies or a new species. The Maui specimens are closely similar to the Molokai type. However, the forewings have a different tint, and the fuscous areas on the base of the costa of the forewing extend distinctly farther distad on the Maui form. The costal areas of the right male genital valvae differ in the specimens I have examined, as figures 1151 to 1154 demonstrate.

**Hyposmocoma (Hyposmocoma) progressa** Walsingham (figs. 954, moth; 1250, female genitalia).

*Hyposmocoma progressa* Walsingham, 1907*b*:561, pl. 18, fig. 25.

Endemic. Maui (type locality: Haleakala, below 4,000 feet).

Hostplant: unknown.

Described from only two females.

**Hyposmocoma (Hyposmocoma) prophantis** Meyrick (figs. 781, palpus; 825, wing venation; 954, moth; 1211, female genitalia).

*Hyposmocoma prophantis* Meyrick, 1915*a*:342.

Endemic. Oahu (type locality: Koolau Mountains, near Honolulu).

Hostplant: unknown.

This moth was described from a series of three females. I have not seen the male.

**Hyposmocoma (Hyposmocoma) propinqua** Walsingham (figs. 955, moth; 1155, male genitalia).

*Hyposmocoma propinqua* Walsingham, 1907*b*:580, pl. 20, fig. 9.

Endemic. Molokai (type locality: 4,000 feet).

Hostplant: unknown.

See the notes under *admirationis* for a list of allied species. This moth is known only from the male holotype.

**Hyposmocoma (Hyposmocoma) pseudolita** Walsingham (figs. 779, palpus; 853, wing venation; 955, moth; 1155, male genitalia).

*Hyposmocoma pseudolita* Walsingham, 1907*b*:625, pl. 23, fig. 21.

Endemic. Oahu (type locality: Waianae Mountains), Molokai?, Hawaii?

Hostplant: unknown.

I am not satisfied with the recorded details regarding the supposed distribution of this species. I have neither seen males from Molokai or Hawaii, nor have I studied an Oahu female.

**Hyposmocoma (Hyposmocoma) punctiplicata** Walsingham (fig. 957, moth).

*Hyposmocoma punctiplicata* Walsingham, 1907*b*:584, pl. 20, fig. 21.

Endemic. Molokai (type locality: above 4,500 feet).

Hostplant: unknown.

Only the female holotype is known, and its abdomen is lost.

**Hyposmocoma (Hyposmocoma) quinquemaculata** Walsingham (figs. 781, palpus; 853, wing venation; 958, moth; 1157, male genitalia; 1251, female genitalia).

*Hyposmocoma quinquemaculata* Walsingham, 1907b:619, pl. 23, fig. 11.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

Dr. Swezey (1926b:76) erroneously listed this species from Necker and Nihoa, in the Leeward Hawaiian Islands, on the basis of a number of poor specimens. He misidentified *malornata* as *quinquemaculata*. See the notes under *malornata*.

**Hyposmocoma (Hyposmocoma) rhabdophora** Walsingham (figs. 960, moth; 1251, female genitalia).

*Hyposmocoma rhabdophora* Walsingham, 1907b:571, pl. 19, fig. 19.

Endemic. Molokai (type locality: above 4,000 feet).

Hostplant: unknown.

Only the female holotype is known.

**Hyposmocoma (Hyposmocoma) rubescens** Walsingham (figs. 782, palpus; 854, wing venation; 961, moth; 1160, male genitalia; 1252, female genitalia).

*Hyposmocoma rubescens* Walsingham, 1907b:628, pl. 23, fig. 27.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Walsingham included three female specimens from Maui in his type series. I have deleted this Maui record because it is probable that the Maui specimens represent a different species.

**Hyposmocoma (Hyposmocoma) sabulella** Walsingham (figs. 783, palpus; 855, wing venation; 962, moth; 1163, male genitalia; 1252, female genitalia).

*Hyposmocoma sabulella* Walsingham, 1907b:565, pl. 19, fig. 4.

Endemic. Kauai (type locality: Halemanu, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) saccophora** Walsingham (figs. 779, palpus; 799, larval case; 963, moth; 1164, 1165, male genitalia; 1227, female genitalia).

*Hyposmocoma saccophora* Walsingham, 1907b:604, pl. 22, fig. 4.

Endemic. Oahu (type locality: allotype male, Waianae Mountains; holotype female, Mt. Kaala, 3,000 feet).

Hostplant: larva evidently lichenivorous, algivorous, or fungivorous.

This moth was described from a series of seven specimens from Oahu, one male from Molokai, and one female from Kauai. The type series is a mixture of several species. A male from near the head of Kawailoa Gulch, Oahu, and possibly an associated female whose abdomen has been lost; the specimen from Molokai; and that from Kauai represent three other species

which I have designated below as new species 25, 26, and 27. I have also studied an associated new species from Nihoa and Necker which I have called new species 28.

Of the seven specimens from Oahu, four were collected in the Waianae Mountains and the remaining three were collected near the head of Kawailoa Gulch in the Koolau Mountains. I have examined three of the four former specimens and two of the three latter specimens. The Kawailoa Gulch specimens represent a distinct species which need not be immediately discussed further.

In addition to these specimens, I have studied other Koolau Mountain specimens collected by Dr. Swezey and thought to be *saccophora*. I have illustrated the male genitalia of one of these in figure 1165. This specimen displays certain divergent characters which indicate that it may represent a different form, subspecies, or species. The spurs of the right valva are definitely shorter than those of the allotype and paratype, the genital flaps are differently shaped, and the left spurs and the pseuduncus appear somewhat different. In the male paratype from the Waianae Mountains (Walsingham specimen 25903) the three spurs of the right valva, and the genital flaps, are similar to those of the allotype. The left valva of the paratype has three long spurs, but because one or two of the spurs have been broken off the allotype, they cannot be compared. The pseuduncus of the paratype resembles that of the allotype more than it does the specimen from the Koolau Mountains (BM slide 14300). Without additional specimens, I cannot decide whether or not this Koolau Mountain form is distinct from the Waianae Mountain type.

The larvae, in their long, posteriorly pointed, slender, hornlike, or elongate thornlike portable cases (figure 799), are often abundant on rocks covered with lichens and mosses. I have observed them on steep slopes of consolidated lava cinders and on the near vertical walls of road cuttings and other such steep slopes. They may, of course, occur on level substrates, but they are more easily observed on near vertical areas where there is less debris to conceal them and to confuse the observer.

Perkins collected the larval case, and it was described by Walsingham (1907b:604): "The larval case is in the form of a somewhat stout thorn; whitish, mottled with greyish fuscous, and with a straight opening at the larger extremity which is fitted with a lid, like the operculum of a univalve mollusc." However, it was never revealed how remarkable it is. The case is made by incorporating large numbers of small sand grains in a silk matrix. The cases I measured are between 9.5 and 10.0 mm. long. They are bicolored, pale beneath and dark above, rather like the coloration of a fish. The differences in color are obtained by more completely enclosing the sand grains in pale silk in the paler areas and leaving more of the grains exposed to form the darker dorsum. Thus, the paler sides and venter are sharply set off from the distinctly darker dorsum.

The head end of the larval case is closed by a remarkable operculum. On the underside of the operculum the larva spins a mat of silk. This may be grasped by the mandibles of the larva and pulled down to close the aperture. Astonishingly, the larva attaches stone weights to the top of the operculum, and these would appear to assist in the closing of the operculum.

The larva must enlarge its case several times as it grows to maturity. Each time it extends the case it must remove the stone weights from the top of the operculum, push the operculum upward and incorporate it into the structure of the roof, build a new operculum, and attach a new set of stone weights.

It is interesting to observe that the anterior parts of the body of the larva are more heavily sclerotized and pigmented. The thoracic legs are quite long, and the larva bears great resemblance to the larvae of the Trichoptera.

I cannot suggest what environmental pressure may have led to such a remarkable adaptive divergence in the species group. This species and its associates belong to *Hyposmocoma sensu stricto* in which most, if not all, of the included species are case-makers. There are no ants in the endemic Hawaiian fauna and ants could not have influenced the evolution of the operculum. Endemic *Odynerus* wasps, which formerly were very numerous in Hawaii, are known to prey on the naked larvae of the Xyloryctinae, Carposinidae, and, most especially, the Tortricidae. None is known to prey upon any *Hyposmocoma* larvae. Although our lack of knowledge does not preclude the possibility of their having attacked some species, it appears doubtful that they placed much, if any, pressure on these *Hyposmocoma*. There are various small hymenopterous parasites which are known to parasitize some *Hyposmocoma* larvae, but we know little or nothing about the threat that they may have posed to *Hyposmocoma*. I doubt that it was great.

I do not know of any bird that preyed upon *Hyposmocoma* larvae, and that remarkable observer, Dr. R.C.L. Perkins, never mentioned such predation. Should a bird prey upon these small larvae, I presume that it would either tear open the case and extract the larva or swallow the case and its included larva. An operculum would not, therefore, be a deterrent to bird predation.

The Hawaiian carabid beetle fauna is extensive. It may have been that carabids fed extensively on the larvae, but we have no evidence regarding such predation. Many of the case-makers are found on various surfaces or under bark or in vegetable debris where they could easily be found by Carabidae and their larvae. The case-making species are exposed feeders in contrast with the many concealed feeders which are known in the subgenus *Euperissus* and which do not make cases.

I first observed this, or a closely allied species, in March, 1937, when I prepared the following note: "The larvae appear to feed upon algae or fungi growing on damp rocks. The larvae keep building their cases from the head end by sealing their lids to the sides of the cases along the dorso-lateral lines and then building on to the sides and the end of the lid. As they spin their silk for the cases, small grains of sand, etc., are incorporated into the substance to form part of its structure. When full-grown, the larva uses silk to attach the case by the head end to the rock, and it then hangs tail downward to pupate."

**Hyposmocoma (Hyposmocoma) new species 25** (fig. 1252, female genitalia).

*Hyposmocoma* species confused as a female paratype of *saccophora* by Walsingham, 1907b:604 (Walsingham specimen 26917; BM slide 8079).

Endemic. Kauai (3,000 to 4,000 feet).

Hostplant: unknown.

The ostium of this species is very different from that of the female holotype of *saccophora*. The bursa copulatrix is also distinct.

**Hyposmocoma (Hyposmocoma) new species 26** (fig. 855, wing venation).

*Hyposmocoma* species confused as a paratype of *saccophora* by Walsingham, 1907b:604 (Walsingham specimen 25651; B.M. slide 5472).

Endemic. Oahu (near the head of Kawailoa Gulch).

Hostplant: unknown.

This species has a small pseuduncus which is obviously unlike the long pseuduncus of true *saccophora*. Unfortunately, the male genital valvae were lost during the slide mounting process before I saw them so that I am unable to supply information on these all-important structures.

**Hyposmocoma (Hyposmocoma) new species 27** (fig. 1166, male genitalia).

*Hyposmocoma* species confused as a male paratype of *saccophora* by Walsingham, 1907b:604 (Walsingham specimen 26141; BM slide 7327).

Endemic. Molokai (above 3,000 feet).

Hostplant: unknown.

The figure of the genitalia of the male paratype demonstrates that this specimen represents a species distinct from *saccophora*. Moreover, it belongs to a different species group—it should be placed in or near the *adelphella* group.

**Hyposmocoma (Hyposmocoma) new species 28** (fig. 1167, male genitalia).

*Hyposmocoma mimica*, as a misidentification by Swezey, 1926b:76.

Endemic. Necker and Nihoa Islands.

Hostplant: unknown.

This is another small, white and fuscous species. Each forewing is about 4.0 mm. long. The hindwings of the male lack subcostal brushes. The male genitalia indicate that this species belongs to the *saccophora* group. This moth may have the thornlike larval cases which have been observed in the Leeward Islands, although there may be more than one species in the *saccophora* group in the Leeward Islands.

**Hyposmocoma (Hyposmocoma) saliaris** Walsingham (figs. 782, palpus; 855, wing venation; 964, moth; 1169, male genitalia; 1209, 1253, female genitalia).

*Hyposmocoma saliaris* Walsingham, 1907b:624, pl. 23, fig. 19.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

This species appears to be a close ally of *parda*.

**Hyposmocoma (Hyposmocoma) scapulella** (Walsingham), **new combination** (figs. 766, head, wing venation; 964, moth).

*Rhinomactrum?* *scapulellum* Walsingham, 1907b:531, pl. 16, fig. 25.

Endemic. Hawaii (type locality: Olaa).

Hostplant: unknown.

Only one female of this moth is known, and its abdomen is lost. It is not allied to *rutilella*, the type-species of Walsingham's genus *Rhinomactrum*, which belongs to subgenus *Euperissus*. The metanotum is clothed with broad squamae with only a few slender squamae laterad.

**Hyposmocoma (Hyposmocoma) schismatica** Walsingham (figs. 779, palpus; 856, wing venation; 965, moth; 1169, male genitalia; 1210, 1253, female genitalia).

*Hyposmocoma schismatica* Walsingham, 1907b:603, pl. 22, fig. 2.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

Walsingham compared this species with *modesta* and *metrosiderella*, but the species are really not close allies.

**Hyposmocoma (Hyposmocoma) scolopax** Walsingham (figs. 857, wing venation; 966, moth; 1170, male genitalia; 1254, female genitalia).

*Hyposmocoma scolopax* Walsingham, 1907b:629, pl. 23, fig. 28.

Endemic. Kauai (type locality: 3,000 to 4,000 feet), Molokai.

Hostplant: unknown.

I have not seen a male from Molokai, but externally the two Molokai females in the British Museum are closely similar to specimens from Kauai.

**Hyposmocoma (Hyposmocoma) semicolon** (Walsingham), **new combination** (figs. 768, head, wing venation; 967, moth; 1171, male genitalia; 1225, female genitalia).

*Dysphoria semicolon* Walsingham, 1907b:548, pl. 18, fig. 2. The type-species of *Dysphoria*.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplant: unknown.

Although Perkins collected a long series of this species, I have no record of its having been rediscovered. The wing venation displays considerable individual variation. In the forewings, veins 4 and 5 may be connate or stalked, and in the hindwings, veins 4 and 5 may be approximate, connate, or stalked. The genitalia are what I call "strong" *Hyposmocoma* type. In the male, the pseuduncus is strongly developed, and the spurs on the valvae are heavy. The ostium of the female is strongly developed and snaillike. I can find no reason to separate this species generically from *Hyposmocoma*—it is a normal member of the nominate subgenus.

**Hyposmocoma (Hyposmocoma) semifusa** (Walsingham), **new combination** (figs. 780, palpus; 815, wing venation; 968, moth; 1224, female genitalia).

*Neelysia semifusa* Walsingham, 1907b:547, pl. 17, fig. 28.

Endemic. Molokai (type locality: about 4,000 feet).

Hostplant: unknown.

Although this species was described as a *Neelysia*, the typical members of which group belong to subgenus *Euperissus*, *semifusa* belongs to *Hyposmocoma sensu stricto*. Only two females are known.

**Hyposmocoma (Hyposmocoma) sideritis** Walsingham (figs. 968, moth; 1172, male genitalia; 1254, female genitalia; 1352, wing venation).  
*Hyposmocoma sideritis* Walsingham, 1907b:608, pl. 22, fig. 15.

Endemic. Maui (type locality: Olinda, 4,000 feet).

Hostplant: unknown.

Only the type pair of specimens is known.

**Hyposmocoma (Hyposmocoma) similis** Walsingham (figs. 857, wing venation; 969, moth; 1173, male genitalia).  
*Hyposmocoma similis* Walsingham, 1907b:617, pl. 23, fig. 6.

Endemic. Hawaii (type locality: Kona, 4,000 feet).

Hostplant: unknown.

Does *similis* represent a fully distinct species, or is it a pale form of *malornata*? See the notes under *malornata* for a discussion of allied forms. I have not examined a female.

**Hyposmocoma (Hyposmocoma) somatodes** Walsingham (figs. 970, moth; 1174, male genitalia; 1254, female genitalia; 1352, wing venation).  
*Hyposmocoma somatodes* Walsingham, 1907b:630, pl. 24, fig. 3.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

Only the type pair is known.

**Hyposmocoma (Hyposmocoma) straminella** Walsingham (figs. 858; 973, moth; 1175, male genitalia; 1255, female genitalia).  
*Hyposmocoma straminella* Walsingham, 1907b:576, pl. 19, fig. 28.

Endemic. Hawaii (type locality: Kona, 3,500 to 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) subcitrella** Walsingham (figs. 801, larval case; 858, wing venation; 974, moth; 1177, male genitalia; 1255, female genitalia).

*Hyposmocoma subcitrella* Walsingham, 1907b:632, pl. 24, fig. 6.

Endemic. Kauai (type locality: Kaholuamano, 4,000 feet).

Hostplants: lichens? on bark of *Cheirodendron* and *Metrosideros*.

Walsingham (1907b:632) said: "The larval case, which is coated with frass, is streaked with black, especially along its lower edge; it bulges in the middle and is attenuate to either end, the ends obtuse."

**Hyposmocoma (Hyposmocoma) subflavidella** Walsingham (figs. 779, palpus; 859, wing venation; 975, moth; 1178, male genitalia; 1210, 1255, female genitalia).

*Hyposmocoma subflavidella* Walsingham, 1907b:569, pl. 19, fig. 15.

Endemic. Maui (type locality: Haleakala, 5,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) subscolopax** Walsingham (figs. 784, palpus; 859, wing venation; 976, moth; 1181, male genitalia; 1256, female genitalia).

*Hyposmocoma subscolopax* Walsingham, 1907b:629, pl. 24, fig. 1.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

This species has a subcostal brush on the hindwing. Although its genitalia are only slightly different from those of *tetraonella*, that species lacks the subcostal brush. Moreover, this species has only a very small, incipient pseuduncus whereas *tetraonella* has a strong, fully developed pseuduncus.

**Hyposmocoma (Hyposmocoma) suffusa** (Walsingham), **new status** (figs. 860, wing venation; 896, moth; 1182, male genitalia; 1234, female genitalia).

*Hyposmocoma domicolens* variety *suffusa* Walsingham, 1907b:563, pl. 18, fig. 27.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

This moth was recorded originally from Kauai as well as the type locality of Hawaii. I have deleted the Kauai record which was based on a single female that appears to represent a different species.

Walsingham was in error when he designated this as a variety of *domicolens*. It is a fully distinct species, as an examination of the genitalia will demonstrate.

**Hyposmocoma (Hyposmocoma) suffusella** (Walsingham), **new status** (figs. 860, wing venation; 926, moth; 1113, 1114, male genitalia; 1256, female genitalia).

*Hyposmocoma lupella* variety *suffusella* Walsingham, 1907b:564, pl. 19, fig. 1.

Endemic. Molokai (type locality: above 3,000 feet), Maui.

Hostplant: *Pipturus*.

The larva is known to be a case-maker. The male genitalia of a paratype from Maui are near those of the Molokai holotype. However, the male genitalia of specimens from Kauai and Oahu display distinct differences which indicate that a series of species has been confused under the name *suffusella*. This condition is similar to that found in *candidella*. I consider *suffusella* specifically distinct from *lupella* to which it was attached as a "variety" by Walsingham. It is allied to *lupella* as well as to *candidella*. The so-called paratypes from Kauai and Oahu may be tentatively listed as the two undescribed species 30 and 31.



**Hyposmocoma (Hyposmocoma) new species 30** (fig. 1115, male genitalia).

*Hyposmocoma* species confused with *suffusella* by Walsingham, 1907b:564 (BM male genitalia slide 7335).

Endemic. Kauai (Kaholuamano, 4,000 feet).

Hostplant: unknown.

This species is represented by a paratype of *suffusella* whose male genital valvae differ from those of true *suffusella*.

**Hyposmocoma (Hyposmocoma) new species 31** (fig. 1116, male genitalia).

*Hyposmocoma* species confused with *suffusella* by Walsingham, 1907b:564 (BM male genitalia slide 7334).

Endemic. Oahu (Waianae Mountains, about 2,000 feet).

Hostplant: unknown.

This species is represented by another "paratype" of *suffusella* whose male genitalia differ from true *suffusella*, as illustrated.

In supplementary remarks, 1907b:734, Walsingham mentions specimens from the northwest Koolau Mountains which may also belong here.

**Hyposmocoma (Hyposmocoma) swezeyi** (Busck), **new combination** (figs. 977, moth, larval case; 1031, male genitalia; 1213, female genitalia).

*Petrochroa swezeyi* Busck, 1914b:105.

Endemic. Oahu (type locality: Kaimuki, Honolulu).

Hostplant: larva lichenivorous?

The larvae make small, oval, flattened cases covered with particles of soil. They have been found on rocks. See the notes under the following species heading.

The holotype is in the U.S. National Museum.

**Hyposmocoma (Hyposmocoma) new species 32** (fig. 773, head, wing venation).

*Petrochroa* species confused with *swezeyi* in collections (BM slide 5212).

Endemic. Oahu (Kaimuki, Honolulu).

Hostplant: larva lichenivorous?

This form appears closely allied to *swezeyi*, but its male genitalia display differences which indicate that a species complex is involved here. When Busck described *swezeyi*, he noted that the cell in the hindwing is closed. On the specimen of this species whose wings I figure, the cell is open. Further study of this complex is obviously required.

**Hyposmocoma (Hyposmocoma) syrrhaptēs** Walsingham (figs. 779, palpus; 861, wing venation; 978, moth; 1183, male genitalia; 1256, female genitalia).

*Hyposmocoma syrrhaptēs* Walsingham, 1907b:612, pl. 22, fig. 24.

Endemic. Kauai (type locality: holotype male 3,000 to 4,000 feet; allotype female, Halemanu, 4,000 feet).

Hostplant: unknown.

This moth belongs to the *iodes* complex and is not allied to *mimema* as Walsingham appeared to suggest.

**Hyposmocoma (Hyposmocoma) tarsimaculata** Walsingham (figs. 784, palpus; 861, wing venation; 978, moth; 1184, male genitalia).

*Hyposmocoma tarsimaculata* Walsingham, 1907b:618, 734, pl. 23, fig. 8.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Walsingham included one female from Oahu (from near the head of Kawailoa Gulch) in his type series. I have deleted the Oahu record from the distribution of this species because I consider the determination of the specimen doubtful. Walsingham also recorded the species from the northwest Koolau Mountains of Oahu in his supplementary remarks on page 734 of *Fauna Hawaiiensis*, but I have not been able to locate such material in the British Museum. Perhaps the specimens are in Honolulu.

**Hyposmocoma (Hyposmocoma) tenuipalpis** Walsingham (figs. 861, wing venation; 979, moth; 1185, male genitalia; 1257, female genitalia).

*Hyposmocoma tenuipalpis* Walsingham, 1907b:557, pl. 18, fig. 19.

Endemic. Molokai (type locality: forest above Pelekunu).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) tetraonella** Walsingham (figs. 784, palpus; 791, 1186, male genitalia; 862, wing venation; 980, moth; 1257, female genitalia).

*Hyposmocoma tetraonella* Walsingham, 1907b:630, pl. 24, fig. 2.

*Hyposmocoma tetraonis* Walsingham, 1907b:632, misspelling (applies to this species?).

Endemic. Hawaii (type locality: Kona, holotype male 4,000 feet; allotype female, 3,500 feet).

Hostplant: unknown.

The male genitalia are similar to those of *subscolopax*, with rather minor differences, but this species lacks a subcostal brush which is developed on the hindwing of *subscolopax*.

**Hyposmocoma (Hyposmocoma) thiatma** Meyrick (fig. 980, moth).

*Hyposmocoma thiatma* Meyrick, 1935a:67.

Endemic. Maui (type locality: Olinda).

Hostplant: unknown.

A state of confusion surrounds the treatment of this species. Meyrick had four examples before him when he described the species (plus another specimen which he considered probably to be this species), but, strangely, it appears that he did not retain any specimens. Moreover, there is not even a name label for the species in his collection. He described *thiatma* from four specimens which he considered to be females. At least one of these four specimens is a male, however. The holotype (now in the Bishop Museum) is a female whose abdomen has been lost. I have not seen the other two specimens and cannot

comment upon them.

Meyrick wrote (1935a:67): "Maui: Olinda, May 13, 1926 (O. H. Swezey); 4 examples. Taken with these on the same day is a single male, which, I think, is probably the other sex of the same species; it is similar, but has the subdorsal streak white, not extending into cilia, and also has a suffused white elongate costal spot about middle and a shorter one at about  $\frac{3}{4}$ ."

At this writing, I have before me the holotype female, one male paratype (considered by Meyrick to be a female), and the other male discussed by Meyrick in the foregoing quotation. The two males are obviously different species, and each of them belongs to a different species group. The male mentioned by Meyrick has a strong, broad pseuduncus, but the male paratype lacks the pseuduncus. The armature of the valvae is conspicuously different in the two species. The male paratype belongs to the group including *auripennis*, *illuminata*, and others, whereas the male discussed by Meyrick may belong to, or near, the *anisoplecta*-like species group. Hence, there are three species represented by these three similar-appearing specimens.

In the holotype female the longitudinal pale vitta of the forewing is more yellow or cream-colored. This color extends through the fringes, and the tegulae and sides of the mesonotum are yellow. In the male paratype the vitta is more white, it does not extend through the cilia, and the tegulae and sides of the mesonotum are not yellow. The same applies to the second male specimen, but its mesonotum is abraded so that I cannot ascertain its normal coloration. This specimen has a submedial and a preterminal white costal macula as noted by Meyrick.

I regret that I have not had all of Meyrick's series before me so that I could make a more detailed report on this complex. It is composed of species which occur together and are externally so closely similar that the renowned expert Meyrick was led to consider them all one species, yet when their male genitalia are studied they are revealed as conspicuously distinct species. There are many such confusing groups of species in *Hyposmocoma*. It is necessary to dissect almost every specimen studied to be sure of the identity of the material.

**Hyposmocoma (Hyposmocoma) new species 33** (fig. 1352, wing venation).

*Hyposmocoma* species confused as a paratype of *thiatma* by Meyrick, 1935a:67, and there stated to be a female whereas it is a male.

Endemic. Maui (Olinda).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) new species 34.**

*Hyposmocoma* species thought probably to represent the male of *thiatma* by Meyrick, 1935a:67.

Endemic. Maui (Olinda).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) thoracella** Walsingham (figs. 782, palpus; 981, moth; 1257, female genitalia; 1352, wing venation).

*Hyposmocoma thoracella* Walsingham, 1907*b*:568, pl. 19, fig. 11.

Endemic. Lanai (type locality: above 2,000 feet).

Hostplant: unknown.

The male holotype bears the British Museum male genitalia slide number 4104. However, no photograph of it was prepared when the *Hyposmocoma* genitalia were being illustrated, and I have been unable to locate such a slide in the collection. This is most unfortunate because only the one male is known.

**Hyposmocoma (Hyposmocoma) tomentosa** Walsingham (figs. 982, moth; 1257, female genitalia).

*Hyposmocoma tomentosa* Walsingham, 1907*b*:605, pl. 22, fig. 6.

Endemic. Hawaii (type locality: Kona, 3,000 feet).

Hostplant: unknown.

This moth was described from two females, and I have not seen the male.

**Hyposmocoma (Hyposmocoma) torella** Walsingham (figs. 784, palpus; 982, moth; 1187, male genitalia).

*Hyposmocoma torella* Walsingham, 1907*b*:627, pl. 23, fig. 24.

Endemic. Molokai (type locality: not definitely known because the type bears no specific locality data for Molokai. However, it was collected by Perkins on June 12, 1893, and on that date Perkins collected at least some insects which he designated as lot 176 from the mountains at 3,000 feet).

Hostplant: unknown.

Only the male holotype is known.

**Hyposmocoma (Hyposmocoma) torquata** Walsingham (figs. 925, moth; 1258, female genitalia).

*Hyposmocoma torquata* Walsingham, 1907*b*:556, pl. 18, fig. 16.

Endemic. Kauai (type locality: 3,000 to 4,000 feet).

Hostplant: unknown.

Walsingham, in his original description, said that the holotype is a male, but it is a female. The paratype is also a female. Walsingham's statement that the male lacks a subcostal brush on the hindwing is meaningless—he had not seen a male.

**Hyposmocoma (Hyposmocoma) trifasciata** (Swezey), **new combination** (fig. 983, moth).

*Petrochroa trifasciata* Swezey, 1915*e*:97.

Endemic. Hawaii (type locality: Laupahoehoe).

Hostplant: larva lichenivorous?

The color pattern of this moth is unusual; see figure 983. Unfortunately, the unique female holotype in the Bishop Museum has lost its abdomen. It was reared from a larval case found by Dr. Swezey "on rocks at the top of the sea-cliff." He said that the larval case was "3 mm. long, oval, of white silk covered with minute particles of sand and dirt."

**Hyposmocoma (Hyposmocoma) trimaculata** Walsingham (figs. 779, palpus; 799, larval case of this species?; 864, wing venation; 984, moth; 1189, male genitalia; 1258, female genitalia).

*Hyposmocoma trimaculata* Walsingham, 1907*b*:598, pl. 21, fig. 22.

Endemic. Oahu (type locality: Waianae Mountains).

Hostplants: lichens? on and beneath the bark of *Acacia koa* and *Aleurites moluccana*.

Parasites: *Atrometus tarsatus* Ashmead, *Lepideupelmus setiger* (Perkins).

The larva forms "a short subcylindrical case, constricted near each end, covered with minute bits of lichen. . . ." (Swezey, 1910*e*:140). I have not verified the determination of the Swezey material.

See the notes under *admirationis* for a list of allied species.

**Hyposmocoma (Hyposmocoma) trimelanota** Meyrick (fig. 984, moth).

*Hyposmocoma trimelanota* Meyrick, 1935*a*:66.

Endemic. Hawaii (type locality: Kilauea).

Hostplant: unknown.

Only the male holotype, now in the Bishop Museum, is known, and it has lost its abdomen and right forewing.

**Hyposmocoma (Hyposmocoma) tripartita** Walsingham (figs. 984, moth; 1189, male genitalia; col. pl. 6:7).

*Hyposmocoma tripartita* Walsingham, 1907*b*:567, pl. 19, fig. 10.

Endemic. Molokai (type locality: 4,000 feet).

Hostplant: unknown.

The female is not known.

**Hyposmocoma (Hyposmocoma) triptila** Meyrick (figs. 779, palpus; 825, wing venation; 985, moth; 1190, male genitalia).

*Hyposmocoma triptila* Meyrick, 1915*a*:340.

Endemic. Oahu (type locality: Koolau Mountains, collected by Perkins in 1908, no further locality given).

Hostplant: unknown.

On the left male genital valva is a most unusual, enormous, trowellike modified seta. It is a most singular development and one of the most extreme forms of genital spur that I have yet seen in this remarkable genus. I have only seen the two males originally described by Meyrick.

**Hyposmocoma (Hyposmocoma) trossulella** Walsingham (figs. 986, moth; 1191, male genitalia).

*Hyposmocoma trossulella* Walsingham, 1907*b*:554, 734, pl. 18, fig. 13.

Endemic. Oahu (type locality: Waianae Mountains, about 2,000 feet).

Hostplant: unknown.

This moth is also supposed to occur in the Koolau Mountains, but I have only seen the male holotype from the Waianae Mountains.

**Hyposmocoma (Hyposmocoma) turdella** Walsingham (figs. 781, palpus; 864, wing venation; 986, moth; 1192, male genitalia; 1259, female genitalia).

*Hyposmocoma turdella* Walsingham, 1907b:631, pl. 24, fig. 5.

Endemic. Lanai (type locality: 2,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) unistriata** Walsingham (figs. 864, wing venation; 987, moth; 1190, male genitalia; 1259, female genitalia; col. pl. 6:6).

*Hyposmocoma unistriata* Walsingham, 1907b:578, pl. 20, fig. 6.

Endemic. Molokai (type locality: holotype male, forest above Pelekunu; allotype female, 4,000 feet).

Hostplant: unknown.

**Hyposmocoma (Hyposmocoma) vermiculata** Walsingham (figs. 865, wing venation; 988, moth; 1193, male genitalia).

*Hyposmocoma vermiculata* Walsingham, 1907b:585, pl. 20, fig. 23.

Endemic. Molokai?, Hawaii (type locality: Kilauea).

Hostplant: unknown.

Walsingham included two female examples from Molokai in his original series. Pending study of males from Molokai, I prefer to question the locality record. I have not examined a female from the island of Hawaii.

This species appears quite similar to *marginenotata*. See the comments under that species name above, and note the unusual vestiture of the vannus of the hindwing.

**Hyposmocoma (Hyposmocoma) vinicolor** Walsingham (figs. 782, palpus; 865, wing venation; 989, moth; 1259, female genitalia).

*Hyposmocoma vinicolor* Walsingham, 1907b:615, pl. 23, fig. 3.

Endemic. Oahu (type locality: Waianae Mountains, 3,000 feet).

Hostplant: unknown.

This moth was described from two females. I have not seen the male.

**Hyposmocoma (Hyposmocoma) virgata** Walsingham (figs. 866, wing venation; 989, moth; 1194, male, female genitalia; col. pl. 7:1).

*Hyposmocoma virgata* Walsingham, 1907b:572, pl. 19, fig. 21.

Endemic. Molokai (type locality: about 4,000 feet), Maui.

Hostplant: unknown.

(Text continued on page 1701.)