

*Henry G. Bess*

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(with 2 Plates)



HONOLULU, HAWAII.  
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with upper half black and lavender mixed, lower half white; one has black tubercles, in the other they are concolorous. Head green with black vertical band in middle of each lobe; one has almost whole side of head black.

Pupa—23-25 mm.; similar to *H. andremona*, except that it has the cremaster slightly produced (spines the same) and there is a black dorsal protuberance on posterior margin of mesothorax; the metathorax is longitudinally striate, whereas in *andremona* it is smooth. Pupa formed in cell in the soil.

Meyrick in "Macrolepidoptera" of the "Fauna Hawaiianis" considers *velans* to be a native race of *andremona*, which is an American species, and that the typical specimens caught by Dr. Perkins were recent immigrants. Be that as it may, the differences shown above for the larvæ and pupæ taken in connection with the differences in the adults, seems to me to be sufficient to consider them as distinct species; i. e., if *velans* is derived from *andremona*, it has become sufficiently modified as to be considered a species.

#### Note on *Plagithmysus perkinsi* Sharp [Col.]

BY W. M. GIFFARD.

(Presented by O. H. Swezey.)

I have just been fortunate enough to breed this beetle from a larva I brought back with me from the neighborhood of the Volcano House, Kilauea, Hawaii, June 6, 1908. On that date, I took a finely matured specimen on a "naieo" tree (*Myoporum sandwicense*) and noticing signs of decay on the tree, as well as traces of the larva of this insect, I cut a section of the trunk and brought the same with me to Honolulu. Ever since that time, I have been watching and following up the boring of the larva beneath the bark, having on two occasions come onto the larva, fortunately however, not damaging it.

For the period between June 6, 1908, and the emergence of the imago, I have had the section of wood enclosed in a sack at my Tantalus home. The sack and all have been dipped twice per week in pure rain water, and besides the wood has been exposed to sunshine at various intervals. The imago emerged May 25, 1909. The larva had bored about 8 inches in a zigzag manner, during the 11 months I had it in my possession.

*Plagithmysus perkinsi* is one of the rarer species and difficult at present to obtain unless under the most favorable circumstances. So far as I know, it has not before been bred from the larva.

JULY 1st, 1909.

The fifty-third regular meeting was held in the usual place, Mr. Swezey in the chair.

PAPERS READ.

**The Ebony Leaf-miner (*Gracilaria mabaella*) [Lep., n. sp.]**

BY OTTO H. SWEZEY.

On a trip to Niu Ridge, towards the southeastern end of the Koolau Range of mountains on Oahu, May 16th, 1909, in a grove of native ebony trees (*Maba sandwicensis* and *M. hillebrandii*) it was observed that a great many of the leaves had been mined by some insect. They were mostly old mines in old leaves, the trees at the time just putting forth a new growth, and the new leaves were yet unmined. Search was made for leaves containing the miner, to ascertain its identity, but nothing was found in any of the leaves. However, Mr. Jacob Kotinsky, who was one of the party, found on a leaf a cocoon which he turned over to me for rearing. The moth which emerged in a few days was a *Gracilaria* of a species different from those already described from these islands.

May 31st, while in the forest of the Koolau mountains above the Wahiawa homesteads, I came upon a small ebony tree, and its leaves were similarly mined. I also found one cocoon, from which a moth of the same species of *Gracilaria* emerged in a few days.

June 27th, I made another trip to Niu Ridge. This time I was so successful as to find a few new leaves of ebony that were mined, and in some of them were nearly full-grown larvæ which I succeeded in rearing to maturity. I also succeeded in catching a few moths by sweeping the foliage of the lower branches of the trees. All were of the same species reared from the cocoons previously mentioned.

In Microlepidoptera of the Fauna Hawaiiensis, two species of *Gracilaria* are described. One, *Marginestrigata*, mines the leaves of *Sida*, *Xanthium* and *Datura*, and is very abundant on the lowlands of Oahu. The other, *epibathra*, is rare, and its

habits are unknown.\* This one mining leaves of the native ebony is very different from the other two species. I have named it for its foodplant.

*Gracilaria mabaella* n. sp. [Fam. Tineidae].

(Plate 3, fig. 6.)

Antennae dark fuscous, longer than fore wing. Palpi slender, ascending, dark fuscous, white above near apex of second segment and at base and apex of terminal segment. Maxillary palpi filiform, white inside, fuscous outside. Head purplish fuscous, some whitish scales in front. Thorax purple. Forewings purple with a few scattering whitish ochreous scales, an ill-defined whitish ochreous patch near base and a wide costal streak of the same color, beginning at about one-fourth and extending to near apex with two extensions dorsally to the fold; several dark dots on costa; cilia fuscous. Hindwings and cilia uniform fuscous. Abdomen fuscous above, pale yellowish below. Fore and hind femora and tibiae brownish fuscous; tarsi white, fuscous at apex of segments. Hind femora white with a fuscous spot on outer side near apex; tibiae and tarsi light fuscous above, whitish below.

Full-grown larva—About 7mm., pale yellowish-white; head concolorous, eyes dark; head and following segment a little wider than the rest of the body; abdominal prolegs on segments 7 to 9.

Pupa—4.6 mm., very slender; pale greenish-white, eyes dark brown; head with a pointed projection in front; wing-cases extend to near apex of 6th abdominal segment, free beyond 4th segment; posterior leg-cases extend slightly beyond apex of abdomen, antenna-cases extend a little farther; cremaster unarmed; dorsum of abdomen covered with minute, short, backward-projecting spines, probably for assistance in emergence; abdominal segments beyond 4th movable. Pupa becomes darker as time for emergence approaches.

The usual form of mine begins near margin of leaf towards base, approaches the margin, then follows it to near apex, thence to midrib which it follows downward, soon widening quite regularly to a broad blotch extending nearly or quite to the base of the leaf. On the old leaves these blotches are conspicuous by their having become blackened after the emergence of the larva.

The larva emerges from the mine to construct its cocoon, which is rounded-oval, white and parchment-like, about 7 mm. long by 4 mm. wide, and is made on the surface of the leaf in a depression, or a slight fold at the margin.

The resting position of the moth is with the anterior end of

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\*I have more recently ascertained that this species mines the leaves of *Dubautia*.

the body raised at an angle of 45°, supported by the fore and middle legs which are placed together, the hind legs being extended backward beneath the body and concealed by the wings, whose tips touch the surface of the leaf. The antennae are folded on the back.

**Notes on Some Insects Observed in South China Which Are Also Common in Hawaii.**

BY F. W. TERRY.

The following brief notes may be of interest in showing the possible source of some of our commoner insect introductions; especially when one considers the early date at which vegetable and other products commenced to be imported from South China to Honolulu and other ports on these islands.

LEPIDOPTERA.

*Zinckenia fascialis* Cram. (*Hymenia recurvalis* Fab.). This little pyralid, which has a wide distribution throughout the Neotropical and Oriental regions, was observed commonly around Hong Kong and Kowloon, the larvæ feeding upon Amarantaceous and Chonopodiaceous weeds, as they do here.

HYMENOPTERA.

VESPIDAE.

*Polistes hebraeus* Fab. and *P. macaensis* Feb. were both fairly common around Hong Kong and Kowloon, although not so much in evidence as they are here.

EVANIIDAE.

Several species were observed, but *Evania appendigaster* Linn. was the most abundant around Hong Kong and Kowloon, and also at Macao; a high percentage of Blattid oothecæ being infested by this species.

The following observations were made on its life-history:

A ♀ was observed ovipositing Aug. 20th, the process of piercing the oothecal wall and depositing the egg occupying about

15 minutes. From this ootheca a ♀ parasite emerged Sept. 29th. The period thus occupied from oviposition to the adult being 40 days.

## CHALCIDIDAE.

The little chalcid, *Tetrastichus hagenowii* Ratzeb., was also common in Blattid oothecæ.

## COLEOPTERA.

## MELOLONTHIDAE.

*Adoretus umbrosus* Waterh. A few specimens of this beetle were collected both at Hong Kong and Macao, but it was far from common, and is probably controlled by parasites or predators.

## ELATERIDAE.

*Melanoxanthus melanocephalus* Thunb., fairly common around Hong Kong.

## DIPTERA.

## SYRPHIDAE.

*Eristalis tenax* L. and *E. punctulatus* Macq. both common around Hong Kong and Kowloon, the latter species also from Macao.

*Eumerus marginatus* Grims., not collected by me, but a ♀ was taken by Mr. F. Muir at Howlik, South China, 1907. Also a ♂ collected by him at Amboina, Moluccas, May, 1909. These records are interesting, since the species was originally described by Grimshaw from specimens collected by Dr. Perkins in Honolulu, 1900.\* At the time, however, Mr. Grimshaw expressed doubt as to the endemic claims of this syrphid.

## MUSCIDAE.

As one might expect, *Musca domestica* Linn. and *Stomoxys calcitrans* Linn. were abundant. *Lucilia dux* Esch.\*\* was also common, both at Macao and Hong Kong, in dead animal matter

\* Fauna Hawaïensis III, pt. 1, p. 82.

\*\* Specimens identified as this species, I suspect to belong to the genus *Pycnosoma*.

and refuse. A small blood-sucking muscid, closely allied to *Lyperosia*, but quite distinct from our introduced *L. serrata*, was observed commonly on cattle; being especially partial to water-buffaloes. An attempt was made to breed it in cattle-manure, but with practically negative results, only one larva feeding up, which suggests that this is not its normal food, for both fresh and old material were used.

Several small *Acalyptratae* and *Ortalidae*, also common here, were collected, but have not been identified.

#### TRYPETIDAE.

*Dacus cucurbitae* Coq. was found to be fairly common in native gardens at Kowloon. Several infested cucurbits were collected, with the hope that parasites might be bred out, but without results.

#### ORTHOPTERA.

##### ACHETIDAE.

*Gryllotalpa africana* Fab., a specimen taken in a moist field in Kowloon.

##### ACRIDIIDAE.

*Oxya velox* Fab., fairly numerous near Macao.

*Atractomorpha crenaticeps* Blanch., rather common around Hong Kong and Kowloon.

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### AUGUST 5TH, 1909.

The fifty-fourth regular meeting of the Society was held in the usual place.

Member elected.....W. R. R. POTTER

#### NOTES AND EXHIBITIONS.

Mr. Swezey exhibited some ears of corn from Hamakuapoko, Maui, which had been attacked by the sugar cane borer (*Sphenophorus obscurus*). The larvæ had in some instances bored up through the stem of the ear from the stalk and formed a cocoon for pupation within the cob. Some had eaten amongst the ker-



nels more or less. He was of the opinion that this was the first record of this weevil attacking corn.

Mr. Rock reported having observed a good deal of dead Hawaiian sumach at Kailua, Hawaii. He thought it had apparently been killed by some insect, but did not discover what.

### Notes on Maui Insects.

BY D. B. KUHNS.

Following are a few observations on insects during a recent trip to Maui:

At the hotel in Wailuku, I was astonished at the number of egg batches of *Siphanta acuta* Walk. that were attached to the veranda post, sides of the walls and leaves of the bird's-nest fern, *Asplenium nidus* L. Upon examination almost every batch of eggs showed the exit holes of a parasite, probably *Aphanomerus pusillus* Perk. A papaya tree in Judge Kingsbury's yard was riddled by larvæ and adults of *Pseudobius longulus* Boh.

In company with Mr. A. Hayselden at Lahaina, I observed *Epitragus diremptus* Karsch. feeding on the leaves of an orange tree, which seems contrary to the general opinion that this insect does not feed on green leaves.

A large *Araucaria* tree in a yard was the home of thousands of ants of the species *Camponotus maculatus* var. *hawaiiensis* Forel. They had eaten large galleries underneath the bark of the tree, and if they had not been disturbed they would have soon killed the tree.

The cocoanut leafroller *Omiodes blackburni* Butl. had stripped the leaves of all the cocoanut trees in Wailuku, but at Lahaina the damage was not noticeable, although the insects were present.

### *Adenoneura falsifalcellum* Wlsm. (A Correction).

BY OTTO H. SWEZEY.

The moth whose habits are given under the name *Enarmonia* sp. on page 15 of Vol. II, No. 1, Proc. Haw. Ent. Soc., I have recently ascertained to be *Adenoneura falsifalcellum* Wlsm. Recently, the Microlepidoptera and the Coleoptera of the fam-

ilies Elateridæ, Staphylinidæ and miscellaneous other families, collected for the "Fauna Hawaiiensis," have been received at the Bishop Museum (i. e. the Bishop Museum's share) worked-out and labelled. It was by comparing my specimens of this moth with those in the collection that I have learned its true identity. Those in the Museum collection were collected by Dr. Perkins at Oloa, Hawaii.

**Notes on *Dromaeolus arduus* Sharp [Col.]**

BY OTTO H. SWEZEY.

On July 5th, 1909, while Mr. Fullaway and myself were collecting insects on one of the ridges of Palolo Valley, Oahu, we found a large number of the larvæ of what proved to be this species of Eucnemini. They were in the wet, soft, rotten wood of dead stems of *Scaevola chamissoniana*. Many were full-grown and had formed elongate oval cells in the wood for pupation, and were lying therein folded in a loop with the two extremities near together. A few cells were found with pupæ in, and from these adults emerged beginning July 19th and for a few days following.

The larvæ of this subfamily of Elateridæ are quite remarkable in structure. They have no legs, and it is very difficult to find any mouth-opening in some of them. The mandibles are peculiar in that they open outward instead of closing together, as is the usual way. The head is usually armed with saw-like teeth, which assist in burrowing in wood by free movements of the head. They have been but little studied. Dr. Sharp figures the larva of an Hawaiian species in *The Cambridge Natural History, Insects, Part II, p. 260*. It does not give all the details present in the larva of *arduus*.

Full-grown larva of *arduus*—17-18 mm.; pale yellowish, head mostly brown, also a little brown at posterior extremity; nearly cylindrical, somewhat compressed, especially at the extremities; moderately constricted between segments; head strongly compressed to a sharp margin, narrower than succeeding segments, front margin nearly straight for a short distance, then evenly curved around each side, which is armed with 7 slightly backward-projecting teeth or serrations; mandibles ob-

scure, perhaps obsolete, Segment 2 strongly compressed in front thickening posteriorly, with some brown chitinized patches both dorsally and ventrally; a median elongate somewhat roughened patch both dorsally and ventrally. Similar roughened patches anteriorly on the other segments, those of segments 3 and 4 somewhat horseshoe-shaped; those of segments 5-12 round or roundish-oval; a median-round or oval ring near posterior margin of segments 4-12 both dorsally and ventrally. Segment 13 has a patch of short, conical, backwardly-directed spines on ventral side, in front of it a curved line of similar spines; probably these and the roughened patches on the segments are concerned with locomotion, assisting the larva in working its way through the soft, rotten wood; this segment is thickened, somewhat compressed, blunt and rounded posteriorly, punctuate all over posterior portion. Spiracles circular, brown, situated on segments 3, 5-12.

The pupa is pale yellowish white; 7-8 mm.

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#### SEPTEMBER 9TH, 1909.

The fifty-fifth regular meeting of the Society was held in the usual place.

#### NOTES AND EXHIBITIONS.

Mr. Fullaway exhibited a collection of insects recently made on Molokai and gave notes on the same.

Mr. Kirkaldy reported that the mantid (*Tenodera sinensis*) formerly reported only from Hamakua and Hilo districts of Hawaii, was now present in Kohala, Hawaii.

Mr. Kotinsky exhibited a peculiar *Pseudococcus*, possibly a new species, recently collected on *Straussia* on Tantalus.

Mr. Kotinsky reported having several times recognized *Pseudococcus nipae* on green-house palms (*Kentia* sp.) coming from Springfield, Ohio.

**Life-History of *Syrirta oceanica* Macq. [Dipt.]**

BY F. W. TERRY.

This little syrphid was originally described from the collection of M. Bigot by Macquart in 1854. The habitat given for the type (a female) is rather vague and suggests a wide distribution, being stated as "De l'Océanie, Otaiti et Nouvelle Zelande." Although so common in the plains and lower elevations, hovering around flowers, especially *Compositae*, its life-history had remained obscure until a ♀ was observed ovipositing under the partially detached bark of a small twig upon the ground in a damp location, Pauoa, near Honolulu, on May 30th, 1909. Rotten guavas were lying in abundance in the vicinity, but although several female adults hovered around them, no further oviposition was observed. Upon examination, 33 eggs were found loosely inserted. These hatched four days later (3, vi, 09), and the larvæ were placed in media similar to that surrounding the place of oviposition, and consisting of wet, decayed *Hepaticae* and guavas. These larvæ fed up readily, remaining invariably immersed in their pabulum, with merely the respiratory tube visible. They commenced to pupate June 22nd; adults emerging July 2nd to 5th. The life-cycle is approximately thus: Incubation period, 4 days; larval period about 19 days; pupal period about 11 days. Total about 34 days.

Egg.—White, narrowly ovoid; .6 x .2 mm.; the entire surface uniformly covered with minute elongate thickenings of the chorion, giving it that reticulated appearance so characteristic of many Dipterous ova.

Larva.—Upon emergence the minute larva is very translucent and difficult to distinguish from its moist food-material. The adult larva is about 14 x 3 mm., pale testaceous and amphipneustic, and bears a very general resemblance to that of *Volucella obesa* Fab. (a common non-indigenous species) but the stigmatic tubes are relatively more slender and longer. The integument is uniformly covered with short whitish hairs.

Head.—Completely retracted and hidden, buccal cavity conspicuous, mouth-hooklets hidden. Antennae arise from a raised

common base, basal segment large and swollen, bearing an extero-lateral prolongation which somewhat resembles in size and appearance the small cylindrical 2nd and minute papilliform 3rd segments.

**Thorax.**—The thoracic segments are much coalesced and ill-defined; the ventral tubercles of the 1st approximate to the mouth, folding around the latter; dorsally this segment bears a pair of small papilliform stigmata, the ventral tubercles of 2nd and 3rd segments are well-developed and bear numerous setæ and hooklets.

**Abdomen.**—A slight constriction separates the thoracic and abdominal regions, the latter consists of 9 segments, many of the ventral tubercles are so well developed as to function as pseudopods. 1st-5th segments, pseudopods well developed, bearing numerous setæ and hooklets; 6th-7th segments, pseudopods and hooklets less developed; 8th segment bears a pair of small, pointed ventral and two pairs of large lateral pointed tubercles, pseudopods absent. 9th segment bears a pair of lateral pointed tubercles and is terminated by the strongly chitinized stigmatic tubes.

**Puparium.**—6 x 3 mm., dark, dull testaceous, thoracic stigmatic tubes shining testaceous one-eighth the total length of puparium, apices rather swollen. Posterior stigmatic tubes shining testaceous one-sixth total length, apex fringed. The three pairs of postero-lateral tubercles distinctly visible, as in the larva. The puparium bears a strong general resemblance to that of *Volucella obesa* but both thoracic and posterior stigmatic tubes are much longer relatively in *Syritta*.

The various stages in the life-history of this fly are figured on Plate 4, as below:

Fig. 5. Egg of *Syritta oceanica* Macq. — x 100.

Fig. 6. Portion of chorion showing thickened areas of the membrane. — x 400.

Fig. 7. Adult larva of *S. oceanica* (dorsal view); a, thoracic stigma; b, antenna; c, posterior stigmatic tube.

Fig. 8. Anterior extremity of larva (ventral view); a, basal antennal segment; a<sup>1</sup>, lateral process of same; a<sup>2</sup>, 2nd antennal segment; a<sup>3</sup>, minute 3rd segment; b, buccal cavity; c, 1st thoracic pseudopod; d, 2nd thoracic pseudopod. — x 30.

Fig. 9. Puparium; a, thoracic stigmatic tube. — x 12.

**Generic Synopsis of Hawaiian Microlepidoptera**  
(Tineina of Walsingham).

BY OTTO H. SWEZEY.

These synoptic tables are formulated for a help in the use of "Microlepidoptera" of the Fauna Hawaiiensis. The families are given the same as therein, and all genera included which are treated of there. Though imperfect, yet the author considers that these tables will be useful in distinguishing genera, by anyone studying Hawaiian "Micros." Six families are represented, with 57 genera.

TABLE OF FAMILIES.

1. Labial palpi mostly short and obtuse..... (V) TORTRICIDAE.  
Labial palpi mostly long, slender and acute .....2.
2. Upper surface of forewings with tufts of raised scales.....  
..... (IV) CARPOSINIDAE.  
Upper surface of forewings without tufts of raised scales  
(sometimes present in *Hyposmocoma*; present in *Diplosara*)...3.
3. Maxillary palpi rudimentary .....4.  
Maxillary palpi developed (absent in *Philodoria*).....5.
4. Hindwings with 8 more or less distinctly connected with cell,  
termen usually sinuate ..... (I) GELECHIADAE.  
Hindwings with 8 not connected with cell, termen not sinu-  
ate ..... (II) OECOPHORIDAE.
5. Forewings with 7 and 8 usually stalked (coincident in *Ba-  
trachedra*, separate in *Plutella*)....(III) HYPONOMEUTIDAE.  
Forewings with 7 and 8 usually separate (coincident in *Ereu-  
netis*, 8 out of 7 in *Opogona*, 7 and 8 stalked in *Setomorpha*,  
sometimes stalked in *Tinea* and *Monopis*)....(VI) TINEIDAE.

(I) GELECHIADAE.

1. Wings much reduced ..... **Hodegia**.  
Wings normal .....2.
2. Palpi of ♂ with strong brush of long hair-scales.. **Stoerberhinus**.  
Palpi of ♂ not as above .....3.
3. Hindwings with apex pointed, produced .....4.  
Hindwings with apex rounded, not produced .....5.
4. Cell of hindwing about  $\frac{3}{4}$ ..... **Aristotelia**.  
Cell of hindwing little more than  $\frac{1}{2}$ ..... **Phthorimaea**.
5. ♂ with tuft of hair in costal fold of hindwing .....6.  
♂ without above tuft .....7.
6. Antennae bipectinate ..... **Ptychothrix**.  
Antennae filiform, pubescent ..... **Thyrocpa**.

7. Palpi short, projecting scarcely more than length of head beyond it ..... **Psychra**.
- Palpi recurved above vertex ..... 8.
8. Forewings with 11 veins (7 and 8 coincident) ..... 9.
- Fore wings with 12 veins ..... 10.
9. Fore wings with 2 and 3 stalked ..... **Autosticha**.
- Forewings with 2 and 3 separate ..... **Merimnetria**.
10. Antennae strongly serrate anteriorly ..... **Catamempsis**.
- Antennae not as above ..... **Gelechia**.

## (II) OECOPHORIDAE.

(Only one genus) ..... **Ethmia**.

## (III) HYPONOMEUTIDAE.

1. Forewings with 10 veins; hindwings with 6 veins... **Batrachedra**.
- Forewings with 11 or 12 veins; hindwings with 7 or 8 veins.... 2.
2. Forewings with 11 veins..... 3.
- Forewings with 12 veins..... 6.
3. Hindwings with 5 absent..... **Elachista**.
- Hindwings with all veins present..... 4.
4. Forewings with 7 to termen..... **Mapsidius**.
- Forewings with 7 to apex..... **Rhinomactrum**.
- Forewings with 7 to costa..... 5.
5. Forewings with 6 out of 7; hindwings with 6 and 7 stalked....
- ..... **Aphthonetus**.
- Forewings with 6 and 7 separate; hindwings with all veins separate ..... **Neelysia**.
6. Forewings with 7 to termen..... 7.
- Forewings with 7 to, or near, apex..... 8.
- Forewings with 7 to costa..... 9.
7. Forewings with 7 and 8 stalked; hindwings with 4 absent.. **Prays**.
- Forewings with 7 and 8 separate; hindwings with all veins present ..... **Plutella**
8. Forewings with 7 to apex; hindwings with 6 and 7 long-stalked ..... **Oecia**.
- Forewings with 7 to slightly above apex; hindwings with all veins separate ..... **Hyposmocoma**.
9. Hindwings with 6 absent..... **Endrosis**.
- Hindwings with 6 present..... 10.
10. Hindwings with 6 and 7 stalked..... 11.
- Hindwings with 6 and 7 separate..... 12.
11. Forewings with 6 out of 7..... **Stigmatophora**.
- Forewings with 6 and 7 separate..... **Agonismus**.
12. Hindwings with 4 absent..... **Blastobasis**.
- Hindwings with all veins present..... 13.
13. Forewings with 4 and 5 stalked..... **Dysphoria**.
- Forewings with 4 and 5 separate..... 14.
14. Antennae of ♂ with basal joint strongly curved, flattened and dilated, with well-developed pecten..... **Bubaloceras**.
- Antennae of ♂ not as above ..... 15.

15. Head thickly clothed above, the scales more or less upstanding ..... **Hyperdasys**.  
 Head smooth, the scales appressed.....16.  
 16. Posterior tibiae clothed above with long, dense hairs.. **Diplosara**.  
 Posterior tibiae with short hairs.....17.  
 17. ♂ with a fringe of hair-scales along lower edge of cell from the base to its middle ..... **Euperissus**.  
 ♂ without above fringe of hair-scales..... **Semnoprepia**.

## (IV) CARPOSINIDAE.

- (Only one genus) .....
- Heterocrossa**
- .

## (V) TORTRICIDAE.

- Lower median vein of hindwings hairy towards base; uncus not developed ..... **Oleuthreutinae**.  
 Lower median vein of hindwings not hairy; uncus developed ..... **Tortricinae**.

## OLEUTHREUTINAE.

1. Antennae of ♂ with an excised notch above basal joint..... **Eccoctocera**.  
 Antennae of ♂ without above notch .....2.  
 2. Hindwings of ♂ with a strong glandular fold on the under-side on vein 1c extending nearly its whole length.. **Adenoneura**.  
 Hindwings of ♂ without such character.....3.  
 3. Hindwings of ♂ with a pouch-like fold along vein 2, containing a thick tuft of scales on the upper side.... **Cryptophlebia**.  
 Hindwings of ♂ without such character.....4.  
 4. Hindwings with 3 and 4 separate ..... **Bactra**.  
 Hindwings with 3 and 4 stalked.....5.  
 5. Forewings with termen strongly sinuate..... **Gypsonoma**.  
 Forewings not as above.....6.  
 6. Forewings with 3 and 4 parallel, recurved so that at termen 4 is very close to 5..... **Crocidosema**.  
 Forewings with 3 and 4 parallel, but 4 not approaching 5 at termen as above ..... **Enarmonia**.

## TORTRICINAE.

1. Forewings with 7 and 8 stalked.....2.  
 Forewings with 7 and 8 separate.....3.  
 2. Forewings in ♂ with costal fold..... **Capua**.  
 Forewings in ♂ without costal fold..... **Epagoge**.  
 3. Forewings in ♂ without costal fold.....4.  
 Forewings in ♂ with costal fold.....5.  
 4. Antennae in ♂ biciliated with fine long cilia..... **Dipterina**.  
 Antennae in ♂ shortly ciliated..... **Tortrix**.  
 Antennae in ♂ strongly bipectinate ..... **Panaphelix**.  
 5. Fore wings of ♂ with fringe of long hairs along costal fold..... **Pararrhaptica**.  
 Forewings of ♂ without above fringe..... **Archips**.



## (VI) TINEIDAE.

1. Forewings with 4 veins, 3-10 absent.....*Opostega*.  
Forewings with more than 4 veins.....2.
2. Forewings with 7 veins, 3-5 and 8 absent.....*Bedellia*.  
Forewings with 10 veins, 3 and 4 coincident, 7 and 8 coincident .....*Ereunetis*.  
Forewings with 11 veins, 10 absent.....*Opogona*.  
Forewings with 12 veins.....3.
3. Forewings with 3 and 4 stalked.....4.  
Forewings with 3 and 4 not stalked.....5.
4. Forewings with 7 to apex.....*Setomorpha*.  
Forewings with 7 to costa.....*Monopis*.  
Forewings with 7 to termen.....6.
6. Hindwings with cell closed between 4 and 5.....*Tinea*.  
Hindwings with cell open between 4 and 5.....7.
7. Maxillary palpi present .....*Gracilaria*.  
Maxillary palpi absent .....*Philodoria*.
8. Hindwings with 5 and 6 stalked.....*Acrolepia*.  
Hindwings with 5 and 6 separate.....*Paraphasis*.

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OCTOBER 7TH, 1909.

The fifty-sixth regular meeting of the Society was held in the usual place.

Mr. G. W. Kirkaldy made the following nominations for honorary membership:

"I beg to submit to you the names of three Entomologists, that they may be balloted for at the next meeting, and enrolled among our Honorary Members.

"During the past few years we have felt that it would be injudicious to increase our Honorary list, but that we should rather wait until our Society had become well established. The time has now come, however, when, in my opinion, we should increase the number of Honorary Members to five, at which number it should stand. We shall soon enter upon our sixth year. We have published 300 pages of entomological matter, with seven plates and several text-figures, the greater part of this relating to the Hawaiian fauna. We are unique in that we are the only publishing Entomological Society outside Europe and America north of Mexico. I therefore feel sure that the three Entomologists whose names I am about to propose will appreciate the recognition from us—the little band of working

Entomologists stationed in the Hawaiian Islands—of their long-continued efforts to increase the knowledge of the Hawaiian Insect Fauna. The three names are: Dr. David Sharp, Dr. R. C. L. Perkins, and the Rev. Thos. Blackburn.

“Dr. Sharp’s interest in the Faunas of the Pacific has been very practical. He has published a great number of descriptions of Coleoptera of these islands and of New Zealand especially. The New Zealand Institute placed him on its Roll of Honour in 1877. His first paper on Hawaiian Insects was published as far back as 1878, and he has now contributed about a dozen papers, including a good deal to the ‘Fauna Hawaiiensis,’ of which he is the editor. It is not too much to say, I believe, that had it not been for Dr. Sharp’s pains and patience, the explorations of these islands, under Dr. Perkins, would not have been maintained all these years, nor would they have been conducted so thoroughly that today there is no country in the world, except those of Western Europe, whose natural products are so thoroughly known.

“Dr. Perkins was the mainstay of this Society during its early years. He has a unique knowledge of the archipelago and its products, and has unselfishly devoted a large part of his life to unravelling the intricate and interwoven threads of Evolution here. He has also been the most valuable and the most voluminous contributor to the literature of the natural history of the islands. A short time ago Dr. Perkins was given the degree of Doctor of Science by Oxford University, this being largely due to the acknowledged value of his work here.

“The Rev. Thos. Blackburn was stationed in Honolulu from 1876 to 1886. His opportunities for entomological work were small, but the pioneer work was done by him. He published some 15 papers between 1877 and 1888, principally on Coleoptera, joining with Dr. Sharp in the lengthy paper which appeared in the Transactions of the Dublin Society in 1885, and it was on his collections in all Orders that the earlier papers of Sharp, Bates and McLachlan were based.

“In submitting these names to you I must insist on the propriety of a society of such a nature as ours limiting the Honorary List to such entomologists as have done work of acknowledged merit on the fauna of these islands, and I think that these are decidedly the three principal ones that could be selected on such a basis.”

Mr. Kirkaldy exhibited a box containing series of the following Scutellerine bugs showing great color-variation:

1.—*Chrysocoris grandis* from Macao.

2.—*Tectocoris diopthalmus* from Australia, Amboina, Fiji, and New Caledonia.

3.—*Lampromicra leucocyanea* from Biara.

4.—*Poecilocoris druræi* from Macao.

The first and fourth series were collected by Mr. Kershaw.

### Some New Species of Hawaiian Lepidoptera.

BY OTTO H. SWEZEY.

*Genophantis leahi* n. sp. [Fam. Phycitidæ].

(Plate 3, fig. 1.)

♂, ♀, 18-20 mm. Antennae, palpi, head, legs and thorax nearly uniform whitish grey. Abdomen shining whitish ochreous. Forewings whitish grey, sprinkled with fuscous, the fuscous scales tending to form lines on the veins, sometimes quite a wide suffused fuscous streak medianly the whole length of wing, usually a narrow whitish ochreous streak along the fold; lines obsolete; usually a black dot in the cell, another at end of cell; a terminal series of black dots; cilia grey with two whitish lines. Hindwings grey, terminally fuscous; cilia whitish grey, light fuscous at base.

The larvæ of this moth feed abundantly on the leaves of *Euphorbia cordata*. I have collected them and reared quite a number of the moths from this plant on the slopes of Diamond Head Crater, Oahu, on several occasions during the past three years. I have named the species for the Hawaiian name of this crater—"Leahi." I have also collected the larvæ from the same plant at Waialua and Waimea, Oahu, on the beach; and on *Euphorbia pilulifera* (a garden weed) in Kaimuki, Oahu.

The larvæ hide in a web spun between adjacent leaves and along the stem. They eat one surface and mesophyll of the leaf, leaving the other epidermis; hence, their presence on the plant is indicated by the webbed dead leaves. The pupa is formed in a slight cocoon amongst these or amongst leaves, etc., on the ground.

Full-grown larva—15 mm., light yellowish, with a wide blackish stripe on each side just above the line of spiracles, three narrower lines on dorsum between these two (these are lacking:

in younger stages); head with a black spot enclosing each eye cluster, a black spot in the upper outer part of each lobe, sometimes a small spot about middle of each lobe; cervical shield has two longitudinal black stripes wide apart, also a little blackened on lateral margins; tubercles minute; hairs pale; spiracles light brown; feet pale like the ventral side.

Pupa—8 mm., pale yellowish brown; wing, leg- and antenna-cases extend to apex of 4th abdominal segment; abdomen terminates very bluntly, with two curved bristles near together at apex, two situated somewhat dorsally and a little farther apart and one at each extreme side directed laterally; two dorsal pits at base of segment 9.

*Limnerium blackburni* is quite common as a parasite on the larvæ of this moth. From a batch of larvæ collected, usually more parasites are reared than moths.

*Scoparia lycopodiae* n. sp. [Fam. Pyraustidæ].

(Plate 3, fig. 2.)

♂, ♀. 16-19 mm. Antennae light fuscous. Head and thorax fuscous mixed with whitish. Palpi light fuscous, whitish above and on inner side. Abdomen grey, segmental margins whitish. Forewings with fuscous and whitish scales nearly uniformly mixed, the fuscous predominating in a subterminal streak; lines obsolete; orbicular and discal dots not defined; cilia whitish with fuscous line at base. Hindwings light fuscous, termen darker; cilia light fuscous, darker at base.

This species comes near to Meyrick's description of *S. epimystis*, but differs chiefly in the lines being obsolete.

Described from 4 specimens reared from pupæ found within the stems of *Lycopodium cernuum*, in the Koolau Mountains of Oahu, above Wahiawa, at an elevation of about 1,800 feet, May 31st, 1909; and one specimen reared from pupa similarly situated, Palolo Valley near Kaau Crater, July 5th, 1909.

In the former locality attention was attracted by the numerous dead tips of the plant, which on examination disclosed the fact that they had been bored for several inches by some insect. The larva was present in a few instances as well as the pupæ mentioned above. The larva apparently enters when quite small and bores downward in the middle of the stem. Having become full-grown, it gnaws a round hole nearly through to the exterior, then pupates just below, where it can readily emerge through the hole at the final transformation.

The full-grown larva is about 15 mm., pale shiny green; head pale yellowish mottled with light brown, eyes and posterior margin blackish; cervical shield concolorous; skin minutely papillose except on tubercles; tubercles broadly rounded or oval, "ii" farther apart than "i", "iii" above spiracle, "iv+v" below spiracle; hairs black, pale tipped; spiracles round, black. A larva but 9 mm. long had head and cervical shield black.

Pupa, 7.5 mm., pale yellowish, eyes, spiracles and apical segment of abdomen brownish; wing-cases extend nearly to apex of 4th abdominal segment; cremaster with 4 curved diverging bristles situated on a minute rounded projection; a large transverse dorsal callosity on terminal segment of abdomen.

*Hyposmocoma ekaha* n. sp. [Fam. Hyponomeutidæ].

(Plate 3, fig. 3.)

♂, ♀. Antennae pale brown, basal segment darker, with pecten. Palpi whitish, brownish on outer side of median segment, tips of terminal segment dark brown; median segment beneath with a large, pointed, forward-projecting, dense tuft of hair-scales. Head, thorax and abdomen whitish ochreous, patagia brown. Forewings medium brown, with a wide dorsal streak whitish ochreous sprinkled with brown scales, boundary line of this streak with several sinuations; cilia whitish ochreous brownish at apex with four dark-brown spots at their base on termen below apex, and four on costa before apex. Hindwings and cilia whitish ochreous, a few brownish scales along costa; no subcostal hair-pencil in male. Anterior and middle legs brownish; posterior legs whitish ochreous with a few brownish scales on outer side. Expanse of wings 16-17 mm.

This species is readily distinguished from all other species by the strongly developed tuft of the median segment of the palpi. The species is named from the native name of its food plant.

Seven specimens of this moth were reared from larvæ and pupæ found on the fronds of a bird's-nest fern (*Asplenium nidus*), in Halawa Valley, about three miles above Honolulu Plantation on the island of Oahu, Sept. 12th, 1909. All the fronds of this fern were badly eaten by the larvæ of this moth. They 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 larvæ 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.

The full-grown larva is pale yellowish; head pale yellowish brown, eyes black; cervical shield pale yellow; tubercles brownish, "ii" a little farther apart dorsally than "i", "iii" above spiracle, "iv+v" below spiracle; setæ pale brown; spiracles concolorous.

Pupæ 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.

Of the pupæ collected, specimens of *Pimpla hawaiiensis* emerged from two.

*Gracilaria hauicola* n. sp. [Fam. Tineidæ].

(Plate 3, fig. 5.)

♂, ♀. 7-8 mm. Antennæ whitish ringed with brown, basal segment whitish; a little longer than forewings. Palpi whitish ochreous, apex of median segment and apical half of terminal segment brown. Head sordid white above, whitish on face. Thorax and abdomen pale brown above, whitish below. Forewings brown, a lemon-yellow streak on costa to 2-5ths then obliquely, at 3-5ths a short outwardly oblique white bar, almost meeting an inwardly oblique white bar from dorsum of wing, beyond these the apical portion of wing is mostly lemon yellow with two or three brown dots or bars on costa; at 2-5ths of dorsum an oblique white bar extends to the yellow streak from costa, at 1-4th another oblique white bar almost reaches the yellow streak; cilia pale brown. Hindwings and cilia dark fuscous. Legs brownish, tarsi ringed with white.

This moth I have named from the "hau" tree (*Paritium tiliaceum*) whose leaves its larvæ mine quite extensively. Sometimes one finds practically all of the leaves mined and often a dozen or more per leaf. It probably occurs on all the islands where the "hau" tree occurs. I have observed it at Koloa, Kauai; Wailuku, Maui; Waikiki and Tantalus, Oahu. My specimens were reared from cocoons collected this summer on Tantalus. The white rounded-oval cocoons were found quite abundant on the surface of leaves, and also on fence-posts situated beneath "hau" trees.

## NOVEMBER 4TH, 1909.

The fifty-seventh regular meeting of the Society was held in the usual place.

## MEMBERS ELECTED.

Honorary.....	}	DR. DAVID SHARP
		DR. R. C. L. PERKINS
Active.....		REV. THOMAS BLACKBURN
		E. M. EHRHORN

## ENTOMOLOGICAL NOTES.

Mr. Ehrhorn exhibited by request of the President an insect box which is extensively used by California collectors. The box measures  $8\frac{1}{4} \times 12\frac{1}{4}$  and is strongly made with loose cover. The cost of this box, not lined with cork, is 25 cents. The members thought well of it and several determined to procure a quantity.

Mr. Ehrhorn also exhibited a new method of mounting Coccidæ. It consists of two pieces of glass  $2\frac{1}{4} \times 3\frac{1}{2}$  between which the specimen on leaf, twig, or even loose specimens are placed and then the mount is bound around with lantern-slide tape. If specimens are too thick, strips of cork or cardboard can be placed at and between the edges of the glass, keeping the glass from crushing the specimens. The label and number card is on the outside and the whole collection can be kept in a drawer similar to a card index. The members thought very favorably of the scheme and one or two suggestions were offered to improve some details. The great advantage of this system is that specimens can readily be examined with lens or even microscope without handling the material. A set of microscope slides corresponding with each receptacle, showing the necessary structure, is also desirable.

A beautiful bunch of strung Earth Pearls, *Margarodes trimeni* Giard (a Coccid), was exhibited by Mr. Ehrhorn; none of the members had ever seen these curious insects.

A box containing typical specimens of each family of the beetles of the United States north of Mexico was another exhibit offered by Mr. Ehrhorn. These were beautifully mounted and placed in proper sequence under the Horn and Leconte classification.

Mr. Kotinsky read a note from Bro. M. Newell reporting the appearance of an unknown Curculionid\* in a fernery in Hilo. The insect has been known for some time in Honolulu but this is the first record from Hilo.

PAPERS READ.

**Geococcus Radicum Green, in Hawaii.\*\***

BY DAVID T. FULLAWAY.

About a year ago my attention was called to a small mealy-bug on the roots of a potted mango. On comparing mounted specimens of the insect with slides in the collection of the Board of Forestry and Agriculture it was found that the same mealy-bug had been obtained several years previously by Mr. Kotinsky on the roots of koa at an elevation of 1,600 feet. Later, it has been taken commonly on the roots of grasses in and about Honolulu.

I am indebted for the accurate determination of the species to Mr. E. M. Ehrhorn, of Honolulu, and to Mr. E. E. Green, of Peradeniya, Ceylon, who has compared my specimens with the type and declares them to be identical. While possessing the ordinary characteristics of the Dactylopinids, this species is rendered peculiar by the presence of prominent chitinous dorsal hooks in the region of the head and anal ring. These hooks are not conspicuous in the figures accompanying Green's description and the insect here was at first considered a distinct species. Mr. Green, however, writes that it is only an intermediate stage of *radicum*; that material in his possession shows the strongly chitinized hooks. Mr. Ehrhorn takes exception to its being considered an intermediate stage, as he has found fully mature females, with eggs, possessing the hooks, and offers the explanation that the hooks have been lost in the type material, which is readily credible, considering their brittleness.

The insect is here described and figured (Plate 4):

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\* This is the insect whose identification is given as *Syagrus fulvotarsis* Pasc. on page 115 following.—[Ed.]

\*\* This paper replaces one in which Messrs. Fullaway and Kotinsky described the species as new to science. On further study and investigation it has been determined as now given.—[Ed.]



Adult female (Fig. 1)—Yellowish beneath white cottony secretion, elongate oval, length 1.35-2.15 mm.; width .45-.80 mm. Segmentation distinct. Integument for the most part without especial chitinization, and colorless in boiled and cleared specimens—a chitinized yellow sub-oval or subcircular spot (.05 mm.), however, near each lateral margin on ventral surface of penultimate segment, and on preceding segment, somewhat more mesad, a paler, vulviform chitinization. Also both ventral and dorsal surfaces bear spiny hairs of different lengths interspersed with wax gland openings of two distinct types. The shorter hairs are much more numerous than the longer and are found over the entire surface, densely crowded in the center of the segments, in the furrows less conspicuous or absent. The longer hairs are more particularly apparent on the front of the head, the two last abdominal segments, and in transverse rows on the abdominal segments. The commoner wax gland openings are circular in shape (fig. 4b) and vary considerably in size. They are very generally distributed over the surface and are interspersed with the less common large circular and very large triangular gland openings (fig. 4a). The antennae (fig. 2) are inserted somewhat on the ventral surface, short, approximate at their bases, six segmented, six longest (.054 mm.), a third longer than one (.036 mm.), two, three, four and five subequal, about one-third of six (.02 mm.). Formulae:

6, 1, (2, 3, 4, 5)  
 6, 1, 3, (5, 4, 2)  
 6, 1, 2, 3, 4, 5  
 6, 1, 2, (3, 4), 5 —

all the segments bearing hairs. They are more numerous, however, on the last segment, which also bears three pairs of stout, thread-like processes. The legs (fig. 3) are short and stout, the three pairs subequal, femur somewhat longer than tibia and nearly twice as thick, tibia (.04 mm.) only slightly less than tarsus (without claw), claw long, thin, only slightly curved, without digitule, the femora beset with hairs, the tibiae and tarsi with hairs and spines. Mentum dimerous and hairy near the tip. Anal opening elliptical, the long axis transverse, anal ring bearing six spines, placed at the base of the caudal lobes, perianal glands in two rows, the inner running inside, the outer outside the anal spines. Caudal lobes well-developed, each bearing a huge chitinous tooth or hook. Pairs of similar but smaller chitinous structures, both directed backward, are found on the dorsum, one just dorsad of the anal ring, the other on the head.

Originally described from Ceylon, on the roots of grass. Habitat in Hawaii: Tantalus, on the roots of koa (*Acacia koa*); Honolulu, on the roots of mango (*Mangifera indica*) and nutgrass (*Cyperus rotundus*).

### The Sugar Cane Mealy Bugs.

(*Pseudococcus calceolariae* Mask. and *P. sacchari* Ckll.).

[HEMIPTERA-HOMOPTERA; COCCIDAE.]

BY JACOB KOTINSKY.

That the mealy bug so common on sugar cane on these islands is the well-known *P. calceolariae* we have it on the authority of Mr. Koebele<sup>1</sup>. Maskell's authority for this species<sup>2</sup> is apparently an error. Mr. Terry's recent discovery of another mealy bug on sugar cane in Hawaii led the writer to a study of the old species also, the former having been referred to him for identification. Mr. Terry's specimens are on the average considerably smaller than *calceolariae*, greyish in color, and fairly imbedded in the cottony egg-sacks full of eggs. Microscopic preparations show also larger legs and differences in antennal proportions. But to our surprise the measurements of these correspond exactly with those given by Prof. Cockerell<sup>3</sup> for *P. calceolariae*. A discrepancy somewhere was evident. Careful perusal of available literature seems to have cleared the mystery and disclosed some interesting facts.

Maskell says<sup>4</sup> of *P. calceolariae* "adult female dull-pink in color, length variable,  $\frac{1}{8}$ - $\frac{1}{4}$  in." Maxwell-Lefroy says<sup>5</sup> under *Dactylopius sacchari* "Both this species and *D. calceolariae* occur together on the canes in Barbadoes, but they may be known by their color (olivaceous or pinkish), their shape (cylindrical or pyriform), length of leg (short or long) and by the antennal formula. There are also differences in the appearance of the waxy covering and filaments." The same author calls *calceolariae*<sup>6</sup> "The Pink sugar cane Mealy Bug" and says further "A large insect, sparsely covered with white wax, the body is pink and rounded, legs short." Of *sacchari*, which he calls "The Grey sugar cane mealy bug," he says<sup>7</sup> "A moderately large insect, covered in mealy wax, the body of a gray or olivaceous color, legs

<sup>1</sup> Rep't. Min. Inter., (1898), p. 107.

<sup>2</sup> Fauna Haw. III., p. 103.

<sup>3</sup> Proc. Acad. Nat.

<sup>4</sup> Ins. Nox. Agr. N. Z., p. 100 (1887).

<sup>5</sup> W. Ind. Bull. III., p. 264.

<sup>6</sup> Scale Insects Lessrs. Ant. Pt. II., p. 24.

<sup>7</sup> Loc. cit., p. 27.

moderately long. Hard to distinguish from the pink sugar cane mealy bug. The grey color, longer legs, less rounded and swollen body are good characters." A comparison of Prof. Cockerell's measurements of the legs of these two mealy bugs in the paper cited above shows the very opposite, i. e. the middle legs of *calceolariae* are much the longer. The external characters of our material agree more with those indicated by Maxwell-Lefroy, and the measurements of the middle legs with the reverse of the order given by Prof. Cockerell. Moreover, specimens of a *Pseudococcus* on sugar cane from Australia and New Guinea in the Board of Agriculture and Forestry collection substantially agree in every respect with our *P. calceolariae*. Following are measurements of middle legs as given by Prof. Cockerell and found in material in the Board collection. The proximity of these pointed to the affinities as indicated in the tables.

Comparison of measurements, in micromillimeters, of middle legs of *P. calceolariae* and *P. sacchari*:

*P. CALCEOLARIAE.*

	Austr.	Honolulu	H. S. P. A	N. Guinea	Ckll's <i>sacchari</i>
Coxa.....	75	68	68	68	133
Femur + trochanter	224	230	196	200	236
Tibia.....	120	134	120	124	146
Tarsus.....	72	76	68	72	73
Claw.....	32	28	24	28	30

*P. SACCHARI.*

	Hawaii	Ckll's <i>calceolariae</i>	Ehrh. on. N. Z. flax in Berkeley
Coxa.....	180	197	184
Femur + trochanter .	315	331	352
Tibia.....	225	223	226
Tarsus.....	90	90	100
Claw.....	30	30	20

The inevitable conclusion from these figures is that the labels on the slides studied by Prof. Cockerell were reversed. In the

text of his paper Prof. Cockerell says that these slides were identified by Mr. T. Pergandi. Evidently, then, Prof. Cockerell did not question the identifications, which were, to all appearances, erroneous.

Prof. Cockerell speaks of *sacchari* as having 7 segmented antennæ. Maxwell-Lefroy, says under *sacchari*<sup>8</sup> "Described from Trinidad on sugar cane. A similar species occurs in Barbados having one point of difference from the Trinidad specimens: the latter are described as having 7-jointed antennæ, which appear 6-jointed owing to the lack of division between joints 2 and 3. Barbados specimens have this character, but joint 3 may also have a division, making the antennæ 8-jointed." In our material the antennal joints of *calceolariae* vary considerably in the number of joints; some are 7-jointed, others have one antenna 7-jointed, the other 8-jointed. Wherever there are but 7 joints, one (usually 4) or two of them are unusually long.

In the absence of the original description of *sacchari* our determination was based on Prof. Cockerell's measurements of *calceolariae*, which I believe has been misidentified for *sacchari*.

As will be noticed in the table of leg measurements, I had the privilege of examining a slide in Mr. Ehrhorn's collection, which is rather interesting. The material for this slide was collected on New Zealand flax in Berkeley, California. *P. calceolariae* having been reported on that plant in New Zealand, Mr. Ehrhorn took it for that species. But its correspondence to *sacchari* seems to be far closer than to the other species, and I should therefore put it down as *sacchari*.

### **Aspidiotus cyanophyll Sign. (Coccidae) on Sugar Cane.**

BY JACOB KOTINSKY.

Mr. Swezey called my attention to what I later identified as the above on sugar cane. These canes were growing in an ant-proof insectary, and were started, I believe, from cuttings; the scales were on leaves. Unless these insects were there previously on the stalk or bud, they must have been blown in there by the wind from an adjacent tree infested with them.

<sup>8</sup> *Loc. cit.*

## Notes on a Day's Insect-Collecting in the Waianae Mountains, Oahu.

BY OTTO H. SWĘZEY.

The Waianae Mountains are much less accessible to us than the Kóolau Mountains, especially the portion of the latter range near Honolulu, where there are numerous trails penetrating easily to the regions good for insect-collecting. To those of us who have been collecting in the latter region the past few years there is, no doubt, much that would be new and interesting to be found in the Waianae Mountains, if we should make the effort to go after them. To stimulate interest in this direction, I desire to exhibit the results of my first trip to these mountains.

On October 10th, 1909, in company with two other members of our Society I went by railroad to the end of the line at Schofield Barracks, on the plateau occupied by the Leilehua Ranch. From the Barracks we tramped across the slowly-rising plateau westward to the mountains, for about two miles following the road leading to the Kolekole pass, which leads to the Waianae side of the range. Near the mountains we left this road and passing some distance to the right ascended the first valley leading into the range to the north from Kolekole pass. Cattle range this valley clear to the top, and hence it is very easy to traverse it as the lantana and underbrush have been largely trampled down; so that the valley is quite open, in this respect too much so for good insect-collecting. But there are places where collecting is good and the valley being open makes them easy of access.

From the crest of the ridge a fine view is obtained of the country on the Waianae side of the range, as also of the whole of the Leilehua ranch, and the pineapple fields of Wahiawa. For a day's trip the time is not sufficient (11 a. m. to 3:45 p. m.) for much collecting, but I have the following to show for it:

HYMENOPTERA—5 *Odynerus nigripennis*; 3 *O. montanus*; 1 *Nesodynerus rudolphi*; 1 *Scleroderma kaalae*; 2 *Sierola* sp.; 1 *Eupelmus* sp.; 1 *Gonatopus perkinsi* (a leafhopper parasitized by it); and 1 *Ecphylopsis nigra*, a wingless Braconid of which

Dr. Perkins took two specimens, one Waimea, Kauai, and one Kona, Hawaii.

LEPIDOPTERA—One caterpillar of *Omiodes continuatalis* feeding on a sedge, whereas before I have only found them feeding on grasses; 1 *Homoeosoma humeralis*; 1 *Epagoge infaustana*; 1 *Aphthonetus corticicolor*; 1 *Hyposmocoma alliterata*; 1 *Heterocrossa solutella*; 1 *Ereunetis minuscula*. Besides these I found the empty pupa of another species of *Ereunetis*, the adult of which I have never yet collected; an empty pupa of *Semnoprepia* sp. in dead *Pipturus* stem; the following butterflies were observed flying: *Anosia plexippus*, *Vanessa huntera* and *V. tamehameha*.

COLEOPTERA—*Cryptolaemus montrouzieri*, *Coelophora inaequalis*, and *Platyomus lividigaster*, all on *Pipturus*; 1 *Elaterid*, and 1 *Oodemus* sp.

HEMIPTERA—1 *Oechalia grisea*; 1 *Orthoeca nigriceps*; several *Nysius delectus*; several *Reduviolus blackburni*; *Orthotylus iolani* numerous on *Pipturus*; 2 *Psallus swezeyi*; several *Nesoprosyne ponapona* on *Pipturus*; 1 large red Jassid; *Nesosydne pipturi* numerous on *Pipturus*; *Nesopleias artemisiae* numerous on *Artemisia*. The latter and *Psallus swezeyi* are new species. They have been named and will be described later by Mr. Kirkaldy.

### A Note on *Rhyparobia maderae* (Fabr.)

BY OTTO H. SWEZEY.

On page 37, Vol. I, Proc. Haw. Ent. Soc., in recording this roach for Hawaii, I stated that I had found no previous record of it in Hawaii. I recently came across a record of Schauinsland having collected several specimens of both sexes, in a native hut at Kalae, Molokai, in 1896 or 1897 (Alfken, Zool. Jahrb. XIX, p. 565, 1904).

DECEMBER 2ND, 1909.

The fifty-eighth regular and the fourth annual meeting of the Society was held in the usual place.

Member elected.....WM. A. BRYAN

## ENTOMOLOGICAL PROGRAM.

Mr. Fullaway stated that he had sent specimens of the mango thrips to Mr. Moulton, who had identified it as *Heliothrips rubricinctus* Franklin.

The Secretary reported that Mr. Kotinsky had sent specimens of the introduced fern weevil to Mr. Lea of Tasmania, who had identified it as *Syagrius fulvitarsus* Pasc.\*

Mr. Ehrhorn exhibited specimens of the largest Coccid known *Lophococcus maximus*. He also exhibited a very ingenious folding beating-net.

Mr. Muir exhibited two specimens of *Pseudosphinx discistriga*, one from Ceram and the other from Larat, with the claspers dissected out to show the stridulating organs. This is the species mentioned by Mr. Muir in a note published in Proc. Haw. Ent. Soc., Vol. II, p. 12, 1908.

Mr. Swezey exhibited a pair of a rare species of Hawaiian wasp (*Oreocrabro abnormis*), which he had bred from their nest in a rotten branch of *Eleocarpus*, collected on Mt. Olympus, Oahu, Nov. 14, 1909.

Mr. Shiraki, the government entomologist of Formosa, was present and exhibited a very interesting collection of Formosan Orthoptera, many of which were new to science.

Mr. Kirkaldy exhibited a few butterflies from New Zealand.

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\* This is the insect mentioned by Mr. Swezey in some notes published in Proc. Haw. Ent. Soc., Vol. I, p. 163, 1908.

## Notes on the Ancestry of the Hemiptera.

BY G. W. KIRKALDY.

During the last few years, Anton Handlirsch has published an extensive work on Fossil Insects\*, in which the Palaeozoic and Mesozoic forms are very fully discussed, and the Kainozoic (non-recent) forms enumerated.

While conceding at once the erudition and patience necessary to such an enormous work, I am sorry to have to join issue with Mr. Handlirsch, almost in toto, where the Hemiptera are concerned.

Handlirsch excludes from serious consideration as Hemiptera, and that very rightly, as I believe, all the palaeozoic forms described as Hemiptera except *Eugereon bockingi* Dohrn, and two new forms, *Scytinoptera kokeni* and *Prosbole hirsuta*. It must be explained, first of all, that the "Suborders" of most authors are the Orders of Handlirsch (so far as Hemiptera are concerned) and their "Orders" are his "Subclasses."

Handlirsch divides the palaeozoic Hemiptera into two [sub-]Orders, *Protohemiptera* (containing *Eugereon*) and *Palaeohemiptera* (with the other two).

For the *Palaeohemiptera*, Handlirsch gives no convincing characters, and, judging from the figures given, I should have no hesitation in placing them in the Homoptera, indeed *Prosbole* is a Fulgoroid, and might even be included in, or near, the Cixiini or Achilini. *Scytinoptera* might well fall in among the Cercopidæ, Tetigoniidæ or certain Fulgoroideæ, but I think it more likely an Asiracid; it is certainly an Auchenorrhynchous Homopteron. Thus, in my opinion, the Auchenorrhynchi (as restricted today), were present in the Palaeozoic Era!

Here I may be permitted to enter a protest against the habit, prevalent even in technical works, of referring to the Carboniferous and Permian Epochs as being "at the dawn of life," "at the early periods of the Earth's history," and such like rubbish,

\* "Die fossilen Insekten und die Phylogenie der rezenten Formen," pp. 1-1430, Pls. 1-51; text figs., tables, etc. (1906-08).



when, so far as one can judge from the rather doubtful data at hand, the Carboniferous was decidedly nearer to our times than it was to the Cambrian, which of course was not nearly "the dawn of life." The world was already becoming middle-aged, or at least had lost the freshness of youth, when *Prosbolæ* and *Scytinoptera* were living.

The status of *Eugereon* is quite another matter.

Handlirsch gives four photographs of this insect in situ, and some restorations, but Dohrn's figures (1866, Palaeontogr. XIII., Pl. 41) seem much more like the photographs than do Handlirsch's restorations.

What the insect really is I am not prepared to say, but I am quite convinced that it is not, in any sense of the word, a Hemipteron.

The characters Handlirsch gives are: an enormously long *labrum*, quite unlike anything known now, a pair of unjointed mandibular setæ, a pair of 5-6-jointed appendages which Handlirsch declares to be the equivalent of the *labium* (rostrum), and a pair of unjointed maxillary setæ (which other authors take for antennæ).

After a very careful study of the drawings, photographs and restorations, I cannot admit that Handlirsch's interpretation is correct, nor that we have here a Hemipterous, nor even a Hemipteroid insect. I think that *Eugereon* is a Neuropteroid insect of a kind that has no representatives in modern times, that has become extinct, forming an Order or Suborder of its own.

In his interpretations of some of the Mesozoic Insects, I do not think that Handlirsch is much happier.

*Dysmorphoptila* might be anything!; *Arhegocimex* cannot be placed near the "Pentatomidæ" (Cimicidæ), for the clavus is very broad apically, the posterior margin of the scutellum being remote from the basal angle of the membrane, a condition never found in the Cimicidæ; the same remarks apply to *Progonocimex*. Of the rest I will only say that in my opinion Handlirsch has made a number of families on no characters at all, these families being superfluous.

In the Homoptera, *Procercopis* is very likely an Issine (as regards *alutacea*, which may not be congeneric with the others).

Turning to Handlirsch's "trees" of the modern families, I do not think that he is any nearer the truth. He seems to me to

have everything reversed, but it would take too long to enter into a detailed discussion here, and I have recently sketched my own views on this subject.\*

In the Homoptera, the tree is soon divided into two, the right-hand branch comprising the Aphididæ and the Fulgoridæ, the *latter* giving off the Aleyrodidæ! The left main branch divides into three, (1) Psyllidæ and Coccidæ; (2) Cercopidæ and Cicadidæ; (3) Jassidæ.

Now if there is any group which is apparently compact, it is the Sternorhynchous Homoptera; yet Handlirsch derives the Aleyrodidæ from the Fulgoridæ, placing both in the same main branch as the Aphidæ, placing all far away from the "Psyllidæ" and the Coccidæ!, while the Cicadidæ are derived from the Cercopidæ, etc.! I do not think that anyone who has studied the Homoptera will agree with this for a moment, the more as it is the wildest theory and is not based on any concrete foundation.

I think that I am therefore justified in declaring invalid, Handlirsch's theories on Hemiptera, ancient and modern, almost in toto.

### Further Notes on Hemiptera, Chiefly Hawaiian.

BY G. W. KIRKALDY.

#### (a) HAWAIIAN HEMIPTERA.

##### *Nesopleias artemisiae* sp. nov.

♂ Yellowish testaceous; the tegmina (except a broad basal band of testaceous) black. The abdomen is varyingly marked with blackish, and slightly also above, with yellowish.

♀ Pale yellowish testaceous, a little yellower on the abdomen in part, and sometimes the abdomen is a little marked with black.

In structure, this species is very like the species on *Dubautia*, but the tegmina are longer (reaching to, or a little beyond, the apex of the abdomen). The genitalia (♂) are somewhat on the plan of *Neososydne raillardiae*, but the pygophor is more elongate, when viewed end-on, the genital styles are narrower basally, the interior emargination extending from the base to the apex.

Length: ♂ scarcely 2 mill.; ♀ 2½ mill.

Hab.: Oahu, Waianae Mountains, 2,000 feet, on *Artemisia australis* (Swezey, Fullaway and Kotinsky).

\* Canad. Ent., XLII, pp. 83, 84 (1910).

## EPELYTES gen. nov.

This genus belongs to the tribe Rhyparochromini of the Family Myodochidæ, and is probably allied to *Polycrates*, though approaching *Entisberus* in general habitus.

Head a little longer than its width between the eyes, suddenly triangular in front of them; eyes somewhat remote from the pronotum, say about one-third of the length of an eye, prominent, rounded exteriorly. Bucculae nearly percurrent, not prominent. Head between eyes slightly narrower than the apical margin of the pronotum, but, with the eyes, much wider than the latter, though narrower than the middle of the fore lobe. Antennae inserted close to the eyes, just at the sudden narrowing of the head, first segment reaching a little beyond the apex of the vertex; second segment of the labium longer than the third. Pronotum longer than its width, slightly constricted medially, the lobes being subequal in length; collar very indistinct, consisting of an obscure depression anteriorly. Fore lobe slightly roundedly diverging, hind lobe the same, the hind margin not twice as wide as the fore margin (of the pronotum); the lateral margins of the pronotum are carinate, very slightly laminate at the constriction; the shape of the pronotum is thus not unlike that, apparently, of *Entisberus*, except that the lateral margins of the hind lobes are much less divergent. Scutellum subaequilateral, shorter than the claval commissure. Tegmina slightly, but distinctly, constricted in line with the hind angle of the scutellum, the exterior margin acute, reflexed; clavus with three rows of punctures, the inner two a little irregular; corium punctured exteriorly, smooth almost entirely interiorly. Membrane with one straight and three sinuate longitudinal veins. Fore femora incrassate, with three small and several minute spinelets beneath. Fore tarsi curved. Head, pronotum and scutellum punctured, tegmina deeply and prominently so. The pronotum is slightly, the tegmina strongly, shining, as also the urosternites, etc.

*E. drapetes* sp. nov.

♂ Black; first three segments (4th lost), of the antennae, the labium, etc., fulvous, coxae and the extreme apices of the antennal segments darker. Clavus and extreme base of corium yellowish-brown, the former a little infusate apically; punctures dark. Corium blackish, a large creamy spot (with dark punctures) near the postero-lateral angle. Membrane olivaceo fuliginous. Second segment of the antennae more than twice as long as the first, and about half as long again as the third. Labium reaching very nearly (or quite) to the middle coxae, first segment not quite reaching to the base of the bucculae. Tegmina almost reaching to the apex of the abdomen, which is subtruncate dorsally. Tarsi 3-segmentate, the first segment the longest, the second very short. Apical margin of the 7th urosternite roundly emarginate.

Length:  $3\frac{7}{8}$  mill.

Hab.: Kauai, Koloa (Swezey), on *Canavalia* sp.

Though this form is not likely to be endemic, I have not been able to identify it, generically or specifically, with anything previously described.

*Psallus swezeyi* sp. nov.

Very close to *P. sharpianus*, but smaller, the tegminal maculations much larger, and the abdomen is black.

♂ Greenish testaceous, irregularly suffused with sanguineous, especially on the tegmina. Head and pronotum irregularly speckled with black and red, the latter with a large nebulous dark spot submedially on each side. Tegmina with large blackish spots, especially down the corium, cuneus hyaline, its margins pale ruddy; veins of membrane reddish orange, medially suffused with blackish. First, third and fourth segments of antennae blackish, the second yellowish. Underside blackish, legs testaceous, fore and middle femora sparsely marked with dark, hind femora with large purplish brown spots so that the whole femur appears dark, except the base and apex. Tibial hairs and the points they spring from black. Pubescence golden yellowish, hairs black. The tegmina are more rounded exteriorly than in *P. sharpianus*. Ovipositor apically orange.

Length:  $2\frac{1}{2}$  mill.

Hab.: Oahu, Waianae Mountains, 2,000 feet. (Swezey).

*Fulvius peregrinator* sp. nov.

This Mirid is allied structurally to *F. oxycarenoides*, but has a very different general appearance.

♂ ♀. Fulvous, the vertex with 2 longitudinal stripes, which continue onto and down the pronotum, which has also lateral stripes of the same color, the 4 continuing more obscurely onto the fore margin of the scutellum, which is otherwise black. The upper surface (at rest; except the membrane) with short, pale golden pubescence. Antennae and labium pale fulvous, apical third of the second segment paler, third and fourth segments fuscous. Tegmina dark testaceous basally, the rest dark fuscous (with a fulvous tint partly in the ♀, the ♂ being paler and more obscure); apical angle of the corium next the cuneus orange. Cuneus black, fuscous interiorly. Veins of the lower wings almost colorless. Beneath blackish, or very dark piceous, the incisures pale partly, femora dark piceous, apices of fore and middle femora paler, the rest of the legs fusco-testaceous. Vertex triangular in front of the eyes, about as long there as behind it, scarcely wider between the eyes than the eyes together. Beneath, a single eye is about as wide as the gula. First segment of antennae extends for about half its length beyond the apex of the vertex, second about two and one-third longer than the first and about equal to the base of the pronotum, third and fourth short. The fore margin of the pronotum is roundly emargi-

nate, lateral margins concavely widening towards the base, very rapidly near it, the postero-lateral angles prominent and acute (the tips a little blunt); hind margin about twice as wide as the fore; calli insignificant. First segment of the labium not quite extending to the base of the head.

Length: ♂  $2\frac{1}{2}$  mill.; ♀  $3\frac{1}{2}$ -4 mill.

Hab.: Kauai, Lihue and Kealia (Terry); Hawaii, Papai-kou, Honokaa and Honomu (Swezey).

Found on banana trash (Terry) and in bored sugar-cane (Swezey). The species, which is of course not endemic, is probably predaceous.

*Thriphleps pumilio* Champion.

1900, B. C. A. Het. II, 326 and 327.

Comparatively recently, an Anthocorid new to these islands, but evidently not endemic, has been found around Honolulu. It agrees almost perfectly with Champion's description, which, slightly altered in phraseology, runs as follows:

"Ovate, sparsely pubescent, shining nigropiceous above, paler beneath; the anteocular portion of the head, the labium, antennae, and legs testaceous; the tegmina testaceous, with the cuneus slightly infuscate, the membrane pale; the venter ferruginous. Head short and broad, the eyes very large; antennae moderately long, 2nd segment stouter and much longer than the 3rd. Pronotum with the sides obliquely converging from the base, the anterior angles rounded; rugosely punctured, the hind lobe depressed on the disk in front, the fore lobe almost smooth behind. Scutellum transversely rugulose. Tegmina with the clavus sparsely and very coarsely, and the other parts closely and finely punctured. Orifice of the stink-glands very long and curved.

Length: ♂ 1 2-3 mill.

Hab.: Guatemala, near the city (Champion).

One specimen. Allied to *T. tripunctatus*, but smaller, the pronotum less rugose, the clavus sparsely punctured; the corium and embolium much more finely punctate."

The Hawaiian examples differ only by the fact that the head is, in mature individuals, entirely dark piceous.

(b) REMARKS ON SAY'S HEMIPTEROUS GENERA AND SUBGENERA.

In the Hemiptera, Say proposed only two genera and two subgenera, of which *Ascra* and *Nerthra* are well known.

*Pamera* was instituted expressly to replace the preoccupied "*Pachymera*" (sic!) of Lepeletier and Serville.\* The type will then be, not any of the 8 species newly described by Say, but one of the original species of *Pachymerus*. As, to the best of my knowledge, no type has been thus selected, I now choose *pedester* Linne. *Aphanus* Laporte, published later in the same year (i. e. 1832), was also erected to supersede the preoccupied *Pachymerus*, and I have previously shown the type to be *pedester*. *Ptochiomera* was erected as a subgenus of *Pamera*, but was not described.

(c) ON SOME FORGOTTEN COCCID NAMES.

Goeze's "Entomologische Beytrage II" (1778) was overlooked by Mrs. Fernald; many of the new names were invalid, being trinomial, but the following demand recognition:

1. *Tachardia* (*Coccus*) GUMMILACCAE Goeze = *lacca* (Kerr 1782).
2. *Eulecanium* (*Coccus*) LIRIODENDRON Goeze = *liriodendri* (Gmelin 1789).
3. "*Coccus*" clematitidis Goeze = No. 1458 Fernald's Cat.
4. *Gossyparia spuria* (Modeer 1778) = *Coccus ulmilanatus* Goeze 1778. I do not know which has priority. N. B.: Goeze's name was not divided.
5. *Lepidosaphes ulmi* (Linne) = *Coccus conchiformis* Goeze 1778.
6. *Pulvinaria carpini* (Linne) = *Coccus mespili* Goeze 1778.
7. *Coccus rufus* Schrank 1776 is (sec. Goeze) probably an Acarid!
8. *C. aquaticus* Goeze 1778 is probably the egg of a Hirudiniid!

(d) NEW NAMES.

The following new names are necessary:

1. *Oncocephalus semiramide* nom. nov. = || *lineatus* (Walker).
2. *Varus legionicus* nom. nov. = || *varius* (Walker).

\* The original Lepeleterian spelling was "*Pachymerus*"; "*Pachymera*" was a laps. cal. of Bethold's in 1827.

3. *Sminthus anniversarius* nom. nov. = || *unifasciatus* (Walker).
4. *Coranus siva* nom. nov. = || *obscurus* (Kirby).
5. *Boisea* nov. subg. (of *Leptocoris*) for *L. vittata*. The isolation of a single species of this genus in America is very remarkable; the new subgenus differs from all the others by the striking coloration, the upper surface being piceous, the margins and keels of the pronotum, the tegminal venation, etc., sanguineous. Closely allied to the subg. *Tynotoma*, it differs by the slight margination of the pronotum, etc.

## (e) ON NABIDÆ.

In the last number of these "Proceedings" (pp. 49-69), I gave a fairly complete account of all that was known of the Biology of the Nabidæ. I had, however, overlooked three references, which, as a matter of convenience, I now add:

In 1855 ("Ueber die Micropyle und den feinern Bau der Schalenhaut bei den Insekteneiern," in Muller's Archiv, 149), Leuckart described and figured (Pl. 8. f. 19), the micropylar end of the egg of "*Nabis brachypterus*," a species which he did not describe, and which has not been dealt with since.

In 1907 ("Predaceous Insects and Their Prey," in T. E. S. London, for 1906, 405), Poulton recorded a nymph of *Reduviolus myrmicoides* (under the name of *Nabis lativentris*), preying on the Mirid bug *Plagiognathus arbustorum*, and an adult of *R. limbatus* preying on the Dipteron *Opomyza germinationis*.

*Reduviolus* is also recorded, in a paper I have not seen, as one of the enemies of the Tetigoniid *Macrosteles sexnotatus* (otherwise known as *Jassus* and *Cicadula*), which is a pest on cereals, grasses, etc. (cf. Jungner, 1906, Arb. deutsch. Landwirtschafts. XV, p. ?).

**A Preliminary List of the Hemiptera of California, pt. 1.**

BY G. W. KIRKALDY.

For my material I owe thanks to Messrs. Giffard, Ehrhorn, and Fullaway of Honolulu, and to Mr. F. X. Williams of San Francisco. I propose to give a full bibliography at the end; at

the present the following are the principal works concerned in this part of the Catalogue:

- Stal: "Hemiptera," in Eugénie's Resa, Ins. (1860).  
 Stal: "Enumeratio Hem.," in Svensk. Vet. Handl. 1870-6.  
 Uhler: "List of Hemiptera of the region west of the Mississippi River," in Bull. U. S. Geol. Survey, II, 269-361, Pls. 19-21 (1876).  
 Uhler: "Report Upon the Insects Collected . . . During the Explorations of 1875 . . .," in Bull. U. S. Geol. Survey, III, 355-475, Pls. 27-8 (1877).  
 Van Duzee: "Annotated List of the Pentatomidæ Recorded from America North of Mexico," in Tr. Amer. E. S., XXX, 1-80 (1904).

#### SUBORDER HETEROPTERA.

##### FAMILY CIMICIDÆ.

1. *Apateticus pallens* (Stal). San Francisco (Uhler); Mountain View (Ehrhorn).  
 This species differs from *modestus* by the much longer ventral spine, and by the flavescent urotergites; from *serieventris* by the ventral median spots grading smaller posteriorly, the longer ventral spine, etc.
2. *A. maculiventris* (Say).
3. *A. bracteatus* var. *crocata* (Uhler).
4. *Perilloides oculatus* (Fabricius).
5. *P. splendidus* (Uhler). San Diego (Uhler); Los Angeles (Van Duzee).
6. ? *Stiretrus anchorago* (Fabricius).

I have not seen adults from California, nor have they been recorded, but some nymphs collected by Mr. Giffard on Santa Barbara foothills (June, 1907,) and San Francisco (July, 1907,) can scarcely refer to anything else. They may be described as follows:

Shining indigo-blue; antennae, labium and legs black with a bluish gleam in part; a large median spot on metanotum immediately behind the junction of the lower wing-pads, the sterna, coxae, trochanters, and a narrow, curved, sublateral stripe down the urosternites—vermillion. The head and nota with the wing-pads are finely rugulose (more coarsely on the last); the abdomen is also finely rugulose but is also



highly polished in appearance. The first segment of the antennae is very slightly longer than the fourth, and about two times the second, which is a half longer than the third. Head not clypeate, eyes prominent. Labium reaching to middle coxae. Pronotum trapezoidal, finely impressed down the middle and also more deeply so across just basal of the middle, this only reaching as far as the inner margin of the slightly laminate lateral margins which are fairly straight, rounding anteriorly, basal margin scarcely a half wider than the anterior. Fore femora little incrassate, beneath with 3 spines, the median the longest, tibiae not dilate, all tarsi bisegmentate. This is the ultimate nymphal instar, an earlier stage is similarly colored, less red below, 4th segment of antennae much the longest.

6. *Holcostethus abbreviatus* Uhler. Santa Cruz Mountains (Ehrhorn).
7. *H. limbolarius* (Stal). Mountain View (Ehrhorn).
8. *Trichopepla atricornis* Stal.
9. *Rhytidolomia faceta* (Say). Keeler (Van Duzee).
10. *R. ligata* (Say).
11. *R. sayi* (Stal). San Francisco (Williams).
12. *Carpocoris remotus* Horvath.
13. *Mormidea punctifera* (Walker).
14. *Euschistus conspersus* Uhler. San Francisco (Williams); Santa Barbara foothills (Giffard).
15. *E. inflatus* Van Duzee.
16. *E. crenator* (Fabricius).
17. *E. servus* (Say).
18. *Neottiglossa cavifrons* Stal.
19. *N. undata* (Say).
20. *Cosmopepla conspicillaris* (Dallas). Mountain View (Ehrhorn).
21. *C. uhleri* Montandon. Santa Cruz Mountains (Ehrhorn).
22. *Eysarcoris intergressus* (Uhler). Mountain View (Ehrhorn).
23. *Meneclis insertus* (Say).
24. *Prionosoma podopioides* Uhler.
25. *Murgantia histrionica* (Hahn). Mountain View (Ehrhorn).
26. *Thyanta antiguensis* (Westwood).
27. *T. casta* Stal.
28. *T. custator* (Fabricius).
29. *T. rugulosa* (Say).
30. *Arvelius albopunctatus* (de Geer).

31. *Dendrocoris contaminatus* Uhler. Inyo Mountains, 8,000 feet (Van Duzee).
32. *D. humeralis* (Uhler). Palo Alto (Van Duzee).
33. *D. pini* Montandon. Argus Mountains (Montandon).
34. *D. fruticicola* Bergroth.
35. *Brochymena affinis* Van Duzee.
36. *B. 4-pustulata* (Fabricius). Mountain View (Ehrhorn).
37. *B. tenebrosa* Walker.
38. *Vanduzeeina balli* (Van Duzee). Independence (Van Duzee).
39. *Eurygaster alternata* (Say).
40. *Stethaulax marmorata* (Say). San Francisco (Uhler).
41. *Sphyrocoris obilquus* (Germar).
42. *Homaemus proteus* Stal. Santa Barbara (Van Duzee).
43. *Camirus consocius* (Uhler).
44. *C. porosus* (Germar).
45. *Pachycoris torridus* (Scopoli).

## FAMILY THYREOCOBIIDAE.

46. *Aethus testudinatus* (Uhler).
47. *A. conformis* (Uhler). San Francisco (Uhler).
48. *A. obliquus* (Uhler).
49. *A. politus* (Signoret).
50. *Macroporus repetitus* Uhler. San Francisco (Uhler).
51. *Pangaeus discrepans* Uhler. San Diego (Distant).
52. *P. piceatus* Stal.
53. *Geotomus parvulus* Signoret.
54. *Cyrtomenus mirabilis* (Perty).
55. *C. teter* (Spinola).
56. *Thyreocoris anthracinus* (Uhler).
57. *T. ciliatus* (Uhler). San Francisco (Uhler).
58. *T. coeruleascans* Stal. San Bernardino (Van Duzee).
59. *T. extensus* (Uhler). Inyo Mountains, 8,000 feet (Van Duzee).
60. *T. pulicarius* Germar.

## Coccidae Not Hitherto Recorded from These Islands.\*

## (Hemiptera-Homoptera)

BY JACOB KOTINSKY.

- 1 (53) *Asterolecanium bambusae* Mask.  
on Bamboo (Hilo and Honolulu).
- 2 (54) *Asterolecanium miliaris* Bdv.  
on Bamboo; Lihue, Kauai (V. Dine). Det. by Sanders.
- 3 (55) *Pseudococcus aurilanatus* Mask.  
on *Araucaria excelsa*; Wahiawa, Kauai.  
Imported from California in 1906, but recognized soon thereafter and believed to have been exterminated.
- 4 (56) *Pseudococcus sacchari* Ckll.  
Recently discovered by Mr. Terry to be common on sugar cane on the Hamakua coast, Hawaii.
- 5 (57) *Pseudococcus bromeliae* Bouche.  
on Pineapple, Sisal, Soursop, etc. This is commonly identified with *P. citri*, but differs from that species in being viviparous, larger, and in producing no cottony sacks. Det. by Kotinsky and Ehrhorn.
- 6 (58) *Geococcus radicum* Green.  
Originally described from Ceylon, on the roots of grass. In Hawaii, on the roots of *Acacia koa* (Tantalus); on the roots of mango and "nut-grass" (*Cyperus rotundus*) (Honolulu).
- 7 (59) *Antonina boutelouae* Parr.  
on *Panicum variegatum* (Honolulu green houses), *P. spectabile* (Koebele No. 1523), and "Manienie" (*Cynodon dactylon*) (Honolulu).
- 8 (60) *Pulvinaria urbicola* Ckll. (?)  
on Pepper tree. Honolulu. This is the species re-

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\* In the absence of the author, this paper has been somewhat revised by the editor; since more recently some of the determinations have been found incorrect. A few that were indicated (mostly doubtfully) as new species, but unnamed, have been omitted from the list.—[Ed.]

corded as *Takahashia japonica* (Proc. Haw. Ent. Soc., II, No. 2, Sept., 1909). I am indebted to Prof. Cockerell for calling my attention to the erroneous identification. I have also seen since specimens of *Takahashia japonica*, sustaining Prof. Cockerell's correction. The antennal formula of our material, however, does not at all agree with that given by the author, so that our species remains indefinitely identified.

- 9 (61) *Coccus viridis* Green.  
on Lime at Kona, Hawaii, imported from Fiji. This species is also believed to have been exterminated.
- 10 (62) *Coccus punctuliferus* (Green).  
on Lime; Makaha, Oahu (Van Dine). Det. by Sanders.
- 11 (63) *Chionaspis citri* Comst.  
on Orange trees. Honolulu. Observed in Mr. McStocker's yard on Lunalilo Street only.
- 12 (64) *Diaspis echinocacti* Douche.  
on Opuntia, Cereus and related species.
- 13 (65) *Hemichionaspis aspidistrae* (Sign.).  
Unless this is identical with the following it also occurs on these islands, especially in Honolulu.
- 14 (66) *Hemichionaspis minor* Mask.  
on Mango, *Asparagus officinalis*, *Antigonon leptopis*, *Poinciana pulcherrima*, "Ti" (*Cordyline terminalis*), *Wistaria*, *Verschaffeltia splendida*, *Waltheria americana*, and a variety of other plants.
- 15 (67) *Aspidiotus cyanophylli* Sign.  
on Mango (Hilo); sugar cane, "Tou-tou," *Wistaria*, *Persea gratissima* and *Eugenia jambulina* (Honolulu).
- 16 (68) *Aspidiotus destructor* Sign.  
on Pritchardia; Wailuku, Maui. That this species, so destructive to cocoanuts in the Society Islands, has never attacked cocoanuts here is rather remarkable, though the variety of *Aphelinus* here may account for the scarcity of the bug.

- 17 (69) *Aspidiotus lataniae* (Sign.).  
on Guava. So identified by Mr. Sanders for Van Dine. I always called it *cydoniae*, but the synonymy of this group is in a bad state of confusion.
- 18 (70) *Pseudaonidia clavigera* Ckll.  
on Chinese banyan, fig, Bombay mango, *Macadamia ternifolia*, *Santalum freycinetianum*, citrus; Honolulu. A well distributed tho obscure species about Honolulu. Thanks to Mr. Marlatt's fine table of this genus in Proc. Ent. Soc. Wash., the identification of this species was made easy and certain. Pity we lack such tables for Pseudococcus and other Coccid genera.
- 19 (71) *Chrysomphalus aonidum* Linn.  
on Bread fruit, Cerasus, mango, citrus, cycas, coconut, etc.
- 20 (72) *Chrysomphalus dictyospermi* Morg.  
on *Verschaffeltia splendida*, almond; Honolulu.
- 21 (73) *Chrysomphalus rossi* Mask.  
on *Araucaria bidwilli*; Honolulu.
- 22 (74) *Odonaspis secretus* Ckll.  
on Bamboo; Honolulu.
- 23 (75) *Odonaspis graminis* Bremn.  
Common on Bermuda or "Manienie" grass (*Cynodon dactylon*) on underground portion of stem, *Never on Roots*. Honolulu and Kona. I append a description of the 2nd stage drawn up some time ago.
- 2nd stage: ♀ scale:—snow white, circular, flat, about 1.5 mm. diameter; exuvium pale yellow, subcentral, in comparison with scales large, when fresh, scale is soft; strong ventral scale, so that insect lies within a circular flat sack.
- 2nd stage: ♀:—Pinkish, almost circular; after boiling in soda and fixing in Canada balsam 432 u long, 368 u wide; transparent, except last segment and borders of 2 penultimate segments amber yellow; no ventral pores; dorsal pores numerous, especially near posterior margin; anus 64 u from posterior extremity; vaginal opening a little cephalad of anus;

lobes very indistinct, one centrally located very narrow-rod-like, 2 laterals broad, dull pointed, one gland interiorly on each.

- 24 (76) *Lepidosaphes lasianthi* Green.  
on Croton; Honolulu. Very common. In a letter Mr. Green advises me that our species is distinct from his *lasianthi* and justifies description of the species under a new name.
- 25 (77) *Parlatoria mytilaspiformis* Green.  
on Orchid (*Vanda tricolor*) Moanalua greenhouses. Also on croton (Ainahau) but this has not yet been definitely determined.

Except where otherwise indicated the writer is responsible for identifications. He is indebted to Mr. Fullaway for access to the collection and records in the Hawaii Experiment Station. The first number (53) is a continuation of Mr. Kirkaldy's list in the 1904 Forester.\* This list as compared with Mr. Kirkaldy's, shows the substantial increase of 25 species, distributed among no less than 15 genera. This would be very significant had they been arrivals since the last list was published. As a matter of fact, however, Mr. Kirkaldy's lists were but compilations of available records and Mr. Koebele, whose reports are the chief source of information, has not made a complete survey of this group since 1897. Even then it is doubtful whether Mr. Koebele recorded other than those of greater or lesser economic importance. That of *Pseudococcus aurilanus*, in 1906, is the only definite record we have of a pest coming in during the "rigid regime," i. e., since the late Mr. Craw assumed inspection in 1904. The various mango Coccids that were apparently imported shortly before the advent of Mr. Craw, could not have gained admission during his regime. Unless surreptitiously done no Coccid could be brought into Honolulu, and only through the mails to the other post offices. It must be admitted that the post offices are an available and doubtless serious leak in the quarantine against Coccids. But even then they could only come to us from the U. S., and in this instance a federal quarantine law prohibiting interstate

\* Haw. For. & Agr. I, pp. 152-159, 1904.

traffic of insect pests could alone deliver these islands from the lurking danger.

Thus Prof. Woodworth's stigma against the usefulness of inspection as a protection to agriculture does not hold good in our case, at least not thus far. The writer is quite convinced that, excepting the species indicated, all the Coccids herein enumerated were here prior to the inauguration of quarantine inspection. With the possible exception of one or two none of the species here listed is of economic consequence. In some cases because the plants attacked have no economic worth, but in the majority because they are kept in check by a variety of Chalcid parasites, the list of which will also be materially increased, if published, as compared with the late Dr. Ashmead's in the Fauna Hawaiiensis.

### **The Feeding Habits of Hawaiian Lepidoptera.**

[Presidential Address]

BY OTTO H. SWEZEY.

In the Lepidoptera Parts of the Fauna Hawaiiensis, very little is given of the habits or biology of Hawaiian butterflies and moths. Only an occasional instance is given of the food-plants of the different species. During the past five years I have made observations along this line which I consider well worth recording. To know a moth when you catch it, to know how, when and under what conditions to catch it, and how to classify it, is knowing a good deal about it; but it is knowing a great deal more if you know the same moth in its younger stages, and how and where these are passed.

When a moth is known only in the adult stage, its interest lies mainly in structural features and whether its coloration makes it an object of beauty; but when its life history is known, there are the additional items of interest its position with respect to the economy of nature, also its economic aspect as to whether friend or foe to human interests.

Among the native trees, shrubs and plants of the Hawaiian islands, are some which are especially subject to the attacks of lepidopterous larvæ, while there are others almost if not entirely

free from them, and again others with but one species at most preying upon them.

A striking feature of Hawaiian Lepidoptera is the almost complete absence of gregarious feeding in the caterpillars. Perhaps there are none strictly gregarious, but some, as the cocoon leafroller (*Omiodes blackburni*), are gregarious when quite young. Another feature is that the greater number of the species are hidden feeders either in rolled or spun-together leaves, in cases, in silken galleries in trash, in stems of living plants, or in dead stems and rotten wood. They have not complete protection, however, as special parasites have become developed to reach them in their hiding places.

In this paper, an attempt is made to give the feeding habits of all species so far as known or previously recorded. The authority is given where the observation is not my own. Introduced species are included along with the others. The order of families taken up is the same as that given in the "Fauna Hawaiiensis," and the nomenclature there given is followed.

There are quite a number of genera, some of them large ones, of which as yet the larvæ are entirely unknown. On the other hand, for a few of the large genera, I have discovered the larvæ and food-plants of a majority of the species. At the present time there are some 770 odd known species of Lepidoptera in the Hawaiian islands, and as will be seen by this paper, something is known of the habits of nearly one-fourth of these species.

#### CARADRINIDÆ.

*Leucania euclidias* Meyr.—The caterpillars of this variable species feed on various species of ferns, particularly on *Acrostichum* spp., and *Aspidium cyatheoides*, though on a number of others as well. *L. pyrrias* Meyr.—The caterpillars feed chiefly on sedges, particularly *Baumea meyenii*, also on grasses and sugar cane. *L. amblycasis* Meyr.—Grasses and sugar cane. *L. unipuncta* Haw.—The cosmopolitan army worm, feeds on grasses, cereals and sugar cane.

*Agrotis ypsilon* Rott.—Cosmopolitan, feeds on garden and farm crops, sugar cane and weeds. *A. saucia* Hub.—Cosmopolitan, garden and field crops, sugar cane and weeds. *A. dislocata* (Walk.)—Garden crops, grasses and sugar cane. *A. cre-*



*mata* (Butl.)—Feeds on a marine plant on sand-hills on Maui, hiding under the sand by day (Blackburn). *A. crinigera* (Butl.)—Garden crops (especially legumes), grasses, sugar cane, also weeds. *A. cinctipennis* (Butl.)—Grasses and other plants. I once found a brood of young caterpillars feeding on a kukui leaf, and fed them to maturity on these leaves, but I think that this was very unusual for the species. *Heliothis armigera* Hub.—The cotton boll-worm, does not seem to be very injurious to cotton here. It is mostly on the buds and blossoms of *Hibiscus*, *Malva* and *Sida*. I have also found them abundant on flowers of a garden marigold. *Spodoptera mauritia* Boisd.—The grass army worm, feeds on various kinds of grasses and on sugar cane. *S. exigua* (Hub.)—Feeds on *Eucolus*, *Ricinus*, *Nicotiana*, beans, peas, etc. The young larvæ are somewhat gregarious, feeding together beneath a common web; but later on separate and produce no web for protection. *Caradrina reclusa* (Walk.)—Feeds on *Portulaca*, *Commelina*, and probably grasses and other herbaceous plants. A somewhat recent introduction; but apparently not going to become a pest. Where I have found them in the mountains, they are amongst the decaying vegetation on the ground.

#### PLUSIADAE.

*Simplicia robustalis* Guen. and *Adrapsa manifestalis* (Walk.)—On grass and weeds. *Hyphenodes altivolans* (Butl.) and *Nesamiptis obsoleta* (Butl.)—On grasses, particularly Hilo grass (*Paspalum conjugatum*). *Cosmophila noctivolans* (Butl.)—*Hibiscus* and *Sida*. *C. sabulifera* (Guen.)—Abundant on the "Hau" tree (*Paritium tiliaceum*), also on *Hibiscus*. *Hypocala andremona* Cram., and *H. velans* Walk.—Both on the native ebony (*Maba sandwicensis* and *M. hillebrandii*). *Plusia chalcites*.—A general feeder on all kinds of garden and ornamental plants and shrubs, also weeds, and many native species of plants and shrub in the mountains.

#### HYDRIOMENIDAE.

Of this family, I know none of the caterpillars or their habits.

## SELIDOSEMIDAE.

*Scotorythra syngonopa* Meyr.—I have collected caterpillars from sandal trees, and native ebony (*Maba sandwicensis*). *S. caryopsis* Meyr.—Feeds on koa trees on Oahu. *S. isospora* Meyr., on Kauai, *corticea* (Butl.) on Maui and *aruraea* Meyr., on Hawaii are closely related to *caryopsis*, and I suspect that they may feed on koa on their respective islands. *S. idolias* Meyr.—Defoliates koa trees (Perkins). *S. rara* (Butl.)—The most common species of the genus. The caterpillars often occurring in large numbers, defoliating guavas, koa trees, *Sapindus*, *Pipturus*, and occurring on many other forest trees, as *Straussia*, *Pelea*, *Cyrtandra*, *Elocarpus*, and also often abundant on tree ferns of various species.

## SPHINGIDAE.

*Deilephila wilsoni* (Roths.) and *calida* (Butl.)—Live on native trees as *Pelea*, *Straussia*, etc.\* I have several times collected one or two of the caterpillars, but failed to rear them, so do not know which species I had, or whether I have had both. *D. lineata* (Fab.)—Feeds on *Portulacca* chiefly, but I have also seen them on four o'clock, *Fuchsia* and on *Boerhaavia*. *Sphinx convolvuli* (Linn.)—Feeds on various species of *Ipomoea* vines including the sweet potato.

## NYMPHALIDAE.

*Anosia erippus* Cram.—Feeds on milkweed (*Asclepias curasavica*). *Vanessa atalanta* Linn.—On *Pipturus* and probably related trees. *V. tammeamea* Esch.—On *Pipturus* and related trees, but chiefly on *Pipturus*. The young caterpillar folds over a piece of the leaf at the margin to form a hiding place, going out to eat and returning for protection, or it may eat what it can reach of the adjacent leaf without crawling out. As it grows in size it deserts its retreat and makes a larger one from time to time. They may be found by searching for these retreats on the leaves. *V. cardui* Linn.—Feeds in a web on *Malva rotundifolia*. I have also taken an occasional caterpillar on

\* *Calida*—“Polyphagus: *Metrosideros*, *Gardenia* and various shrubs; *wilsoni*—polyphagus: *Acacia* koa, *Metrosideros* *Boba*, *Euphorbia*, etc.” [Perkins in MSS.]

cocklebur (*Xanthium*); and have seen them on thistles on Haleakala, Maui. Once I found a few on *Nicotiana* in Honolulu. *V. huntera* Fab.—Feeds in a web on leaves of *Gnaphalium*.

#### LYCAENIDAE.

*Lycaena baetica* Linn.—In the pods of various leguminous plants, feeding on the growing seeds. *Crotalaria saltiana* is most attacked by them, but garden peas and beans are also somewhat attacked. *L. blackburni* (Tuely)—Feeds similarly on koa pods, also on the capsules of *Dodonea*. Two species of *Lycaena* have been purposely introduced from Mexico to prey upon lantana. The larvæ feed on the flower clusters; on the leaves also, more or less.

#### PIERIDAE.

*Pontia rapae* (Linn.)—On cabbage and various other cruciferous plants.

#### PHYCITIDAE.

*Genophantis iodora* Meyr.—Larvæ in webbed leaves of *Euphorbia clusiaefolia* and *E. celastroides*. *G. leahi* Sw.—In webbed leaves of *Euphorbia cordata*, and *E. pilulifera*. *Plodia interpunctella* (Hub.)—The Indian meal moth, in all kinds of cereal products, dried fruits and other foods. *Ephestia elutella* (Hub.)—Quite similar habits to the above. It is more of a pest than *Plodia*. *Homoeosoma humeralis* (Butl.)—The larvæ feed in the flower-heads of *Bidens*, dahlia, marigold and other composite plants; also bore in the stem. I have found them most numerous boring the stems of *Ageratum conyzoides*, a common weed in cane fields. *Myelois ceratoniae* Z.—Larvæ in pods of *Ceratonia*, *Acacia farnesiana* and similar legumes. They feed on the seeds and also on the pulpy matter inside the pods. *Cryptoblabes aliena* Sw.—Larvæ on various plants, feeding where there has been infestation by mealy bugs, aphids, or something similar. Thus often found on orange trees, lantana, cotton, sorghum and sugar cane. They are also numerous among the flower clusters of algaroba and mango.

An unrecorded species of Phycitid breeds in the flower-heads of the silversword plant (*Argyroxiphium sandwicense*) in the crater of Haleakala.

## GALLERIADÆ.

*Meliphora grisella* (Fab.)—Feeds in combs of bee-hives, but I have not observed it myself.

## CRAMBIDÆ.

I have not seen the caterpillars of any of this family; but I am under the impression that Dr. Perkins reports the genus *Talis* as feeding in grass.

## PYRAUSTIDÆ.

*Margaronia exaula* (Meyr.)—Dr. Perkins informs me that the caterpillars feed on some euphorbiaceous plant; but I have not yet seen them. *Omiodes*.—The larvæ of this genus are leaf-rollers, feeding on leaves of grasses and other monocotyledonous plants; rolling the leaves to form a tube in which to hide, or folding over the edge of leaves, or feeding between spun-together leaves. *O. blackburni* (Butl.)—Feeds chiefly on coconut leaves; but also to some extent on other palms and on bananas. *O. meyricki* Sw., *O. musicola* Sw., and *O. maia* Sw.—Feed only on bananas. *O. asaphombra* Meyr.—On *Joinvillea adscendens*. *O. iridias* Meyr.—On *Astelia veratroides*. *O. anastrepta* Meyr. On *Carex oahuensis*. *O. antidoxa* Meyr.—On *Rhyncospora thyrsoides*. *O. accepta* (Butl.), *continuatalis* (Wall.), *demaratalis* (Walk.) and *localis* (Butl.)—On grasses; *accepta* on sugar cane also. *O. monogramma* Meyr.—On *Dianella odorata*, a liliaceous plant. *O. monogona* Meyr.—On the “wiliwili” tree and various bean vines. This is the only one feeding on a dicotyledonous plant.

*Hymenia recurvalis* (Fab.)—Feeds on *Euxolus*, *Portulacca*, garden beets, coxcomb, and other amarantaceous plants, also on chenopodious weeds, spinning a slight web.

The larvæ of the genus *Phlyctaenia* are also leaf-rollers, or mostly feed in a depression or groove of a leaf beneath a web, or between spun-together leaves. *P. calliastra* Meyr.—On *Peperomia membranacea*; *chytropa* Meyr.—On hibiscus; *monticolans* (Butl.)—On *Ipomoea bona-nox*; *nigrescens* (Butl.)—On *Abutilon* and *Sida*; *iocrossa* Meyr.—On various species of *Cyrtandra*; *eucrena* (Meyr.)—On a labiate (Fullaway); *Platy-leuca* Meyr., and *chalcophanes* Meyr.—On *Touchardia latifolia*;

*metasema* Meyr.—On *Phyllostegia glabra*, a mint; *ommatias* Meyr.—On *Dubautia laxa* and *plantaginia; stellata* (Butl.)—On *Pipturus albidus; despecta* (Butl.)—On *Ipomoea bona-nox*, sweet potato and also other species of *Ipomoea; ennychioides* (Butl.)—On a tree which I have not positively identified, but may be *Bobea; pyranthes* Meyr.—On *Vaccinium penduliflorum*. I have also reared moths from caterpillars found on *Campylothecha, Lipochaeta* and *Adenostema*, which I have not been able to separate from *despecta* though the caterpillars are different, and also different from each other according to their food plant.

*Pyrausta dryadopa* Meyr.—I have reared from larvæ in spun leaves of *Scaevola glabra. P. constricta* (Butl.)—Very abundant usually on *Scaevola chamisoniana*.

*Mecyna aurora* (Butl.)—Larvæ feed in spun leaves on *Campylothecha* and *Bidens. M. virescens* Butl.—On “mamani” trees (*Sophora chrysophylla*) (Perkins).

*Evergestis anastamosalis* (Guen.)—Larvæ bore in sweet potato vines also into the tubers; and I have found them boring in the stems of an ornamented *Ipomoea. Nomophila noctuella* Schiff.—Feeds on clover and grass (Felt); *Polygonum aviculare* (Leach). *Hellula undalis* (Fab.)—Feeds on cabbage and other cruciferous plants. The larvæ mine the leaves, bore the stems, and also feed on the surface more or less, well protected by a silken tunnel. They often penetrate to the terminal bud of the young cabbage plant and thus destroy it for heading.

*Promylea pyropia* Meyr.—Mines the leaves of *Peperomia*. One larva requires several leaves. After eating out all the mesophyll of one leaf it migrates to another, and so on.

*Mestolobes* is a large genus of which no one has yet discovered the larvæ, although some of the species are very common. The same may be said for *Orthomecyna*.

*Scoparia* is a large genus, the larvæ of which are said to feed in silken tunnels in mosses. I have often found them; but *melichlora* Meyr., is the only species I have succeeded in rearing from moss. Mr. Fullaway has reared *meristis* Meyr., and *siderina* from larvæ found in moss. *S. lycopodiae* Sw., which I have recently described, bores in the stems of *Lycopodium cernuum*.

## PYRALIDIDAE.

*Pyralis mauritialis* Boisd.—Larvæ feed in old *Polistes* nests.

## PTEROPHORIDAE.

*Trichoptilus oxydactylus* (Walk.)—Larvæ on *Boerhaavia diffusa*. A species of *Platyptilia* purposely introduced from Mexico, feeds on flower clusters of lantana.

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## ORNEODIDAE.

*Orneodes objurgatella* Walsm.—“Bred from seeds of forest trees” (Perkins).

## GELECHIADAE.

*Aristotelia nigriciliella* Walsm.—Mines the leaves of *Gouldia macrocarpa*. *A. ichthyochroa* Walsm.—Produces galls on stems of *Gouldia macrocarpa*. *A. elegantior* Walsm.—Feeds in fruits of *Gouldia macrocarpa*.

*Phthorimaea operculella* Z.—Mines leaves, and bores in stems and fruits of tomato, potato, tobacco, *Datura* and *Nicandra*; in potato it bores into tubers also.

*Gelechia gossypiella* (Sand.)—In seeds of cotton and *Trespesia populnea*. *Sitotroga cerealella* (Oliv.)—A pest on corn, the larvæ feeding inside the kernels, especially in bins, cribs or warehouses; also in rice standing in the field and in stored rice in the paddy.

*Stoeberhinus testaceous* Butl.—Larva feeds in silken tunnel amongst dead leaves of grass in turf. *Autosticha pelodes* (Meyr.)—Larvæ in dead sticks of lantana, castor oil plant, etc.; amongst fibrous matter at base of palm leaves, on dead or partially dead twigs of Araucarian pine, and beneath dead leaf sheaths of sugar cane.

*Thyrocopa albonubila* Walsm.—Larvæ in dead branch of koa. *T. argentea* (Butl.)—On leaves of *Sapindus*, when nearly full-grown hiding in a webbed together mass of two or three leaves. *T. indecora* (Butl.)—“Larvæ in rotten wood” (Blackburn). *T. pulverulenta* Walsm.—Larvæ in base of grass tufts, also in rotten wood. *T. fraudulentella* Walsm.—Larvæ in silken tunnels in and beneath dried cow dung. Probably normally a dead-wood

feeder. *T. abusa* Walsm.—Larvæ on bark and in dead twigs on many species of plants as lantana, ieie vine, *Cyrtandra*, *Ipomoea*, *Ricinus*, guava, koa; also often feeding on the living twigs; always protected by silken web or tunnel.

#### OECOPHORIDÆ.

*Ethmia colonella* Walsm.—The larvæ protected by webs on the leaves of the Kou tree (*Cordia subcordata*), which they keep in a constant state of defoliation.

#### HYPONOMEUTIDÆ.

*Batrachedra sophroniella* Walsm.—Larvæ very abundant on a fern (*Aspidium cyatheoides*), feeding on under surface of frond, each covered by a white silken web. *B. rileyi* Walsm.—Larvæ are general feeders amongst dry decaying plant substances, and often feeding on living plant tissues also. They are usually to be found where plants have been infested with Aphids or mealy bugs, and often associated with other lepidopterous larvæ, as in pods, capsules or other fruits of various plants, viz.: pods of glue-bush, cotton-bolls, ears of corn, bunches of bananas, tamarind and many leguminous pods, castor-oil seeds and capsules.

*Stigmatophora incertulella* Walk.—Larvæ feed in large numbers in the male inflorescence of *Pandanus*. *S. quadrifasciata* Walsm.—Larva feeds inside dead leaves of *Pandanus*, cutting out regularly oblong oval pieces of the epidermis between which it pupates.

*Aphthonetus* is quite a large genus of which I have reared but one species (*kauaiensis* Walsm.), which feeds on koa leaves. The larva feeds at apex of leaf on upper surface where it is hidden by a sort of median fold which it has produced on the leaf.

*Neelysia* is another large genus of which but few of the larvæ are known. Mr. Fullaway has reared *N. cleodorella* Walsm., from *Cyrtandra*. *N. argyresthiella* Walsm.—Larvæ in silken tunnels in moss.

*Hyposmocoma* is the largest genus of all Hawaiian Lepidoptera. Walsingham recognizes 177 species and several varieties. The larvæ presumably live in cases (many are known to do so);

many styles of these cases are to be found on rocks, bark of trees, beneath the bark of dead trees, and in dead and decaying stems and trunks of trees. Some feed on lichens, others on bark and wood, so far as known. There may be other habits by many of them. I give the habits of the few that are known.

*H. discella* Walsm.—“Larvæ in an irregular case of silk and grass encrusted with miscellaneous fragments (some of them apparently insect remains). On *Cheirodendron*, *Metrosideros*, etc., probably lichenivorous” (Perkins). *H. notabilis* Walsm.—Larva in a nearly smooth, subcylindrical case bulged in the middle. Among fibrous matter at base of palm leaves. *H. partita* Walsm.—I bred a specimen from a pupa in a dead twig. There was no case. *H. abjecta* (Butl.)—Larvæ in a regular elongate oblong-oval, brown case covered with frass and bits of rotten wood, in dead ieie vine and other sticks. *H. blackburnii*. Butl.—“On more or less decayed koa trunks” (Perkins). “I think it is connected with dead wood” (Blackburn). *H. alliterata* Walsm.—Larvæ 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. I have found them on the trunks of living koa, kukui, *Boehmeria* and ceara rubber trees. *H. trimaculata* Walsm.—Larvæ in a short subcylindrical case, constricted near each end, covered with minute bits of lichen; on and beneath bark of koa trees. *H. bacillella* Walsm.—“Larvæ on *Metrosideros polymorpha* and other trees” (Perkins). *H. canella* Walsm.—“Larvæ on rocks” (Perkins). *H. saccophora* Walsm.—“Larva in case on rocks, no doubt lichenivorous” (Perkins). *H. vicina* Walsm.—“On more or less decayed koa trees” (Perkins). *H. metrosiderella* Walsm.—“Larvæ on *Metrosideros*” (Perkins). *H. montivolans* (Butl.)—“Larva in case on rocks” (Perkins). *H. liturata* Walsm.—Larva in lichen-covered case on rocks, lichenivorous. *H. parda* (Butl.)—“Apparently connected with dead wood” (Blackburn). *H. subcitrella* Walsm.—“Larva in case on *Cheirodendron*, *Metrosideros*, etc.” (lichenivorous?) (Perkins). *H. chilonella* Walsm.—Larva elongate, white, boring in dead *Pipturus* stems; without a case. *H. ekaha* Sw.—Larva feeds on under surface of fronds of birds-nest fern, in a silken frass-covered tunnel, also bores the rachis.



*Hyperdasys cryptogamiellus* Walsm.—“Pupa in dead koa stick” (Fullaway). *Euperissus cristatus* Butl.—Larva large elongate, white, bores in dead “ieie” vines. *Semnoproepia fulvogrisea* Walsm.—Larva white, elongate, feeding in dead wood. I have reared it from dead flower stalk of native palm, and from leaf-sheaths on dead bamboo. *S. petroptilota* Walsm.—Larva elongate, white, in rotten wood. The larvæ of these two species, *Euperissus cristatus*, and *Hyposmocoma chilonella*, are quite similar. *Diplosara lignivora* (Butl.)—“Larva feeding on rotten wood” (Blackburn) (Perkins). Case large, brown, elongate oblong.

*Blastobasis inana* (Butl.)—“Bred from yam; introduced” (Perkins, Koebele). I bred two specimens from garden beans; found a pupa in dead sugar cane. *Endrosis lactella* (Schiff.)—“Larva on seeds, dry refuse, etc.” (Meyrick). *Oecia maculata* Walsm.—Larva in flat oval case on walls of buildings. *Mapsidius auspicata* Walsm.—Larva in dense white silken tunnel on leaves of *Charpentaria*. *Prays fulvocanellus* Walsm.—Larva in buds of *Pelea* and *Platydesmia*. *Plutella maculipennis* (Curt.)—Larva on cabbage and other cruciferous plants.

#### CARPOSINIDÆ.

*Heterocrossa olivaceoniteus* Walsm.—Larva in fruit of *Sideroxylon*, and buds and fruit of *Clermontia*. *H. gemmata* Walsm.—Larva in flowers and fruit of *Rollandia*. *H. subumbrata* Walsm.—Larva in gall on stem of *Scaevola chamisoniana*. *H. divaricata* Walsm.—Larva in young fruit of *Eleocarpus*. *H. inscripta* Walsm.—Larva in “Ohelo” berries (*Vaccinium reticulatum*). *H. gracillima* Walsm.—“Larva in berries of *Cyathodes*” (Fullaway). *H. distincta* Walsm.—Larva in buds of “Ohia” (*Metrosideros polymorpha*).

#### TOETRICIDÆ.

##### OLETHREUTINÆ.

*Eccoptocera foetorivorans* (Butl.)—Larva spins together the leaves at the growing tip of twigs of *Metrosideros polymorpha*; also between guava leaves. *Crociosema plebiana* Z.—Larva feeds in flower buds of *Sida* and *Abutilon*; *C. lantana* Busck—Flower clusters and fruit of lantana (purposely introduced).

*Adenoneura falsifalcellum* Walsm.—Larva in pods and seeds, and also boring in stems of a bean vine which I have identified as *Canavalia galeata* in a previous paper before this Society; but at present there is some doubt as to the identity of the plant. *A. rufipennis* (Butl.)—Larva feeds in pods of koa, on the growing seeds. *A. plicatum* Walsm.—“Larva in seeds of native acacias” (Perkins).

*Cryptophlebia illepida* (Butl.)—Larva in pods of koa and *Acacia farnesiana*, feeding on growing seeds; also in litchi nuts (Fullaway). *Enarmonia walsinghami* (Butl.)—Larva in dead twigs of koa. *Bactra straminea* (Butl.)—Larva bores in stems of sedges at base.

## TORTRICINÆ.

*Archips postvittanus* (Walk.)—Larvæ on many kinds of plants, shrubs and trees; roll the edges of leaves or spin leaves together for hiding-place. *Archips longiplicatus* Walsm.—Larva in leaf-buds and between leaves of *Myrsine*. *Amorbia emigratella* Busck—Larvæ with similar habits to *Archips postvittanus*. *Dipterina fulvosericea* Walsm.—Larva between spun leaves of *Xylosma*. *Tortix metallurgica* Walsm.—Larva between spun leaves of *Phyllanthis*. *Epagoge infaustana* Walsm.—Larva between leaves and boring in tips of twigs of *Pipturus*.

## TINEIDÆ.

*Opogona aurisquamosa* (Butl.)—Larvæ are scavengers, feeding on dead vegetable substances in many situations, viz.: decaying fruits, decaying leaves of bananas and palms, rotten wood, dead stems of bamboo, castor oil plant, sugar cane, *Pipturus*, *Clermontia* and other native trees. *O. apicalis* Sw.—Similar habits to above.

*Ereunetis simulans* (Butl.)—Larvæ in and beneath bark of dead trees, also in the wood itself. *E. minuscula* Walsm.—Larvæ in dead stems, also in decaying pods of various legumes, and on dead leaves of banana, papaia, palm, *Pandanus*, pineapple, etc. *E. flavistriata* Walsm.—Larvæ on sugar cane, feeding on inside of dead leaf-sheaths, also on the buds, and frequently eating off large patches of epidermis of the stem. Besides they have the general habits of *minuscula*. *E. penicillata* Sw.—Dead *Pandanus* leaves.

*Philodoria auromagnifica* Walsm.—Larva mines leaves of *Myrsine*. *P. micropetala* Walsm.—Larva mines leaves of *Pipturus*. *P. splendida* Walsm.—“Leaf-miner in Ohia, *Metrosideros polymorpha*” (Perkins).

*Gracilaria marginestrigata* Walsm.—“Larva mines leaves of ‘Kikania’” (Perkins). They also mine leaves of *Sida* and *Xanthium*. *G. epibathra* Walsm.—Larvæ mine the leaves of *Dubautia*. *G. mabaella* Sw.—Larvæ mine the leaves of *Maba*. *G. hauicola* Sw.—Larvæ mine the leaves of the “hau” tree.

A purposely introduced species of *Lithocoletis* mines the leaves of lantana.

*Bedellia somnulentella* (Z.) and *B. minor* Busck—Larvæ mine the leaves of *Ipomoea*. *B. oplismeniella* Sw. (MSS.)—Larva mines the leaves of a grass, *Oplismenus compositus*. *B. boehmeriella* Sw. (MSS.)—Larva mines the leaves of *Boehmeria stipularis*.

*Setomorpha dryas* (Butl.)—Larva feeding in corn on the ear. *Monopis monachella* (Hub.)—“Larva among rubbish; in bird’s nests; in skins” (Walsingham). *M. crocicapitella* (Clem.)—“Larva in textile stuffs” (Walsingham). *Tinea fuscipunctella* Haw.—“Larva in a case, feeds on dry refuse” (Meyrick). *Cyane terpsichorella* Busck—Larva on dead leaves of banana, pineapple, *Pandanus*, etc., and beneath leaf-sheaths of sugar cane.

ELECTION OF OFFICERS FOR ENSUING YEAR:

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Vice-President.....	F. W. TERRY
Secretary-Treasurer.....	D. B. KUHNS

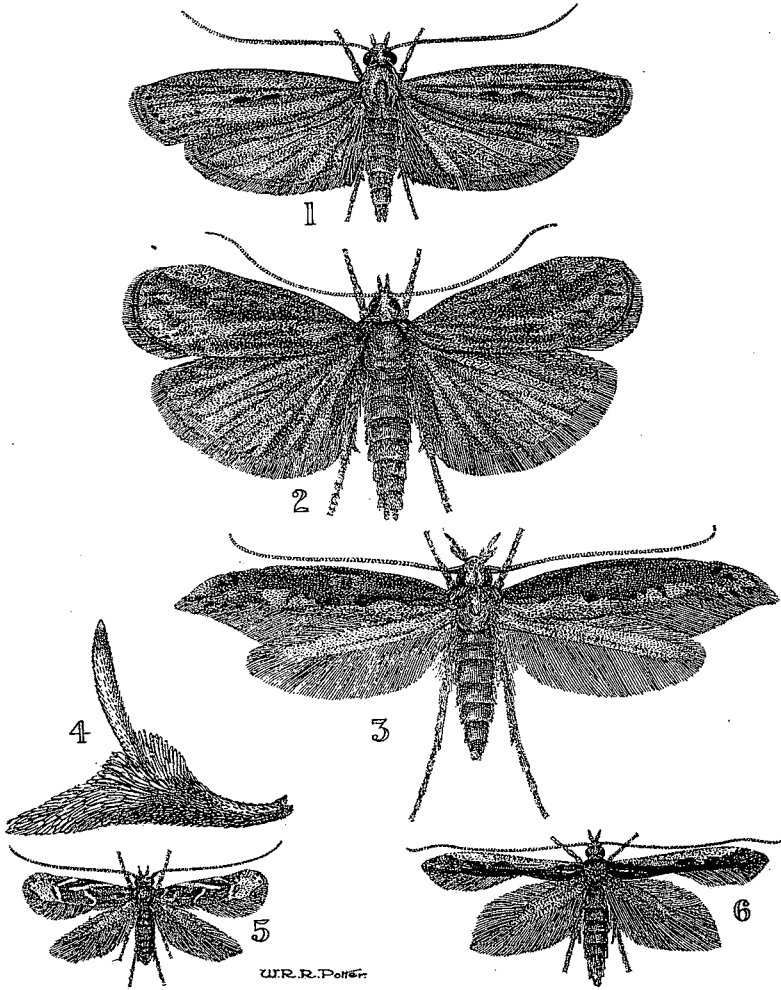
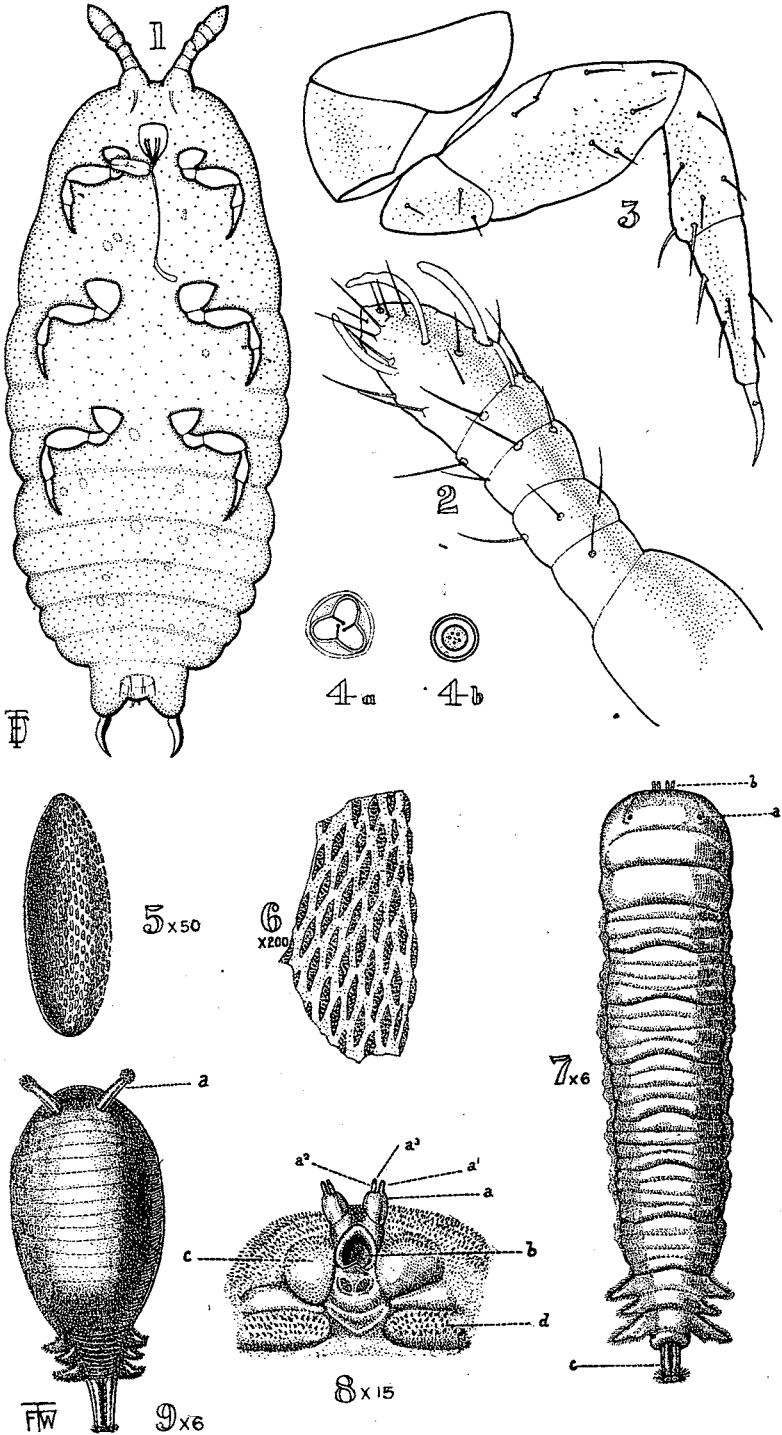


FIG. 1—*Genophantis leahi*, x5.  
FIG. 2—*Scoparia lycopodiae*, x5.  
FIG. 3—*Hyposmocoma ekaha*, x5.  
FIG. 4—*Hyposmocoma ekaha*, labial palpus, highly enlarged.  
FIG. 5—*Gracilaria hauicola*, x5.  
FIG. 6—*Gracilaria mabaella*, x5.



FIGS. 1-4b—*Geococcus radicum*. FIGS. 5-9—*Syritta oceanica*.

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