PROCEEDINGS

OF THE

Hawaiian Entomological Society

VOLUME II

Dictyophorodelphax mirabilis.

1908–1912
HONOLULU, T. H.

PROCEEDINGS OF THE HAWAIIAN ENTOMOLOGICAL SOCIETY.

INDEX TO VOLUME II.

(*Indicates genera and species new to science.)

HYMENOPTERA.

DIPTERA.

LEPIDOPTERA.

COLEOPTERA.

HEMIPTERA.

ORTHOPTERA.

NEUROPTERA

MISSCELLANEOUS.

ERRATA AND CORRIGENDA.

Page 9, *"Pison iridipennis"* mentioned was later identified as *Pison argentatum.*

" 12, "Sphingid from Larat" was later identified as *Pseudosphinx discistriga.*

" 15, line 17, change *"Enarnonia* sp." to *"Adenoneura falsifalcellum* Walsm."

" 84, second line from bottom, "Perkins" should not be italics.

" 112, line 28, for *"cyanophyll"* read *"cyanophylli."*

" 114, line 19, for *"Nesoprosyne"* read *"Nesophrosyne."*

" 136, line 10, for "euphorbiaceous" read "apocyanaceous."

" 138, delete line 7.

" 138, line 19, for *"Trespesia"* read *"Thespesia."*

" 142, line 20, for "Tortix" read "Tortrix."

" 161, line 18, for *"panapona"* read *"ponapona."*

" 164, bottom line, for *"appaveris"* read *"pappveris."*

" 165, line 17, for *"Ephesia"* read *"Ephestia."*

" 179, third line from bottom, for "Leucanid" read "Lucanid."

" 183, line 30, second word, for "epidemis" read "epidermis."

" 186, line 36, for "1911" read "1910."

" 192, line 11, for "Ichnenmonidae" read "Ichneumonidae."

" 198, line 4, for "Wailua" read "Waialua."

" 198, line 32, for *"fusator"* read *"fuscator."*

" 215, footnote for *"Aphycus terryi"* omitted; should read "For description, see page 281."

" 216, lines 2 to 5, the columns of the list are reversed.

" 216, line 10, for "coroplastae" read "ceroplastae."

" 232, lines 16-20 should go to bottom of page.

" 236, lines 17-18, the figures in the table for *"Hyposmocoma dorsella* and *Hyposmocoma quinquemaculata"* should be interchanged.

" 237, delete line 10: *"Archips lichenoides* Walsm."

" 243, fifth line from bottom, delete "slightly."
" 261, line 11, for "Mr. C." read "Mr. H. C."
" 268, line26, for "vertex" read "ventral."
" 269, line 2, for "second" read "first."
" 275, line 27, for "Torticidae" read "Tortricidae."
" 281, lines 2 and 3 from bottom, for *"saccharifolia"* read *"saccharifolii."*
" 293, lines 10-19 should go to the bottom of page.
" 302, line 19, for *"Proterhiuus"* read *"Proterhinus."*
" 302, bottom line, for *"blackburni"* read *"blackburnii."*
" 306, line 5 of second column of table, for "kalakauea" read "kalakauae."
" 306, 308, 310, line 1 of second column of table; for "Heterogina" read "Heterogyna."

PROCEEDINGS

OF THE

HAWAIIAN ENTOMOLOGICAL SOCIETY

Vol. II. HONOLULU, HAWAII No. 1

CONTENTS.

JANUARY 2nd, 1908.

The thirty-sixth regular meeting was held in the Library of the H. S. P. A. Experiment Station, Mr. Giffard in the chair.

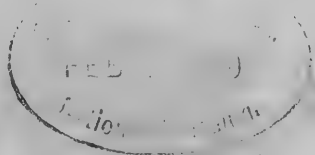
MEMBERS ELECTED.

G. R. Carter, Henry Holmes.

NOTES AND EXHIBITIONS.

Mr. Kirkaldy exhibited a large and interesting collection of Chinese Heteroptera.

Mr. Swezey exhibited specimens and gave the following description:

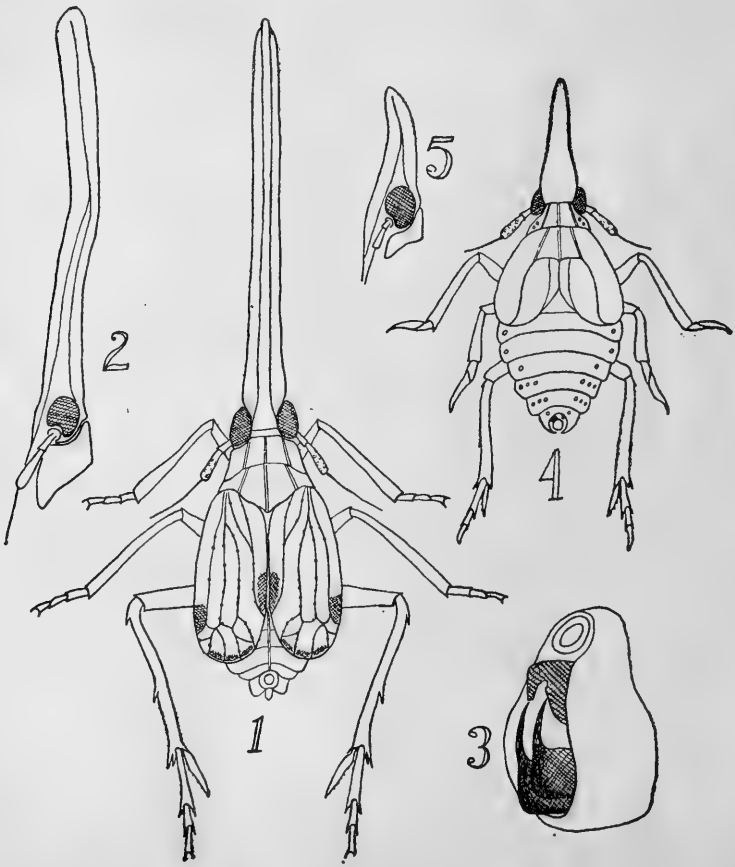


Nymph of *Dictyophorodelphax mirabilis* Swezey.

December 5, 1907, I obtained an adult and 2 nymphs of this species from the same ridge of Konahuanui on which I first collected 4 adult specimens in February, 1906. (Proc. Haw. Ent. Soc., I, p. 104, 1907). I was unable to determine its food-plant, however, whether it was fern, grass, or sedge, or something else. These being mixed together where I had swept with the net each time when a specimen was obtained.

Nymph—whitish with pale brown markings on tegminal-pads, sides of thorax and abdomen. A fuscous streak on side of head prolongation. Legs white, with 2 black spots on dorsal side of tibiae the one nearer base small, the one nearer apex larger, those on posterior tibiae smaller than those on the other tibiae; tips of tarsi black, a black spot at apex of basal joint of hind tarsi. Prolongation of head about as long as head and thorax together.

Two short black-tipped spines on outer side of hind tibiae, one near base, the other a little beyond middle. Calcar of hind tibiae with 6-7 tiny black teeth.



Dictyophorodelphax mirabilis. Fig. 1, adult; 2 side view of head; 3, male genitalia; 4, full grown nymph; 5 side view of head of nymph, Fig. 3, highly enlarged; other figures, x 12½.

FEBRUARY 13th, 1908.

The thirty-seventh regular meeting was held at the usual place, Mr. Giffard in the chair.

Dr. Perkins and Mr. Kotinsky were appointed a committee to draw up and submit to the Society a list of popular names of the more common economic insects in order to secure uniformity of use among the local entomologists.

PAPERS.

Notes on Hawaiian Insects.

BY DR. R. C. L. PERKINS.

This paper consisted of general remarks on a number of chiefly undescribed insects, the descriptions of which will appear elsewhere.

Life History of *Caradrina reclusa* Walker.

BY OTTO H. SWEZEY.

This Noctuid has become quite numerous in Honolulu and the adjacent mountains within the past two or three years. The first that I noticed it was in Kalihi, Oahu, March, 1906, and Hamakua and Kohala, Hawaii, April, 1906. Dr. Perkins had taken specimens a few years previously. During the summer of 1906 certain black caterpillars were observed by Mr. Giffard and Dr. Perkins very abundant on Mt. Tantalus. These on rearing proved to be the moth under consideration. A few months later the same caterpillars were found abundant at Maunawili, by Messrs. Giffard and Terry. Since that time, the caterpillars and moths have been observed by different ones at different places in the vicinity of Honolulu and the southeast end of the island. The moth has also been taken on Maui.*

I recently sent specimens of the moth to Dr. Dyar of the U. S. Nat. Museum, who identified them as *Caradrina reclusa* Wlk. In Hampson's "Moths of British India," the habitat of

*In August 1908, caterpillars were found very numerous at Koloa, Kauai. They were in a grove of mountain apple trees (*Eugenia malaccensis*). They probably had fed on the leaves of the very small trees, which were coming up very numerously, and other herbage; but at the time were feeding largely on the fallen fruit. [O. H. S.]

this moth is given as Nilgiris, Ceylon, Borneo, Fiji. It evidently reached Hawaii from the latter place.

In October, 1907, I caught in my house at Kaimuki a female of this moth, which deposited eggs during the night, and I was enabled to make complete observations on the life history. The eggs were not laid in a mass or cluster, but scattered around singly, or two or three together on the surface of leaves; in several places, 5, 7 and 8 respectively, were nearly in rows on the surface of grass leaves; there were also eggs on the cloth covering the jar in which she was retained; in one place, 9 were closely clustered together. There were 216 eggs in all. The moth died the 4th day.

The egg is hemispherical, having the flattened surface next to the leaf; ribbed meridionally with about 30 ribs, 10 of which reach the upper pole; slight cross ridges between the ribs; at the upper pole an irregular patch of reddish color, an irregular ring of the same color at about 1-3 the distance from pole to base of egg, remainder of egg pale green, when first laid, entirely pale green, the reddish markings appearing soon after. Eggs hatched in 5 days.

Larva: 1st stage—about 2mm. long when first hatched; dull whitish, head black; cervical shield and tubercles nearly black. The hairs in tubercles quite prominent, dark. They crawl by a looping motion, using of the prolegs, only the anal and those on segment 10, the other prolegs are rudimentary. They eat off the surface of leaves, leaving one epidermis.

2nd stage—about 4mm. long, pale mottled reddish green, with a dorsal and on each side a subdorsal stripe, paler, head very pale luteous, eyes black; tubercles small, with a tiny blackish dot at base of hairs; hairs pale, shorter than in first stage. They now use abdominal prolegs of segments 9 and 10 (others rudimentary) and still crawl by a looping motion. They now eat holes thru the tender leaves; but in older leaves, leave one epidermis.

3rd stage—about 6-8mm. long; very much mottled with greenish, blackish and some times a faint reddish tinge; a dorsal whitish line on each side, darker along ventral side; segment 12 slightly swollen, two whitish spots on dorsal side; segment 6 also has two white spots on dorsal side each in a subdorsal line; tubercles white; hairs very short; head slightly fuscous

except the upper and posterior parts which are pale brown where usually withdrawn into segment 2, eyes black; cervical shield darker than rest of body with dorsal white line less prominent than on other segments, the subdorsal lines more prominent. All prolegs now fully developed.

4th stage—15-17mm.; much more mottled and variegated than preceding stage with black, browns, olivaceous, yellowish and whitish, the darker colors predominating; two more or less conspicuous sub-dorsal rows of black spots on segments 7-12, a broad paler region on dorsum between these, in the middle of which is a series of obscure lozenge-shaped darker spots; head mostly black except the periphery (portion covered when retracted) which is pale brown; two conspicuous whitish subdorsal spots on segment 6; posterior sub-dorsal parts of segment 12 and upper parts of segment 13 yellowish; spiracles black, a yellowish streak below them; tubercles not conspicuous, same color as place where situated, hairs short; 12th segment quite swollen.

5th and 6th stages—very similar to fourth stage, but usually darker, almost black. When full-grown 26-32mm. long. When disturbed the caterpillars drop from the leaf where feeding and mostly lie straight and rigid, feigning death. When smaller they dropped and curled up when disturbed.

The caterpillar in breeding-cage ate leaves of sweet potato, bean, *Portulaca,* grass and "honohono" (*Commelina*). They did not take readily to sugar-cane. In nature they have not been found injuring any cultivated plant or crop, but it is possible that they might do so later on if they become more abundant.

The five molts occur at intervals of 3-9 days, usually about 4 days; and the caterpillars become full-grown in 30-40 days.

The pupa is formed in the soil, an inch or two below the surface. It is 13-15mm. long; uniform medium brown, eyes black, wing-, leg-, and antenna-cases extend to apex of 4th abdominal segment; articulations between segments 4-7 movable; a row of about 20 pits on dorsal part of basal margin of segments 5, 6 and 7, from the ends of these rows a band of punctures extends around the ventral side; apex of abdomen blunt and rounded, with two dark spines placed near together, their tips converging, slightly ventrally curved. Pupal period 12-14 days.

MARCH 5th, 1908.

The thirty-eighth regular meeting was held in the usual place, Mr. Giffard in the chair.

MEMBERS ELECTED.

D. B. Kuhns, J. W. Waldron, A. Waterhouse, H. E. Cooper.

NOTES AND EXHIBITION OF SPECIMENS.

Mr. Wilder exhibited a male and female and several inflated larvae of *Hypocala andremona* (?). He discovered the caterpillar in large numbers on one of his trees on January 11th, of the present year and brought them to the Board's entomologists who could not identify it with anything known to them. Upon further study and subsequent breeding by Messrs. Craw, Kotinsky, Swezey and Jordan it proved to be the above named species. All stages of the insect were observed and parasites (*Trichogramma pretiosa*) bred from the eggs. Mr. Swezey called attention to the remarkable color variation in the caterpillars, of which scarcely two were alike, nor was there any apparent relation between colors and sex. Mr. Kotinsky spoke of the peculiar confinement of the insect to a single tree in the vicinity investigated. The identity of the tree could not be ascertained as no flower of it was ever seen. Some insect was known to have injured the tree for the past two or three years, but hitherto undiscovered.

Dr. Perkins wished to record the presence on these islands of two parasitic Hymenoptera remarkable for similarity in appearance, yet belonging to what he considers two distinct genera, both of which are new and to be described. Both are common in Honolulu and belong to the family *Scelionidae,* sub-family *Baeinae;* one or both of them may be parasitic on eggs of foreign Heteroptera, though from the habits of allied species they would be expected to breed in spiders eggs. The male has 12 antennal segments, the female 7 with a solid club. One of these genera will be named *Pseudobaeus,* the other *Dyscritobaeus.*

PAPER READ.

Observations on the Life-History of *Chaetogaedia monticola*, Bigot.

BY OTTO H. SWEZEY.

It is but recently that I discovered the method of egg-laying of this Tachina fly. It is usually stated in entomological literature that Tachina flies lay their eggs on the bodies of their hosts; in fact with certain species the act has been observed, but for far the greater number of them, the act of egg-laying has not been observed , or at any rate not recorded. That *Chaetogaedia* had a different method of laying eggs was surmised, when in June, 1907, this parasite was reared from more than half of a lot of pupae of *Agrotis cinctipennis,* one of the less common native cutworms. The eggs of this lot of cutworms were hatched in breeding cage and grew to maturity without the possibility of access of a Tachina fly; hence, considerable of a mystery arose when more Tachinids than moths bred out from the lot. (Proc. Haw. Ent. Soc. I, pp. 163, 164, 1908.)

This mystery was not cleared up till in February, 1908, when in watching a female *Chaetogaedia,* as I supposed hunting for caterpillars amongst grass and weeds, I observed that she was laying eggs on the grass leaves. She would quickly crawl around among the leaves, only stopping momentarily to place an egg here and there on the surface of a leaf, never more than one per leaf. They were placed on the leaves of weeds as well as on the grass. After making this observation, it was easy to explain how the caterpillars previously alluded to, become parasitized; for they were daily supplied with food (mostly *Sonchus*) gathered from outside where Tachinas were common, and had undoubtedly deposited many eggs on the leaves. The caterpillars ate the leaves with the eggs thereon, which hatched inside and grew to maturity, not however killing the caterpillars till after the latter had transformed to pupae.

I have since learned that another Tachina fly has similar habits of laying its eggs, the "Uji," which is very destructive to silk worm caterpillars in Japan. This is the only instance I have found in entomological literature of a Tachinid laying its eggs otherwise than directly on the host (caterpillar, grasshopper, or whatever it is).

The egg-laying habits and the life history of the "Ugi" (*Ugimya sericariae* Rondani) were published in detail by Sasaki, in Journ. Sci. Coll. Imp. Univ. Japan, 1886. The eggs are laid on mulberry leaves, eaten by the silk worms; hatch in the digestive canal in a few hours; the larvae bore thru its walls, feed on the ganglia for a time; later enter the tracheal system and become located in a sort of cup or sac, with the spiracles at the posterior end near a spiracle of the caterpillar and the anterior end with the body cavity where it is convenient to feed on the fat of the silkworm; when fully developed the maggot forces its way out thru the skin of the silkworm (or pupa, if it has pupated); enters the ground to form its puparium, within which it remains thru the winter.

Chaetogaedia monticola agrees with this in some parts of its development. The eggs are laid on leaves as before stated. The egg of *Chaetogaedia* appears as a tiny black dot on a grass leaf. It is .44mm. long by .25mm. broad, quite regularly ovate, shaped like a hen's egg only somewhat flattened where in contact with the leaf; smooth and shining black. A female dissected was found to have several hundred of them in the ovarian tubes. Another female which bred out in captivity, was dissected when several days old, to count the eggs. The oviduct contained 1066 eggs which were black and apparently ready for oviposition. The ovarian tubes, which are numerous and collected into two ball-like structures, were full of immature ova. Probably the mapority that are laid are not eaten by caterpillars; hence, the provision of such a large number is to insure some of them being eaten. They are so small as to escape being injured by the jaws of the caterpillars in biting off bits of leaf, tho probably some are destroyed. They soon hatch in the alimentary canal of the caterpillar and bore thru its walls to the surrounding body cavity. If they did not hatch the same day they would probably pass out with the excrement. A caterpillar which had been fed with leaves on which quite a number of *Chaetogaedia* eggs (dissected from a caught female) had been spread, died after 5 days. It was dissected and 24 maggots of the parasite were found inside. They were about 2mm. long and were mostly located in the head and anterior segments of the caterpillar. Other caterpillars which had been similarly treated and had died, were dissected and fewer maggots found

inside. With so many maggots there is not food enough for all, so the caterpillar dies too soon before the parasites can become full-grown. Perhaps only those caterpillars which have eaten but one egg, or have had but one egg hatch inside of them, are able to survive till the maggot becomes full-grown, and those having more than one maggot inside die too soon, and thus the maggots themselves die; at any rate, I never have reared more than one parasite per host, nor have I found more than one puparium formed per host.

In dissecting caterpillars containing maggots, I never have found maggots feeding on the nerve ganglia, as Sasaki has; but I have found them located, as he says, near a spiracle of the caterpillar, and enclosed in a sort of sac which is apparently an enlarged tracheal tube, the maggot locating in it when small and the tube becoming enlarged as the maggot grew. Usually there is a blackening of the caterpillar externally where one of these is located. When about full-grown the maggot leaves the sac and lies lengthwise in the caterpillar (or pupa, if it has pupated) eating up all or nearly all of the fatty matter of the latter. It may be nearly full-grown at the time the caterpillar pupates, or it may be still quite small; but I never have known of a case where the puparium of the parasite was formed before the caterpillar had pupated. The puparium is cylindrical, rounded at the anterior end, and rather blunt at the posterior end where it is often somewhat widened. It is of a very dark reddish color, and each of the two spiracular orifices at the posterior end has three black rounded protuberances around it. The anterior end is always directed anteriorly in the host pupa. The adult fly emerges in about 10 to 14 days from the time the puparium is formed.

APRIL 2nd, 1908.

The thirty-ninth regular meeting was held in the usual place, Mr. Giffard in the chair.

NOTES AND EXHIBITION OF SPECIMENS.

Referring to recent notes on *Pison iridipennis* presented to the Society by Mr. Swezey and others, Dr. Perkins stated that after collecting and carefully examining specimens of this supposed species, he is certain that it is not *iridipennis* and in

view of the breaking up of the genus it is possibly not even a *Pison*.

Mr. Giffard exhibited a very neatly mounted collection of Aculeate Hymenoptera collected at Summit, California, last summer.

PAPERS READ.

Synonomy of Hawaiian Cynipidae.

BY R. C. L. PERKINS.

Those who follow Dalla Torre & Kieffer in the Classification of the Cynipidae, will find the following changes necessary in Ashmead's species enumerated in the Fauna Hawaiiensis.

Cothonaspis Hart.

Subg. *Anectocleis* Forst.
hawaiiensis Ashm.
=*Hypodiranchis hawaiiensis* Ashm.
lanaiensis Ashm.
=*Hypodiranchis lanaiensis* Ashm.
monticola Ashm.
=*Diranchis monticola* Ashm.
rubripes D. T. & Kieff.
=*Diranchis rufipes* Ashm.
nom. praeocc. in subg. *Cothonaspis.*

Eucoela Westw.

Subg. *Psichacra* Forst.
molokaiensis Ashm.
=*Aglaotoma molokaiensis* Ashm.
subrufa D. T. & Keiff.
=*Aglaotoma rufiventris* Ashm.
nom. praeocc. in subg. *Hexamerocera.*

Subg. *Hexamerocera.*
konensis Ashm.
=*Hexaplasta konensis* Ashm.

Trybliographa hawaiiensis Ashm. I cannot find in Dalla Torre & Kieffer it is described by Ashmead as having a completely closed marginal cell, while in *Trybliographa* (=*Cothonaspis*) this cell is open. Probably it should be referred to Eucoela subg. Psichacra. *Pilinothrix bicolor* Ashm. alone remains unchanged by the authors of the Cynipidae in Wytsman's Genera Insectorum.

History and Present Status of *Orthezia insignis* in Hawaii.

BY JACOB KOTINSKY.

Orthezia insignis was first discovered at Wailuku, Maui, in 1899 by Mr. G. P. Wilder of Honolulu and Brother Frank of the Catholic Mission and was by the former brought to the government's attention in November of that year. Mr. Koebele heard of this unpleasant discovery while in Sydney, New South Wales, and forthwith issued instructions to have the pest eradicated. It would seem, however, that word had gone forth in the meantime proclaiming the bug as the true savior of the cattle industry from the lantana pest, and cattlemen everywhere eagerly, surreptitiously distributed it over their lantana infested fields. The blackened appearance of the leaves served to advertise the newly discovered remedy and was taken to indicate the doom of the pernicious plant. Despite repeated warnings by Mr. Koebele and other local entomologists the insect was distributed over all the important islands of the group.

APPEARANCE ON OAHU.

In November, 1904, while crossing the Nuuanu Pali Mr. Giffard drew the attention of Mr. Craw and the writer, who accompanied him, to what was probably the first appearance of the scale on this island—two patches of blackened lantana about one-third the way down the other side of the Pali. By way of the Pali and doubtless also on birds' feet it has crossed the ridge since and spread to and overrun all of the Kona district of this island. In this area it has touched an important residential portion of Honolulu, viz.: Manoa, Makiki and Pawaa districts.

In course of its march seaward it was found on a large variety of plants, and actually killing several ornamental plants, like Coleus, Alternanthera, Gardenia, Meyenia and others. It was reported on citrus and banana trees but upon investigation the writer found that it did no more damage to these trees than to the chicken coop which it had also overrun in the same yard—it was merely a case of overflow from lantana on the adjoining lot.

The question confronting us at present is whether the time is ripe for an attempt to check it. Needless to say that viewed

from our present knowledge the Agromyzid alone would have probably sufficed to check lantana from further distribution. But before the introduction of any of the lantana destroyers this could not have been foreseen and, necessity to check lantana being urgent, several other safe species were introduced. These importations did not include Orthezia. But evidently ranchmen were in straightened circumstances, and seized upon Orthezia, whosoever was responsible for its introduction, as a godsend. Moreover they now claim that nothing has done so much toward killing lantana as did Orthezia, and large stretches of dead lantana testify to the correctness of their claims. Considered from the business view point Orthezia has done much material good by killing off large areas of lantana. Yet it is no denying that it is a disgusting scourge once it invades a garden. While it kills little perhaps, its presence induces growth of the sooty mold and turns black everything it overruns. The situation summarized is as follows: Orthezia is an undoubted blessing to the ranchmen whose best pastures are overrun by lantana; it is a disagreeable pest to the horticulturist, and, as lantana is the best soil builder we have, the owner of large tracts of arid rocky land is not thankful for its presence there.

In commenting upon these notes Dr. Perkins said that while the scale has thus far done more good than harm it is his belief that ultimately it may become injurious and will require control. Mr. Giffard stated that he is convinced the scale, and especially the copious amount of honey-dew it produces, interferes with the efficient work of the Tingid. In addition he said the agricultural and horticultural interests of the Territory required that the scale bug be placed in control.

MAY 7th, 1908.

The fortieth regular meeting was held in the usual place, Mr. Swezey in the chair.

EXHIBITION OF SPECIMENS.

Mr. Swezey exhibited large series of specimens illustrating his papers which follow.

On the Stridulating Organ of a Sphingid from Larat.

BY F. MUIR.

When in Larat my attention was attracted to this Sphingid by the loud noise it made both on the wing and at rest. I only

succeeded in catching one, a male, and found that the noise was produced by a rapid lateral movement of the last segment of the body, where a highly specialized organ existed. The claspers, when closed, are shaped like the stem of a decked boat. On the dorsal surface (the deck) are two groups of highly specialized scales, flat, rough or hard forming a file. Along the posterior edge of the preceding segment the scales are also highly specialized, being stiff and shaped like the teeth of a comb. By a lateral movement of the segment that bears the claspers the files are rubbed against the "teeth" of the "comb" and produces a loud noise that can be distinctly heard ten yards away.

The Younger Stages of *Nesodryas freycinetiae* Kirkaldy.

BY OTTO H. SWEZEY.

This is a delicate pale green little leaf-hopper living on the "ieie" vine (*Freycinetia arnotti*). The eggs are inserted in the younger leaves at the crown of the growing vine, parallel with the fibers of the leaves, one or two together. The young nymphs are very flat, adapted to crawling between the leaves in the crown of the plant. They also may be found exposed on the surfaces of the outer parts of the leaves, where they might not be recognized as young leaf-hoppers at first sight, on account of their flatness; and their coloration as described below allows them to be mistaken for a bit of dirt or debris.

The first stage is about 1.25mm. long and about 0.75mm. wide; flattish; head bluntly triangularly produced in front of eyes; pale green; sides and front of head, sides of thorax, two apical segments of abdomen (except median dorsal triangle in penultimate segment), femora, basal portion of tibiae and tips of tarsi, dark fuscous; eyes red; tibial spurs of hind legs have but one tooth, it and the spines at apex of tibiae and tarsal segments, black-tipped.

The second stage is about 1.5mm. long; coloration similar to previous stage except that the green portion is not so pale, and has a yellowish tinge. The tibial spurs have two teeth.

The third stage is about 3.25mm. long; coloration similar to second stage, except that the legs are less fuscous, and the ventral side has a bluish tinge. The tibial spurs now have three teeth.

The fourth stage is about 3mm. long. The whole insect is now nearly all green, yellowish on thorax, and bluish below; a few pale brownish markings on thorax, wing-pads and dorsum of abdomen; two fuscous spots on prothorax, one on costa of tegminal-pad, near apex, one near inner angle of hind wing-pad, one at lateral margin of apical segment of abdomen; a fuscous spot on lateral margin at apex of second and third abdominal segments; tips of tarsi fuscous; tibial spurs of hind legs have four teeth.

The fifth stage is very little larger than the fourth; coloration the same; the sensoria on the second segment of antennae are now fuscous.

It is worthy of note that the tibial spurs of the hind legs are simple in the first stage, i. e. have but one tooth and that is at the apex; and that a tooth is added for each stage to the fourth; but the fifth stage has four, the same number as the fourth. In the adult there are five teeth on the tibial spur, sometimes but four, and sometimes there are six.

Life History Notes on Two Variable Tortricids.

BY OTTO H. SWEZEY.

Cryptophlebia illepida (Butler).

The larvae of this moth may often be found very abundantly in the pods of the Glue-bush (*Acacia farnesiana*), where they feed upon the seeds and also on the pulp of the pod. They feed in Koa pods and probably also in the pods of several other Leguminous plants; and have been reported from Litchi nuts.

The eggs are roundish-oval, about 0.3mm., flat, convex above and finely reticulated. They are whitish, dull purplish, or pinkish in color and somewhat iridescent. They are laid on the surface of the pods, singly, or often several together and slightly overlapping.

The full-grown larva is about 15mm. long, plump, dull whitish with a rosy tinge; head strongly bilobed, light brown, eyes in a black dot, another black dot at postero-ventral angle of head; cervical shield slightly tinged with brown; tubercles broadly roundish or oval, somewhat infuscated over their whole surface, those of row "i" notched on the anterior margin

on segments 6-12; spiracles black, pale-centered; tubercles "ii" wider apart dorsally than "i," "iii" just above spiracle; "iv+v" below spiracle, farther from it than "iii" is. When ready to pupate the larva eats a hole out through the pod; then spins quite a dense cocoon of whitish silk having one end near the hole in the pod, so that the moth may readily make its exit when ready to mature.

The pupa is 6–10mm. long., by about 3mm. wide; medium brown; dorsal surface of abdominal segments, beginning with second, supplied with two transverse rows of very numerous tiny, short, conical spines, those of the anterior row are the larger; those of succeeding segments increase somewhat in size going posteriorly; cremaster obsolete; wing, and antenna-cases extending to apex of 3d abdominal segment, a free tip extending a little farther; articulations between segments 3-7 movable. The pupal period is 10-12 days.

Enarmonia sp.

In July, 1907, I found a few larvae of this moth eating the growing seeds of *Canavalia galeata,* a native species of bean with a woody twining vine and very large pods containing 2 to 4 black beans about $\frac{3}{4}$ inch long. The vine had been planted by a fence in Honolulu and had gotten considerable of a growth, and a few pods had already formed. As the vine continued to grow and produce pods these larvae increased in abundance so that finally nearly every pod was attacked by them. They did not confine their attacks to the pods, however; besides feeding in the fleshy walls of the green pod and eating the growing beans within, they also bored the peduncles of the flower clusters, the petioles of the leaves, and the branches of the vine itself; practically attacking all parts of the plant.

Quite a series of this moth was bred from the vine during January and February, 1908. There is some little variation in coloration as shown by the specimens exhibited. I find that I have a specimen of this moth collected up Makiki Valley in May, 1908, which is the only one I had previously seen.

The eggs are laid on the surface of the bean pod, singly or one or two together in slight unevennesses of the surface. They are irregularly oval, about half a mm. long; flattened below, slightly convex above and finely reticulate; whitish in color,

sometimes iridescent, becoming pinkish a little before hatching.

On hatching, the larva bores into the pod, feeding for awhile in its fleshy walls, but when it gets larger, attacks the seeds. One larva may eat several of the large seeds before reaching its full growth. When full-grown, the larva is 18 to 20 mm., plump, yellowish white; head medium brown, strongly bilobed; cervical shield slightly infuscated; tubercles faintly infuscated; hairs pale, short; spiracles pale brown.

Before pupating the larva constructs a silken gallery where it has been feeding, extending often through one or more beans, and it finally extends this to the outer wall of the pod, through which it eats a circular hole, except a thin layer on the outside, which can easily be broken through when the moth emerges; then the larva recedes back into the gallery, spins a silken partition across about a quarter of an inch from the outer end, and in this place of security pupates.

The pupa is 10mm.; light brown; head, thorax and wing cases darker; the latter and antenna-cases extend to apex of 3rd abdominal segment, a free tip extends a little farther. Abdominal segments 3 to 7 have on dorsal side two transverse rows of numerous tiny, very short, conical spines, those of the anterior row larger than those of posterior row; segment 2 has one row of very tiny spines near posterior margin; segment 8 has but one row of few large spines; segment 9 has but two large dorsal spines and a terminal row of 7, there are also several slender hooked bristles at apex of abdomen.

This and *Cryptophlebia illepida* are two very variable species. They illustrate the great variability among the Tortricids of the Hawaiian Islands, as shown by the series of specimens exhibited. This variability has led to some confusion by Lord Walsingham in his recently published "Microlepidoptera" (Fauna Hawaiiensis, I, Pt. V). He has apparently often made varieties of some of these variations. Each species and variety is figured; hence, it should be easy to identify any Hawaiian "Micro"; but on account of such great variation in so many species, one may often not have a specimen of any certain species, which agrees with the particular specimen figured by Lord Walsingham. This makes it very difficult to identify specimens with any certainty, altho from a first glance at the excellent colored plates, it would appear an easy matter.

JUNE 4th, 1908.

The forty-first regular meeting was held in the usual place, Mr. Swezey in the chair.

NOTES AND EXHIBITION OF SPECIMENS.

Mr. Kirkaldy referred to the notable changes that have taken place in the vicinity of Kilauea, Hawaii, as a result of the railroad running through the "Fern Forest." A number of ferns and trees have been killed along both sides of it, and on those dead plants he collected some of the best insects. The making of the road around the crater has also killed a lot of scrub ohias upon which a number of good things, particularly Aculeate Hymenoptera may be collected. In his opinion the ants had spread farther than their limits in December, 1905.

Dr. Perkins exhibited his collection of Hawaiian Proterhinus; the collection he said was not nearly complete and comprised about 120 out of 150 known species. Still it is a fairly good working collection and was carefully examined by all present.

Further Notes on *Melittobia hawaiiensis* Perkins

BY OTTO H. SWEZEY.

This little Chalcid was discovered by Mr. Giffard in 1907, bred from the larva of some species of wasp or bee in its nest in decayed branch of tree (Proc. Haw. Ent. Soc., I, Pt. 4, p. 121, 1907). In the latter part of the same year, I found several nests of the leaf-cutter bee (*Megachile palmarum*) in which the most of the cells had been parasitized by this Chalcid. I have reared it in the laboratory also, upon the larvae of three different wasps: *Odynerus nigripennis, Pison hospes,* and *Sceliphron caementarium.* In March, 1908, I first, discovered them breeding on the larvae of the bud-moth (*Ereunetis flavistriata* Wlsm.) in sugar-cane at the Experiment Station, H. S. P. A. Of a lot of about 50 cocoons of the budworm, collected at one time, 6 of them, or 12%, contained a budworm parasitized by *Melittobia.* Five of them had eggs of *Melittobia* (7,

9, 11, 20 and 30 respectively per budworm) scattered on the surface. These were allowed to hatch and grow to maturity. The sixth cocoon contained 35 pupae of *Melittobia* which had consumed a budworm within its cocoon, and were lying in contact with its driedup remains.

Apparently the female *Melittobia* enters the budworm's cocoon before it is entirely completed, stings the worm and deposits eggs upon it. Or it may be that after entering the cocoon, she waits till the budworm is assuming the inactive condition previous to the transformation to pupa, and then deposits her eggs upon it; either stinging the budworm to prevent further transformation, or else the young larvae hatch and begin eating so quickly that further transformation is prevented.

The egg is white, cylindrical, slightly curved, ends rounded, 0.3mm. long by 0.12mm. wide. They are laid indiscriminately on the surface of host, singly or several together. They hatch very quickly and the young larvae feed externally upon the budworm, becoming full grown in about a week. They are footless grubs just a little more than 1m. in length, and transform to pupae in two or three days. They rest in the pupal stage about two weeks. So many of this parasite develop upon one host, that it should be a very valuable parasite upon the budworm. I have not as yet ascertained whether it is generally distributed throughout the Islands or not.

The known hosts of this parasite now include *Megachile, Sceliphron, Pison, Odynerus* of Hymenoptera; and *Ereunetis* of Lepidoptera.

On Peculiar Deviations from Uniformity of Habit Among Chalcids and Proctotrupids.

BY OTTO H. SWEZEY.

Ceraphron abnormis Perk.

In January, 1908, a single Ceraphronid bred out of a cocoon of *Haplogonatopus vitiensis,* collected in growing sugar cane at the Experiment Station of the Hawaiian Sugar Planters' Association, Honolulu. At first it was a matter of surprise and considerable doubt as to whether the cocoon from which it

emerged was its own, or that of *Haplogonatopus* as it was at first supposed to be. To determine this, more cocoons were collected to ascertain whether more of this insect might be bred. From 25 cocoons collected January 28, 5 Ceraphronids emerged between February 1st and February 10th; then examination of remaining cocoons revealed 4 more of them containing each a pupa which on rearing proved to be Ceraphronids. This made 9 of the 25, or 36%. One pupa was with the remains of a pupa of *Haplogonatopus,* tending to prove that the former is a parasite of the latter.

Further observations were immediately undertaken in order to establish proof in regard to this. Many cocoons of *Haplogonatopus* were collected at different times and examined. The number which contained either larvae of Ceraphronid feeding upon larvae of *Haplogonatopus,* pupae of Ceraphronids, or from which adult Ceraphronids had already emerged, varied from 24% to 68%. In a few instances 2 pupae of Ceraphronid were found in one *Haplogonatopus* cocoon. In one instance two larvae were found feeding externally on the larva of *Haplogonatopus* within its cocoon, so it was made evident that the Ceraphronid attacks its host within the cocoon. Fresh cocoons of *Haplogonatopus* were obtained and a few Ceraphronids admitted to them. They were observed apparently ovipositing in these cocoons very soon, but the oviposition was not actually seen. The female would traverse the cocoons several times from end to end, all the time vibrating the antennae rapidly and touching all parts of the cocoon, apparently to determine whether the cocoon was an empty one or not, or whether its contents were in the right condition for it to oviposit in. After a few minutes she came to rest in a position which would indicate that oviposition was taking place, even though it could not be actually observed. This position was retained for a minute or two.

For further proof of the habits of this Ceraphronid, quite a number of leaf-hoppers which were already attacked by the larva of *Haplogonatopus vitiensis,* were collected from the cane field, and freshly bred-out Ceraphronids placed with them in breeding cage. None were observed to attack the leaf-hoppers themselves, nor the *Haplogonatopus* larvae preying on the leaf-hoppers. The *Haplogonatopus* larvae were nearly full-

grown, and they left their hosts and spun cocoons in a few days. These were undoubtedly attacked by the Ceraphronids, for within 3 weeks from the time the experiment was started, 1 Ceraphronid emerged from a cocoon, and in a few more days 11 more emerged.

At the same time another experiment was conducted. A number of leaf-hoppers already parasitized by *Haplogonatopus* were collected from the field and placed in two breeding cages. In due time the parasites spun their cocoons. Then adult Ceraphronids were admitted to one cage, but not to the other. From the latter cage adult *Haplogonatopus* emerged from all of the cocoons; while Ceraphronids emerged from all of the cocoons of the former cage. This proves that the Ceraphronid attacks its host only after it has made its cocoon.

Along with *Haplogonatopus vitiensis* there were a few *Echthrodelphax fairchildii* also breeding upon the cane leaf-hoppers. To ascertain whether this Ceraphronid was breeding upon this Dryinid also a number of leaf-hoppers already parasitized by it were collected and placed in a breeding cage until the parasites had left the leaf-hoppers and spun cocoons. Ceraphronids were then admitted. In about three weeks Ceraphronids issued (the first one in 19 days), and it was found that they had parasitized all of the *Echthrodelphax* cocoons. The adult Ceraphronids issuing from these cocoons were smaller than those issuing from *Haplogonatopus* cocoons; the larva of *Echthrodelphax* being smaller than that of *Haplogonatopus* accounts for the difference in size of the parasites issuing from them respectively.

So far as previous records show Ceraphronids have been bred from Lepidoptera, Aphids, Syrphids, Cecidomyids, Cynipids, Braconids, ants and some Coleoptera. Chiefly, however from Aphids, Cynipids and Cecidomyid galls; but now we have the remarkable case of a species breeding upon members of the closely related family, Dryinidae. Of these two Dryinids in questions, *Echthrodelphax fairchildii* is a native species preying upon the sugar cane leaf-hopper (*Perkinsiella saccharicida*) and certain native leaf-hoppers of the same family (Asiracidae). The other Dryinid (*Haplogonatopus vitiensis*) was introduced from Fiji, in 1906, to prey upon the cane leaf-hopper.

I do not at present know this Ceraphronid from any other place in these islands but Honolulu. Dr. Perkins has a specimen collected several years ago. He also has a specimen among some California insects. It has undoubtedly become introduced here within recent years.

Dr. Perkins has recently described this species as *Ceraphron abnormis*. The description to be published elsewhere.

Paraphelinus xiphidii PERKINS.

This little Chalcid is parasitic upon the eggs of *Xiphidium varipenne* Swezey, an introduced Locustid which has been present in the Hawaiian Islands for at least 15 years. This parasite on its eggs was discovered in 1905, and subsequent observations shows that it is distributed throughout the islands. *Xiphidium* eggs, wherever found, are largely parasitized by this species. An account of its habits is given in Bull. H. S. P. A. Div. Ent. I, Pt. 7, p. 214, 1905; description is given op. cit. I, Pt. 8, p. 264, 1906.

In February, 1908, among a lot of cocoons of *Haplogonatopus* from which a hyperparasite (Ceraphronid) was breeding out, were some parasitized by this Chalcid. About a dozen bred out from one cocoon. As I had bred this Chalcid only from the eggs of *Xiphidium* previously, I was quite astonished at now breeding it as a hyperparasite on a Dryinid. Examination of remaining cocoons of this lot, revealed two which contained dried up and blackened remains of the *Haplogonatopus* larva, within which in one instance were 6 *Paraphelinus* pupae, and in the other one were 8 *Paraphelinus* pupae. Further examination of cocoons collected from the field showed an occasional one with either larvae or pupae of *Paraphelinus*. *Xiphidium* eggs parasitized by *Paraphelinus* were found in the same field.

An experiment was conducted as follows: Several adult *Paraphelinus* which had bred from *Haplogonatopus* cocoons were placed with *Xiphidium* eggs. In these they were observed to oviposit, and in 28 to 30 days the adults emerged. Some of the latter were then placed with cocoons of *Haplogonatopus,* in some of which they oviposited, and adults emerged in the usual time.

Apparently only those cocoons are stung in which the larvae have not yet pupated; for in examination of quite a number of cocoons, wherever larvae or pupae of *Paraphelinus* were found, they were within a *Haplogonatopus* larva, or its dried up blackened remains. The length of period from oviposition to emergence of adults is from 20 to 30 days.

There are about the same number per host, whether it is *Haplogonatopus* larva or *Xiphidium* egg. 12 or 13 is a common number per host.

From parasitizing Locustid eggs which were hidden behind leaf-sheaths of sugar cane, to parasitizing Dryinid larvae within their cocoons on the cane leaves is quite a wide divergence of habit. Apparently in this case, whichever happens to be most convenient or accessible, or whichever the parasite first happens to find, is what she deposits her eggs in.

In discussion following this paper Dr. Perkins said that although Mr. Koebele had collected Dryinids very extensively throughout California, he had never bred a Proctotrupid from them, which made Mr. Swezey's discovery all the more remarkable.

He also related that in course of correspondence with Dr. Howard, the latter insisted that Giard's report of having bred *Aphelininae* from eggs of *Xiphidium* was an error. It was however, verified by Mr. Swezey when he bred an allied species (*Paraphelinus xiphidii*) from *Xiphidium* eggs in Hawaii; but now Mr. Swezey's discovery that this Chalcid is also parasitic on *Haplogonatopus* is still more remarkable.

Mr. Kotinsky referred to what is already published in the Proceedings of the Entomological Society of Washington relative to his breeding *Syntomosphyrum esurus* as a primary parasite on *Chilocorus similis* pupae, though it had thitherto been regarded as a secondary parasite.

A Brief Note on Three [Two New], Californian *fulgoroid hemiptera.*

BY G. W. KIRKALDY.

1. *Oliarus franciscanus* (Stal).

This species, described by Stal, (1859 Eugenies Resa, Zool. Ins. 273), as *Cixius franciscanus*, is noted by Van Duzee (1908

Proc. Ac. Nat. Sci. Philad. for 1907, p. 486), as being unknown to him. A single female collected by Mr. Giffard at Santa Barbara foot-hills last July, seems to agree with Stal's short description. The following additions may be made thereto, premising that it belongs to the typical subgenus, (cf. Kirkaldy 1907 Bull. II, S. P. A. Ent. III (not '111' as Van Duzee cites!) p. 107). The axillary vein of the clavus is more than half the length of the stalk of the anal, and runs into the latter vein basal of its middle; the tegminal veins are rather thickly granulate, as regards, at least, those basal of the membrane, the granules being dark on the pale veins, the apical veins dark.

2. *Danepteryx barbarae* sp. nov.

This is close to *D. manca* Uhler, but differs by the basally truncate frons, which is also much wider in proportion, widening towards the apex. The vertex is shorter and wider, the lateral margins parallel, (converging very slightly anteriorwards, if anything), the anterior margin very obtuse-angled. The pronotum is rather more produced anteriorly, its lateral margins more arched. Antennae yellowish-testaceous. The tegmina vary in length.

Length ♀ 5½ mill.

Hab: California, Santa Barbara foot-hills, July (Giffard).

3. *D. artemisiae* sp. nov.

Smaller and much darker than the last, but the head structure is very similar; the frons is narrower, though at the same time it is distinctly wider than in *D. manca*. The general ground-color is dark fuscous, the legs more heavily and darkly sprinkled than in the *D. barbarae*. Antennae dark fuscous. Tegmina piceous or blackish (instead of yellowish-brown), with paler markings. The tegmina are narrower, and the pronotum is shorter than in *D. barbarae*, more so even than in *D. manca*.

Length ♀ 4½ mill.

Hab: California, Alameda, (Perkins), on *Artemisia*.

The genus *Danepteryx* was founded by Uhler in 1888, the species then erected, *D. manca*, being from Los Angeles, as also *D. lurida*, described by Melichar in 1906. One of the new ones now proposed is from Santa Barbara, and the other from Alameda, so that the genus, although restricted, so far, to California, seems to be well distributed over that State.

JULY 9th, 1908.

The forty-second meeting of the Society was held in the usual place, Mr. Swezey in the chair.

The following resolutions on the death of our fellow-member, Alexander Craw, were presented by the Executive Committee and unanimously adopted by the Society:

Whereas, The Hawaiian Entomological Society has learned with profound sorrow of the death of its esteemed member, Alexander Craw, June 28, 1908, be it therefore

Resolved, That the Society, through its Secretary, transmit to the bereaved family its deepest sympathy, and this expression of its appreciation of the irreparable loss sustained. Mr. Craw was one of the founders of the Society; was its first Vice-President and always took a keen interest in the Society, attending the meetings faithfully unless prevented by matters of health or duty and was ever ready to join in the discussions of practical entomological interest. He was a sincere, kind, generous, and hospitable man, and in the few years spent in our midst had endeared himself into the hearts of all with whom he was associated.

Be it further Resolved, That these resolutions be spread on the minutes of the Society.

Otto H. Swezey,
R. C. L. Perkins,
Jacob Kotinsky,
Executive Committee.

Biographical Sketch of Alexander Craw.

BY JACOB KOTINSKY.

With the death of this remarkable man passes away another prominent figure from the horizon of American horticulture and economic entomology. Few economic entomologists are better known and no one more favorably than was he during his life work. Few entomological workers passed through California without seeking out and making his personal acquaintance, and all were charmed with the man. His unvarying amiability has won for him a lasting abode in the heart

Alexander Crum

of every one that knew him. By early training a capable and successful horticulturist his indomitable love for plant life later led him to form the vanguard of a fight against horticultural enemies on a scale that was never undertaken before.

Alexander Craw was born in Ayr, Scotland, August 3, 1850. In 1873 he emigrated to California and after a two years' residence in San Diego, moved to Los Angeles, where he took charge of the famous Wolfskill orange grove. His early training stood him in good stead in the early days of California's growth as a horticultural center. His authority in matters horticultural was never questioned and his advice ever eagerly sought. Presently *Icerya purchasi,* which had preceded his arrival in California by about five years, threatened the destruction of the citrus industry. It is difficult to determine at present who started the movement which culminated in the introduction of *Novius cardinalis* from Australia into California by Albert Koebele in 1888. But it is certain that Mr. Craw was a powerful factor in that movement. Never in our conversation in the office did he credit himeslf with the conspicuous role, yet it is quite evident to me that his constant agitation of the matter before the California horticultural organizations, and the incessant pressure he brought to bear by means of these upon authorities in Washington was to a considerable degree responsible for Koebele's victorious mission. Once victory was achieved and that so completely and in such an unusual manner he was possessed with the idea of controlling all horticultural insect pests by means of their natural enemies.

About 1890 he was prevailed upon to accept the office of inspector and entomologist under the California State Board of Horticulture, a line of work not previously undertaken anywhere and in which he spent the remainder of his life. Always kindly yet always firm in the performance of his duty he stood for fourteen years like a rock at the Golden Gate and jealously guarded his adopted state from horticultural pests of the world. All opposition he swept aside with a smile, without making a foe or losing a friend. He was a keen observer so that by 1891 we find him not only familiar with the common garden and orchard pests but describing a species of his favorite group, Hymenoptera Parasitica (*Coccophagus* (=*Aspidiotiphagus*) *citrinus,* Bull. 57, California State Board of Horticulture,

1891). His writings are not profuse, and are confined almost entirely to periodical reports in which he aimed principally to enlighten his horticultural readers on their insect problems as he viewed them. In Bull. 4, Tech. Ser., Division of Entomology, U. S. D. A. he published a list of the Coccidae which he found in course of inspection at San Francisco. A number of species and varieties named *Crawii* may be observed in catalogs of this family.

In 1904 he was induced to enter the service of the Hawaiian Board of Agriculture as Superintendent of Entomology and Inspector. This office he filled in the same efficient manner that he had carried on the work in California, proving of great benefit to Hawaii in the exclusion of dangerous insect pests, and resulting in a better quality of fruits and vegetables being shipped here. His devotion to duty had the better of discretion, so that when on October 11, 1907, he was overtaken by the serious illness which on June 28, 1908, terminated his life, it was largely the result of over-work.

NOTES AND EXHIBITION OF SPECIMENS.

Mr. W. M. Giffard exhibited for record a female Horn-tail wood wasp (Family *Siricidae*) dark blue in color, which had been taken on Wyllie Street, Nuuanu Avenue, Oahu. This insect belongs to a family the larvae of which are very destructive to certain trees of temperate climates, particularly firs and pines. The probabilities are that the insect (the species of which Mr. Giffard could not determine) bred out of imported veranda furniture, some of which, covered with close fitting bark, were on the premises where it was caught. It was noticed particularly that a veranda chair of this nature showed a few holes 3-16 in. in diameter from which insects of some kind had emerged. It is not probable that the insect exhibited will breed in this climate as the trees and wood which this family of insects are known to attack elsewhere do not grow here.

Dr. Wilcox referred to an article he read in which was recorded the important observation that the larvae of insects working within a plant caught in an extended drought were found capable of transforming starch into water and thus drag out their existence during months of a dry season.

Mr. Giffard also exhibited a number of parasitic Hymenoptera of the Family *Encyrtidae,* sub-family *Eupelminae,* which had been bred by him, on several occasions during the past two years, from hollow twigs of native trees containing the nests of species of Nesoprosopis (*Aculeate Hymen.*). There has as yet been no opportunity to name the Encyrtids exhibited. The exhibit included portions of the twigs above referred to, showing not only the remnants of the nests of the Nesoprosopis but also in two instances remnants of the nests of species of Odynerus.

Mr. Kotinsky related his recent observation of vast numbers of caterpillars in a grain warehouse in Honolulu. These caterpillars were later definitely determined to be *Ephestiodes gilvescentella* Ragonot. He was certain of the identification because it corresponds in all details with Meyrick's description in the Fauna, who claims to have compared his specimens with Ragonot's types. He stated that to his knowledge the insect is not recorded in economic literature. It is commonly found in grain and meal coming from the Pacific Coast, where it is doubtless a common granary and mill pest. *Ephestia kuehniella* on the other hand, which was reported as a feed pest from California and elsewhere on the mainland, does not seem to occur here. It would appear from these facts that *E. gilvescentella* has probably been mistaken for the Mediterranean flour moth.

Mr. Swezey exhibited a collection of Hawaiian Phycitidae, and made some remarks on their habits and life history.

PAPER READ.

Some Remarkable Australian *Hymenoptera.*

BY R. C. L. PERKINS.

In this paper I have dealt with only a small number of species of Australian Hymenoptera, but all of them are of extreme interest, either because they are altogether new generically, or are new to Australia as genera, or they are remarkable for peculiarity of habits or for other special reasons.

I will first briefly review some of the most interesting species.

Of the bees I have here described two new genera, one of which, *Palaeorhiza,* is evidently represented by many species

in Australia. Several have been described as belonging to the genus *Prosopis,* in spite of the fact that the most superficial examination shows that these insects have an acute lanceolate tongue. Hitherto no connecting link between the blunt-tongued and acute-tongued bees has been recorded, but in *Palaeorhiza* we have a form, which, except for the structure of the tongue, would be assigned to the section of Obtusilingues. It will therefore be obvious that this section and the Acutilingues can no longer be maintained as of great importance, since *Palaeorhiza* must always be associated with *Prosopis,* as the male genital characters, and all other ones, save the lingual, clearly show. It may be advisable, however, to consider the genus as representing a family distinguished from Prosopidae by lingual characters only. In this connection, however, it is only proper to add that the Australian genus *Meroglossa,* associated by Smith with the blunt-tongued bees, without remark, has an acute tongue, being so figured and described by that author. Ashmead also includes *Meroglossa* in his tables, as being blunt-tongued, without any remark whatsoever. In these Australian genera we therefore have a distinct lead from the blunt to the acute-tongued section of the bees.

The other genus here described by me as *Pachyprosopis* is another of the series of remarkable blunt-tongued bees, in which Australia is enormously rich. Few, I think, seeing it alive would take it for a bee, since it superficially has rather the appearance of a large-headed Crabronid or Pemphredonid.

In the wasps I have described a new genus *Macrocalymma,* which appears to me very remarkable. This species is extant in the British Museum with the name *Discoelius smithianus,* Sauss. attached. I have not been able to find any description of the species in de Saussure's writings.

Another genus *Ischnocoelia* is represented, by several species apparently, in the British Museum, but they have not been described. The *Montezumia* is not only interesting from the fact that the genus is unrecorded from Australia, but more so from the great Acarid chamber in the propodeum of both sexes, a new situation for such a structure, the chamber found in the bee genus *Koptorthosoma* and that of a Mexican wasp, *Odynerus,* being abdominal.

The remarkable Dryinid, *Harpagocryptus,* a parasite of small crickets, is a most anomalous insect. It is clearly allied to the Central-American *Olixon* of Cameron, referred by him to the Braconidae, but rightly removed by Ashmead to the Bethylid group.

PALAEORHIZIDAE (? Meroglossidae).

Palaeorhiza gen. nov.

General appearance much like that of some brightly metallic Australian *Prosopis,* members of which genus (s. l.) it also considerably resembles in many points of structure. In the several species known to me the scape of the antennae in the male is cylindrical and not at all dilated. Labrum simple, transverse, cilated at apex; mandibles with two grooves, bidentate in the male, the inner tooth more or less obscure; tridentate at apex in the female. Ligula lanceolate, acuminate; labial palpi four-jointed, formed like the maxillary palpi, but the joints all shorter, subequal; maxillary palpi six-jointed, moderately long, the joints not differing much in length, the four apical ones more slender than the preceding and themselves slightly decreasing in length to the apex, their form elongate and subclavate. Anterior area of propodeum smooth, moderately large, more or less triangular in shape, well marked off by the totally different sculpture of adjoining parts, but not enclosed. Wings with the stigma as well developed as in *Prosopis*; two cubital cells, the first much longer than the second, the latter receiving both recurrent nervures, neither being interstitial; transverse median and basal nervures interstitial or almost so. Anterior tarsi of female with the arrangement of peculiar curved hairs for sweeping pollen towards the mouth, as in the industrial *Prosopis*, or more strongly developed than in some species of that genus. Male often with the two or three terminal exposed ventral segments with dense clothing of hair; seventh ventral segment produced on each side into delicate lateral processes, affording good specific characters; eigth ventral segment simply produced in the middle in the species examined by me. Genital armature like that of many *Prosopis*, the stipites simple, without lacinia, pilose, the sagittae extending slightly or considerably behind these, curved downwards towards the apex and sometimes apically compressed; the armature evidently affording good specific characters.

Type of the genus *Prosopis perviridis* Cock.

In the event of the genus *Meroglossa* proving to be allied to *Palaeorhiza* the family would naturally be called *Meroglossidae.*

PROSOPIDAE.

Pachyprosopis gen. nov.

Head quadrate, of enormous size, fully as large as or larger in dorsal aspect than the mesonotum, ocelli in a triangle with very wide base, the hinder ones closer to one another than to the distant occipital margin. Eyes reaching base of mandibles, clypeus very short and trans-

verse, its hind margin very wide. Labrum when fully seen very large, comparable in size with the clypeus, having a large median basal tubercle, which is emarginate in front, and in front of this a strongly raised median longitudinal carina. Mandibles with well-developed apical tooth and an inner short blunt one. Tongue much as in *Euryglossa*. Maxillary palpi 6-jointed, two basal ones stout, the third more slender and elongate, but stouter than the three following, which are subequal in length, the two first of these being clavate, or elongate-subtriangular. Labial palpi shortish, 4-jointed, the terminal slender. Pronotum not visible from above, the head being adapted to the mesonotum, post-scutellum emarginate in front, as long as the very short propodeum in dorsal aspect; anterior area of the latter defined by difference in sculpture. Hairs of anterior tarsi regularly arranged, but less dense than those of *Prosopis*, *Stilpnosoma* and *Euryglossa*, and with those on the outer side peculiarly flattened. Stigma about as much developed as in *Euryglossa*, radius bent almost at a right angle, at end of first abscissa, second submarginal cell consequently very high, the second transverse cubitus twice as long as its lower side, its superior apical angle very acute. First recurrent nervure received by first submarginal cell a little before the apex, the second recurrent received by the second submarginal equally a little before its apex. Discoidal cell beneath the second submarginal also very narrow and high, diamond-shaped, but with the upper angle truncate. Hind tibiae spinose, as in females of *Sphecodes*. Abdomen truncate at base and impressed on the truncate part.

A very remarkable blunt-tongued bee, of which there are allies in Australia of much more minute size, but these differ in characters, which may prove generic, or may necessitate modification of the characters given above.

Pachyprosopis mirabilis sp. nov.

Black, mandibles, except tips, labrum, antennae, legs (except coxae trochanters and greater part of femora) together with the abdomen ferruginous or in parts more yellow. The clypeus and a wide triangle above it is bright yellow. Front femora black on the basal half, the other femora pale only at their apices. The head and thorax have a metallic tint, blue or green.

Head rather shining as compared with the thorax, the clypeus sparsely punctured, the front with very fine remote punctures, and the surface between with excessively dense microscopic sculpture. Grooves along the inner orbits deep, extending from just above the line of insertion of the antennae not quite to the top of the eyes. Thorax above very dull, minutely, but distinctly, remotely punctured. Post-scutellum more densely, but less definitely punctate. Anterior area of the propodeum impunctate, bare, with the general dense surface sculpture only, at the sides of this rougher and pilose. Abdomen dull with dense surface sculpture, but not punctured, its basal truncation pilose. Female, length 5 mm.

Hab. Australia, N. Queensland.

EUMENIDAE.

Macrocalymma gen. nov.

Ligula long, slender, deeply cleft at apex, the paraglossae with horny pilose tips. Labial palpi 3-jointed, two basal joints elongate and subequal, the third short, about half as long as the second. Maxillary palpi short, four-jointed, the first thickest and longer than the second, which in some aspects is subclavate, the third very slender and much longer than the small apical joint. Middle tibiae with two spurs, the claws of tarsi bifid at apex. Wings with the second cubital cell much contracted above and receiving both recurrent nervures. First abdominal segment pedicellate, very slender on the basal half (or less), behind this subquadrate in dorsal aspect, this subquadrate apical part rounded in front, and slightly concave behind, the posterior lateral angles prominent; second segment with a very short neck or basal constriction, which is smooth and shining. To these characters it may be added that the mandibles are short, their apical margin oblique and quadridentate, the clypeus widely subtruncate or very faintly emarginate at apex, not at all pointed. The tegulae are greatly developed, their apices reaching back slightly behind the posterior margin of the scutellum; the propodeum has trenchant lateral submembranous carinae, which posteriorly form a projecting angle (but rounded off) on each side.

This genus may be known at once from any of those with two spurs on the middle tibiae, cleft-tarsal claws and similar neuration, by the distinctive characters of the mouth-parts.

Macrocalymma smithianum sp. nov.

Head black, the clypeus, a spot between the antennae, one behind the eyes and a line on the scape in front, yellow. Antennae with the first two joints, sometimes also some of the following, the modified apical ones, and the flagellum beneath, ferruginous or reddish. Pronotum obscure red, with a yellow line in front, the tegulae reddish with pale margin and apex; a spot on each side of the post-scutellum and the lateral submembranous carinae of the propodeum pallid and yellow; a spot beneath the tegulae red or yellow. Legs ferruginous, the hind femora and sometimes the base of the intermediate ones more or less, the coxae and sometimes the middle and posterior tarsi black or blackish; sometimes the posterior tarsi only are fuscous. Abdomen black, more or less densely covered with golden tomentum; first segment with the apical dilated part dull red, more or less distinctly yellow-margined posteriorly; second segment with a yellow or reddish yellow apical band; third with a reddish band, and this and the following segments with pallid apical margins.

Head with the vertex subquadrate, seen in profile sharply angulated posteriorly behind the eyes, antennae terminating in a hook. Head and thorax closely and coarsely (more or less rugosely) punctured, the propodeum coriaceous and with much finer and less distinct punctures. Wings conspicuously clouded along the costal margin, elsewhere smoky or yellowish-tinged and hyaline, the stigma dark brown, its apical margin obliquely truncate Basal abdominal segment closely punctured; second much more finely and sparsely, the surface shining

when denunded of tomentum; beneath, it is conspicuously flattened or subdepressed behind the middle, raher strongly punctate and the surface between these punctures is shining and finely, but conspicuously punctulate. Length to apex of second abdominal segment 8-9 mm. Described from males only.

Hab. Australia; common in middle Queensland.

Ischnocoelia gen. nov.

Head in front view subrotundate, mandibles shortish (not at all like those of *Eumenes*) with four terminal well developed teeth; clypeus widely truncate or slightly rounded at apex; maxillae with very elongate galea, attenuate to the tip, the maxillary palpi very short, three-jointed, the three joints together hardly as long as the second joint of the three-jointed labial palpi, of which the two basal joints are subequal and elongate, the third hardly half as long as either of these; ligula long and slender, deeply cleft at the apex, the bifurcations pilose, as also a portion of the ligula behind these, the intermediate space bare. Wings with the second cubital cell narrowed to an angle above, the sides meeting at the radius, the second recurrent nervure received nearly at the middle of this cell on the cubitus, the first recurrent between this point and the lower basal angle of the cell, but nearer the latter. Middle tibiae with two well-developed calcaria, the tarsal claws toothed beneath near the middle. Abdomen pedicellate, the first segment sublinear throughout, about four times as long as its greatest width, widening slightly, but not adruptly, at about its basal third, and continuing of nearly equal width on its apical half; second segment campanulate with a very short neck at base. Female.

From the foregoing characters it is clear that this insect in some respects is intermediate between the subfamilies *Ischnogasterinae* and *Discoelinae* as defined by Ashmead, but I consider these groups at the most as of tribal value.

Ischnocoelia xanthochroma sp. nov.

Black with orange and reddish markings, the red and yellow colors more or less shading into one another, so that except in certain parts they may be generally designated as orange. Head black, the antennae ferruginous, but black or dark above on the apical half of the flagellum; the clypeus, a more or less triangular spot above this, emarginate posteriorly, the sinus of the eyes, the sides of the head behind these, as well as the vertex posteriorly except in the middle, orange. Pronotum, tegulae, scutellum, propodeum (excepting the sides and sometimes the base medially) and a large area on the mesopleura orange; legs yellow, the hind pair more ferruginous, their coxae mostly black, the middle ones nearly wholly reddish, but variable in color. Wings hyaline, yellow along the costa, as also the stigma. Neuration generally dark, but the veins yellow or brownish towards the base of the wings, as also the costa to the stigma.

Head incrassate, densely and somewhat coarsely subrugosely punctured; mesonotum somewhat shining, punctured like the head or slightly more coarsely, and with dense minute punctures between the

large ones; post-scutellum coarsely rugose-punctate, and seen from in front with a distinct lateral angulation on each side and a median one still more prominent; propodeum shortly pilose, rounded at the sides, and with a deep median impressed line. Abdomen with sericeous pile, the surface having an excessively minute and dense microscopic puncturation, the pedicel only with remote, larger punctures, but even these are fine and shallow. Length to the apex of the second abdominal segment 9-10 mm.

Hab. Australia, middle Queensland, not rare.

Obs. In North Queensland a variety is found, in which all the yellow markings are rufous, those of the occiput connected on the vertex behind the ocelli, the abdominal pedicel entirely rufous. I see no structural difference to distinguish this form.

Montezumia australensis sp. nov.

Black, with orange markings, those on the head partly bright yellow.

Male; a spot on the mandibles, the clypeus, a spot above it, a line in the sinus of the eyes, yellow; front of scape, a short line or spot on the posterior orbits, sometimes one on the upper margin of the eyes, more orange colored; flagellum more or less ferruginous beneath towards apex, the apical hook sometimes more obscure than the preceding joints. A band on the pronotum, the tegulae, sometimes two spots on the scutellum and two on the post-scutellum, or the latter almost entirely, and a mark on each side of the propodeum posteriorly, orange: legs mostly ferruginous, with the coxae and the basal part of the femora (the posterior ones for half their length or more) black. All the abdominal segments with apical orange bands.

Clypeus distinctly, but not deeply emarginate, feebly punctate; the front of the head densely rugosely punctured. Whole thorax, including the propodeum, densely rugosely punctured, the surface, which is more or less shining between the punctures, bearing a very minute microscopic, but quite distinct, puncturation. Propodeum with a deep round fossa or chamber above the abdominal articulation; on each side of the chamber is a curved carina more or less pale colored, and in lateral view forming a projecting angle of the propodeum; a shorter curved carina external to this forms with it a less deep cavity on either side of the median chamber, and these subsidiary cavities, like the latter, are often filled with acari. Wings hyaline, more or less infuscate or yellowish tinged, and more deeply yellow or brown along the costa, the stigma brown, the first recurrent nervure received before, the second after, the middle of the second cubital cell, the lower or cubital side of this cell being about three and a half or four times the length of its upper or radial side. Basal abdominal segment pedicellate, the pedicel elongate, but shorter than the bell shaped portion of the segment behind it, which is closely and rather strongly punctured and has a median impression; second segment much more finely, but distinctly, and for the most part closely punctured, the surface coriaceous or microscopically shagreened between the punctures; beneath, its basal transverse sulcature is smooth, behind which the segment is considerably, but not vertically, raised, as viewed with the ventral side upwards. Length of male to apex of second abdominal segment about 10 mm.

Female usually like the male, both sexes varving a little in the markings.

Hab. Australia; very abundant in middle Queensland.

DRYINIDAE.

Harpagocryptus gen. nov.

Head transverse in dorsal aspect, produced in the middle in front, large, wider than the thorax; the occiput arcuately emarginate; ocelli very feebly developed, the anterior one almost or entirely aborted. Antennae twelve-jointed, elongate, filiform, all the joints long, excepting the small pedicel. Mandibles pointed at the tips to form a large acute tooth, internal to which are three very minute teeth on the edge. Maxillary palpi long, six-jointed, the first joint short and stoutish, the second very elongate, twice as long as the first, slender at the base, clavate; third shorter than second, moderately stout, subparallel-sided; fourth, fifth and sixth slender, elongate, subequal. Labial palpi four-jointed, the first elongate, second short and wide, subtriangular in some aspects, third and fourth elongate, slender, subequal. Labrum distinct, clypeus well-defined. Prothorax large and long, narrowed posteriorly, and there emarginate; mesothorax very small, tongue-shaped; tegulae distinct, front wings narrow, strap-like, reaching to the posterior face of the propodeum, hind wings wanting. Propodeum very long, its superior posterior angles produced into a strong acute tooth on each side. Front femora very stout, intermediate less strongly so, claws short, stout, pulvilli large, tarsi densely pubescent beneath. Abdomen elongate ovate, second segment much the longest.

The general appearance of this insect is ant-like in the extreme and it would almost certainly be passed by in the field, by any one, who was not collecting ants.

Harpagocryptus australiae sp. nov.

Black or blackish fuscous, clypeus, labrum, mouth parts, mandibles except the teeth, antennae except several of the apical joints, and the extreme apices of the other flagellar joints, the front and middle tarsi excepting the claw-joints, brownish yellow or testaceous. All the coxae and trochanters in part at least, and the front tibiae more or less brownish yellow, rest of legs darker, brown or pitchy. Tegulae pale testaceous.

Whole insect clothed with a whitish-fuscous pile and having an excessively minute and dense sculpture, which under high powers of the compound microscope appears as a dense reticulation of fine lines. Scutum and scutellum of mesonotum distinguishable in certain aspects, and of about equal length. Calcaria of middle tibiae of about equal length, half as long as the first tarsal joint, which is nearly twice as long as the elongate second one.

The antennae are long and slender, much longer than the head and thorax together, the scape is stout and about as long as the first funicle joint, which is decidedly shorter than the next, while those following are all subequally elongate, many times as long as thick.

Towards the tips of the antennae, the joints become dark-colored and slenderer, so that the antennae are attenuate apically. The pedicel is very short, compared with the other joints, but it is evidently longer than wide. Length about 4 mm.

Hab: Australia, Queensland; larva forming a sac on the sides of the abdomen of small crickets (Trigonidiidae).

Obs. Although I have referred this insect to the Dryinidae, largely on account of its larval habits, the larval sac being of the same form as that of *Aphelopus,* which likewise has non-chelate tarsi, yet its twelve-jointed antennae might be held sufficient to exclude it from this family.

LIST OF OFFICERS FOR 1908.

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Vice President ..... O. H. Swezey
Secretary-Treasurer ..... J. Kotinsky
Members of Executive Committee .....
R. C. L. Perkins
F. W. Terry
Editor of Proceedings ..... O. H. Swezey

All correspondence to be addressed to the Secretary at the Bureau of Agriculture and Forestry, Honolulu, Hawaii, from whom copies of the Proceedings may be purchased.

Volume I of the Proceedings, for 1905-07 (in 5 Nos.), contains 210 pages, 4 plates, and 5 text figures. Price of the complete volume $2.00. Single numbers 50 cents.

VOL II, No. 2. SEPTEMBER, 1909.

PROCEEDINGS

OF THE

Hawaiian Entomological Society

FOR

August, 1908—June, 1909

(with 2 Plates and 3 Text Figures)

HONOLULU, HAWAII.
PRICE, 50 CENTS.

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AUGUST 6th, 1908.

The forty-third regular meeting was held in the usual place.

MEMBER ELECTED.

Dr. E. V. Wilcox.

NOTES.

Mr. Van Dine reported having carefully examined about one thousand mango seeds collected by Dr. Baldwin in nine localities of Maui, and not finding any weevils (*Cryptorhynchus mangiferae*). This would indicate that possibly this pest has not yet spread from Oahu to Maui.

Mr. Giffard opened the discussion on the mango scale bugs at the Moanalua Gardens and their distribution to other portions of the islands. Neither Mr. Kotinsky nor Mr. Van Dine have observed any of these scales outside of Moanalua, the former not having seen them alive even there since their fumigation by the Hawaiian Board of Agriculture.

Dr. Wilcox made inquiry for the Hawaiian Promotion Committee as to the feasibility of introducing rattan (*Calamus,* Palmaceae) from Malaya, probably Java for cultivation. In view of the common presence of borers in those plants in the Orient, Mr. Giffard doubted whether the Board of Agriculture would allow their importation. It was suggested that a less risky method would be to bring seeds. Dr. Wilcox asked a similar question relative to the cocaine (*Erythroxylon coca,* Linaceae) plant which it is contemplated to bring from Peru and Mexico.

Mr. Kotinsky reported having discovered aphis on the mango trees brought by Mr. McIntyre from Manila, although they were grown in a supposedly insect proof house and transported in screened wardian cases. Mr. Van Dine stated that the aphis was probably brought in by ants.

Mr. Giffard reported having read of the presence of the Argentine ant (*Iridomyrmex humilis*) in California, warning the inspector against it, also inquiring whether anything akin to it has been observed here.

Dr. Wilcox discussed the apparent possibility for usefulness of sulphur trioxide, which, while an excellent insecticide and fungus disinfectant, is innocuous to colored materials. Mr. Giffard inquired whether other entomologists observed the difference of behavior of the same species of insect in different cyanide bottles. Mr. Van Dine said that he finds chloroform a useful substance owing to the rapidity in killing specimens. Dr. Wilcox said that the rapid killing bottle must be an advantage since the insects are killed so quickly, that no time is left to contract muscles and thus get organs out of shape and normal position.

Mr. Kotinsky reported having bred *Lycaena* sp. (one of the two Lantana Lycaenids) from pepper pods on the surface of which larvae were found feeding. It seems however that this was an accidental deposit of several eggs probably by one female, as outside of the first six or seven no other peppers were observed damaged by this insect.

SEPTEMBER 7th, 1908.

The forty-fourth regular meeting was held in the usual place.

NOTES AND EXHIBITION OF SPECIMENS.

The time of the meeting was chiefly occupied in discussion of the Argentine ant (*Iridomyrmex humilis* Mayr). Mr. Kotinsky read a letter he had received from Mr. E. M. Ehrhorn, San Francisco, Cal., in which the situation as regards this ant in California, was given. Mr. Kotinsky had also received specimens of the ant from Mr. Ehrhorn. From the fact that this ant has become established in California, and that it is known to be so serious a household and agricultural pest in Louisiana where it has been established for quite a number of years, our port inspectors should be particularly watchful lest it become

introduced into these islands by way of the shipping from San Francisco.

Dr. Filippo Silvestri, entomologist at the Royal School of Agriculture, Portici, Italy, who had been spending a few days investigating the methods of combatting insect pests as carried on in the Hawaiian Islands, was present, and favored the Society with some remarks and suggestions.

Dr. Silvestri reported having collected a Lepismid on the rocks at Waianae which he thought would prove to be a new species, and offered to send the description for publication in the Proceedings. He also reported having discovered an important Protozoan, parasitic on one of our species of termites. The slide preparations that he made he will study at home. He spoke with great appreciation of the value of the work done with parasites on these islands in combatting the various injurious insects, particularly *Perkinsiella saccharicida* (Homoptera-Delphacidae) the leaf-hopper pest of the sugar cane.

Having been informed that *Coccus tuberculatus* described by him on page 168 of Proc. Haw. Ent. Soc., I, No. 5, was a homonym, Mr. Kotinsky offered to change the name to *C. muiri* in honor of the collector.

NOVEMBER 5th, 1908.

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

MEMBERS ELECTED.

D. T. Fullaway, J. P. Cooke.

PAPERS READ.

Notes on a Collection of Odynerus from Maui.

BY W. M. GIFFARD.

(Specimens exhibited).

This collection of 19 species of Odynerus was made in Wailuku and Iao Valley, Maui, on March 22nd, and at Olowalu, Maui, on March 25th, 1908. The number of species so far recorded for the island of Maui is 23, which with two species (*Chelodynerus chelifer* and *O. microdemas*) included in this collection will now make 25 species recorded for that island.*

* **C. chelifer** is recorded on the adjacent islands of Molokai and Lanai whilst **O. microdemas** is similarly so on Molokai only.

The species collected by me on the above dates and their distribution is as follows:

Wailuku (Outskirts of town).

10. *O. aprepes;* male, female. (Female, so far unrecorded).
2. *O. konanus;* male.
6 *O. molokaiensis;* male, female.
6 *O. insulicola;* male, female.
18 *O. sandwichensis;* male, female.
1 *O. nigripennis;* male.

Total, 6 species.

Iao Valley, 1300 ft. elevation.

2 *O. naiadum;* male.
21. *O. purpurifer;* male, female.
24 *O. camelinus;* male, female.
1 *O. homoeogaster* (*deinogaster?*); male.
1 *O. tempe;* male. (Female only recorded).
2 *O. nigripennis;* male, female.
1. *O. erythrostactes;* male.
1 *O. instabilis;* male.
10 (*O. ecostatus, O. laevisulcatus*); male, female.

Total, 10 species.

Olowalu Coast.

7 *C. chelifer;* male, female.
1 *Pseudopterocheilus congruus;* male.
2 *O. microdemas;* male, female.
1 *O. frater;* male.
2. *O. sandwichensis;* male, female.
} flying together.
2 *O. insulicola;* female.
2 *O. molokaiensis;* male, female.

Total, 7 species.

Olowalu, 1200 ft. elevation.

1 *O. ecostatus;* male.

NOTE:—Certain of the Wailuku species in this collection might well be included together with those of Iao Valley for the purposes of this exhibit, some having been as a matter of fact taken in both places by previous collectors (See Proc. Haw. Ent. Soc., Vol. I, pt. 3, p. 86). I have separated the distribution of the species in the present exhibit in order to show difference in elevation of the collecting ground and also because certain of the Iao Valley species proper are recorded only as taken from the higher elevation.

A Note on a Cimicid Hemipteron with deformed head, and on a Membracid with deformed pronotum.

BY G. W. KIRKALDY.

(Presented by O. H. Swezey. Specimens exhibited).

Deformed antennae and legs are not of unusual occurrence in certain families of Heteroptera, especially in Coreidae and Myodochidae, these being due in many cases to injuries received in nymph-hood. Similar abnormalities in head and pronotum are not so common, and I therefore place two on record.

The first is a curiously deformed head of a female Phyllocephaline Cimicid, *Megarrhamphus hastatus*, from Java, collected by Mr. Muir. In the normal condition of the head viewed from above (fig. 1), the juga are very much elongate, the tylus being very short and closed around in front by them. In this deformed specimen, the whole head is shortened, the juga are a little crumpled, much misshapen, the right jugum being rounded, shortened, and swollen apically (fig. 2).

1. *Megarrhamphus hastatus* normal head;
2. The same abnormal.

One of the characteristics of a typical Membracid Homopteron is the possession of an elongate process of the pronotum, which lies more or less flat along the back. I now exhibit a specimen of a species of *Centrotypus* collected by Mr. Muir at Parit Buntar, in the Malay Peninsula, which has this process crumpled and much shortened, the main part of the pronotum being also crumpled on one side.

Banana Leaf-rollers of the Genus Omiodes [Lep.].

BY OTTO H. SWEZEY.

(Specimens exhibited).

Omiodes blackburni (Butler).

This species is the common Palm Leaf-roller, which works such havoc with the leaves of coconut palms. It is known to feed more or less on bananas particularly the wild or native varieties. Dr. Perkins, several years ago, reared numerous moths from caterpillars which were very abundant on native bananas at Makaweli, Kauai. A sample sent to Meyrick was identified as this species.

I have never until recently found the caterpillars of this species feeding on bananas. In August of this year I found quite a number of them feeding on bananas where they were growing wild on the plateau in Iao Valley, Maui. I also found them quite numerous in Nahiku, Maui, where there are numerous patches of wild bananas along the government road. In October, I found them feeding on the tall-growing cultivated varieties at Kohala, Hawaii, and through the districts of the windward side of the island from Kukuihaele to Hilo.

Omiodes meyricki Swezey.

Mention of my discovery of the caterpillars of this species, feeding on wild bananas above Honomu, Hawaii, is found in Proc. Haw. Ent. Soc., Vol. I, p. 134. The moths which I reared from them proved to be a new species, and it was described later (Bull. Ent. H. S. P. A., V, p. 24, 1907).

In October of this year, while on an inspection trip through the sugar plantations of Hawaii, I found the caterpillars of this species very numerous on wild bananas, growing in the gulches on the windward side of the island, from Ookala to Hilo, also at Mountain View and Pahoa. Wherever I chanced to see wild banana plants in these regions, they had been much eaten by these caterpillars, and I could usually find plenty of them of all sizes.

Omiodes musicola n. sp.

Male, female, 25-30 mm. Head dark fuscous in front of antennae, ochreous fuscous behind; thorax and abdomen with fuscous and ocheous scales mixed, some ferruginous scales also on some of the segments of the abdomen, apical margins of abdominal segments whitish; genital tufts nearly black. Antennae pale fuscous, ochreous

in front; palpi fuscous, ochreous below; tongue and tips of maxillary palpi fulvous; legs ochreous, femora and fore tibiae with some fuscous. Forewings dark fuscous with some ochreous scales mixed in, more abundant on costa, and a few scattered ferruginous scales, more abundant at base, veins ochreous; first line ochreous, angled outwardly about middle making nearly a right angle, posteriorly heavily margined with dark fuscous; a more or less obscure dark fuscous orbicular dot; an ochreous discal spot traversed by a transverse black spot; second line ochreous, angled outwardly below costa and again below middle, margined anteriorly with dark fuscous; a series of terminal black spots between the veins; cilia pale fuscous, darker at base. Hindwings slightly paler fuscous than forewings, a dark fuscous discal dot, an ochreous post-median line anteriorly dark fuscous margined, angled outwardly below middle; a dark fuscous line on termen, cilia as in forewings.

The color pattern of this species is very similar to that of *O. blackburni* and *O. meyricki;* but in this the dark fuscous predominates, while in *blackburni* ochreous predominates, and ferruginous predominates in *meyricki.* The angulation of the first line of forewings is nearly a right angle in *musicola,* while in the other two mentioned species it is an acute angle. The angulation of second line below middle is less acute in this species than in the other two.

In August, 1908, I discovered numerous caterpillars of all sizes, also eggs, on wild bananas high up in Iao Valley and at Nahiku, Maui. These caterpillars were different from any *Omiodes* caterpillars I had yet seen, and on rearing, proved to be different from any previously described species; hence, I am describing it as new.

The egg-masses were found on the under side of the leaf mostly along the midrib, but also on the surface away from the midrib. The eggs were similar to those of other species of *Omiodes,* and about as many in a mass as in those of *O. blackburni.*

Full-grown larva about .27 mm.; dull pale greenish; head testaceous with some light brownish checkering on upper part, a round black spot in each lobe in front, two oblique short black lines on paraclypeus, eyes black with a dark brown streak extending upward from them, a short black line on posterior margin of head extending upward from a black dot at postero-ventral angle; cervical shield with black lateral margins, anterior margin slightly fuscous and with a row of ten dark fuscous dots, a large broad elongate longitudinal black bar in each lateral lobe, on the dorsum between these and near the posterior margin are two groups of five tiny dark fuscous dots; tubercle in front of spiracle with a black line on dorsal margin; tubercles ii on

segments 3 and 4 almost entirely blackened, all the other tubercles are at least slightly infuscated, some more so, and those of segments 11-13 and of row iii especially are conspicuously infuscated; spiracles circular, yellowish.

Pupa, 14 mm. long, medium brown, darker on dorsum; wing-cases extend to apex of 4th abdominal segment; leg-cases and antenna-cases extend about two segments farther, free beyond 4th segment; cremaster subconical with a cluster of eight hooked bristles at apex fastened into silk of the cocoon.

The smaller caterpillars fed on the under surface along the midrib of the leaf where it was convenient for them to make a web for their protection; larger ones secrete themselves in rolled up edges of the leaves. The pupae are found in the latter place or some other favorable situation. The pupal stage occupied 11 days.

DECEMBER 3rd, 1908.

The forty-sixth regular and 4th annual meeting was held in the usual place.

Revised Constitution and By-Laws as adopted at this meeting.

Article I. Name.

The name of this organization shall be *The Hawaiian Entomological Society.*

Article II. Objects.

The objects of the Society shall be to promote the study of entomology in all possible bearings, and to encourage friendly relations between those in any way interested in the science.

Article III. Membership.

The Society shall consist of active, corresponding and honorary members. No corresponding members shall be elected from residents on the Island of Oahu.

Article IV. Officers.

The officers of the Society shall be a President, Vice-President and Secretary-Treasurer, to be elected by ballot at the an-

nual meeting. The duties of these officers, besides those usually pertaining to their respective offices, shall be jointly to act as Executive Committee and to transact the business of the Society not otherwise provided for. Also, the President shall deliver an address at the annual meeting.

Article V. Meetings.

The regular meetings shall be held, unless otherwise ordered by the Executive Committee, on the first Thursday of each month. The annual meeting for the election of officers shall be the regular meeting for the month of December. Special meetings may be called by he Executive Committee, or by the President at the written request of five active members.

Article VI. Amendments.

This Constitution may be amended at any regular meeting by a two-thirds vote of the active members present, a copy of each amendment proposed having been presented at the preceding regular meeting.

By-Laws.

1.—The annual dues for active members shall be five dollars, and for corresponding members two dollars. Honorary members shall be exempt from dues.

2.—Election of members shall be by ballot, nomination having been made by a member of the Society at a previous meeting. A majority vote of active members present or represented by proxy shall be necessary for election.

3.—Five members shall constitute a quorum for the transaction of business. Active members may be represented by written proxy presented to the Secretary previous to the meeting.

4.—Written notice of all meetings of the Society shall be sent to all members at least three days in advance.

5.—Regular meetings shall open at 3.30 P. M. and close not over an hour and a half later.

6.—Any member in arrears for one year may, after due notification, be dropped from the rolls. No member in arrears shall be entitled to a vote or to the Proceedings of the Society for that year.

7.—In the absence of President and Vice-President a chairman pro-tem may be elected by a majority vote of active members present, or represented by proxy.

8.—The order of proceedings at all meetings shall be as follows:

a. Roll call of members and submission of proxies.
b. Reading and approval of minutes.
c. Reports of officers and committees.
d. Nomination and election of members.
e. Unfinished or new business.
f. Entomological program.
g. Nomination and election of officers for the ensuing year.

The following officers were elected for the ensuing year:

President.....Otto H. Swezey.
Vice-President.....D. L. Van Dine.
Secretary-Treasurer.....D. B. Kuhns.

PAPERS READ.

Generic Synopsis of Hawaiian Macrolepidoptera.

BY OTTO H. SWEZEY.

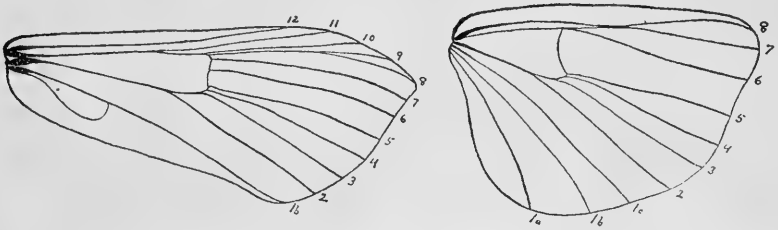
[Presidential address].

In the use of the part "Macrolepidoptera" of the Fauna Hawaiiensis, there are excellent tables to assist in the identification of species; but one finds a lack of generic and family tables. On account of this, I have often found difficulty in determining to what genus a specimen belonged, if it was not closely related to a species or genus with which I was already familiar. Primarily for my own convenience I have constructed the following tables of families and genera. My tables are based on Meyrick's classification, and are largely adapted from various tables of his, necessarily modified considerably to include only genera existing here, and especially for the new genera which have not before appeared in tables.

In some cases genera have been split up or rearranged by more recent writers (as for example: *Agrotis* the species of which have been assigned by Hampson to several different genera); in other cases Meyrick has assigned species to different genera from what other writers have; but in these tables the genera are used as given by Meyrick in the Fauna, purposely that they may be conveniently used in connection with the Fauna.

As is well known, tables are only a help, and can not be depended on exclusively in assigning specimens to their proper genera; but the fact that for many of the genera in the Fauna, no characters are given, shows all the more the usefulness of tables of this kind, and I think they will be fully appreciated by those interested in Hawaiian "Macros."

I have verified the tables for the most of the genera; but of some of the rarer ones I have not seen specimens, and have had to rely on the accuracy of descriptions, in the construction of these tables.



As a sample of wing venation, I insert a cut of wings of *Omiodes blackburni,* the Palm Leafroller. These wings have all veins present; whereas many genera have one or more veins missing. They are numbered by the method used by Meyrick and others, which is more simple than that used by some Lepidopterists.

As tabulated, there are four Superfamilies represented; 15 Families; and 61 Genera.

1. Hind wings with 1c present.....(D) PYRALIDINA
   Hind wings with 1c absent.....2.
2. Antennae terminally clavate.....(C) PAPILIONINA.
   Antennae not terminally clavate.....3.
3. Forewings with 5 basally approximated to 4..(A) CARADRININA
   Forewings with 5 parallel to 4 or approximated to 6.....
   ..... (B) NOTODONTINA.

(A) CARADRININA.

1. Hindwings with 5 well developed.....(I) CARADRINIDAE.
   Hind wings with 5 imperfect or obsolete.....(II) PLUSIADAE.

(I) CARADRINIDAE.

1. Eyes hairy .....Leucania.
   Eyes not hairy .....2.
2. Middle and posterior tibiae spinose.....3.
   Middle and posterior tibiae not spinose.....4.
3. Anterior tibiae with two apical spines and two on inner side.
   .....Heliothis.
   Anterior tibiae with more spines than above.....Agrotis.

4. Abdomen more or less crested.....**Spodoptera.**
Abdomen not crested .....**Caradrina.**

(II) PLUSIADAE.

1. Abdomen crested. .....2.
Abdomen not crested.....3.
2. Abdomen with small dorsal tuft near base.....**Hypenodes.**
Abdomen with 3 large dorsal tufts.....**Plusia.**
3. Palpi porrect .....4.
Palpi upturned. .....5.
4. Hind wings with 4 and 5 parallel.....**Nesamiptis.**
Hind wings with 4 and 5 not parallel.....**Hypocala.**
5. Forewings with termen angulately produced in middle.....
.....**Cosmophila.**
Forewings not so produced.....6.
6. Cell of hind wing very short.....**Adrapsa.**
Cell of hind wing normal.....**Simplicia.**

(B) NOTODONTINA.

1. Hind wings with 5 imperfect or obsolete.(IV) SELIDOSEMIDAE.
Hind wings with 5 fully developed.....2.
2. Antennae thickened towards middle or posteriorly.....
.....(V) SPHINGIDAE.
Antennae not thickened .....(III) HYDRIOMENIDAE.

(III) HYDRIOMENIDAE.

1. Face rough-haired. .....**Dasyuris.**
Face with conical tuft of scales.....2.
2. Antennae in male unipectinated.....**Prognestola.**
Antennae in male bipectinated.....**Xanthorhoe.**
Antennae in male ciliated.....3.
3. Abdomen crested. .....**Eucymatoge.**
Abdomen not crested.....**Hydriomena.**

(IV) SELIDOSEMIDAE.

1. Hind wings in male above with median streak of erect hairs, apex of fore wing strongly rounded.....**Sisyrophyta.**
Hind wings in male clothed with long hairs towards dorsum, apex of fore wing produced.....**Acrodrepanis.**
Hind wings in male normal, apex not peculiar.....2.
2. Fore wings in male with large patch of modified scales in cell beneath. .....**Nesochlide.**
Fore wings in male not as above.....3.
3. Posterior tibiae in male dilated, containing hair-pencil, size more than 25 mm.....**Scotorythra.**
Posterior tibiae in male not dilated, without hair-pencil, size 25 mm. or less.....**Tritocleis.**

(V) SPHINGIDAE.

1. Thorax with short double posterior tuft.....**Sphinx.**
Thorax without above.....**Deilephila.**

(C) PAPILIONINA.

1. Anterior legs of male useless for walking. (VII) NYMPHALIDAE.
   Anterior legs of male well developed.....2.
2. Anterior tarsi of male more or less abbreviated, or with one or both claws absent.....(VIII) LYCAENIDAE.
   Anterior tarsi of male not abbreviated,claws developed..... (VI) PIERIDAE.

(VI) PIERIDAE.

..... **Pieris.**

(VII) NYMPHALIDAE.

Eyes hairy .....**Vanessa.**
Eyes glabrous. .....**Anosia.**

(VIII) LYCAENIDAE.

..... **Lycaena.**

(D) PYRALIDINA.

1. Fore wings six-cleft.....(XV) ORNEODIDAE.
   Fore wings not six-cleft.....2.
2. Hind wings with defined pecten of hairs on lower margin of cell towards base. .....3.
   Hind wings without such pecten (sometimes with loose scattered hairs) .....5.
3. Fore wings with 7 absent.....(IX) PHYCITIDAE.
   Fore wings with 7 present.....4.
4. Maxillary palpi triangularly scaled.....(XI) CRAMBIDAE.
   Maxillary palpi not triangularly scaled.....(X) GALLERIADAE.
5. Wings cleft, or entire, 8 and 9 of fore wings separate..... (XIV) PTEROPHORIDAE
   Wings entire, 8 and 9 of fore wings stalked.....6.
6. Fore wings with vein 7 rising out of 8...(XIII) PYRALIDIDAE.
   Fore wings with vein 7 separate from 8...(XII) PYRAUSTIDAE.

(IX) PHYCITIDAE.

1. Hind wings with 4 and 5 approximated.....**Cryptoblabes.**
   Hind wings with 5 stalked with 4, or wanting.....2.
2. Fore wings with 5 absent.....3.
   Fore wings with 5 present.....5.
3. Labial palpi erect. .....**Ephestia.**
   Labial palpi porrect.....4.
4. Hind wings with 3 and 4 stalked.....**Plodia.**
   Hind wings with 3 and 4 separate.....(new genus)*

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* For an unnamed species bred from flower heads of silversword plant (Argyroxiphium) in the crater of Haleakala, Maui.

5. Fore wings with 11 veins.....6.
   Fore wings with 10 veins.....7.
6. Fore wings with 4 and 5 separate.....Genophantis.
   Fore wings with 4 and 5 stalked.....Myelois.
7. Hind wings with 3 and 4 stalked.....Ephestiodes.
   Hind wings with 3 and 4 approximated or connate.Homoeosoma.

(X) GALLERIADAE.

..... Meliphora.

(XI) CRAMBIDAE.

1. Fore wings in male with semitransparent patch in cell.....
   .....Euchromius.
   Fore wings in male without such patch.....2
2. Termen of fore wings deeply excavated below middle.....
   ..... Prionopteryx.
   Termen of fore wings not excavated.....Talis.

(XII) PYRAUSTIDAE.

1. Male with bladder-like swelling beneath costa of hind wing at base. .....Hyperectis.
   Male without such character.....2.
2. Fore wing with more or less developed tufts of raised scales in cell. .....Scoparia.
   Fore wing without such tufts.....3.
3. Fore wings 4 times as long as wide, legs extremely long.Lineodes.
   Not as above.....4.
4. Antenna of male with base of shaft excised and a tuft of hair from extremity of basal joint.....Hymenia.
   Antenna of male not so.....5.
5. Palpi upturned. .....6.
   Palpi porrect. .....8.
6. Maxillary palpi strongly dilated with scales.....Margaronia.
   Maxillary palpi filiform. .....7.
7. Outer spurs of hind tibiae about half the length of inner spurs.
   ..... Omiodes.
   Outer spurs of hind tibiae of nearly even length.....Hellula.
8. Palpi with the 3rd joint naked.....Evergestis.
   Palpi with the 3rd joint concealed by hair or scales.....9.
9. Posterior tibiae in male with outer middle-spur rudimentary..
   ..... Phlyctaenia.
   Posterior tibiae in male with above spur developed.....10.
10. Fore wings with 10 rising out of 9.....Nymphula.
    Fore wings with 10 separate.....11.
11. Face forming a horny prominence.....Loxostege.
    Face without a horny prominence.....12.
12. Middle tibiae in male dilated.....Mecyna.
    Middle tibiae in male normal.....13.
13. Fore wings much narrower than hind wings.....Nomophila.
    Fore wings about same width as hind wings.....14.

14. Palpi very long, tapering.....**Pyrausta.**
Palpi moderate, loosely scaled. .....**Protaulacistis.**
Palpi short. .....15.
15. Fringe of hairs on lower median vein of hind wings.**Orthomecyna.**
No fringe as above. .....16.
16. Hind wings with veins 4 and 5 closely approximated at base.
..... **Promylaea.**
Hind wings with 4 and 5 not approximated at base..**Mestolobes.**

(XIII) PYRALIDIDAE.

..... . **Pyralis.**

(XIV) PTEROPHORIDAE.

Fore wings with 7 and 9 present, face tufted.....**Platyptilla.**
Fore wings with 7 and 9 absent face not tufted....**Trichoptilus.**

(XV) ORNEODIDAE.

.... **Orneodes.**

A revision of the Hemipterous family Nabidae found in the Hawaiian Islands.

BY G. W. KIRKALDY.

The Nabidae have usually been considered a part of the great predaceous family Reduviidae, but constitute a separate family, distinguished by the absence of the stridulatory apparatus on the prosternum, by the distinctly 4-segmentate labium and by the characteristic venation. The ova are inserted, whereas they are deposited externally in the Reduviidae, but the nymphs, as in the latter family, have three odoriferous orifices on the tergites.

The Hawaiian species belong to one genus (though this may, if one wishes, be split up into four subgenera) and indeed, if we except the almost cosmopolitan and certainly immigrant *Reduviolus capsiformis,* may very reasonably be considered to have all developed from one original immigrant, possibly indeed from *R. blackburni.*

There is no need to discuss the structure in detail, as there is very little in it of special interest; the venation, however, demands a few words.

The tegminal venation is not at all dissimilar from that of a Zeline Reduviid such as *Triatoma,* except that the membranal veins are continued furcately to the very apex. The costal vein continues to the exterior angle of the apical margin unforked. The subcostal and radial are coalesced (as is common in Heterop-

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tera) for about two-thirds of the length of the corium, after which the subcostal continues alone to the apical margin of the corium, meeting the costal there; the radial sector deflects to meet at an angle a fork of the median, the two continuing to the apical margin of the membrane, the median continuing also, rather deflectedly, to the apical margin of the corium. This is the case in such typical forms as *capsiformis,* but the relations of the veins are more obscured in *lusciosus,* &c.

There are several little points which cannot be settled without recourse to freshly emerged specimens, but for systematic purposes, it is sufficient to say that a large area is formed in the basal middle of the membrane which is traversed longitudinally by two submedian veins, which in some species are simple, in others shortly forked. This venation, however, is not of a positive specific value, as variations occur even in the two tegmina of the same specimen.

In the *Nesotyphlias* series, at least in *R. lusciosus,* the venation is very similar, except that the tegmen is much more coriaceous (though the brachypterous form of *R. blackburni* approaches in that respect), and the clavus is not separated, but the length of the main veins is variable, the membrane is very oblique and much shortened. In *R. kaohinani* and its allies, the tegmina are still more reduced.

It is not possible to interpret the wing from that of the mature adult. There are two main, subhorizontal veins (the "primary" and the "subtended"); these do not reach the margin, but are joined about their middle by the "connecting" vein, from the lower half of which arises the hamus (*h*); the claval commissure is accompanied by a vein from which springs an arched one. The uppermost vein is possibly the subcostal (joined basally to the radial), and the next is possibly the median, the hamus representing the radial sector. (Pl. I, f. 11).

The venation is a little reduced in the brachypterous form of *R. blackburni* and much more in *R. nesiotes* (Pl. 1, f. 12), while the wing is almost obsolete in the *Nesotyphlias* group and has no appreciable venation.

The males are much slenderer than the females, in which the abdomen is more or less widened laterally in the middle. The ovipositor is very conspicuous. In the males, the pygophor is ornamented by a hook on each side (Pl. 1, fs. 1-4), which is articulated close to the apical margin, and in repose lies fairly flat against the body, with the acute end pointing forwards, but can be turned in a sort of socket so that this end can point in the opposite direction. These hooks consist of two parts, which, however, are all of one piece, the "handle" and the "blade."

These homely terms seem to be sufficient for descriptive allusion. There is no doubt, I suppose, but that these hooks are used for gripping the female during copulation, but it is certainly a point for observation and confirmation. The figures are a little diagrammatic, as the parts are rarely in the same plane.

Although, like the Reduviidae, adapted for a life of rapine, the Nabidae are not entirely predaceous, nor indeed are the Reduviidae always. In these islands, nymphs and adults prey on Leaf-hoppers, Aphidae, Psocidae, small Diptera, etc., but *R. capsiformis* also sucks up the sweet secretion of the Asiracid *Perkinsiella saccharicida* (1). Various notes on exotic species have been made; thus the holarctic *R. ferus* has been recorded as preying on the Cecidomyid-fly *Mayetiola destructor* (2); the palaearctic *R. limbatus* on *Tipula paludosa* (3); *R. myrmicodes* on the eggs of the butterfly *Pieris* (4); and *R. apterus* on Aphidae in the gall-crumpled leaves of *Ulmus* (5). Of course these are isolated fragments, but are sufficient to indicate the nature of their food-supply. Like most predaceous Heteroptera, *Reduviolus* can stab pretty severely (6), though it can not obtain the same purchase as the Reduviidae with their firm, hard, beaks. (7).

Exotic species of *Reduviolus* are usually found in mixed, low herbages, grasses, sedges, etc.; one species (*myrmicodes*) on the ground, with ants. In these islands, *R. capsiformis* is found in grasses and weeds in rather dry places as a rule, while in similar situations is found *R. blackburni,* though at rather higher, and in fact wetter, elevations, and more naturally perhaps, among ferns, especially "Staghorn" (*Gleichenia dichotoma*). The species of *Nesotyphlias* are found on the ground and on tree-ferns; the rest are arboreal. The arboreal forms seem to be somewhat restricted in their hunting-trees. *R. kahavalu* is restricted to *Sophora chrysophylla* and seems, so Dr. Perkins informs me, to be the most arboreal of all the species. *R. tarai* is always on *Cyathodes,* though naturally it occurs on other plants which

(1). Perkins, 1903, Bull. Board Agr. Hawaii, I, 19.
(2). Bruner and Swenk, 1907, Bull. Nebraska Agr. Sta., xcvi, 17, f. 4.
(3). Campion, 1905, Entom., xxxviii, 281.
(4). Marchal, 1900, B. S. E. France, 330.
(5). Fieber, 1860, Eur. Hem., 159.
(6). Eardley-Mason, 1889, Ent. Mo. Mag., xxv, 457.
(7). Although none of the Homoptera is known to be predaceous, Mr. Kershaw writes to me, "Did I tell you that whilst at Piroe [in Ceram] sitting in a chair, a nymph of a small Fulgoroid settled on my bare foot, and punctured it and began to suck? Muir saw it."

touch the latter. At Kilauea, Hawaii, I found one of this species on Ohia lehua, but it was a scrub-tree and closely swathed around up to its lower branch by the *Cyathodes*. *R. truculentus* is restricted to *Pipturus* and has not been found elsewhere. The other arboreal forms have been found on *Acacia koa* and *Nani* (*Metrosideros*) *polymorpha*, but also on ferns, etc., when these are around the trees. Thus also while the *Nesotyphlias* forms seem to be ground-feeders, yet they also occur on tree-ferns and other trees when the branches of the latter are in communication with the ground or the shrubbery. They seem to be fond of dead fronds of ferns, whether on the tree or fallen.

The eggs of *Reduviolus* were first described by Swezey in 1905 ([8]) and the following year by Chapman ([9]). Those of *R. capsiformis* (*blackburni* Swezey) are inserted in the midrib of cane-leaves and similar situations. Chapman found the eggs of what was supposed to be *R. myrmicodes* (*latwenirus*) inserted in the leaves of *Chlora perfoliata*. These eggs are much like those of *R. capsiformis*, but are more deflected near the micropile end. Their deposition appears also to be more regular than in the latter. Chapman says: "When the egg hatches, it opens by an elaborate lid or stopper being pushed off, or rather out. This lid occupies the whole thickness of the woody layer, and when pushed out leaves the whole of the tube in this layer lined by egg-shell, so that it is more like a stopper in a bottle than a lid. When pushed out it does not fall, but remains attached to the egg by several twisted films, which retain it, at a distance of about half a millimetre, in a position as if its being pushed back into its place were contemplated. This stopper is of a white pith-like texture and highly organized structure. It is a slightly conical tube, with a diaphragm near its inner opening; the outer surface is longitudinally striated. The inside is impressed with hollows in several irregular series, such as might be made, if it were on a larger scale, by making grooves with rounded ends from the edge to the bottom, whilst it was still soft material, by pressure of a finger, then repeating this in a shorter series and again by another, with only the finger tips within the margin. The flat bottom has also a number of upright, slender processes, sometimes branched, half the height of the hollow they are in." This capsule is not unlike, generally speaking, that of certain Reduviids.

The nymphs of our species are not specially interesting. They have three glandular openings, the tarsi are all bisegmentate,

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(8). 1905, Bull. H. S. P. Ent., I, 234, Pl. 17, f. 2-3.
(9). 1906, Ent., XXXIX, 73, Pl. 3.

at least in the later stages, the first segment being minute; the claws are long and subequal. The ant-like appearance of one of the exotic species of *Reduviolus* has been long known, but none of the Hawaiian forms show any resemblance of this nature; they are always found in the same sort of place as their adults. *R. kerasphoros* is recognizable by the thickened first segment of the antennae, but has not the cephalic horns of the adult. *R. tarai* and *truculentus* by their pattern and colouring, as recorded in their specific descriptions further on; *R. subrufus* is very red; *R. capsiformis* is slender and pale yellowish with a percurrent red line down the middle; *R. lusciosus* is brownish yellow; but I have not observed any special structural characters, except in *R. kerasphoros*, with its thickened antennae.

Dr. D. Sharp has described and figured (10) the nymph of *R. myrmicodes* (under the name of *Nabis lativentris*), showing its ant-like appearance, as before mentioned, and observing "it is strange that this curious case of resemblance should hitherto have escaped notice." As Poulton has also recently (11) written, "It is remarkable that so interesting a form of mimicry in such a common insect should have been undescribed until so late as 1899," it is evident that a summary of the literature will not be out of place here.

In 1834 O. G. Costa described a new species of *Reduviolus* under the name of *Nabis myrmicodes* (12); as his description was based upon a nymph, it is allowable to infer that his attention had been drawn to the ant-like appearance of the bug. I have, however, not seen a copy of his rare paper, and do not know the details; I am not even sure that the reference given is correct.

In 1879 O. M. Reuter (who has just recently, after a life devoted to Science, and especially to the Hemiptera, been afflicted by total blindness), published a valuable summary, with much new matter, of what was known on the subject of "Mimicry" in Hemiptera, entitled "Till kännedomen om mimiska Hemiptera och deras lefnads historia" (13). With reference to *Reduviolus myrmicodes*, which, according to the nomenclature in vogue at that time, he called *"Coriscus lativentris,"* he says: "This species is not a mimic in the adult state, but is an exceedingly good one as a nymph or larva. Nymphs of this have even

(10). D. Sharp, 1899, Cambr. Nat. Hist., VI, 556-7, f. 269.
(11). Poulton, 1908, Essays on Evolution, 1889-1907, pp. 257-8.
(12). O. G. Costa, 1834, Cenni Zool. xii, 71; (I have not seen this).
(13). Reuter, 1879, Oefv. Finsk. Förh., 1878-9, pp. 141-199, (the notes on **Reduviolus** are on pp. 189-90).
(14). Breddin, 1896, Zeitschr. fur Naturwiss, LXIX, 33-5, Pl. I, f. 10.

been described as a separate species by Costa under the name of *Nabis myrmicodes,* having reference to its mimicry of an ant, and indeed very happily so named. In the parks and leafy woods in places around Lille in the north of France, I happened to net, in some shady groves, a considerable number of the nymphs of this species, from 2-4½ millimeters long; in the net with the same were numbers of a *Myrmica,* the species of which I did not determine; these individuals, though systematically so far apart, could scarcely be separated then. Towards the mimicking of the *Myrmica,* there contribute in a high degree the four upright spines in the nymphs, one on each side of the meso-and metathorax; the abdomen is not itself so extraordinarily constricted at the base, but it appears so, by reason of the white spots, placed one on each side at the base. This is the case actually in the young nymphs, which have need of the mimicry, but in the older ones it is less marked, owing to the four white spots above-mentioned disappearing (15). The species has by that time become very big, so that mimicry of an ant would be of utility no longer, as the latter are not so large. The colouring of the small individual is also more in accordance with that of the *Myrmica. Coriscus lativentris* is a predaceous bug whose lifehistory, and the nature of its relations with the ants, are as yet unknown."

More recently, Breddin, in a paper entitled "Nachahmungserscheinungen bei Rhynchoten" (14) has also discussed this species. He says: "Figure I shows a blackish-brown insect the proportions of whose body cannot in the least be compared with those of an ant. But through a real stroke of genius on the part of Nature (!) this little animal is wonderfully clothed. On each side of the base of the abdomen there appears a whitish, faintly glittering spot which extends far across the back until the dull ground-colour appears only as a narrow central stripe which is very much like the well-known stalked abdomen of the ants. In order to make the masquerade complete, the plump and conspicuous anterolateral parts of the abdomen are made invisible by the little white spot, and the transformation of the really plumply built insect into a slender ant, is complete.

"This adaptation is very much more marked than in the colouring or the nymphs of the other species of *Nabis,* especially in

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(15). They occur in nymphs of 4⅔ mill. long, not any longer in those of 6 mill, length.

the very closely allied *N. brevipennis* nothing very strikingly marked is shown.(16).

"The colour-divergence between nymph and imago [in *myrmicodes*] is also usually marked, so that one who is not fully experienced in these matters will take the blackish, white-spotted nymph, and the plain greyish brown adult for two entirely different insects, as indeed an early writer (Costa) has done, in describing the nymph as a separate species under the name of *Nabis myrmicodes*. This marked difference gives us a glance into the mode of life of the bug. While we find the species of *Nabis*, as for example the closely related *N. brevipennis*, as adults and also as nymphs, in herbage and shrubs, we meet *N. lativentris*, on the contrary, with its nymphs, generally crawling on the ground; they are also found among clumps of roots of strong plants, and under stones watching for their prey. They appear especially abundant where forest-ants are plentiful; and have even been found in hills of *Lasius fuliginosus*.

"The Nabis-group belongs to the Family Reduviidae [rather, superfamily Nepoideae G. W. K.] consisting of carnivorous insects, which are among the most terrible of predators in the insect world. It is then not to be doubted that these Myrmecophanous nymphs prey upon insects and especially upon ants. Masked by its wonderful 'myrmecophanism,' the *Nabis*-nymph, a wolf in sheep's clothing, steals up to the approaching ant who believes she is being met by a sister-ant, seizes her with the fore legs which are especially well equipped and adapted to catch and retain the prey, and with its awl-shaped and crooked proboscis bores into the body (17). At any rate we have here to do with aggressive mimicry."

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(16). "All of the **Nabis**-nymphs known to me show, as indeed is common in the Hemiptera, the colour markings of their adults, usually a purer or darker yellow or, as in **brevipennis**, a monochromatic dark brown, with a slight copper tinge." [Although Breddin is quite mistaken about most of the nymphal Hemiptera being coloured like their adults, his remarks on this in **Reduviolus** are confirmed very largely by my own above on Hawaiian forms. G. W. K.].

(17). Breddin has mixed up the form of the labium in Reduviidae with that in Nabidae. It is also not the labium that bores. I do not believe that the **Reduviolus** preys on the ants. It rather takes advantage of its likeness to the ants to pursue other prey which the ants do not attack, and which therefore would not try to escape, till too late; or perhaps it is left alone by the ants on their marauding expeditions. This is however a subject for observation rather than guessing.

DISTRIBUTION OF HAWAIIAN *Reduviolus.**

	SPECIES	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	HABITAT
I	*capsiformis* (20)	*	*	*	*	*	*	grasses, etc., generally in dry places.
2	*blackburni*	*	*	*	*	*	*	grasses, sedges, ferns, etc., generally in damp places.
3	*kahavalu*	.....	.... .	.....	.....	.....	*	*Sophora chrysophylla.*
4	*tarai*	*	*	*	*	*	*	*Cyathodes tameiameiae.*
5	*morai*	*	.....	.....	.....	.....	.....	(? dead fronds of tree ferns, etc.)
6	*nubigenus*	.....	?	*	*	*	.....	?
7	*koelensis*	.....	*	.....	*	.....	.....	*Acacia koa; Nani polymorpha* (21); ferns.
8	*truculentus*	.....	*	.....	.....	.....	.....	*Pipturus albidus.*
9	*subrufus*	.....	*	*	.....	*	*	*Nani polymorpha*; dead fronds of tree ferns.
10	*sharpianus*	*	.....	.....	.....	.....	.....	? *Nani polymorpha.*
11	*rubritinctus*	.....	.....	.....	.....	*	.....	?
12	*kerasphoros*	.....	*	.....	.....	.....	.....	*Nani polymorpha; Acacia koa.*
13	*lusciosus*	.....	*	.....	.....	?	.....	
14	*silvicola*	.....	.....	*	.....	.....	.....	at roots of grass, ferns, etc, (22)
15	*silvestris*	*	.....	.....	.....	.....	.....	
16	*pele*	.....	.....	.....	.....	.....	*	
17	*nubicola*	.....	.....	.....	.....	*	.....	
18	*procellaris*	.....	.....	*	.....	.....	.....	
19	*volcanicola*	.....	.....	.....	.....	.....	*	
20	*kaohinani*	.....	*	.....	.....	.....	.....	
21	*paludicola*	.....	.....	*	.....	.....	.....	
22	*lolupe*	.....	.....	.....	.....	.....	.....	
?23	*curtipennis*	?	.....	?	.....	.....	*	
		6(?7)	9 (?10)	8(?9)	5	7(?8)	8	

(19a) *nesiotes* not included, as the island is not known.

(20) Also in Laysan Island; cosmopolitan. The other species, so far as is known, are precinctive.

(21) Formerly known as *Metrosideros polymorpha.*

(22) These all ascend trees incidentally, when these are shrubby, and surrounded by ferns, &c., which intermingle with their lower branches.

Little else is known of the habits of *Reduviolus* and its allies. Scott has described a neotropical genus (18) of which the species live en famille with colonies of Spiders. *R. capsiformis* is found plentifully here in dry grass with the little introduced Spider *Erigone vagans,* but I have not observed any such habits as those related by Scott.

Very little is known of the parasites of Nabidae, in fact the only record of which I know is that, by Swezey, of *R. capsiformis* by the Mymarid *Polynema reduvioli,* one to each egg (19).

We see (22a) that three species each are apparently peculiar to Kauai, Oahu, Molokai and Hawaii; and two to Maui, while none is peculiar to Lanai; three are throughout the islands, one of the latter indeed being almost cosmopolitan.

REDUVIOLUS W. Kirby (1837).

All the Hawaiian forms fall at first under the typical subgenus (*except that some of them which are undoubtedly sprung from one of the others, have annulated antennae*), inasmuch as they are characterized by the head not being strongly narrowed behind the eyes, by the wing-hook originating from the "connecting vein" close to the "subtended vein," and by the urosternites lacking denuded patches and being well limited from the uropleurites (23).

For those forms which are apparently always brachypterous (almost apterous), and which lack ocelli or have them only very minute, the pronotum scarcely wider basally than medially, etc., I have proposed a mutation-name, *Nesotyphlias.* It is not strictly a genus, or even perhaps, a subgenus, in an exotic sense, but it is certainly not equivalent to the ordinary brachypterous forms of the genus in Europe and North America. The Hawaiian Fauna is very peculiar and must be treated in a special manner.

As there is not the slightest chance that any of the forest, endemic, forms will be found elsewhere, I have tried rather to

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(18). 1881, Ent. Mo., Mag., XVII, 272.

(19). 1905, Bull. H. S. P. Ent., I, 235.

(22a). By the table on p. 56.

(23). Previously, I have used the terms "sternites," "pleurites," etc., in this connection, but the fact that, strictly, the parts of the sterna, nota and pleura are sternites, tergites and pleurites, respectively though not usually so termed, renders it advisable to prefix Packard's "uro", when abdominal parts are to be indicated. "6th urosternite" is evidently less cumbersome than "6th ventral segment of the abdomen."

give the characters by which the different species seem to differ from one another, than to describe them at great length and distinguish them from exotic forms. In some, I might almost say, most, of the forms, I have had very insufficient material, and there is still room for a good deal of work in collecting and studying both adults and nymphs.

TABLE OF HAWAIIAN SPECIES.

This table will, I believe, aid considerably in determining the species, but it is little use trying to work out these difficult forms from single examples, in many cases, especially females (24).

1(24). Tegmina well developed; membrane wide, reaching well beyond the apex of the abdomen; wings at least one-third of the length of the abdomen; ocelli normal.

2(7). Lateral margins of the pronotum only slightly sinuate, those of the hind lobe not suddenly diverging, hind margin not twice as wide as the collar

3(6). Scutellum with a median dark line down the middle; at least the hind femora apically dark.

4(5). Elongate, slender, pale testaceous, tegmina not lightly punctured, nor specked with fuscous; fore femora obsolescently marked with yellowish-brown; veins of median areas of membrane usually simple; male hook with dorsal margin (as seen in profile at rest) of the blade strongly rounded, ventral side strongly rounded, ventral side slightly emarginate.....1. **capsiformis** (Germar).

5(4). Less elongate and stouter, ashy-grey, tegmina lightly punctured or specked with fuscous; fore femora more strongly marked with fuscous; vein of median area of membrane usually forked; male hook with the dorsal margin of the blade fairly straight, the ventral strongly bidentate.....2. **blackburni** (F. B. White)

6(3). Scutellum and legs immaculate [subg. **Nesomachetes**].....3. **kahavalu** Kirkaldy.

7(2). Lateral margins of the pronotum distinctly sinuate, those of the hind lobe suddenly diverging; hind margin more than twice as wide as the collar.

8(9). Tegmina not or scarcely punctured, nor specked with fuscous; veins of the median area of the membrane scarcely forked; pronotum with the hind lobe not raised strongly (as seen in profile) .....4. **tarai** Kirkaldy.

9(8). Tegmina distinctly punctured or speckled with fuscous, especially near the exterolateral angle of the corium; veins of the median area of the membrane shortly forked; hind lobe of pronotum distinctly raised.

10(5). First segment of antennae shorter than the head.

11(14). Colours of corium not sharply contrasted; length not more than 8½ mill.

(24). **13 nesiotes** is not included.

12(13). Hind lobe of pronotum with 5 longitudinal lines; membrane normal .....5. **morai** Kirkaldy.
13(12). Hind lobe of pronotum not clearly lined; veins of the median area of the membrane more or less broken up, partly forming spots and drops.....6. **nubigenus** Kirkaldy.
14(11). Corium basally clear yellow, apically bright reddish; length 4 mill.....10. **sharpianus** Kirkaldy.
15(10). First segment of the antennae distinctly longer than the head.
16(21). First segment of the antennae not thickened.
17(18). Cinereous, very heavily marked with blackish-grey.....8. **truculentus** Kirkaldy.
18(17). More or less tinged with reddish.
19(20). Slender, elongate, cinereous, tinged with red; hind margin of pronotum slightly emarginate..7. **koelensis** (Blackburn).
20(19). Stouter, always distinctly ruddy; hind margin of pronotum truncate.....9. **subrufus** (F. B. White).
21(16). First segment of the antennae very distinctly thickened.
22(23). Head normal(?).....11. **rubritinctus** (Blackburn).
23(22). Head anteriorly with a blunt spine on each side [subg. **Milu**].....12. **kerasphoros** (Kirkaldy).
24(1). Tegmina elongate, narrow, or else very short; clavus not separated; membrane short; wings halter-like; ocelli absent or very minute.....[subg. **Nesotyphlias**].
25(28). Antennae with a single annulus near the apex of the second segment.
26(27). Tegmina extending practically to the apex of the abdomen. ..... 13. **lusciosus** F. B. White; 14 **silvicola** Kirkaldy; 15 **silvestris**, sp. nov.; 16 **pele**, sp. nov.; 17 **nubicola**, sp. nov.; 18 **procellaris** Kirkaldy.
27(26). Tegmina extending to about three-fourths of the abdomen. .....20. **volcanicola** Kirkaldy.
28(25). Second segment of antennae multiannulate.
29(30). Tegmina about three times as long as scutellum, apically angularly rotundate.
30(31). First segment of antennae pale, scarcely annulate, basal half fuscous; anterior lobe of pronotum gently rounded, not forming an angle with hind lobe....21. **kaohinani**, sp. nov.
31(30). First segment of antennae multiannulate; posterior lobe of pronotum convex, in profile forming an angle with the hind lobe.....22. **paludicola** Kirkaldy.
32(29). Tegmina a little more than twice as long as the scutellum, apically broadly rotundate.....23. **lolupe** Kirkaldy.

1. *capsiformis* (Germar).

Nabis capsiformis (Germar 1837) Reuter 1908 Mém. Soc. Ent. Belg., XV, 114 (with exotic synonymy).

N. innotatus F. B. White, 1877, A. M. N. H. (4) XX, 112.

Reduviolus blackburni Kirkaldy, 1902, Faun. Haw., II, 155 (part); Swezey, 1905, Bull. H. S. P. A., Ent. I, 234, Pl. 17, f. 1-4.

Pale greyish or yellowish-testaceous, with two or three small spots along or near the apical margin of the corium. The dark markings on the head, pronotum, legs and underside are very variable in hue and extent, but are nearly always comparatively slight. The forms living in dry, lower localities, near the coast, are very light coloured, with more elongate, flimsy tegmina, but those occurring at higher and wetter elevations are darker, and the tegmina are shorter and stouter; these last approach **koelensis** somewhat, but the latter is at once distinguished by the much broader hind lobe of the pronotum, and the species is arboreal. The dark forms of **capsiformis** also approach the light forms of **blackburni,** but the male hooks are very different. (Pl. I, f. 1).

R. capsiformis is practically cosmopolitan and is apparently distributed over all these islands at all elevations I have also seen specimens from Laysan. Superficially it is not unlike the immigrant Mirid *Oronomiris hawaiiensis* and is found in the same situations, viz: grasses, sugar-cane, etc.

2. *blackburni* (White).

Nabis blackburni F. B. White, 1878, A. M. N. H., (5), I, 373.

Reduviolus id. Kirkaldy, 1902, op. cit. 155 (pt.).

This species, as above remarked, is very much like dark *capsiformis,* but is darker, ashy-grey, and while in *capsiformis* the *urotergites* are pale, (perhaps a little fuscous in part), in *blackburni* they are blackish with red or yellowish pleurites. Some specimens from Hawaii, Lanai and Maui, at higher elevations, are redder and much darker and have a superficially very different habitus, but I can find no specific differences.

At the higher elevations, are found forms with much shorter tegmina (f. 17 representing the tegmen of a female I found at Kilauea, Hawaii; the membrane of the longer form of tegmen is shown at f. 16). This form tends to bridge over the distance towards *lusciosus.* In all, the male hook is very characteristic (f. 2). The wing is shown at f. 11; that of the short-winged form is not very different, beyond the shortness.

R. blackburni is distributed over all these islands at all elevations, more commonly perhaps, at 2000 ft. and over; I do not know it from any other country, but I am not convinced that it is endemic. It is to be found in grasses, sugar-cane, stag-horn fern, etc., and may be beaten from low Ohias and other trees, but I think that it is in the trees only accidentally.

The **nymph,** when living, is dark purplish-brown above, more or less variegated; scutellum yellow behind. Beneath pale yellow, abdomen apically more or less fuscate. Femora annulate near the apex. Pleurites spotted with reddish.

3. *kahavalu* Kirkaldy.

Reduviolus innotatus Kirkaldy, 1902, Faun. Haw. III, 154, Pl. 5, f. 32, (not Blackburn).

R. kahavalu Kirkaldy, 1907, P. H. E. S., 1, 156, (new name).

Male, female. Very pale greenish (turning yellowish after death), practically immaculate, the urotergites more or less fuscous. Antennae testaceous, sometimes light fuscous. Tegmina translucent, slightly tinged with greenish, opalescent, membranay veins ashy. Eyes medium-sized, not occupying the whole of the head in profile. Second and third segments of the antennae subequal in length, twice the length of the head in profile, and about one-half longer than the first segment, 4th. slightly longer than the first. Fore femora subequal in length to the head, pronotum and scutellum together. The veins of the median area of the membrane are not forked, (f. 14). The wing-hook arises from the connecting vein, almost at its junction with the subtended vein. Pronotum with the lateral margins almost straight, scarcely divergent, the hind lobe not, or scarcely, elevated, (figs. 5 and 8). The characteristic male hook is shown in fig. 3.
Length, 9½-10½ mill.

Hab: Hawaii, Kona, 2000-6000 ft. (July-Aug.); Kilauea (Aug.), on Mamani (*Sophora chrysophylla,* one of the Leguminosae).

This species seems to be restricted to Hawaii, the record in the "Fauna Hawaiiensis" from Waianae, Oahu, being referable to *R. capsiformis.* The only examples of *R. kahavalu* that I have seen are those collected by Dr. Perkins, and referred to above.

4. *tarai* Kirkaldy.

Reduviolus tarai Kirkaldy, 1902, Faun. Haw., III, 154, Pl. V, 40, (male hook).

R. kaonohiula Kirkaldy, 1908, Proc. Haw. Ent. Soc., I, 192.

Male, female, purplish-brown, more or less suffused with sanguineous, especially on the legs and tegmina. Antennae testaceous, more or less tinged with fuscous or sanguineous. Scutellum bluish-black, bright red laterally. Lateral margins of tegmina narrowly yellowish. Meso- and metapleura bright red, marked with black. Membrane colourless or milky, veins pale ashy. Fore femora reddish, middle and hind femora yellowish, apically reddish, the tibiae and tarsi yellow, etc. Abdomen above fuscous more or less discally, pleurites yellowish or sanguineous; abdomen beneath yellowish. The eyes are larger than in **R. kahavalu,** breaking the dorsal line in profile. Head about as long as the first segment of the antennae or very slightly longer and very slightly shorter than the fourth segment; second and third segments subequal, each about three-fifths longer than the first. Pronotum with lateral margins of hind lobe somewhat divergent, and

a little raised. Fore femora slightly more incrassate than in R. kahavalu. Membranal venation much as in the latter, but the medial veins are more parallel.

Length, 8½-10 mill.

Hab. Oahu, Waialua, Koolau range (March); Molokai, 3000 ft. (June); Lanai, 2000 ft. (Feb.); Hawaii, Kona, 5000 ft. (June), collected in these places by Dr. Perkins. I have also taken it on Hawaii, Kilauea (Nov. and May), on Pukeawe (*Cyathodes tameiameiae*, one of the Epacridaceae), in company with the Asiracid *Nesosydne cyathodis* Kirkaldy.

There were some mistakes in my original description, which can be corrected by reference to the above.

This species and the next hold a sort of intermediate position between *R. blackburni* and the *subrufus* series; the base of the pronotum is more than twice as wide as the collar but is not noticeably raised. *R. tarai* is easily recognized by its immaculate red or reddish tegmina; the antennae and legs are not annulate or at most very indistinctly. The veins of the median area of the membrane are simple. All the examples I have collected are very red, most of them fading considerably later on, but Dr. Perkins tells me that the pale forms are met with. The type of *kaonohiula* is very bright red, the membrane being opaque milky.

The type was a specimen from Lanai, the type of *kaonohiula* being from Hawaii.

The male hook was figured in the "Fauna Hawaiiensis."

The nymph in the last instar is rather pretty when alive, being clear pale green, marked with rosy, and harmonizes well with the colouring of its host-plant.

var. *montivaga* Kirkaldy.

Reduviolus montivagus Kirkaldy, 1908, P. Haw. E. S., I., 192.

This differs from the typical form by the immaculate yellow pleura, etc. It was collected in the Waimea Mts., Kauai. It may be a good species, but I have not seen males.

5. *morai* Kirkaldy.

Reduviolus morai Kirkaldy, 1902, Faun. Haw., III, 155, Pl. 5, f. 39 (not 39a).

This species was sufficiently accurately defined in 1902, except that the last three lines should be deleted, as the annulations of the legs are rather obscure. It is, with the next, readily recognizable by its stouter form and short first segment of the antennae, and by the closely spotted tegmina, but is distinguishable

from *nubigenus* by the longer pronotum and by the different venation of the membrane.

It is apparently restricted to the Mountains of Kauai.

6. *nubigenus* Kirkaldy.

Reduviolus nubigenus Kirkaldy, 1908, P. Haw. E. S., I, 191.

All of the *R. morai* recorded in the "Fauna Hawaiiensis" from localities other than Kauai, belong to this, though "Oahu" requires confirmation, as I have no specimens from this island now to examine. I suppose that f. 39a refers to this species, but I have no males now before me. Pl. I, f. 15, shows the characteristic membranal venation.

7. *koelensis* (Blackburn).

Nabis koelensis Blackburn, 1888, Proc. Linn. Soc. N. S. Wales (*2*), III, 352.

In the "Fauna Hawaiiensis," I considered this to be a synonym of *R. subrufus,* but it seems to be constantly slenderer, and scarcely, if at all, tinged with red, and the male hook seems a little more rounded dorsally. This and the following long-winged forms are easily distinguished by the lateral margins of the hind lobe of the pronotum being considerably divergent posteriorly, the hind margin being distinctly more than twice as long as the collar (fig. 6); the first segment of the antennae is distinctly longer than the head (except *R. sharpianus*).

I have, since 1902, seen only some specimens taken by myself in Oahu, from Koa (*Acacia koa*) in Nuuanu Valley (about 1000 ft.) and from Ohia lehua (*Nani* [*Metrosideros*] *polymorpha,* one of the *Myrtaceae*) on Tantalus (about 1750 ft.). Blackburn's type was from Lanai, Koele.

8. *truculentus* Kirkaldy.

Reduviolus truculentus Kirkaldy, 1908, Proc. Haw. Ent. Soc., 1, 191.

R. subrufus Kirkaldy, 1902, Faun. Haw., II, Pl. V, f. 38.

This species (whose membrane is shown on f. 13) can easily be distinguished from *R. koelensis* by its greater bulk and much heavier markings; the pattern and colouring will separate it at once from *R. subrufus.* It seems to be restricted to Oahu, on the Honolulu Mts., and is found on Mamake (*Pipturus albidus,* one of the Urticaceae).

The living **nymph** of the final instar is of a very pale greenish of the same tint as the underside of the **Pipturus**-leaves, but after death, the greenish tint changes into pale yellowish. The apical lobe of the head, the legs, etc., are whitish translucent; antennae, clypeus, etc., tinged with orange. On the fore and middle femora there is a pale fuscous-red subapical annulus and a similar bright red one on the hind pair. The lateral margins of the hind lobe of the head and the hind margin (medially interrupted) of the pronotum, a short line exteriorly and one interiorly, on the tegminal pads, greenish-grey. Abdomen above with an irregular dark fuscous stripe down the middle, a bright red spot on most of the segments in the middle.

9. *subrufus* (White).

Nabis subrufus F. B. White, 1877, A. M. N. H., (4) XX, 112.

N. oscillans Blackburn, 1888, Proc. Linn. Soc., N. S. W., (2) III, 352.

Reduviolus subrufus Kirkaldy, 1902, Faun. Haw., III, 156, Pl. 5, f. 37.

R. arrogans Kirkaldy, 1908, P. Haw. E. S. I.

Eliminating *truculentus* and *koelensis,* my remarks in the "Fauna Hawaiiensis" still hold. The emargination of the hind margin of the pronotum is a variable character, as I have taken specimens off the same tree, some with truncate margin and some with emarginate; the amount of infuscation and the membranal venation also vary. *Arrogans* is, now I think, simply a darker form with simpler venation. I separate, however, as a variety (**melemele**), a rather polished, yellow form from Maui, (Haleakala), which seems to have all the specific characters of *subrufus,* but of which I have seen only females.

R. subrufus is distributed all over Oahu, Molokai, Maui and Hawaii (and probably Lanai), in the forest region, and frequents Ohia lehua (*Nani polymorpha*).

The type of *subrufus* was from Oahu, that of *oscillans* from Hawaii (Kilauea), and that of *arrogans* from the Molokai Mts., but I have taken an identical specimen of the latter with typical ones in Hawaii (Kilauea).

I have figured the male hook (f. 4).

10. *sharpianus* Kirkaldy.

Reduviolus sharpianus Kirkaldy, 1902, Faun. Haw., III, 156, Pl. 5, f. 36.

I have not seen a male of this species, which is restricted to Kauai. The coloring and short antennae will distinguish it among the *subrufus*-series.

11. *rubritinctus* (Blackburn).

Nabis rubritinctus Blackburn, 1888, op. cit., 351.

This species is still unknown to me, as I do not think Blackburn would have overlooked the head-spines. It may be that it forms, by the possession of thickened antennae, a link between the typical *subrufus*-forms and the subgenus *Milu*.

12. *kerasphoros* (Kirkaldy).

Reduviolus rubritinctus Kirkaldy, 1902, Faun. Haw., III, 157, Pl. 5, f. 33.

Milu kerasphoron Kirkaldy, 1907, Canad. Ent., XXXIX, 248.

M. kerasphoros Kirkaldy, 1908, P. Haw. E. S. I., 195.

This species seems to be restricted to Oahu, but is found all over its forest region, on Ohia lehua (*Nani polymorpha*) and Koa (*Acacia koa*). The form with red and yellow tegmina, sharply contrasted, is typical; for that with purplish tegmina, I have proposed the varietal name **purpurea** (P. Haw. E. S. I.).

I erected for this, the genus *Milu*, but I now agree with Reuter that it is not worthy of more than subgeneric rank. (Reuter, 1908, Mém. Soc. Ent. Belg., XV, 109).

The nymphs display the thickened antennae, though less (and more regularly) so, but the head-spines are not apparent.

13. *nesiotes* sp. nov.

This has the general appearance of a short-winged **blackburni**, but the female abdomen is more like that of **subrufus.** It is larger and darker than **blackburni.**

Sordid brownish testaceous, a black line from clypeus to posterior angle of scutellum, etc. Tegmina yellowish-brown, irregularly suffused with fuscous, membrane much as in **blackburni** (short-winged form). Abdomen pitchy black; tergo-pleurites obscurely spotted with yellow-brown. In brachypterous **blackburni** the wing-venation is nearly the same as that of the normal form, except that it is shortened, but in **nesiotes,** the wing-venation is much reduced, (Pl. I, f. 12).

Length, 9½ mill.

Hab. Hawaiian Isles (? locality).

I have only fragments of a single female, and have described it only because it appears to me not to be conspecific with any other form; and to be worthy of record on account of the wing reduction.

14. *lusciosus* (White).

Nabis? lusciosus F. B. White, 1877, A. M. N. H., (4), XX, 112.

N. lasciosus Letheirry and Severin, 1896, Cat. Hém., III, 210.
Reduviolus lusciosus Kirkaldy, 1902, Faun. Haw., II, 157, Pl. V, f. 35; Reuter, 1908, Mem. Soc. Ent. Belg., XV, 124.
R. monticola, Kirkaldy, 1908, P. H. E. S., I, 192.

Male, elongate oval, pale brownish yellow, a percurrent line from base of vertex to posterior angle of scutellum, dark fuscous; this latter is double on the middle lobe of the pronotum, and there is a varyingly pronounced fuscous oblique line on each side of the posterior lobe, meeting this double line at the base of the middle lobe. The tegmina are variable, usually they are almost immaculate, but may be darker, or even a little reddish tinged, and marked with fuscous; they are lightly and sparsely punctured with fuscous, but more closely along the subcostal cell. Membrane pale cinereous, veins a little darker. The antennae are yellowish, as regards the first two segments, a blackish annulus near the apex of the second; the others dark fuscous. The legs are yellowish, the base of the hind femora, a few faint mottlings on all the femora, apex of tibiae, etc., fuscous. Urotergites fuscotestaceous, the pygophor yellow, a spot on the apex and a line down the middle near the apex, blackish; the pleurites are yellowish, not chequered, but have a sanguineous line down the middle. Sternites and mesoternum yellowish, the lateral margins broadly dark fuscous or blackish. The first and fourth segments of the antennae are subequal, each also subequal to the length of the head in profile; the second and third segments of the antennae are subequal, and each about one-half longer than the first. The labium extends to the middle coxae. The eyes do not occupy the whole of the head, either dorsally or ventrally in profile. Pronotum very slightly elevated, (fig. 7). Tegmina elongate, slightly rounded exteriorly, apical angle of corium extending as far as the apex of the abdomen, acute; membrane extending well beyond the abdomen, norrow, much longer than wide, the basal angle formed by the two membranes in repose, acuminate, (fig. 18). Blade of hook broad, semicircular, angulate apically and dorso-basally.

Female very similar to the male, but the abdomen is wider, exposing the pleurites about the middle; the pleurites yellow, with a fuscous spot on the outer half of each segment basally, this spot not extending to the inner margin.

Length: Male, 10 mill.; female, 10½ mill.

Hab. Oahu, all over the Koolau range, or at least the southern part. I have also seen an example from West Maui, that I cannot separate. It may often be beaten from *Acacia koa* and *Nani polymorpha,* as also from various Ferns, but it seems to be really a ground species, like all its subcongeners, and is common in the grass on the top of Mt. Tantalus, at 2000 ft.

15. *silvicola* Kirkaldy.

Reduviolus silvicola Kirkaldy, 1908, P. Haw. E. S. I.

This is doubtfully valid, only a single female being known, but it is more elongate, and darker than *lusciosus,* and the pro-

notum seems proportionately longer, especially the middle lobe.
Length, 10½ mill.
Hab. Molokai.

16. *silvestris* Kirkaldy.

Reduviolus silvestris Kirkaldy, op. cit., 194.
Closely allied to **lusciosus,** but differs as follows: Darker, and the legs more mottled. Eyes a little larger, breaking the dorsal line of the head in profile; the second segment of the antennae is only a third longer than the first. The tegmina are much shorter, not quite reaching to the apex of the abdomen. In the female (the only sex I have seen), the spot on the tergopleurites extends across from the outer to the inner margin.
Length, 8½ mill.
Hab. Kauai, 4000 ft.

17. *pele,* sp. nov

The male has the form and general colouring of **lusciosus,** but is much smaller, and the fore lobe of the pronotum is a little more convex. The tegmina are less elongate, scarcely extending beyond the apex of the abdomen. The eyes are also distinctly larger in proportion, while the hook is different.
The female is much darker than the corresponding sex of **lusciosus** and the fore lobe of the pronotum is more convex.
Length, 7½ (male)-8½ (female).
Hab. Hawaii, Kona, (2000 ft.). Olaa, (Perkins); Kaumana in Hilo, (2000 ft, Swezey); Kilauea, 4000 ft., Kirkaldy, off *Cibotium.*

18. *nubicola,* sp. nov.

Of this I have not seen a male; the female differs from **lusciosus** by the lateral margins of the pronotum being more divergent behind, and the fore lobe more convex. The membrane is shorter and more divergent interoapically, lateral margins straight or slightly emarginate. The basal segment of the antennae has faint fuscous annulations.
Length, 8 mill.
Hab. Maui, Haleakala, (5000 ft., Perkins).

19. *procellaris,* sp. nov.

Male yellowish-brown, the central line dark blackish-brown, thick, the hind lobe with 5 longitudinal lines. Gula and genae blackish. Tegmina yellow-brown, blotched and spotted (especially inwardly) with blackish-brown, posterior margin of corium very irregularly sinuate. Legs more darkly spotted than in **lusciosus,** etc., coxae mostly black. Abdomen dark fuscous, or blackish, ventrally paler down the middle; pleurites yellow-brown, marked with black.
Length, male, 9½ mill.
Hab. Molokai, 4500 ft.

20. *volcanicola* Kirkaldy.

Reduviolus volcanicola Kirkaldy, 1908, P. Haw. E. S., I, 193. *R. lusciosus* Kirkaldy, 1902, Faun. Haw., III, Pl. V, figs. 34 and 34a.

Hab. Hawaii, Kilauea.

21. *kaohinani,* sp. nov

Male distinguished from **paludicola** by the gently-rounded anterior lobe of the pronotum and from **lolupe** by the longer tegmina. It is distinguished from both by the much slenderer form. Tegmina fuscous, a pale streak on the basal three-fourths of the costal margin; veins more or less pale. The first segment of the antennae is scarcely annulate.

Length, 8½ mill.

Hab. Oahu, Tantalus, about 2000 ft., a single specimen, taken by Mr. Swezey, is in my collection.

22. *paludicola,* sp. nov.

Distinguished from the other species (except **lolupe**) by the multiannulate first segment of the antennae, and the very short tegmina. Anterior lobe of pronotum convexly raised (f. 10), confusedly fuscous, hind lobe with 5 fuscous longitudinal lines. Clavus yellowish-cinereous; corium pale reddish-fuscous; the minute membrane whitish, with a fuscous, inner spot. Hind tibiae annulate. Abdomen blackish, more or less reddish partly; pleurites chequered, blackish red and yellow.

Length: Male, 10 mill; female, a little less.

Hab. Molokai, 4000 ft., (July 12 and Sept. 27).

23. *lolupe,* sp. nov.

Female very close to the last, but larger and the legs less darkly mottled, while the tegmina (and membrane) are shorter. Brownish-yellowish; eyes black; a broad lateral piceous stripe beneath from apex of head to apex of abdomen, leaving, however, a pale space around the eyes beneath. Legs less noticeably annulate with paler fuscous. Abdomen above brownish tinged with red, tergopleurites brownish-yellow, partly suffused with sanguineous.

Length, 10¼ mill, max. width, 3¼ mill.

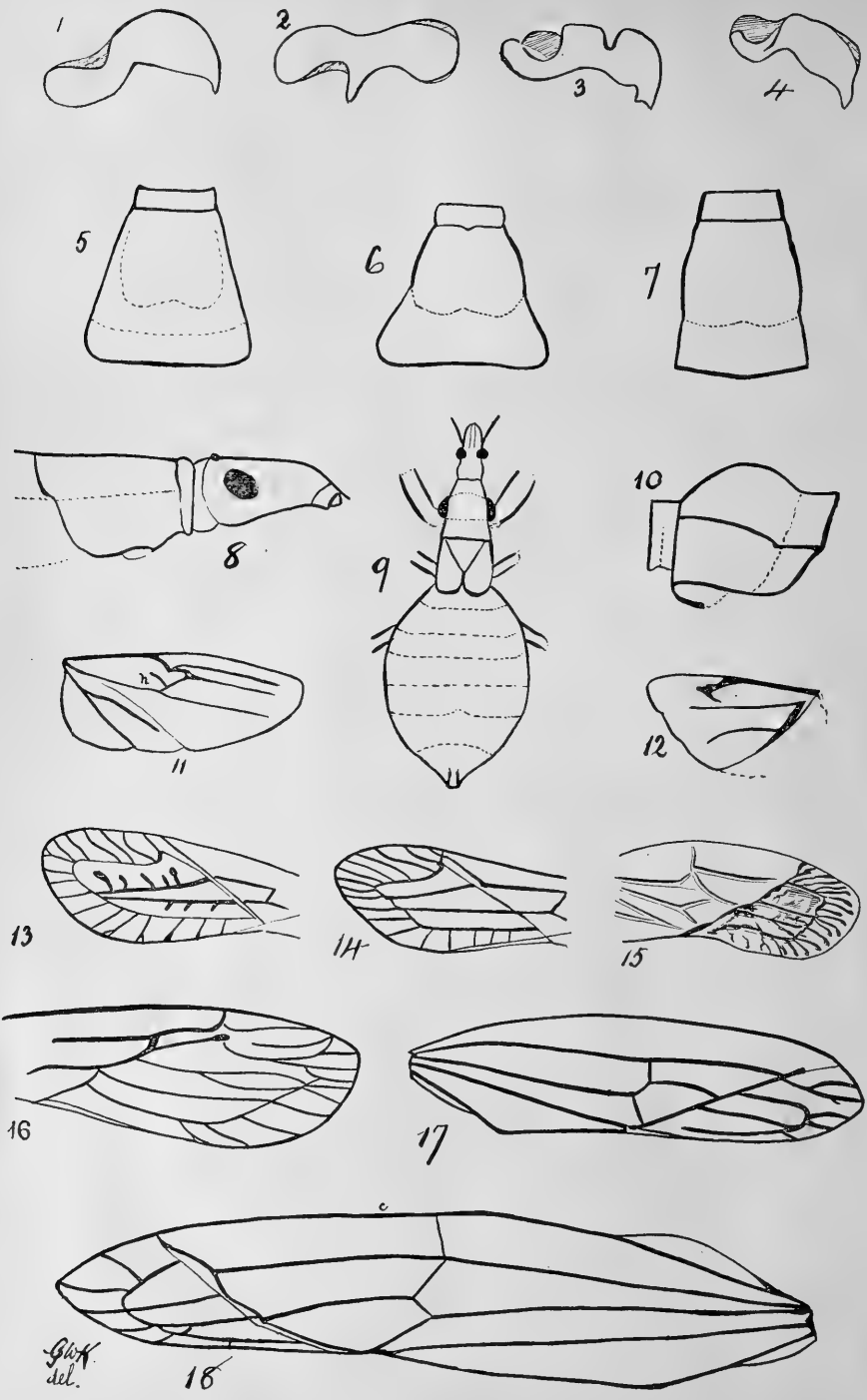
Hab. "Kauai? Molokai?"

A rough outline is shown on fig. 9.

24. *curtipennis* (Blackburn).

Nabis (?) *curtipennis* Blackburn, 1888, P. Linn. S. N. S., Wales, (2), III, 353.

"Apterus; oblongo—ovatus; pallide testaceus fusco vel nigro variegatus; abdomine supra (segmentis apicalibus fuscis exceptis) rufo,



Kirkaldy—Hawaiian Nabidae.

infra fusco rufo et testaceo variegato; hemelytris abdominis apicem haud attingentibus.

Length, 7½ mm.

"Allied to N. (?) lusciosus, White. The thorax is thickly blotched with blackish colouring, and the legs are conspicuously annulated with the same colour. The hemelytra [tegmina] do not quite reach the apex of the hind body.

"A single specimen occurred near Waimea, Hawaii."

This species is scarcely identifiable without the type for inspection.

NEW FORMS DESCRIBED IN THIS PAPER.

Reduviolus nesiotes, sp. nov.
R. subrufus, var. *melemele,* nov.
R, pele, sp. nov.
R. nubicola, sp. nov.
R. procellaris, sp. nov.
R. kaohinani, sp. nov.
R. paludicola, sp. nov.
R. lolupe, sp. nov.

EXPLANATION OF PLATE I.

Fig. 1. *Reduviolus capsiformis* (Germar), male hook.
Fig. 2. *R. blackburni* (White), id.
Fig. 3. *R. kahavalu* (Kirkaldy), id.
Fig. 4. *R. subrufus* (White), id.
Fig. 5. *R. kahavalu* (Kirkaldy), pronotum.
Fig. 6. *R. koelensis* (Blackburn), id.
Fig. 7. *R. lusciosus* (White) male, id.
Fig. 8. *R. kahavalu* (Kirkaldy), in profile.
Fig. 9. *R. lolupe* (Kirkaldy).
Fig. 10. *R. paludicola* (Kirkaldy), pronotum in profile.
Fig. 11. *R. blackburni* (White), wing of macropterous form.
Fig. 12. *R. nesiotes* (Kirkaldy), wing.
Fig. 13. *R. truculentus* (Kirkaldy), membrane.
Fig. 14. *R. kahavalu* (Kirkaldy), id.
Fig. 15. *R. nubigenus* (Kirkaldy), id.
Fig. 16. *R. blackburni* (White), id. (of macropterous form).
Fig. 17. The same, tegmen of brachypterous form.
Fig. 18. *R. lusciosus,* membrane.

Note on a genus of Californian Tetigoniidae (Hemiptera).

BY G. W. KIRKALDY.

In 1902 (Can. Ent., XXXIV, 19), Ball placed his new genus *Pagaronia* near *Errhomenellus* and *Tetigonia,* and remarks, "this is a very puzzling form and seems in several characters to connect the Tettigonidae with the Jassidae through some of the lower forms in that group," (p. 21). In my opinion, the genus belongs to the Iassini (cf. Kirkaldy, 1907, Bull. H. S. P. Ent., III, p. 73), and should be placed not very far from *Iassus* Fabricius, the structure of the head, the venation, and the genitalia being sufficiently characteristic. It is to be noted that the Iassini are apparently not "low" forms, but are rather to be placed at the end of the Tetigoniidae (Jassoidea of Van Duzee), and considered as the best-developed forms.

A single male of *P. 13-punctata* Ball was collected in California, Santa Barbara foothills, (June, 1907), by Mr. W. M. Giffard, which may be called var. *octopunctata* nov., differing from the typical form by the absence of the facial spots near the ocelli, and of the pronotal spots; the male plates are three times as long as the apical urosternites.

The roundly emarginate lateral margins of the pronotum near the eyes give this form a very Fulgoroid appearance, not at all unlike that of some Achilini.

In the same locality, Mr. Giffard found also *Paropulopa interrupta* Ball, a small Cicadoid.

JANUARY 7th, 1909.

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

NOTES AND EXHIBITION OF SPECIMENS.

Mr. W. M. Giffard exhibited a single male specimen of *Odynerus vulcanus* taken by him on Tantalus, Oahu, at 1500 feet elevation. Dr. Perkins who had examined the specimen informed Mr. Giffard that it was absolutely typical with the same species which is not uncommon on the Island of Hawaii. As *O. vulcanus* is not ordinarily taken on any other island than Hawaii the specimen taken by Mr. Giffard must be considered as having been either accidentally introduced or blown over from the adjacent isle.

Mr. Kuhns exhibited a specimen of *Periplaneta australasiae* which he chloroformed in the act of oöthecaposition showing the case partly extruded.

Mr. Giffard asked whether the beetle-roach (*Eleutheroda dytiscoides*) which infested cypress trees was viviparous or not. Mr. Swezey thought it was.

Mr. Wilder reported finding the uncommon roach, *Rhyparobia maderae,* in a store on Maui. Mr. Swezey had taken three specimens sometime ago, one in Pahala, Hawaii, one in Kekaha, Kauai, and one in Honolulu.

Mr. Fullaway reported finding the eggs of *Holochlora venosa* in the stems of mangoes. Mr. Giffard said the insect was quite common in Nuuanu, having been collected by Mr. Jordan and himself. He believed the eggs to be heavily parasitized.

Mr. Swezey exhibited a portion of a *Polistes* nest, collected amongst the glue bushes of Kaimuki, near Diamond Head. In this nest, inserted amongst the papery substance of the nest were two eggs of *Elimaea appendiculata*, a large green locustid which normally deposits its eggs in leaves of plants, inserting them at the edge between the upper and lower layers of the leaf.

Mr. Fullaway exhibited five species of Bruchids which he had bred from various kinds of beans. He also exhibited a specimen of *Coccinella abdominalis,* the rarity of which he thought likely to be due to its being parasitized.

Mr. Kirkaldy exhibited three drawers of Hemiptera, as part of a large collection made incidentally by Mr. Muir in the Malay Archipelago while searching for parasites.

FEBRUARY 4th, 1909.

The forty-eighth regular meeting of the Society was held in the usual place.

NOTES AND EXHIBITIONS.

Mr. Kotinsky exhibited specimens and presented the following note on *Eleutheroda dytiscoides.* "Sunday, December 20, 1908, I observed a specimen of this roach with a strange white appendix projecting behind, running about the house, where the insect is a common nuisance. Upon capturing the specimen she parted with the appendix, which upon examination, turned out to be a batch of embryos. An attempt to breed some of these failed." This observation is proof of the species being viviparous.

Mr. Kotinsky expressed the need of a Field Naturalists' Club. He stated that there are many youths in the city who make excursions to the mountains and that if they had proper guidance and instructors to accompany them good results would be obtained. The subject was discussed by those present.

PAPER READ.

Takahashia japonica (?) Ckll., a Coccid, new to Hawaii.

BY JACOB KOTINSKY.

My friend, Mr. J. Kidwell, has a very prolific pepper tree in his yard. Some time ago he brought me larvae and pupae of *Lycaena* collected on the plant. Recently he found a large colony of the above Coccid on the same bush, and brought me specimens for identification. They were thickly scattered over leaves and twigs, many young just hatching and setting down for business. Careful inspection of the premises failed to disclose another host, nor could Mr. Kidwell suggest a clue to the possible origin of the insect in his yard. After saving material for the collection I had the balance burned, and hope now the possible pest is exterminated.

Prof. Cockerell[1] characterizes this genus as follows: "Similar to ordinary *Pulvinaria* in general structure, but forming a very long, firm, cottony ovisac, which projects from the twig in a curve about 17 mm. long and carrying on its end the shriveled body of the female." All of these characters I find correct in the specimens under consideration except the projection from the twig in a curve. Specifically there is also some difference from *japonica* as described by Prof. Cockerell, but not enough, I think, from what little study I have been able to give the specimens, to justify creation of a new species. There is for instance no indication of a double jointed tarsus. Joint 3 of the antennae is but slightly longer than 4, so that the formula is altered somewhat. Outer angle of anal plates is rather sharp and not rounded.

T. japonica is recorded from Japan on mulberry. Pepper is therefore a new food plant. It is also a new record for the Territory. But in the last respect there are several more to come.

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(1). Bull. 4, Tech. Ser., Div. Ent., U. S. D. A., p. 47, 1896.

MARCH 4th, 1909.

The forty-ninth regular meeting was held in the usual place.

NOTES AND EXHIBITIONS.

Mr. Fullaway exhibited specimens of a new Coccid species, *Ceroputo ambigua,* found on the salt marsh grass, *Salicornia ambigua,* in the salt marsh regions of California, and offered some notes on its life-history. The species is small (about 3 mm.) and covered with a white waxy secretion. There are three larval stages before the mature female appears. The mature males, which are wingless, develop through the so-called pupal stage from individuals having the characteristics of the second larvae. There is one generation annually. The species, although exceedingly abundant in spite of predaceous and parasitic enemies, is without economic importance, the salt marsh grass—its only known host plant—not being fit for consumption.

Mr. Kirkaldy exhibited a new Mirideous Heteropteron from Borneo, and two boxes of Homoptera & Cimicidae (Pentatomidae) from New Zealand.

Mr. Swezey exhibited specimens illustrating his paper on "Another Banana Leaf-roller."

Mr. Kotinsky exhibited a huge scorpion (*Palamnaeus* sp.) a pair of which were brought alive from South Java by Mr. Terry and which he was obliged to kill in order to prevent their possible escape. The incident emphatically demonstrates the usefulness of an inspection service. Mr. Terry called attention to the absence in the Board of Agriculture laws or regulations preventing the importation of pests of this character.

Mr. Kotinsky told of a mealy bug that he had been collecting on the roots of Koa and other plants on Tantalus ever since 1905. From its apparent confinement to higher elevations, he was inclined to believe it to be endemic, especially since it was undoubtedly a new species to science. A few days ago, Mr. Fullaway brought specimens of a mealy bug collected on the roots of a pot-grown mango tree in the city in which he recognized his interesting Tantalus Coccid. Closer study with Mr. Fullaway showed it to be an undescribed *Ripersiella.* Shortly it is contemplated to publish a description jointly by Messrs. Fullaway and Kotinsky.

PAPER READ.

Another Banana Leaf-roller [Lep.].

BY OTTO H. SWEZEY.

Omiodes maia n. sp.

Male, female, 28-30mm.; head, thorax and abdomen dark fuscous much mixed with ferruginous scales, especially on the abdomen; apical margins of abdominal segments ochreous; antennae fuscous above, pale beneath, basal joint fuscous; palpi fuscous, whitish below with a slight ferruginous tinge anteriorly; femora and tibiae fuscous largely suffused with ferruginous; tarsi ochreous. Forewings dark fuscous suffused with ferruginous on costa, and less densely so near termen, a few ferruginous scales scattered in some other parts of wing; a whitish ochreous dash in middle near base; first line ochreous, angulated outwardly (nearly at right angles) at middle, upper portion indistinct, lower portion very distinct; roundish black orbicular; two blackish discal spots transversely placed (mostly contiguous) followed by a few ochreous scales; second line ochreous, sinuate outwardly beneath costa, below middle forming an acute triangular projection outwards; both lines often ferruginous mixed; veins marked with ochreous or ferruginous ochreous; cilia fuscous, darker at base. Hind wings medium fuscous, a darker discal spot and terminal dark fuscous line; a paler postmedian line with acute projection outwardly below middle, a few pale ferruginous scales in its dorsal part, a few also just before terminal dark fuscous line, which is usually interrupted by pale ferruginous scales on the veins; cilia as in fore wings.

Very similar to *O. musicola,* but the latter is paler fuscous, and has ochreous suffusions and markings where *maia* is ferruginous.

I bred a series of moths on three different occasions, from caterpillars found on bananas growing in two different gulches at the head of Manoa Valley: Jan. 23, March 10* and May 2*, 1909, respectively. In one of the gulches, I found the caterpillars quite numerous.

Full-grown caterpillars are just like those of *musicola.* Some have darker markings than others: markings of head quite black, and wider black margins to cervical shield, the longitudinal black bar joining it in front and behind, which gives the cervical shield a very blackish appearance. Caterpillars just hatched have heads entirely black; those one-third grown have most of the tubercles black.

Pupa similar to *musicola.*

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* These observations were made after paper was presented to Society.

This makes four species of *Omiodes* now known to feed on banana: *blackburni* on all the islands, *meyricki* on Hawaii, *musicola* on Maui, *maia* on Oahu. They are closely related, all having similar pattern on wings and no doubt have evolved from a common ancestor. In a previous article I have mentioned differences in color and degree of angulation of first line of forewings. I have measured this angle in several specimens of each species with the following results: In *blackburni* it is 52°, in *meyricki* 56°, in *musicola* 85°, and in *maia* 80°.

APRIL 1st, 1909.

The fiftieth meeting of the Society was held in the usual place. On account of his removal to accept a position in the Bureau of Entomology at Washington, D. C., Mr. D. L. Van Dine tendered his resignation as Vice-President. It was accepted, and Mr. F. W. Terry was elected to fill the office vacated.

NOTES AND EXHIBITIONS.

Mr. Terry presented notes on the Insects of Hong Kong and exhibited specimens.

PAPER READ.

A Conspectus of the Fulgoridae of the Hawaiian Hemiptera.

BY G. W. KIRKALDY.

The Fulgoridae are all apparently endemic, and belong to two genera, *Iolania* and *Oliarus,* both belonging to the tribe of Cixiini.

Three longitudinal keels on the mesonotum; costal margin of tegmina strongly granulate.....**Iolania**

Five longitudinal keels on the mesonotum; costal margin of tegmina not (or obscurely) granulate.....**Oliarus**

Iolania Kirkaldy.

1902, Faun. Haw., III, 118, Pl. 5, f. 3.

A reexamination of this genus presents only one species, *perkinsi;* the ground colour of the male tegmina is much yellower than in the other sex. I separate off, as a variety (*notata*), the form with a large brown blotch at the base of the tegmina of the male.

Oliarus Stal.

So far as concerns the structure of the legs, the Hawaiian forms all belong to the typical subgenus, but I separate them off under the name *Nesoliarus*, on account of the great plasticity of those characters which are of specific value in the exotic forms, and on account of the sexual dimorphism, which is more or less apparent—mostly considerably so—in the pattern and colouring of the tegmina. As it would not be possible to include these Hawaiian forms in a general table of species, owing to the above-mentioned plasticity, it is convenient to group them under a special subgeneric name (type *tamehameha*).

In the europaean fauna, the male genitalia have been extensively used in the differentiation of species. I have, however, not been able to do this with the Hawaiian species. The form of the parts is not very evident without dissection, and I have not had sufficient material except in a few species. Moreover, the form of the genital styles (the "claspers" of Scott), appears to be much the same in all, being not very dissimilar to those of *Cixius stigmaticus* when viewed from below (cf. Ent. Mo. Mag., VII, fig. I, p. 293), except that the stalks are straighter. With more material, I may be able in the future to investigate further.

The venation, which in the Australian and Fijian species I found so characteristic, is highly variable in the Hawaiian forms. The place of forking of the radial and brachial veins, and the place of union of the two claval veins, which characters seem to be of specific value in exotic forms, are inconstant and of no value here.

The tabular form under which I now proceed to describe the Hawaiian forms is, I think, sufficient for the present—till I can obtain more material in certain of them—to differentiate them apart from one another; at the same time, it is, in most cases probably, not sufficient to distinguish them from the species of other countries. As, however, the endemic forms here are not at all likely to occur elsewhere, this will be of little account.

The Hawaiian species are usually found among Ferns, *Sadleria*, *Cibotium*, *Gleichenia*, etc. Swezey (1) has described the nymphs of *O. kaonohi* (2), which he found in "decaying leaf-bases and fibrous matter of tree-fern trunks."

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(1). 1907, P. Haw. E. S., I, 83.

(2). I identified this for Mr. Swezey as my **koanoa**, but the species seem to be different.

The following is a preliminary arrangement of the Hawaiian forms:(3).

1(2). Tegmina short and broad, costal margin thickened and arched at the base; apical and margin of wings fuliginous. LANAI; HAWAII, (Kona). F. H. 120 and 122, Pl. 4, f. 6.....4. **hevaheva** Kirkaldy.

2(1). Tegmina not specially thickened, nor arched at the base; more elongate, at least in the larger species.

3(8). Expanse of tegmina more than 17½ mill.

4(5). Mesonotum brownish testaceous; tegmina immaculate (male), somewhat maculate (female); wings apically not fuliginous. KAUAI, F. H., 120, Pl. 4, f. 4.....1. **tamehameha** Kirkaldy.

5(4). Mesonotum black; wings apically fuliginous.

6(7). Tegmina hyaline, immaculate (male), a narrow median transverse stripe, often faint, (female). OAHU, (Tantalus); MOLOKAI, 4000 ft., (a fragment); MAUI, (Haleakala); HAWAII, (Kilauea and Olaa). F. H., 120 and 121, Pl. 4, f. 5.....2. **kanakanus** Kirkaldy.

7(6). Clavus, inner 2-5 of corium, and apical ⅓ of tegmina, suffused with fuliginous. Otherwise as in **kanakanus.** MOLOKAI, (4000 ft.).....3. **kahavalu,** sp. nov.

8(3). Expense of tegmina less than 17½ mill.

9(36). Males.

10(29). Tegmina immaculate, except the veins.

11(14). Tegmina, with at least one-third suffused with fuliginous or yellowish-fuliginous.

12(13). Basal and apical thirds of the tegmina fuliginous, middle third hyaline. [Rarely the tegimna are partly hyaline apically, cf. F. H., Pl. 4, f. 8.] OAHU, (Koolau and Waianae ranges); MOLOKAI, (4000 ft.); HAWAII, (Olaa and Kohala Mountains).....5. **tarai** Kirkaldy.

13(12). Tegmina entirely dark fuliginous (sometimes a very little dilute). MOLOKAI, (4000 ft.); MAUI, (Haleakala, 5000 ft.). F. H., 123, Pl. 4, f. 9.....6. **morai** Kirkaldy.

14(11). Tegmina only dark (if at all) on veins, though sometimes partly tinged with yellowish.

15(18). Mesonotum pale castaneous; veins on basal two-thirds of tegmina pale.

16(17). Veins on basal ⅔ minutely, but distinctly granulated with brown. Differs from **koanoa** by the longer and narrower tegmina and pale mesonotum. Length, 6 mill. OAHU, (Koolau ranges, all over); HAWAII, (Kilauea, on tree-ferns; ferns; and **Freycinetia**).....7. kaonohi, sp. nov.

17(16). Veins on basal ⅔ not, or very obsolete, granulated; otherwise like **kaonohi.** HAWAII, (Naalehu, on fern, O. H. S.).....8. **filicicola,** sp. nov.

18(15). Mesonotum black. [In some examples, the keels are dark castaneous].

19(24). Veins on basal ⅔, black, or largely so.

20(23). Veins partly pale.

21(22). Tegmina shorter and broader. Length, 6 mill. OAHU, (Konahuanui, O. H. S.).....9. **procellaris,** sp. nov.

(3). "F. H."=Fauna Hawaiiensis, III. The "length" is taken from apex of vertex to apex of closed tegmina.

22(21). Tegmina elongate. Length, 8½ mill. KAUAI, (2000-3000 ft.).....10. **pluvialis**, sp. nov.

23(20). Veins black, or at least the median brachial, and apical ones). Length, 7 mill. KAUAI, (Halemanu, 4000 ft.).....11. **nubigenus**, sp. nov.

24(19). Veins on basal ⅔ pale, sometimes with dark granules.

25(28). Costal margins of tegmina more parallel.

26(27). Exterior keels of mesonotum subparallel with the interior pair. Length, 5 mill. OAHU, (Konahuanui, O. H. S.).....12. **silvicola**, sp. nov.

27(26). Exterior keels of mesonotum straight, angulate basally. Length, 6-7 mill. HAWAII, (Kilauea and Olaa); MAUI, (Lahaina coast).....13. **montivagus**, sp. nov.

28(25). Costal margins of tegmina well rounded. Length, 7 mill. OAHU, (Kawailoa gulch); MOLOKAI, (400014500 ft.); HAWAII,)Hualalai, 5000 ft., Olaa, Kilauea). F. H., 120 and 124, Pl. 4, f. 11.....14. **koanoa** Kirkaldy.

29(10). Tegmina maculate.

30(33). Vertex truncate apically.

31(32). Mesonotal keels castaneous; tegmina scarcely more than twice longer than wide, hyaline, veins on basal ⅔ pale, granules pale brown, tegmina sparingly spotted with pale brown. Length, 5 mill. OAHU, (Kaala, 3500 ft., on **Acacia koa**).....15. **acaciae**, sp. nov.

32(31). Mesonotal keels black. Tegminal veins almost entirely black! clavus with 3 black spots, rest of tegmen spotted with yellow fuliginous. Length, 9 mill. MAUI, (Haleakala, 5000 ft.).....16. **haleakalae**, sp. nov.

33(30). Vertex rounded or subangular apically.

34(35). Costal margins pale brown; tegminal veins particolored on basal half; tegmina scarcely more than twice as long as broad, on basal half; tegmina scarcely more than twice as long as broad. Length, 6 mill. MAUI, (Haleakala, 5000 ft.).....17. **monticola**, sp. nov.

35(34). Tegmina about 2½ times as long as broad; costal margins black and white alternately (also radial, etc.) Length 8 mill. OAHU, (Tantalus).....18. **kaohinani**, sp. nov.

36(9). Females.

37(42). Tegmina more or less fuliginous, or at least strongly yellowish; not speckled.

38(441. Mesonotum at least dark castaneous, generally blackish.

39(40). Tegmina dark fuliginous, except a small part of the costal area.....6. **morai** Kirkaldy.

41(38). Mesonotum pale castaneous; tegmina varying from yellowish to dark fuliginous.....13. **montivagus**, sp. nov., and 7. **kaonohi**, sp. nov.*

42(37). Tegmina not fuliginous, or only spottedly so.

43(50). Tegmina immaculate.

44(47). Length not less than 7 mill.

45(46). Veins on basal ⅔ of tegmina pale brown, granules dark. KAUAI, (4000 ft.).....19. **silvestris**, sp. nov.

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* At Kilauea (of Hawaii) there is a similarly coloured form, 7½ mill, long; vertex shorter and broader, of which I do not know the male. It may be called var. **volcanicola** nov. (of **kaonohi**).

46(45). Veins on basal ⅔ alternately dark and pale; HAWAII, (Kilauea)*.....20. **pele,** sp. nov.

47(44). Length not more than 6 mill.

48(49). Cross veins on tegmina near the apex not suffused.....14. **koanoa** Kirkaldy.

49(48). Cross veins suffused. KAUAI, (2000-3000 ft. and Makaweli, 2000 ft.).....21. **kauaiensis,** sp. nov.

50(43). Tegmina maculate.

51(52). Length less than 6½ mill. Vertex truncate apically, broad and short. HAWAII, (Kilauea), F. H., 120 and 122, Pl. 4, f. 7. .....22. **puna** Kirkaldy.

52(51). Length more than 7 mill.

53(56). Apical third of tegmina not spotted.

54(55). Tegminal veins particoloured. MOLOKAI, (4000 ft.); KAUAI, (Halemanu, 4000 ft.); HAWAII, (Kona, 4000 ft.).....20. **pele,** var?

55(54). Tegminal veins black.

56(53). Apical third of tegmina more or less spotted, or at least some of the apical veins strongly suffused.

57(58).

(a). Face black, lateral margins narrowly castaneous, a pale wedge at the base of the clypeus laterally; vertex scarcely extending beyond the eyes, broad, lateral margins converging towards the apex which is slightly rounded; about twice as broad at base as at apex, and about ¼ longer than wide at base. Tegmina hyaline, heavily spotted, at least 4 black spots on the costal area; veins on the basal ⅔ of tegmen particiloured. Sterna, abdomen, femora, etc., mostly dark piceous or blackish. Length, 10½ mill. MOLOKAI....23. **paludicola,** sp. nov.

(b). Face as in the last, but the pale area large vertex narrower, nearly twice as long as broad. Tegmina yellowish hyaline, veins black, except the radial which is partly white; apical third spotted. Underside, legs, etc., dull piceous. Length, 8¼ mill. HAWAII, (Hilo, 2000 ft.)..24, **nemoricola,** sp. nov.

(c). Face as in the last: vertex short and broad, much as in **paludicola.** Tegmina hyaline, tinged with yellow, slightly spotted, veins particoloured. Legs brownish-yellow. KAUAI, (4000 ft.). F. H., 120 and 124, Pl. 4, f. 10.....25. **orcno** Kirkaldy.

[var. **molokaiensis** has tegmina not yellowish more heavily spotted; face blackish. MOLOKAI.]

[var. **oahuensis** is like **molokaiensis,** but the tegmina are obliquely banded, the pale area on the face larger than in the type. OAHU, Koolau range].

(d). Vertex narrow, longer, slightly wider basally than apically. Tegmina not strongly spotted, sometimes scarcely so apically, with yellowish fuliginous transverse stripes (sometimes little apparent). Legs yellowish.....8. **kaohinani,** sp. nov.

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* Perhaps also from OAHU, (Waianae, 3000 ft.)) MAUI, (Kipahulu, O. H. S., and Haleakala, 5000 ft.).

I have to thank Mr. W. M. Giffard for the generous gift of his collections, and Messrs. O. H. Swezey and F. W. Terry for allowing me the loan of their specimens for examination. The foundation of this paper has been the balance of the collections made by Dr. Perkins for the "Sandwich Islands Committee."

The following new forms have been described in this paper:

Iolania perkinsi var. *notata.*

Oliarus *kahavalu, kaonohi, filicicola, procellaris, pluvialis, nubigenus, silvicola, montivagus, acaciae, haleakalae, monticola, kaohinani, silvestris, pele, kauaiensis, paludicola, nemoricola,* spp., and kaonohi var. *volcanicola;* and orono var. *molokaiensis* and *oahuensis.*

On a new Derbid Homopteron from New Zealand and Notes on other Hemiptera.

BY G. W. KIRKALDY.

The genus *Cenchrea* was described by Westwood, as a sub genus of *Derbe* (1841 Ann. Mag. Hist., vi, 479; and 1842 T. Linn. Soc., London, xix, 15), with a single species, *dorsalis,* from St. Vincent in the Lesser Antilles. Since then, Uhler has described *exquisita* from the same Island (1895, P. Z. S., London), and Ball has added *uhleri* and *heidemanni* from the United States (1902, Can. Ent., 261).

As the only genus of Derbidae that was known to inhabit both New and Old Worlds, is *Lamenia* Stål (which has 9 species in America, one in Tahiti—a possibly wrong habitat however—2 in Queensland, and one in Larat of the Malay Archipelago), I was surprised to find among some Maorian Hemiptera sent me by my friends Mr. A. Hamilton (Director of the Dominion Museum) and Mr. G. Howes (Govt. Entomologist), from Wellington, two examples of a species of this genus. It must be noted, however, that it is very probably not endemic there.

In his figure of *C. dorsalis,* (1842 Trans cit., Pl. 19, f. 8), Westwood has evidently incorrectly represented the pronotum, which he has shown as having a truncate basal margin; a character found in no Derbid, in which family it is always emarginate, very often deeply so.

C. maorica, sp. nov.

The type example is pale yellowish-brown, the frons having a large inverted fuscous Y, the clypeus also partly suffused with the same tint. The tegmina are bronzy yellow, the costal area and the greater

part of the apical third blackish, the latter so suffused as to make apparent 3 bronzy-yellowish spots, one at each corner of the rough triangle. The veins are partly (and probably very varyingly) orange-brown, and there are several small yellow spots scattered over the tegmen. Wings fuliginous. Legs pale yellow. Abdomen black, the incisures sanguineous. The scutellum has 3 paler longitudinal lines. The other specimen is probably not quite mature, the whole colouring being pale, the small spots on the tegmina whitish, and the veins concolorous with the ground colour.

The tegminal venation is very similar to that of **C. dorsalis,** but the brachial vein is forked much nearer to the base.

Length, 4 mill.; expanse of tegmina, 15 mill.

Hab. New Zealand, Wellington (Hamilton and Howes).

I have recently received from Mr. Hamilton, a specimen of the Homopteron *Siphanta acuta* from Auckland. This is, I believe, the first record of its occurrence in New Zealand. It is of course, not endemic, but immigrant (probably introduced with ornamental shrubs) from Australia.

In my recent "List of the Hemiptera of the Maorian Region" (1909, Trans. N. Z., Inst., xii, 22-9), I omitted *Poecilometis gravis* (Fabricius), a Halyine Cimicid. This was described in 1781 from New Zealand, but has since been found in New South Wales. As this genus of 12 species is entirely Australian, and *gravis* has never been found since in New Zealand, it is probable that the latter habitat was incorrect in the first place.

In the same list, "syn." between 14 and 15 should be deleted; there should be a "*h*" before the second "*cnicocephalus*" on line 29 of p. 26 ;and on p. 28, line 9 from botton, "specimens" should be "species."

MAY 6th, 1909.

The 51st regular meeting of the Society was held in the usual place.

Mr. Giffard exhibited specimens of a stylops (*Elenchus* sp.), and leaf-hoppers (*Nesosydne ipomoeicola* Kirk.) from which they had bred. The leaf-hoppers were collected by him on Tantalus, and the stylops bred out in Jan. and Feb., 1906.

Mr. Giffard also wished to record the finding recently of *Orthezia insignis* infesting a *Clermontia* bush on Schmidt's Ridge, Tantalus.

JUNE 3rd, 1909.

The fifty-second regular meeting was held in the usual place.

PAPERS READ.

Notes on the Hemipterous genus *Oechalia*.

BY G. W. KIRKALDY.

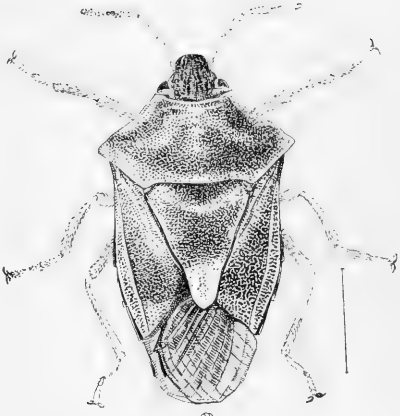
The genus *Oechalia* is a typical Cimicine, restricted to Australia, New Zealand and the Hawaiian Islands. It may be divided into two subgenera, the typical, containing only *O. consocialis*, from Australia and New Zealand, and *Hawaiicola* (nov.) with *grisea* (the type) and *kaonohi*, sp. nov., confined to these islands, the prosternum (1) in these two last having a little lobe on each side in front.

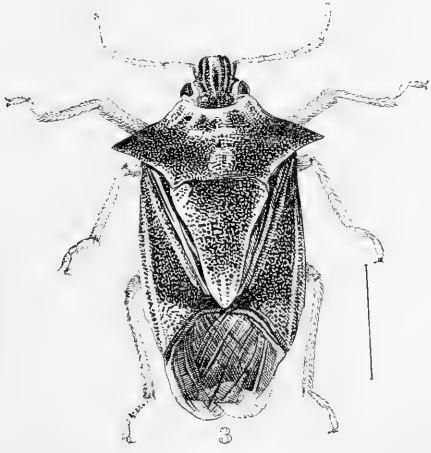
The australo-maorian *consocialis* is, like the hawaiian *grisea*, exceedingly variable in colour; in all the few specimens that I have seen, the pronotal angles are acute and prominent, perhaps a little more so than in any *grisea*. The male pygophor is very similar to that of the other species, but I have only one male which is perhaps not quite mature.

O. consocialis is carnivorous. Bergroth cites a correspondent as authority that it "se nourrit des cadavres de divers animaux" (1891, Rev. Ent., x, 202). Froggatt states that it feels on larvae of the Lepidopteron *Phalaenides* (*Agarista*) *glycine*, which it finds on Vines, etc., and of the Coleopteron *Galerucella semipullata* which defoliates garden Fig-trees, ornamental trees, etc. "On a warm summer day, where the caterpillars are plentiful on the Vines, these bugs may be observed running about with the remains of a caterpillar hanging on their beak, or else quietly at work sucking up the juice of a freshly attacked victim" (1902, Agr. Gaz., N. S. Wales, 321). This carnivorous habit is well known in the Cimicinae, and I have only recently received some nymphs of the closely allied New Zealand species *Cermatulus nasalis* with caterpillars of *Asaphodes megaspilata* (on *Leptospermum scoparium*), attached to their beaks, from my friend Mr. George Howes of Wellington.

O. consocialis (also known as *schellembergii*)is apparently well distributed over Australia and Tasmania, as well as New Zealand. The record from the Philippines is probably erroneous.

(1) Schouteden, (1907), Gen. Ins., LII, 75, incorrectly says "pronotum."





Kirkaldy—On the genus *Oechalia*.

1. *O. kaonohi*. 2. *O. grisea*.
3. *O. grisea* var. *pacifica*.

The subgenus *Hawaiicola* now contains at least two species: whether the new one now described is the "new species" of my paper of the Proc. Haw. E. S., I, 141, I do not know. As yet, I have seen only a single male taken at Naalehu, Hawaii, by Mr. Swezey, in a sugar-cane field.

Stal's two species, *Arma patruelis* and *pacifica* evidently refer to the two forms of *O. grisea, pacifica* being the same as typical *grisea.*

The following table will distinguish these three species:

1(2). Prosternum simple; abdominal basal spine of the urosternites rather short, scarcely extending beyond the hind coxae; male pygophor pale, with pale styles.....[Oechalia typical] **consociatis** Boisduval.

2(1). Prosternum lobulate in front on each side; urosternital spine reaching well beyond the middle coxae or nearly to the fore coxae.....[subg. **Hawaiicola,** nov.]

3(4). Broader form, pronotum very distinctly transverse; urosternital spine shorter. Male styles blackish; posterolateral spinelet on 7th urosternite more distinct. 2. **grisea** Burmeister.

(a). Pronotal spines blunt=**grisea** typical.

(b). Pronotal acute, prominent=var. **patruelis.**

4(3). Longer and narrower form, pronotum scarcely transverse, urosternital spine longer, male styles pale; posterolateral spinelet on 7th urosternite scarcely distinct. 3. **kaonohi,** sp. nov.

Oechalia kaonohi, sp. nov.

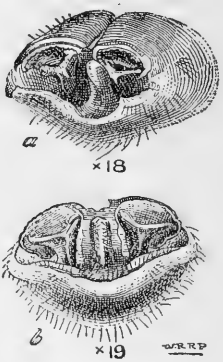
Male very similar to **grisea,** but as may be seen from the dimensions, much longer and at the same time narrower. Both head and anterior part of pronotum are distinctly less declivous and the head is distinctly longer. In typical **grisea** the proportion of the length of the pronotum to its width is 2:1, while in **kaonohi** it is 2⅔:1.

The pronotal angles are roundedly obtuse and scarcely prominent. As stated in the table, the abdominal spine is distinctly shorter and the 7th urosternite is scarcely spinose laterally. The male pygophor is pale and the papillae on the semicircular plate are less in number, while the crenulations on the ventral margin of the same are less in number and feebler. The colouring is similar to that of light-coloured **grisea,** and the new species will be found, probably, to vary like the latter.

Length, 12 mill., breadth between lateral angles of pronotum, 4½ mill.

Hab. Hawaii, Naalehu, and other places.

In no way is typical *grisca* a link between its var. *patruelis* and *kaonohi*, as apart from the development of the pronotal spines, the first two are identical in form.



(*a*) *Oechalia grisea*, male pygophor;
(*b*) *O. kaonohi*, the same.

N. B.—In both, the ventral surface of the pygophor is uppermost.

I have not seen any females of *kaonohi*, but that of *grisea* is sufficiently distinct from *consocialis*, its 7th urosternite being more deeply emarginate apically, and the apilolateral plate of the pygophor is distinctly longer and more prominent.

Note on the Synonomy of two Hawaiian Beetles.

BY G. W. KIRKALDY.

In Mr. Champion's notice in the Ent. Mo. Mag (2), xx, 103-4, (May, 1909), "Notes on Cossonidae," it is stated that the beetle *Thalattodora insignis* Perkins (1900) found in a log on the beach at Kauai [Kanai! Champion] is a synonym of *Dryotribus mimeticus* Horn, 1873, from South Florida. This beetle is also recorded from N. W. Australia; "Nyew-tew" Isl., China; by Champion (Ent. Mo. Mag., (2), xx, 123, June, 1909). The Australian examples "were found under driftwood on a sandy beach." In the latter paper, Champion also synonymizes *Haloxenus Perkins*, (1900), from Molokai and Lanai, with the Floridan *Macrancylus* Leconte (1876).

Notes on *Hypocala andremona* and *Hypocala velans* [Lep.].

BY OTTO H. SWEZEY.

[Specimens exhibited].

As reported on page 6, Vol. II of the Proceedings of the Hawaiian Entomological Society, Mr. G. P. Wilder discovered the caterpillars of *Hypocala andremona* on a tree in his yard. At the time the tree was supposed to be a Sapota, but it could not be determined with certainty as the tree had never borne fruit. Recently Mr. Wilder has informed me that this tree has borne fruit, and it proves to be Sapota.

On a trip up Niu ridge by several of the members of our Society, May 16, 1909, caterpillars of this same species of moth were discovered feeding quite numerously on Hawaiian ebony trees (*Maba sandwicensis*). They showed the same variation in coloration as those which infested Mr. Wilder's Sapota tree. Among them were a few that were slightly different and not so slender as the others, these on rearing proved to be *H. velans*.

May 31, on a trip into the Koolau Range above Wahiawa, I again found caterpillars of *H. velans* feeding on an ebony tree. The caterpillars of this moth were heretofore unknown; now its native food plant is made known as well as that of *H. andremona*.

I now present descriptions of larva and pupa of each.

Hypocala andremona Cramer.

Full-grown larva is about 45 mm.; cylindrical, slightly narrowed in front of 5th segment.

Green form—Nearly uniform bright green with a yellowish tinge, more yellowish on dorsum of 5th segment. A pale yellow subdorsal line and a pale yellow line just below spiracles; three crinkled faint lines between these two, a similar line on each side of dorsal vessel; spiracles white, black margined, a black spot above and enclosing the upper part of each, often a forward projection from the upper part of the spot, more particularly on the spot above the posterior spiracle. Tubercles concolorous, inconspicuous; hairs slender; 12th segment slightly enlarged dorsally. Head concolorous, with two vertical black bars in front very wide apart. The black spots on the spiracles are larger in different specimens, varying till in some there is a continuous stripe enclosing the spiracles, pinkish on the lower part. The caterpillar turns rosy dorsally when about ready to pupate.

An intermediate form has head mostly black, and much blackish mottling on dorsal part; cervical shield mostly black-marked; the black spiracular stripe incomplete.

Another intermediate form has a complete subdorsal black stripe, spiracular stripe incomplete, several fine much-interrupted black lines between these two stripes; an interrupted subspiracular black stripe; a few short black lines on dorsum of segments 2 to 6; conspicuous yellowish-white transverse dorsal mark on segment 5; head blackish on periphery, or nearly all blackish.

Black form—Almost entirely black, less intense below; head entirely black; a white line each side of dorsal vessel, a subdorsal white line and a fainter line between it and the preceeding; several crinkled white lines on sides; more or less whitish or pinkish between segments on line of spiracles, large white patch below spiracle making an interrupted white subspiracular stripe; spiracles white; two subdorsal white spots on segment 5, often pinkish; segment 12 slightly enlarged dorsally and some whitish or pinkish on this enlargement. Two specimens had orange-yellow on middle of cervical shield, on 5th segment and on hump of 12th segment.

Pupa—22 mm.; medium dark brown; wing- antenna- and leg-cases terminate roundly on apex of 4th abdominal segment; incisures between segments 4-7 movable; fine punctures scattered over surface of abdomen above and below, more numerous at base of segments; spiracles situated in smooth oval darker areas; cremaster inconspicuous, with four slightly diverging, ventrally curved, hooked spines, the two inner ones larger.

Pupation takes place in a cell in the soil, or beneath trash on the surface. The cell is supplied with a few fibers of silk. The pupal period 13-17 days.

Hypocalæ velans Walker.

Full-grown caterpillar—40 mm.; shorter and thicker than *andremona*; of a fuscous-brown color which is nearly uniform, but on close examination is found to be made up of dark fuscous or black with numerous crinkled longitudinal lines of a lavender color; two distinct lines border the dorsal vessel and have outward angulations in the segments; just at inner margin of tubercle i in segments 5-11 is a small black spot, a larger spot in front of tubercle ii in segments 7-10; a spot of yellow and lavender mixed lies outwards from tubercle i in segments 5 and 12; a pale yellowish spiracular line; tubercles pale lavender with a black dot at base of setae; spiracles oval, very pale yellowish with black margin; cervical shield has a black longitudinal subdorsal band on each side; head mostly black, a few pale lavender spots in front and on upper part, paraclypeus pale, with two black spots.

Two specimens were light green with the lines which were lavender in the other specimens white instead; spiracular stripe

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 Hawaiiensis" 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 larvae and pupae 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.

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VOL. II, NO. 3. MAY 1910.

PROCEEDINGS

OF THE

HAWAIIAN ENTOMOLOGICAL SOCIETY

FOR

July—December 1909

(with 2 Plates.)

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* Resigned in April.

** To fill vacancy.

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All correspondence to be addressed to the Secretary, at the Bureau of Agriculture and Forestry, Honolulu, Hawaii, from whom copies of the Proceedings may be purchased.

Volume I of the Proceedings, for 1905-07 (in 5 numbers), contains 210 pages, 4 plates, and 5 text figures. Price of the complete volume $2.00. Volume II, No. 1, contains 35 pages, 1 cut and one portrait. Volume II, No. 2, contains 53 pages, 2 plates and 3 cuts. Price of any single number 50 cents.

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(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 "naico" 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

*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 Hawaiiensis 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.

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 nidas* 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 *Pseudolus 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 Olaa, 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 palé yellowish white; 7-8 mm.

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 Syritta 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'Oceanie, 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^1, lateral process of same; a^2, 2nd antennal segment; a^3, 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 sinuate ..... (II) OECOPHORIDAE.
5. Forewings with 7 and 8 usually stalked (coincident in *Batrachedra*, separate in *Plutella*)....(III) HYPONOMEUTIDAE.
   Forewings with 7 and 8 usually separate (coincident in *Ereunetis*, 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.. **Stoeberhinus.**
   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 ¾.....**Aristotelia.**
   Cell of hindwing little more than ½.....**Phthorimaea.**
5. ♂ with tuft of hair in costal fold of hindwing .....6.
   ♂ without above tuft .....7.
6. Antennae bipectinate .....**Ptychothrix.**
   Antennae filiform, pubescent .....**Thyrocopa.**

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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..... Stagmatophora.
    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.. ..... **Eccoptocera.**
Antennae of ♂ without above notch ..... 2.
2. Hindwings of ♂ with a strong glandular fold on the underside 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.**
5. Forewings with 7 to costa.....6.
   Forewings with 7 to termen.....8.
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.**

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 diophthalmus* from Australia, Amboina, Fiji, and New Caledonia.

3.—*Lampromicra leucocyanea* from Biara.

4.—*Poecilocoris druraei* 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. Antennae 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
REV. THOMAS BLACKBURN

Active.....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 mealybug 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 mealybug 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 *Syagrius fulvitarsis* 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 suboval 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 (*Magnifera 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[1]. Maskell's authority for this species[2] 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[3] 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[4] of *P. calceolariae* "adult female dull-pink in color, length variable, 1/8-1/4 in." Maxwell-Lefroy says[5] 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*[6] "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[7] "A moderately large insect, covered in mealy wax, the body of a gray or olivaceous color, legs

1 Rep't. Min. Inter., (1898), p. 107.
2 Fauna Haw. III., p. 103.
3 Proc. Acad. Nat.
4 Ins. Nox. Agr. N. Z., p. 100 (1887).
5 W. Ind. Bull. III., p. 264.
6 Scale Insects Lessrs. Ant. Pt. II., p. 24.
7 *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 *Psudococcus* 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 *sacchari*
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 *calceolariae*	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*[8] "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.

[8] *Loc. cit.*

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

BY OTTO H. SWEZEY.

The Waianae Mountains are much less accessible to us than the Koolau 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 *Homocosoma 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 inequalis,* and *Platyomus lividigaster,* all on *Pipturus;* 1 *Elaterid,* and 1 *Oodemas* sp.

Hemiptera—1 *Oechalia grisea;* 1 *Orthoea 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 Auchenorhynchi (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 *Prosbole* 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 pre 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!; *Archegocimex* 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 infuscate 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: 3⅞ 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: 2½ 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 triagular 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: ♂ 2½ mill.; ♀ 3½-4 mill.

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

Found on banana trash (Terry) and in borered 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"* clematitis 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 Hirudinid!

(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 Lepeletierian 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 Nabidae.

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 germationis*.

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. Landwirtschaftges. 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 Eugenie'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 cimicidae.

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—vermilion. 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. *Meneclas 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 THYREOCORIDAE.

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. coerulescans* 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 "nutgrass" (*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-

* 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, cocoanut, 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 aurilanatus,* 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

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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 gregarous feeding in the caterpillars. Perhaps there are none strictly gregarious, but some, as the cocoanut 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.

Caradrinidae.

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. pyrrhias* 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 *Euxolus*, *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. *Hypenodes 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. caryopis* 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 *caryopis,* 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 occuring 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 crippus Cram.—Feeds on milkweed (*Asclepias curassavica*). *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

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* *Calida*—"Polyphagus: *Metrosideros, Gardenia* and various shrubs; *wilsoni*—polyphagus: *Acacia koa, Metrosideros Bobea, 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.

Galleriadae.

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

Crambidae.

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.

Pyraustidae.

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 cocoanut 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); *Platyleuca* Meyr., and *chalcophanes* Meyr.—On *Touchardia latifolia;*

melasema 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 poistively identified, but may be *Bobea; pyranthes* Meyr.—On *Vaccinium penduliflorum.* I have also reared moths from caterpillars found on *Campylotheca, 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 *Campylotheca* 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 pyropa 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.

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.

Oecophoridae.

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.

Hyponomeutidae.

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.

Stagmatophora 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, *Bochmeria* 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. ckaha* 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. *Semnoprepia 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.

Carposinidae.

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 plymorpha*).

Tortricidae.

olethreutinae.

Eccoptocera foetorivorans (Butl.)—Larva spins together the leaves at the growing tip of twigs of *Metrosideros polymorpha;* also between guava leaves. *Crocidosema 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.

TORTRICINAE.

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 *Phyllanthus*. *Epagoge infaustana* Walsm. —Larva between leaves and boring in tips of twigs of *Pipturus*.

TINEIDAE.

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. bochmeriella* Sw. (MSS.)—Larva mines the leaves of *Bochmeria 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:

President	G. W. Kirkaldy
Vice-President	F. W. Terry
Secretary-Treasurer	D. B. Kuhns

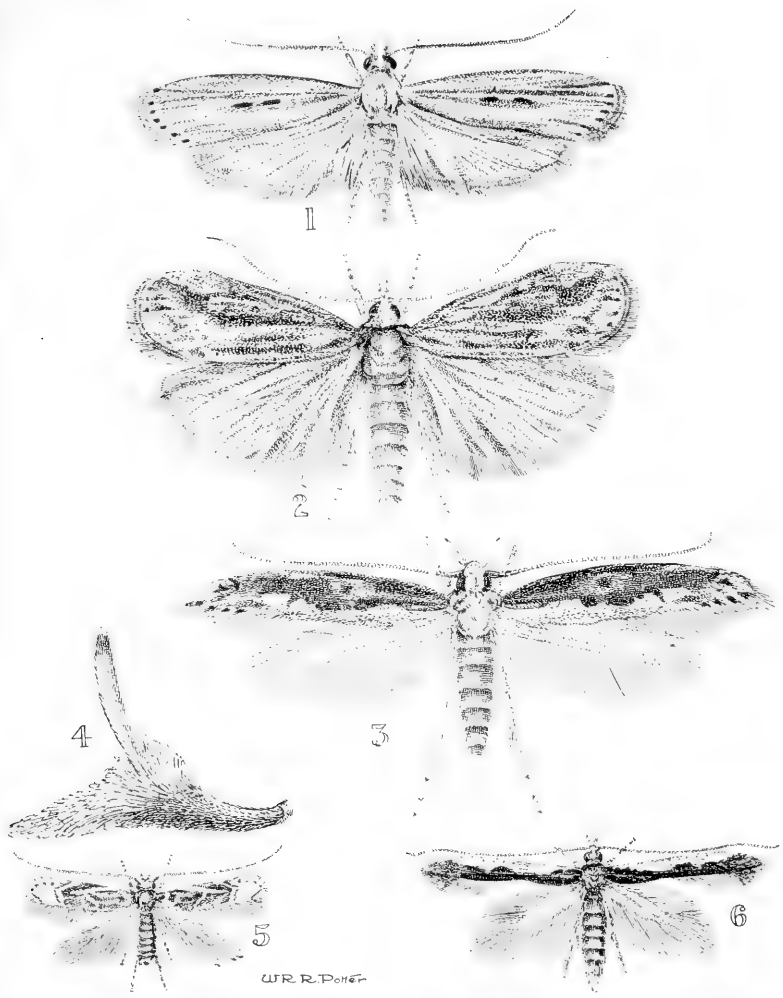
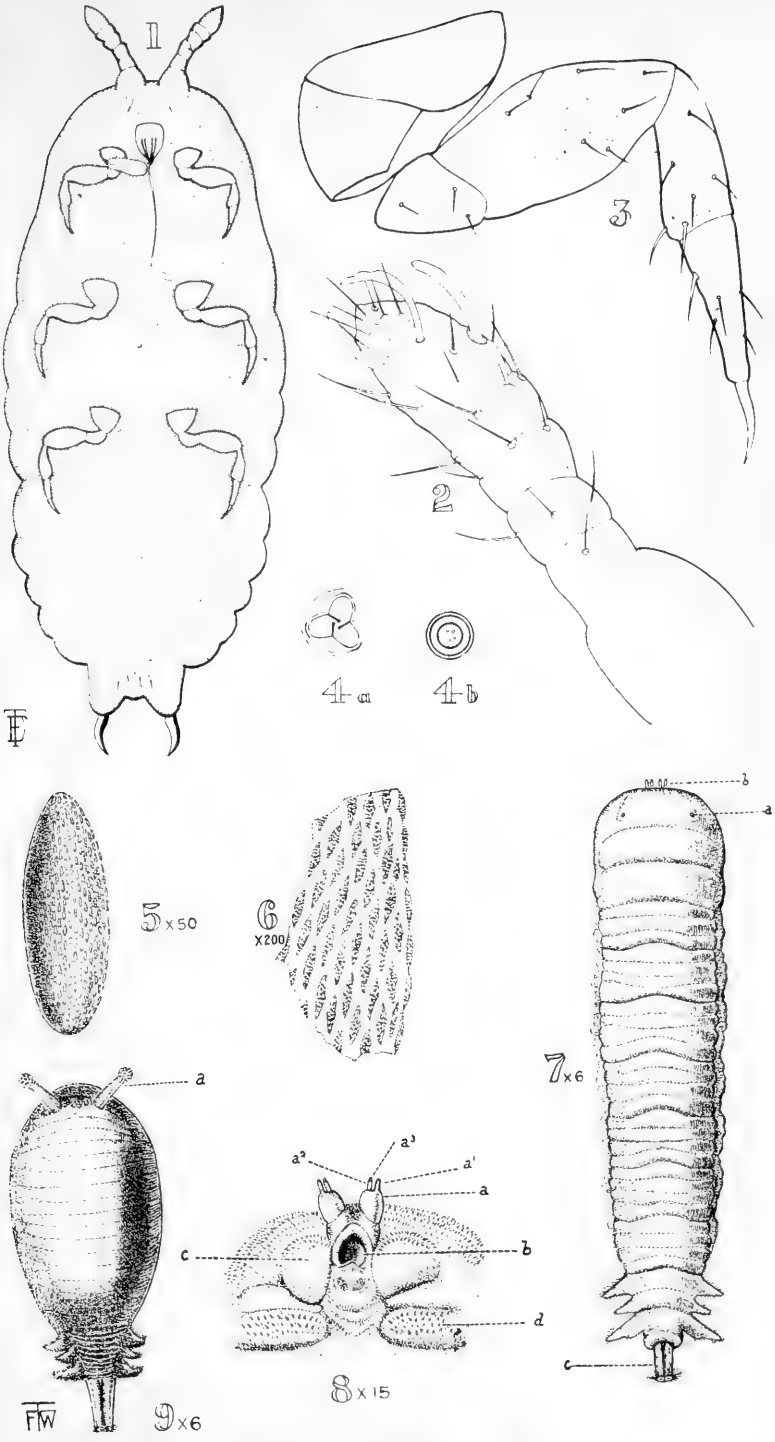


FIG. 1—*Genophantis leahi*, x5.
FIG. 2—*Scoparia lycopodiae*, x5.
FIG. 3—*Hyposmocoma ekaha*, x5.
FIG. 4—*Hyposmocoma ekaha*, labial palpus, highly enlarged.
FIG. 5—*Gracilaria hauicola*, x5.
FIG. 6—*Gracilaria mabaella*, x5.



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

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PARADISE OF THE PACIFIC PRINT, HONOLULU

VOL. II, No. 4 APRIL, 1912

PROCEEDINGS

OF THE

HAWAIIAN ENTOMOLOGICAL SOCIETY

FOR THE YEAR 1910.

(With one Plate.)

HONOLULU, HAWAII.
PRICE 50 CENTS.

OFFICERS FOR 1910.

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VICE-PRESIDENT.....F. W. TERRY
SECRETARY-TREASURER.....D. B. KUHNS
EDITOR OF PROCEEDINGS.....O. H. SWEZEY

*Deceased, Feb. 2, 1910.

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Wilder, G. P.

*Honorary members.

All correspondence should be addressed to the Secretary, Hawaiian Entomological Society, Experiment Station, H. S. P. A., Honolulu, Hawaii, from whom copies of the Proceedings may be purchased.

Volume I of the Proceedings, for 1905-07 (in five numbers), contains 210 pages, 4 plates and 5 text figures. Price of the complete volume, $2.00. Volume II, No. 1, contains 35 pages, 1 cut and 1 portrait. Volume II, No. 2, contains 53 pages, 2 plates and 3 cuts. Vol. II, No. 3, contains 57 pages and 2 plates. Price of any single number, 50 cents.

JANUARY 6TH, 1910.

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

Member elected .....L. Lewis

ENTOMOLOGICAL PROGRAM.

Mr. Swezey exhibited an ear of corn infested by the Angoumois grain moth and read the following notes thereon:

This moth, which is a bad pest on corn and wheat, occurring in Southern Europe, the southern part of United States, in Australia and India, has recently been reported in these islands. This infested ear of corn, which I am exhibiting, was recently sent to the Experiment Station, H. S. P. A., from Maui Agricultural Company's Plantation on Maui. This sugar plantation is lately planting more or less corn. From this sample sent (from which several moths have bred out since its receipt) it appears that this pest is well established there, though so far as I know, its presence has not previously come to the attention of any of the entomologists. The person sending this sample was under the impression that the injury was done by weevils, the rice weevil, *Calandra oryzae,* being also present in the corn infested by these moths.

This pest was no doubt introduced from Louisiana, as seed corn was obtained from there the previous year.*

Mr. Ehrhorn had also recently received a sample of corn infested with this pest, from the same district of Maui, with inquiries in regard to it.

Mr. Terry exhibited a specimen of the small roach, *Euthyrrhapha pacifica,* and one of its egg capsules from which the young had emerged. He called special attention to the fact that instead of emerging in the usual way for roaches the young of this species gnaw a hole through the capsule resembling that made by parasites, for which it might be mistaken.

The remainder of the time was taken up with general conversational entomological discussion.

*An investigation of the pest was made later on by Mr. Swezey. He found evidence of the pest having existed for quite a number of years in a corn-growing region of Kula, Maui, at an elevation of 4000-6000, on the slope of Mount Haleakala, where it usually did no appreciable damage unless the corn was stored too long after being gathered.—[Ed.]

FEBRUARY 3RD, 1910.

The sixtieth regular meeting of the Society was held in the usual place.

Vice President Terry read a very interesting letter from the Rev. Thos. Blackburn, and it was voted to incorporate it in the proceedings of the Society. He also informed the members of the death of Mr. G. W. Kirkaldy, and, upon motion of Mr. Ehrhorn that a committee of three be appointed by the chair, including the Chairman as a member, to draft proper resolutions on the death of Mr. Kirkaldy, he appointed Messrs. Ehrhorn and Fullaway on the committee.

Mr. Blackburn's Letter.

Rectory, Woodville, Adelaide, S. Australia,

December 13 1909.

D. B. Kuhns, Esq., Secretary Hawaiian Entomological Society:

Dear Sir:—I have to thank you for your letter of 12th ultimo, informing me that the Hawaiian Entomological Society has elected me an Honorary Member of the said Society, and in accepting that membership I beg you to assure the Society that I am very sensible of the distinguished honour I have received through its vote.

I have also to thank you for the receipt of a set of copies of the Proceedings, which I am reading with keen interest. I look upon my entomological work on the Hawaiian Islands as the most interesting work that has fallen to my lot in scientific pursuits, and my thoughts often go back to it with no little regret that it is ended. Had there been in my time such a band of scientific workers as now compose your Society it would of course have given no little additional zest to my exploration.

I notice in your Proceedngs occasional reference to the fact of there being species which have not been met with since my time—at any rate not in localities that were visited by me. It may perhaps be useful in view of the fact if I mention the locality which I found most prolific in Coleoptera at the time I was collecting on Oahu. The lapse of twenty-seven years has perhaps somewhat dulled my memory of the country and of the names of particular valleys, but I think I am right in say-

ing that I reached the locality referred to above by proceeding up the Pauoa Valley to its upper extremity, where it came upon something of the nature of an area of tableland, one part of which lying to one's right as one entered it from the Pauoa Valley overlooks the Manoa Valley. From somewhere in the region just above the Manoa Valley a narrow ridge runs up from this flat by folowing which I made my way with much difficulty, and after several attempts, to the summit, called Konahuanui, just above the Pali. That summit may very likely be easy to reach now, but in my time there was no distinct track, and I got over some difficult places only with the help of ropes. It was on the flat mentioned above and on the ridge leading up towards Konahuanui that I was most successful in collecting Oahuan Coleoptera—among other species: *Labetis, Clytarlus microgaster,* and some Elateridae occurred to me there—Goniorycti, etc., exceptionally numerous in lily-like plants high up on the ridge.

I see the Society does not keep a library. If it at any time should do so I shall be glad to send in my papers on Australian fauna as they come out, and meanwhile shall be glad if I can hear of any means by which I can serve the interests of the Society, with the proviso, however, that as I have had now for some years past scarcely any leisure time that I can give to scientific work, it is difficult for me to do anything that cannot be done in quite short time.

Once more thanking the Society for the honour it has conferred on me, I remain, dear sir,

Yours sincerely,

THOS. BLACKBURN.

PAPERS READ.

Mr. Terry exhibited specimens and read a note **'On a New Oahuan Trypetid,** *Tephritis dubautiae."**

A Few Notes on Coccidae.

BY E. M. EHRHORN.

I desire to record the error of identification of *Coccus mangiferae* as being found on imported Mangoes from India and

*Not available for publication.—[Ed.]

found at Moanalua, Oahu. On January 29 I visited Moanalua, and in company with Mr. MacIntyre, examined some of the Mango trees, one of which was badly infested with what MacIntyre said was that terrible Indian scale. When I looked at specimens through my pocket lense, I said to him that it was our common *Coccus acuminatus,* and I asked him if he were sure that it was the same scale which compelled them to fumigate when it was discovered, and he thought it was. On returning to the office I looked up the record and material, the latter consisted of two microscope slides, one marked *Coccus mangiferae,* Green on Mango leaves, Moanalua, and the other *Coccus mangiferae,* Green on Mango trees from Moanalua, at Dr. Baldwin's place, Honolulu, February 13, 1907, both determined by J. Kotinsky. Having in my collection specimens of *Coccus mangiferae* which Mr. E. E. Green sent me, I made microscope slide-mounts for comparison, and found that Mr. Kotinsky's identification was wrong and that he had mistaken *C. acuminatus* for *C. mangiferae.* The two species resemble each other very closely, but the microscope brings out the dark zone with numerous oval pores surrounding the anal plates of *C. mangiferae,* which is wanting in *C. acuminatus.* Also the antennae of *C. mangiferae* are eight jointed, while those of *C. acuminatus* only six or seven jointed; when six jointed the third is the longest and is as long as the terminal three together. This of course will remove the species from the list of Hawaiian Coccids as recorded in a paper read before this Society by Mr. Kotinsky on December 2, 1909.

On January 30, while collecting on the Pauoa trail, Messrs. Fullaway, Kuhns and Terry found a remarkable and interesting Coccid. Mr. Kuhns, who found the gall infested leaves, believing them to be those of a Psyllid, left his material on the trail, and when Mr. Terry followed a little later and saw the leaves on the trail thought they were galls of some Coccid, and packed them home. While examining material the next day he found that his supposed Coccid was in reality a Coccid, and he kindly turned the material over to me for study.

This is the first definite record of a gall Coccid found in the Hawaiian Islands, and there is no record in the checklist of Coccidae, although I find a mention of the occurrence of a gall Coccid here, in Bulletin 7, U. S. Bureau of Entomology, U. S. Dept. of Agric. 1897, p. 76, where Dr. L. O. Howard mentions

a strange gall-making Coccid, *Olliffiella cristicola* Ckll., and takes the opportunity to publish an illustration which was made several years before Cockerell described the insect from material received from Fort Grant, Arizona. It belongs to the Dactylopiinae just before *Eriococcus.* A group of sixteen species of gall-coccids is mentioned and all confined to Australia except one to Hawaii and one to Japan. I have not found any record of the Hawaiian species, and imagine that the record is from specimens in the collection of the Bureau. I have searched over all the literature at hand and have compared specimens as far as possible with every genus, and I have failed to find any genus into which to place it. The nearest being *Cissococcus,* Ckll., into which I shall temporarily place it adding a few features of the insect which do not correspond with the genus. Coccids living in coneshaped galls on leaves, body elongate oval, tapering caudad ending in a funnel shaped segment, in the center of which is the anal ring. Legs and antennae present and well formed. Antennae of seven joints. Caudal tubercles well developed forming part of the funnel shaped segment, simulating those of Lecaniinae. Larva Dactylopine with caudal tubercles well developed. Male winged with caudal tubercles bearing two long stout bristles and a stout spine.

Cissococcus? oahuensis n. sp.

Galls in clusters scattered on both sides of leaf, but usually upper surface preferred. Gall cone shaped, somewhat curved and constricted near leaf and varying more or less in shape. At times two or three will coalesce. Length about 3 mm and about 1 mm at widest point.

Female elongate oval tapering gradually caudad, about 1½ mm long by about 1 mm at caphalic end. Body of a dirty lemon color, covered slightly with white secretion. After boiling in caustic potash, derm becomes colorless, except the last abdominal segment and appendages, which remain light brown. Antennae 7 jointed, segmentation very distinct. Joint 7 longest, joints 1 and 2 subequal. Formula 7 (1.2) 4. 6. 3. 5.

Legs short and stout, with a few scattered hairs. Femur about ½ as broad as long, tarsus half as long as tibia, claw stout and sharply curved, digitules slender knobbed hairs. Last abdominal segment formed into a funnel, with the anal ring situated about the center. Anal tubercles resembling somewhat the anal plates of Lecanium, form part of the funnel and the derm of all is strongly

chitinous and has a scaly appearance. Caudal tubercles, each with two stout spines and one long bristle, situated near the inner margin. The margin of the funnel appears to have numerous fine, short spines.

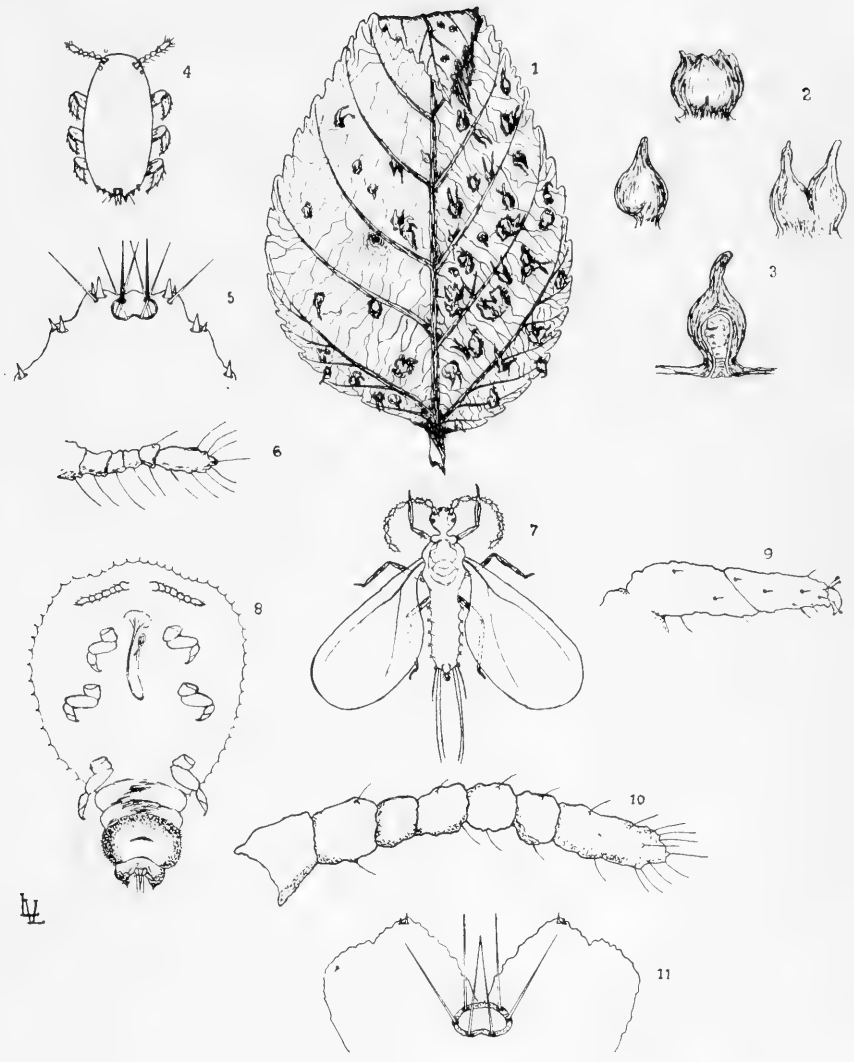
Female viviparous. Young larva resembling *Pseudococcus*. Anal tubercles, with two stout spines and one long hair, which is longer than those of anal ring. Margin of abdomen beset with slender spines, which are more pronounced towards caudal end. Antennae 6 jointed, of which 6 is the longest and 3, 4 and 5 are subequal; joint 1 is broader than long. Each joint bears several fine long hairs and joint 6 ends with numerous hairs. The male is of ordinary type, with caudal tubercles well formed and bearing each two long setae, which are about half as long as the antennae. These are ten jointed, with 2 and 3 longest and subequal. Joint 1 is about as broad as long, the rest of the joints are subequal and all joints quite hairy. Legs are long and slender, quite hairy. Tibia a trifle longer than femur and about 3 times as long as tarsus. Claw long, straight and slender.

Hab. on leaves of *Urera sandwichensis* (*Opuhe*). Pauoa trail, Tantalus, Oahu, Hawaiian Islands.

Explanation of Plate 5.

Cissococcus? oahuensis n. sp.

1. Leaf showing galls in situ.
2. Galls, different aspects.
3. Gall cut open showing adult female.
4. Larva.
5. Caudal end of body of larva.
6. Antenna of larva.
7. Adult male.
8. Adult female.
9. Tibia, tarsus and claw of female.
10. Antenna of adult female.
11. Anal lobes and ring of adult female.



Cissococcus (?) oahuensis.

MARCH 3RD, 1910.

The sixty-first regular meeting of the Society was held in the usual place.

The following resolutions on the death of Mr. Kirkaldy were presented by the committee appointed at the previous meeting:

Resolved, That this Society desires to record its deep sorrow and keen sense of loss experienced through the untimely death of Mr. G. W. Kirkaldy, its late President and one of its most enthusiastic members.

The deceased was in his 37th year, and his unexpected demise was the result of an unfortunate riding accident involving a broken leg, some five years ago. Repeated local operations were unsuccessful and whilst enjoying a brief vacation in San Francisco last January Mr. Kirkaldy decided to undergo another operation; at first everything seemed satisfactory, but soon gangrene developed, proving fatal on February 2.

Mr. Kirkaldy was born in London of Scotch parentage, and while still a boy he exhibited a keen love for natural history. He was educated at the City of London School, and contrary to his tastes he entered a shipping firm. During this most uncongenial period he assiduously occupied his spare time with entomology, finally concentrating his attention upon aquatic Hemiptera, publishing his first paper, "A Revision of the Notonectidae," in 1897. Two years later he commenced the working out of the Hemipterous portion of the zoological material collected by Dr. R. C. L. Perkins in the Hawaiian Islands. The results of which are published as the "Fauna Hawaiiensis." In 1903 the Hawaiian Sugar Planters' cane crop was menaced by a recently introduced Fulgorid, which had acquired most formidable proportions, and it was in conjunction with these studies of the native fauna that an examination of this insect resulted in its proving new to science, and its consequent fixation in entomological nomenclature as *Perkinsiella saccharicida* Kirkaldy.

In the summer of 1903 the deceased was engaged as assistant entomologist conjointly by the Hawaiian Territorial Board of Agriculture and Forestry and the Hawaiian Sugar Planters' Association. Later continuing his studies upon the hemipterous material (especially Fulgoridae), collected by the traveling entomologists of the Association during their quest for beneficial

insects, the results being published in various bulletins issued by the Association.

For some years Mr. Kirkaldy had devoted much attention to bibliography, many of his numerous papers being emendations in nomenclature. A staunch supporter of nomenclatorial "priority," he frequently became involved in polemics with coworkers of opposite views. Although considered by some an extremist in this respect, he was supported by many leading entomologists, and his views were undoubtedly logical, although perhaps appearing heterdox to th eentomological classicist. At the time of his death he was engaged upon a "Catalogue of the Hemiptera," which was to have embraced the whole order, and would have occupied him many years. This catalogue was to have been in many respects unique, and much more exhaustive than the usual type. Unfortunately only Volume I (*Cimicidae*) is published, and it is understood that only a portion of Volume II is complete. It is sad to realize that he did not live to see even the beginning of this, his life-work.

A "Natural History of the Hemiptera" was also planned for future publication. A voluminous writer and wide reader, a staunch friend and genial companion, he was always ready to give others the benefit of his wide bibliographical knowledge, and his untimely demise is greatly to be deplored, not only as a severe loss to Hemipterology, but his optimistic and kindly personality will be greatly missed by his friends and colleagues. He was a fellow of the Entomological Society, London, since 1893, a member of the American Association of Economic Entomologists, and several other entomological societies, and was for several years associated as a sub-editor with the "London Entomologist."

In expressing our keen realization of a great loss we desire to extend our sympathy to the widow and relatives who must still more deeply feel their heavy bereavement.

The deceased leaves a widow, little daughter and aged mother to mourn his loss.

(S) F. W. TERRY,
E. M. EHRHORN,
D. T. FULLAWAY.
Committee.

Mr. Ehrhorn moved, seconded by Mr. Giffard, that the resolutions be spread upon the minutes of the Society and a copy sent to the family.

ENTOMOLOGICAL PROGRAM.

Insects Associated with "Mamake" (Pipturus albidus), a Native Hawaiian Tree.

BY OTTO H. SWEZEY.

Among the native trees and plants of the Hawaiian Islands, the scientific observer notices when on excursions to the mountain forests, that there are some species very little or not at all attacked by insects; while on the other hand, other species are very badly attacked by them. If the scientific observer be an entomological collector he soon gets to know which trees or plants are good for collecting and which ones it is not worth while trying to collect insects from. The "mamake" tree is one of the species which are very much attacked by insects. It seems to be a special favorite for quite a large number of insects; there being quite a few species even that are exclusively (or nearly so) attached to it.

During the past two or three years I have taken records and notes on insects found on "mamake," in my collecting trips to the mountains, and I think that it is quite desirable that my notes should be published. My observations have been mostly on Oahu; but to a slight extent on Maui, Hawaii and Kauai also. I have embodied in this, notes and records contributed by Mr. W. M. Giffard on Coleoptera that he has collected and reared from "mamake."

I have found this a very interesting line of entomological research, and would earnestly advise other members of the Society to take up something similar in connection with their collecting trips.

I have first treated of the insects according to their Orders beginning with the Lepidoptera, the work of which is the most conspicuous to the casual observer. Then following are lists with respect to the part of tree attacked, predators, parasites, etc.

Lepidoptera.

FAMILY NYMPHALIDAE.

Vanessa tammeamea Esch.—This is the large native butterfly. Its larvae are large, green, spiny caterpillars which feed

upon the leaves. In younger stages they are blackish with white markings and sometimes mauve as well. Frequently a full-grown caterpillar of the mauve coloration is found. When the larva is quite small it cuts into the edge of a leaf and folds over the partially detached portion to form a "retreat" or hiding place. As it grows, successively larger "retreats" are formed. In searching for caterpillars they may be readily located by looking for these "retreats"; but the full-grown caterpillar is not always found in a "retreat." It is readily seen, however, by its size. This insect is almost exclusively attached to "mamake," but its caterpillars are occasionally found feeding on a few of the related trees, as *Neraudia* and *Boehmeria*.

Scotorythra rara (Butl.)—The larvae of this moth are of the usual "measuring worm" type. They are variegated with various shades of grey, brown and often green. Besides feeding on the leaves of "mamake" they also feed on the leaves of koa, guava, tree ferns, *Straussia, Cyrtandra, Pelea,* and probably many other native trees. They are often so numerous as to cause considerable defoliation.

FAMILY PLUSIADAE.

Plusia chalcites Esp.—This moth has a large green larva which crawls by a looping motion, but has one more pair of abdominal prolegs than the ordinary measuring worm. They have no particular food-plant, but feed on many cultivated plants and trees, also weeds, and many of the native trees and plants. They are often found feeding on the leaves of "mamake."

FAMILY PYRAUSTIDAE.

Phlyctaenia stellata (Butl.)—The pale whitish-green larvae of this Pyralid, when small, feed singly on the underside of the leaves, often in a groove or unevenness of the surface, or beside a rib, and protected by a web. When larger a fold is made in the leaf and sufficiently covered for protection with white silk. The larvae feed chiefly on leaves of "mamake," but I have occasionally found one on one or two closely related trees.

FAMILY GELECHIIDAE.

Thyrocopa abusa Walsm.—The larvae of this moth feed on dead twigs and vines, eating off the bark and burrowing inside

as well. They burrow in the pith of some plants, even in living plants to some extent. I have found them on recently dead branches of "mamake." They are brownish and well protected by silken tunnels.

FAMILY HYPONOMEUTIDAE.

Hyposmocoma chilonella Walsm.—This variable species has a long slender whitish larva which bores in dead branches of "mamake." Probably they are to be found in other trees as well, but all that I have reared were from "mamake," though I have often found similar larvae in dead branches of many kinds of trees. This species is remarkable for the fact that the larval habit is different from others of the genus, it being a wood-borer and without a case; whereas, the larvae which are known of this Hawaiian genus with 177 species, live in cases, each peculiar to the species.

Hyposmocoma sp.—I have found the larval cases of some species which I was unable to rear, inside burrows of other insects in dead branches of "mamake."

FAMILY TORTRICIDAE.

Archips postvittanus (Walk.)

Amorbia emigratella Busck.—The green larvae of these two yellowish introduced Tortricids are leaf-folders or leaf-rollers on many kinds of plants and shrubs. I have found them on "mamake."

Epagoge infaustana Walsm.—This is a native Tortricid whose greenish larvae feed in the tips of growing shoots of "mamake"; also in folded leaves or between fastened-together leaves. I do not know of their feeding on any other plant.

FAMILY TINEIDAE.

Opogona aurisquamosa (Butl.)—Larvae of this Tineid I have often found in decaying branches of "mamake" and beneath dead bark. They are rather general scavengers, feeding among dead leaves and in dead branches of many kinds of plants. They are often abundant in dead sugar cane and that which has been much eaten by the cane borer.

Ereunetis minuscula (Butl.)—Larvae of this Tineid have somewhat similar habits to the preceding species, though

usually to be found in drier situations. I have found them in dead and decaying branches of "mamake."

Philodoria micropetala Walsm.—This pretty little leaf-miner is very abundant on "mamake," and I think peculiar to it. I have often counted over 100 of their mines per leaf.

Coleoptera.*

family cerambycidae.

Sub-family Cerambycini. Group Plagithmysides.

Plagithmysus lamarkianus P.—Males and females taken in situ at 4000 feet elevation, Kilauea, Hawaii. Not uncommon.

Callithmysus kobelei P.—Taken in situ on Tantalus, Oahu, at 1800 feet elevation. Both sexes in numbers bred from dying and wholly dead limbs gathered in same locality at 2000 feet elevation. Not at all common.

family curculionidae.

Tribe Cryptorhynchini.

Acalles humeralis P.—Taken singly and in cop. under the dry bark at 1800 feet elevation on Tantalus, Oahu. Both sexes bred in numbers from partly dead branches and limbs gathered at 2000 feet elevation in same locality. Not common.

Tribe Cossonini.

Dryopthorus crassus Shp., *D. gravidus* Shp., *D. squalidus* Shp., *D. distinguendis,* P., *D. declivis* Shp., *D. modestus* Shp., *D. insignis* Shp., *D. insignoides* P., *D. oahuensis* P.—Both sexes of each of these species excepting *oahuensis,* taken in situ under decaying bark of *Pipturus* on Tantalus at 1300 to 2000 feet elevation. The same species also bred from half dead branches and trunks of *Pipturus.* Many of the species may be considered ubiquitous and are by no means confined to *Pipturus,* unless it be *oahuensis,* which itself is somewhat uncommon and not at all abundant on this tree. Only half a dozen specimens of

*These notes and records of Coleoptera contributed by Mr. W. M. Giffard. They were obtained on his collecting trips since 1904. All breeding was done at his Tantalus bungalow, at 1350 feet elevation.

oahuensis were obtained during five years collecting on Tantalus, Oahu, and these were always in the live wood of *Pipturus* where it joins that which is dying. Two specimens of *oahuensis* were bred from half dead *Pipturus* wood. It has not been taken on any other island. All the other species of *Dryopthorus* named were taken and also bred in large numbers on Oahu; but it has not yet been actually determined whether all these species are peculiar to this island.

FAMILY PROTERHINIDAE.

Proterhinus vestitus P. and *P. blackburni* P.—Both common species and not altogether attached to *Pipturus.* Bred from dying wood of *Pipturus* gathered on Tantalus, Oahu, at 1800 to 2000 feet elevation. Also taken on Tantalus in situ under dead bark of *Pipturus.*

FAMILY ANOBIIDAE.

Xyletobius walsinghami Perkins—A few specimens bred from a trunk of dying tree on Tantalus. The largest species of the genus occuring in these Islands.

FAMILY CIOIDAE.

Species of *Cis* and *Apterocis* were taken from under dead bark of *Pipturus* on Tantalus, and also bred from the dying wood gathered in the same locality at 1800-2000 feet elevation.

FAMILY NITIDULIDAE.

Eupetinus impressus (Shp.)—Under decayed bark.

FAMILY ELATERIDAE.

An undetermined species under decayed bark; also pupae in the rotting wood.

FAMILY COLYDIIDAE.

Antilissus aper (Shp.)—Under dead bark of *Pipturus,* at 2000 feet elevation on Tantalus. Not uncommon under dying or dead bark of *Bobea* and *Straussia.*

FAMILY CARABIDAE.

Two or three species taken from hollow portions of the trunk and limbs of *Pipturus* on Tantalus at 1800-2000 feet elevation. Probably in hiding or in search of prey.

In addition to the Coleoptera recorded by Mr. Giffard, I have collected the following as occurring incidentally:

Cryptamorpha desjardinsii Guer.
Rhizobius ventralis Er.
Cryptolaemus montrouzieri Muls.
Coelophora inequalis (Fab.)
Platyomus lividigaster.

The four latter are Coccinellids, and were either in hiding or in search of prey; the first two feeding on *Pseudococcus citri.*

Hemiptera.

FAMILY PYRRHOCORIDAE.

Metrarga nuda White—Found inside dead branches that are more or less split up, or burrowed by other insects.

FAMILY NABIDAE.

Reduviolus truculentus Kirk.—Found on the living branches and foliage, where it is predaceous on other insects occurring there.

Reduviolus lusciosus (White)—Sometimes found on lower branches or on young trees. Has predaceous habits like the preceding species.

FAMILY ANTHOCORIDAE.

Lasiochilus decolor (White)—A small, dark brown bug found in dead branches and under bark. Probably predaceous.

FAMILY MIRIDAE.

Tichorhinus iolani (Kirk.)—This small green bug is often very abundant, feeding and breeding on the foliage. Probably attached to this tree.

Tichorhinus kanakanus (Kirk.)—Slightly larger than the preceding and not so common.

I have a red Capsid, unidentified, taken from *Pipturus.*

FAMILY JASSIDAE.

Nesophrosyne pipturi (Kirk.)

Nesophrosyne ponapona (Kirk.)—Two species very abundant on "mamake" and probably attached to it.

FAMILY ASIRACIDAE.

Nesosydne pipturi (Kirk.)—This pretty little leafhopper very common; probably attached to this tree.

FAMILY COCCIDAE.

Pseudococcus citri (Rossi)—This mealy-bug often seen on the leaves, but not common.

Saissetia hemispherieum (Targ.)—An occasional specimen on the twigs.

PARASITIC HYMENOPTERA.

FAMILY ICHNEUMONIDAE.

Echthromorpha fuscator Fab.—Parasitizes the chrysalis of *Vanessa tammeamea.*

Limnerium blackburni Cam.—Parasitizes the larvae of *Phlyctaenia stellata.*

FAMILY BETHYLIDAE.

Scleroderma sp.—Probably a new species near *kaalae* Ashm. Parasitizes the larvae of *Hyposmocoma chilonella.*

FAMILY DRYINIDAE.

Gonatopus perkinsi Ashm.—Parasitizes *Nesosydne pipturi,* also other related leafhoppers. The parasitized leafhopper is recognized by the conspicuous black wart-like body on its abdomen.

FAMILY EUPELMIDAE.

Omphale metallicus Ashm.—I have reared this little parasite from the leaf-miner, *Philodoria micropetala.* It is parasitic also on other leaf-miners and other small Micros.

FAMILY TRICHOGRAMMIDAE.

Pentarthron flavum Perkins—Parasitic in the eggs of *Vanessa tammeamea.* It also paratizes the eggs of many species of moths.

PARASITIC DIPTERA.

FAMILY TACHINIDAE.

Chaetogaedia monticola (Bigot)—Parasitizes the caterpillars of *Scotorythra rara* and many other caterpillars.

FAMILY PIPUNCULIDAE.

Pipunculus swezeyi Perkins—Parasitic on the nymphs of leafhoppers. Probably attacks *Nesosydne pipturi,* though I never have reared it.

MISCELLANEOUS.

Odynerus spp.—I have found nests of these wasps filled with caterpillars in hollow, dead twigs, but have not reared the wasps to maturity to identify them. There are probably several species, as: *O. nigripennis, O. montanus, O. pseudochromus, O. pseudochromoides* and *Nesodynerus rudolphi.*

Nesoprosopis spp.—Several species of the native bees also nest in dead branches.

Ants—Several species found nesting in dead branches, or running up the trunks in search of prey.

Calotermes castaneus Burm.—Nests in the dead branches.

Cricket—A small species, taken on bark, Tantalus, 1800 feet elevation (W. M. G.).

Oliarus sp.—Taken at Maunawili, Oahu, 800 feet elevation (W. M. G.).

Euxesta annonae Fabr.—Observed on bark of tree at Maunawili, Oahu, 800 feet elevation (W. M. G.).

Sciara molokaiensis Grims. (?)—Dipterous larvae (probably this Mycetophillid) observed under rotting bark of *Pipturus,* Tantalus, 1500 feet elevation (W. M. G.).

Earwig—In rotten branches, in search of prey.

Psocids—Several undetermined species, collected from the leaves and branches.

Psyllid—An undetermined specimen. An incidental capture.

Insects Attached to Pipturus, or Nearly So.

Lepidoptera—*Vanessa tammeamea.*
Phlyctaenia stellata.
Epagoge infaustana.
Philodoria micropetala.

Coloptera— *Calithmysus koebelei.*

Hemiptera— *Reduviolus truculentus.*
Tichorhinus iolani and *kanakanus.*
Nesophrosyne panapona and *pipturi.*
Nesosydne pipturi.

Insects Attacking the Living Tree.

Feeding on the Leaves—
Vanessa tammeamea.
Scotorythra rara.
Plusia chalcites.
Phlyctaenia stellata.
Archips postvittanus.
Amorbia emigratella.
Epagoge infaustana.
Philodoria micropetala.
Tichorhinus iolani and *kanakanus.*
A. red Capsid.
Nesophrosyne ponapona and*pipturi.*
Nesosydne pipturi.
Pseudococcus citri.

Boring in Green Twigs—
Epagoge infaustana.

On Living Bark—
Saissetia hemisphericum.

Insects Attacking Dead or Dying Trees.

In Trunk and Branches—

Plagithmysus lamarkianus.
Callithmysus koebelei.
Acalles humeralis.
Dryopthorus gravidus, squalidus, distinguendis, declivis, modestus, insignis, insignoides, crassus and *oahuensis.*
Proterhinus vestitus, and *blackburni.*
Xyletobius walsinghami.
Eupetinus impressus.
Hyposmocoma chilonella.
Calotermes castaneus.

Feeding on Fungus on or Beneath Bark.

Cis spp.
Apterocis spp.

Insects in Search of Prey.

Coleoptera—

Carabid beetles.
Rhizobius ventralis.
Cryptolaemus montrouzieri.
Coelophora inequalis.
Platyomus lividigaster.

Hemiptera—

Metrarga nuda.
Reduviolus truculentus, and *lusciosus.*
Lasiochilus decolor.

Miscellaneous—

Ants.
Earwig.
Staphilinid.

Parasites—

Echthromorpha fuscator.
Limnerium blackburni.
Scleroderma sp.
Gonatopus perkinsi.
Omphale metallicus.
Pentarthron flavum.
Chaetogaedia monticola.
Pipunculus swezeyi.

Specimens were exhibited, and in the discussion which followed the paper, Mr. Giffard stated that between 1904 and 1906 he had paid special attention to beetles attached to "Mamake," but could not with any certainty state that more than one species was absolutely restricted to that tree, as far as the island of Oahu is concerned. He referred particularly to *Callithmysus kobelei* which he had bred from Mamake on several occasions. A small species of *Acalles,* one of *Proterhinus* and one or more of *Cis* he had also bred, but was not sure but that these were also attached to other hosts. On Hawaii he had collected *Plagithmysus lamarkianus* from *Pipturus,* as had other collectors, but had no opportunity to breed it from the tree.

Mr. Giffard exhibited a spider's nest between two koa leaves which had been pre-empted by the mud nest of *Odynerus* that, in turn, had been parasitized by *Eupelmus.* He also exhibited the cells and larvae of *Odynerus,* together with a series of *Eupelmids* that had emerged from them.

Mr. Terry exhibited a male Stylops *Neocholax jacobsoni* Meij. which he had caught at night in Java, and stated that there was no previous record of a Stylopid caught at night.

Mr. Leckenby (a visitor present, who had recently returned from New Zealand) stated that in New Zealand there was a flycatcher, *Rhipidura flabellifera,* that might prove of value in Hawaii. He had observed a large spider in Fiji that fed on Japanese beetles that might also be introduced.

APRIL 6TH, 1910.

The sixty-second regular meeting of the Society was held in the usual place.

ENTOMOLOGICAL PROGRAM.

List of the Aphidae of the Hawaiian Islands.

BY D. T. FULLAWAY.

[Microscope Slides of Specimens Exhibited.]

The following list is supplementary to that published by Mr. Kirkaldy in 1908.* A synopsis of the group appears in

*Proceedings Hawaiian Entomological Society, I, Part 5, p. 206.

the Annual Report of the Hawaii Agricultural Experiment Station for 1909, and the notes here presented in connection with each species are merely for ready reference.

1. *Idiopteris nephrolepidis* Davis, on *Acrostichum reticulatum;* Tantalus, Niu, Palolo, Oahu.
2. *Macrosiphum trifolii* Perg., on *Sonchus oleraceus;* Tantalus, Honolulu, Oahu.
3. *Macrosiphum rosae* Linn., on cultivated roses; Mana, Puuopelu, Hawaii; Honolulu, Oahu.
4. *Macrosiphum sanborni* Gillette, on cultivated chrysanthemums; Honolulu, Oahu.
5. *Macrosiphum circumflexum* Buckt., on *Physalis Peruviana;* Tantalus, Oahu.
6. *Myzus citricidus* Kirkaldy, on *Citrus aurantium;* Mana, Hawaii; Honolulu, Oahu.
7. *Myzus persicae* Sulz., on *Brassica oleracea;* Honolulu, Oahu.
8. *Pentalonia nigronervosa* Coq., on cultivated banana (*Musa* spp.); Honolulu, Oahu.
9. *Rhopalosiphum violae* Perg., on cultivated violets; Tantalus, Oahu.
10. *Toxoptera aurantiae* Koch., on *Pelea, Straussia, Coffea;* Tantalus, Niu, Palolo, Oahu.
11. *Toxoptera caricis* Fullaway, on a species of *Carex;* Pauoa, Oahu.
12. *Aphis sacchari* Zehntner, on sugar cane (*Saccharum officinarum*); Honolulu, Oahu.
13. *Aphis bambusae* Fullaway, on a bamboo (*Phyllostachys?*); Honolulu, Oahu.
14. *Aphis swezeyi* Fullaway, on *Gnaphalium;* Halawa, Oahu.
15. *Aphis gossypii* Glover, on *Gossypium, Cucumis, Arum esculentum, Hibiscus rosasinensis, Medicago denticulata,** Phaesolus lunatus, Portulaca oleracea, Cuphea ,Bidens;* Honolulu, Wahiawa, Waipahu mauka, Kunia, Tantalus, Oahu.
16. *Aphis brassicae* Linn., on *Brassica oleracea;* Wahiawa, Honolulu, Oahu.

**The *Aphis* on *Medicago denticulata*, *Phaseolus lunatus*, and *Portulaca oleracea* is probaly anothor species—*Aphis medicaginis* or *Aphis appaveris*.

17. *Aphis maidis* Fitch, on sorghum (*Andropogon vulgare* var. *saccharatum*), corn (*Zea mays*); Honolulu, Kunia, Oahu.
18. *Aphis myosotidis* Koch., on *Erechtites* sp.(?); Tantalus, Pauoa Valley, Oahu.
19. *Myzocallis kahawaluokalani* Kirkaldy, on *Lagerstroemia indica,* also on other shrubs; Honolulu, Oahu.
20. *Eriosoma mali* Samouelle, on apple (*Pyrus malus*); Waiki, Hawaii.
21. *Cerataphis lataniae* Boisd., on fan palm (*Pritchardia*); Honolulu, Oahu.

Some Recent Moth Determinations.

BY OTTO H. SWEZEY.

I wish to put on record for future reference the determinations of a few moths recently made for me by Mr. August Busck of the United States National Museum.

EPHESIA ELUTELLA Hubn.

This is the moth referred to as *Ephestiodes gilvescentella* Rag. by Mr. Kotinsky, on page 27 of Vol. II, Proc. Haw. Ent. Soc. It is a bad feed warehouse and household pest, the larvae feeding on all kinds of cereals and cereal products, bakery goods, nuts, dried fruits, etc.

CROCIDOSEMA LANTANA Busck.

This is the Tortricid introduced from Mexico by Mr. Koebele, to assist in the destruction of Lantana. The larvae feed in the flower clusters and also on the immature fruit. It is very similar to *C. plebiana* Z., which feeds in the buds of "Ilima" and *Abutilon,* and occurs in Europe, Australia, West Indies, Central America and South America, as well as the Hawaiian Islands.

AMORBIA EMIGRATELLA Busck.

This is the larger yellowish introduced Tortricid leaf-roller,

whose larvae are often so numerous on many kinds of plants, trees and shrubs. The green larvae sometimes eat the young fruits of the orange and aligator pear, if a leaf lies near or in contact. It has recently been described by Mr. Busck in Proc. Wash. Ent. Soc., XI, p. 201, 1909. It is a Mexican species, there being specimens in the United States National Museum from several places in Mexico, also from Costa Rica.

CYANE TERPSICHORELLA BUSCK.

This is the "Dancing Moth" discussed on page 20 of Bull. 6, Div. Ent., II, S. P. A. Mr. Busck thinks that this Tineid is probably of Central American origin.

The second and fourth species above, Mr. Busck found to be undescribed, and he has named them as given above, intending to describe them in the forthcoming number of Proc. Wash. Ent. Soc.*

One of the visitors, Mr. Louis Margolin, of the Federal Forest Service, was asked to make a few remarks on some of his observations during his visit on the islands. Mr. Margolin said that, not being an entomologist, but, however, being interested in entomology, he wanted to state that while on Maui his attention was drawn to the dying koa forest near Kailiili. The people there were very much alarmed at the rapid passing of the trees and believed it to be insect work. Several members of the Society, in discussing the matter, stated that no insect was known to attack the trunks of healthy koa trees, and that, in their opinion, the probable cause was bacteria in the soil, similar cases having been determined by investigators on the Nahiku forest.

A member present inquired into the advisability of introducing woodpeckers which, he thought, would help reduce some of the wood-boring beetles. Prof. Bryan, being present, the Chairman referred the matter to him. He gave a very interesting talk on the possibilities of introducing a few useful birds, but warned the members of promiscuous introductions, owing to the changeable habits some birds had exhibited after being introduced. He cited the mynah bird as an example. He also mentioned the possible danger of our red-headed woodpecker scattering the seeds of the Hitchcock berry (*Rubus jamaicensis*). If any introductions were to be made of woodpeck-

* Proc. Wash. Ent. Soc. xii, No. 3, pp. 132-134, 1910.—[Ed.]

ers he thought that species from the Philippine Islands and East Indies would be more apt to prove successful, though on a whole the introduction of birds should be controlled under strictly scientific supervision and their habits should be observed in large enclosures for a sufficient period to determine whether or not their feeding habits would change. A lengthy discussion followed, embracing the introduction of seeds and plants, and several members present testified to their experience with some of our berry plants adopting an entirely different habit from their usual growth, with a yield of poor, insignificant fruit. Several grasses were cited as being good forage plants on the mainland, but inferior forage here and acting more as weeds. Much stress was laid on the importance of having the Federal Experiment Station make tests of all seed introductions to permanently settle the question of whether seed plants or grasses should be allowed to be planted in the islands.

MAY 5TH, 1910.

The sixty-third regular meeting of the Society was held in the regular place.

PAPERS READ.

Some Recent Weevil Determinations.

BY OTTO H. SWEZEY.

CARYOBORUS GONAGRA (Fab.)

This is the large Bruchid which began to attract attention late in the summer of 1908. It is now very abundant and widely distributed on the lowlands of Oahu, but has not as yet been reported from the other Islands. It breeds in the pods of algaroba, glue bush, tamarinds, several cultivated cassias and other legumes. I recently came across a figure of *Caryoborus gonagra* (Fab.) in Dr. Maxwell-Lefroy's new book, Indian Insect Life, which looked very much like our insect. Looking up the description in Schoenherr's Catalogue of the Curculionidae, it was found to correspond well. I then sent specimens to Dr.

Lefroy, and he has confirmed my identification of the insect. It has no doubt been introduced from India, or some other part of the Orient, in seeds of some leguminous plant.

Acythopeus aterrimus (Waterh.).

This black Curculionid of the tribe Barini has been found established in an orchid house in Honolulu. It no doubt was introduced in orchids from the Philippine Islands, as there is a specimen of the species in the collection of the Bureau of Agriculture and Forestry that was taken from orchids imported from Manila. I have identified the species from a figure in a paper by Lea on Orchid and Fern Weevils (Agr. Gaz., N. S. W., June, 1904) and by referring to the original description. It was described by Blackburn in Australia as *Baris orchivora;* but Lea, later, synonomizes this with Waterhouse's species.

Cryptorhynchus batatae (Waterh.).

Dr. Perkins has called my attention to an account by H. A. Ballou (West Indian Bulletin, pp. 180-192, 1909) of this weevil as a pest on sweet potatoes in Barbados. The paper contains a copy of the original description by Waterhouse in Proc. Ent. Soc., London, 1849. Comparing our specimens, bred from sweet potatoes, with this description, we conclude that ours is the same as the Barbados pest.* Our specimens had been identified as Blackburn's *Hyperomorpha squamosa,* but not with certainty, though it probably is the same species.

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*More recently specimens of this weevil have been compared by Mr. Schwarz at the United States National Museum and by Mr. Champion of England, and it is settled beyond a doubt that this species is *batatae.* Champion has referred it to the genus *Euscepes,* however, and hence, it should now be known as *Euscepes batatae* (Waterh.) It has not been settled definitely yet, however, whether it is the same as *Hyperomorpha squamosa* Blkb.—[Ed.]

The Introduction of Birds Into Hawaii.

BY WILLIAM ALANSON BRYAN.

(Author's Abstract.)

Geologists point out that birds came into existence in the animal kingdom long after the class Insecta had begun to flourish. Finding a place vacant in the scheme of nature, they proceeded through the process of evolution and adaptation to fill it. As time went on the class was divided into orders, families and species, each suited to its environment and each endowed with special food habits. That so many birds are insectivorous may be taken as an index to the enormous reproductive capacity of insects and their general acceptability as food for birds, as well as the inadequacy of the forces of the animal kingdom that fed on insects before the advent of birds.

True as this generalization may be of birds as a class of animals, it is not so true of the birds of Hawaii. Isolated as the islands have been, apparently from very remote geological time, their land fauna has been singularly of an accumulative character. The birds that came to the Islands doubtless came by accident, and their future depended on their ability to adapt themselves to the conditions as they found them. As a consequence, they became in a large number of cases highly specialized, nectar-feeding species and, as a result, they were unable to adjust themselves to the change in the flora and other conditions which preceded or accompanied the advent of white men in the group. What we know of the extinct species indicates that the bird fauna was in a vanishing condition even before white men came to the group. Their coming, therefore, has only added to the adverse condtions then existing. The disappearance of the native birds from Hawaiian forests is one of the wonder tales of ornithology. With three or four exceptions, no birds have been introduced to take their place and help in any way to re-establish the balance of nature which exists elsewhere and which doubtless would have existed here had the isands been more accessible to the ordinary routes of bird migration. Add to the isolation, the environmental changes that have taken place in these islands in the last one hundred years, and we have a condition that has but few

parallels. During that period the lower zone—*i. e.*, the agricultural area below 1500 feet elevation—has been remade from the faunal, as well as from the agricultural point of view. New plants, new conditions, new insects have been introduced and in many cases encouraged to occupy the land. In the majority of cases their natural enemies have not followed the insect pests that have come to these shores. One of the results of this has been that many agricultural plants and domestic animals are almost without protection from their natural enemies. The speaker for this reason has repeatedly urged that the introduction of birds into Hawaii will become of more and more economic importance.

In this connection, an instance of the condition existing here may be of interest. In two hours collecting I was able to gather from a patch of sweet corn, a rod square, specimens of seven orders, representing twenty-nine families and thirty-nine species of insects. Fourteen species were directly injurious to vegetation, six doubtfully so, while five were known to be beneficial and four both beneficial and injurious by turns, while the remaining ten were of no known economic importance.

That similar conditions exist with reference to a number of the crops grown here in a small way is well known. That these pests will continue to multiply to the limit of their food supply unless natural enemies are introduced is not disputed. That the native birds are vanishing and, as a class, are now of little importance to agriculture is shown by a reference to their habits and their weakened condition, both in numbers and species. In the eleven orders of birds represented in Hawaii (two of which have been introduced) there are, all told, not more than one hundred and thirty-two species. Of that number sixty are sea or marsh birds or rare accidental visitors. Thirty-one of the remainder are extinct or too rare to figure in any way in the economic ornithology of even the native forests. Twenty-one species belonging to ten genera are of more or less economic importance. Of this meager list the plover, the hawk and the owl are non-passerine, so that the eighteen passerine native forest dwelling birds are representatives of seven genera. Aside from the work they do in the native forest, they do not count as factors in the struggle against insects, and there is no reason to suppose that they should, since by nature they all belong to the deep forests of the higher elevations. The few (nine) species introduced are of far more

economic importance than are all the native birds combined. Since there is but little to be expected from the native avifauna along the line of insect control, what is required is the judicious introduction of foreign birds to feed on our insect pests. We could thus form a second line of defense against insect invasions that will be a first aid to the plant and animal quarantine now maintained here by the territory and nation.

The intelligent introduction of birds into Hawaii or any other country is by no means the simple task that some have thought it to be. Three important questions with reference to their food habits must be settled definitely in advance of the liberation of any species of bird in the Territory. They are: (1) The food of the species at home. (2) What proportion of its food is injurious insects? (3) What its food will be when brought to Hawaii?

On the mainland the conditions existing about a farm home are far different from those found in Hawaii. There the yard, garden, orchard, meadow, field crops, shrubs and forest have their special bird inhabitants. In case of an insect outbreak they all take part in suppressing the invasion. The average farm on the mainland during the year has more species of birds than occupy the entire land area of the Hawaiian group. It has been found, however, that not all birds are good birds at all times. Most of them, however, are so useful on the average as to warrant their general protection.

The development of the study of economic ornithology is still in its infancy. Wilson, in 1808, won the title of being the pioneer in America. Audubon, like Wilson, spoke in general terms of the habits and value of birds. Their direct benefit to agriculture was first appreciated in 1850, and Flagg in 1861, in a paper on the "Utility of Birds," declared that "each species performs certain services in the economy of nature which cannot be so well performed by other species." Prof. Jenks devised the system of alimentary analysis which has been much used in the study of the habits of birds. The Biological Survey was first organized in 1885, and from first to last 300 or more papers have appeared of more or less value. These form the bulk of the economic literature on North American birds. Very little of the work done on the mainland, however, is of direct use in considering the problems of Hawaii, for the obvious reason that her problems are her own and very peculiar to the group.

The three methods of studying the food of birds need not be discussed here, since they are the usual methods of ascertaining the kind and amount of food consumed. By their use ornithologists have definitely shown that practically all of the injurious insects on the mainland have their enemies among the birds, and that often the amount of insect food consumed is enormous. Owing to the active nature of birds they demand large quantities of food. It has been shown that sixteen canaries (kept by Stanley) ate one-sixth their weight daily. Herrick observed three young red-winged blackbirds to be fed 40 times in four hours; four young king birds were fed ninety-one times in four hours, four young song sparrows were fed seventeen times in four hours, four young song sparrows were fed seventeen grasshopper nymphs and two spiders in sixty-seven minutes, while a house wren made one hundred and ten visits to her nest in four and a half hours and fed one hundred and eleven insects and spiders to her young.

The relation of insect outbreaks and the damage done by to crops fluctuates greatly. To obviate this a check should be provided by nature that would be always at hand and ready to feed on any new pest that appears, without being too particular as to the exact family and species to which the pest belongs. Birds meet the requirement better than any other animal. They are alert and active and mounted on swift wings. In more than one instance they have proven their ability to work together for the common good. Two illustrations selected almost at random from published data are given to show the way bird control works out on the mainland.

An observation conducted by Forbes in an orchard badly infested with canker worms is of interest. He shot and examined one hundred forty-one specimens. Of the thirty-five species he found that twenty-six species had been eating canker worms and eighty-five specimens, that is 72 per cent. of the species and 60 per cent. of the specimens, had eaten the worms. Of the entire lot 35 per cent. of their food consisted of the canker worms. He compared this result with the normal May food of the birds and found that birds of varying sizes and habits had migrated to the outbreak; that wrens, blue jays, meadow larks, etc., etc., were among them; that in addition to the canker worms a sufficient per cent. of their normal food of different kinds had been eaten to prevent its increase; and that with one

exception birds eating worms had simply added the canker worm to the ration.

Prof. Aughey at the time of the red-legged locust outbreak in Nebraska found all the birds from the humming bird to the white pelican had done their best to suppress the outbreak. Six robins had eaten 265; one olive-backed thrush, 55; five cat birds, 152; one ruby-crowned kinglet, 29 locusts, and so on through a long list; the palm going to four cuckoos that had devoured 416 locusts among them. These and other examples that can be cited leaves no doubt as to the good intentions of our feathered friends, and the facts seem to warrant the belief that they put their good intentions into practice.

The relation of birds to predaceous and parasitic insects is of interest especially in Hawaii. I am aware that Dr. Walsh and others have pronounced birds as of doubtful economic value, but there is a general belief that the error made by Walsh and his followers was one of basing their conclusions on too narrow a view of the role played by birds in the economy of nature. All agree with Weed and Dearborn that it was unfair to classify birds as injurious, beneficial and neutral on the stomach contents alone. Supposing an ichneumon parasite to be found in the stomach of a robin it could, as has been shown by Dearborn, be referred to any one of the following classes:

1st.—A primary parasite of an injurious insect.

2nd.—A secondard parasite of an injurious insect.

3rd.—The primary parasite of an insect feeding on a noxious plant.

4th.—The secordary parasite of the same insect.

5th.—The primary parasite of an insect feeding on a wild plant of no value.

6th.—The secondary parasite of an insect feeding on a wild plant of no value.

7th.—The primary parasite of a predaceous insect.

8th.—The secondary parasite of a predaceous insect and so on.

These and other circumstances mentioned during the consideration of this subject were calculated to show that there was no danger that birds, if properly selected before introduction, would seriously interfere with our introduced beneficial insects.

In closing it would seem to be a simple matter for any one familiar with the facts to suggest a half dozen species of birds

that should be imported at once into Hawaii. For example, the house wren, the mocking bird and the fly catchers could be taken on their records. Nevertheless those interested in bird introduction should recognize that an extensive outfit with sufficient funds for carrying on scientific experiments at home and abroad must be provided before thorough work can be done. Time and skill of a high order are two important factors that must not be overlooked in attacking the problem. There should be large importations made in stocking the new species in the Islands and a number of species should be introduced with a view to establishing conditions of inter relation between species resulting in a division of labor similar to that which is known on the mainland and in other regions where the bird population is in a more normal condition.

Finally, it seems proper to urge that it is unwise to undertake bird introduction into the Island on a small scale as a beginning looking to a larger development of the experiment if it should prove successful. There is always the possibility of the first introduction being ill-advised or turning out badly, with the result that the whole subject of bird introduction would be discredited in the popular mind.

The protection furnished by a large well equipped experimental aviary under the direction of an ornithologist familiar with conditions as they exist is without doubt the first and the most essential step in bird introduction, and one which should be the foundation of the work.

After this paper a very interesting discussion followed. Dr. Perkins agreed with Prof. Bryan and added that after examining the stomachs of a great many Hawaiian birds he had found but one instance of a bird eating a beneficial insect. One species of *Clorodrepanis from* Oahu, was found to be a heavy feeder on the scale (*Coccus acuminatus*). He also stated that nearly all of the Honey Creepers fed their young on caterpillars, but the adults rarely touch an insect. He, too, emphasized the importance of careful experiments before introducing a strange bird, as nearly all of the introductions of strange birds without such precautions had proved failures. Mr. Ehrhorn spoke very highly of the California black bird (Brewers' blackbird) as an insect eater. He noticed that these birds would very often perch on the backs of cattle, no doubt picking at some of the flies which were annoying them. He also mentioned

a Chinese thrush brought to San Francisco by a Chinese that fed only on live grasshoppers. Vice-President Terry then read a letter from Dr. Cobb in Jamaica stating that turkeys were very effective in keeping down insects in Jamaica cane fields. Mr. Ehrhorn said that he had seen turkeys doing good work against crickets in California. Mr. Terry noticed at Hong Kong some insectivorous birds which he thought might prove very useful.

Prof. Bryan said the common house wren was a very good insect feeder. He mentioned also an African bird that lived around animals picking off flies and other insect pests. After reading all the available literature regarding this bird the only thing not to its credit was the picking at the saddle galls or sores on stock. This bird he thought would be an efficient enemy of the horn fly.

Mr. Ehrhorn wanted to know what insects besides the Japanese beetle and the 'Olinda bug" affected the Eucalyptus in Hawaii. Mr. Swezey said that the Torpedo bug (*Siphanta acuta* Walk.) could be added to the list.

Mr. Swezey exhibited a nest of *Polistes aurifer* that had been made under ground.

JUNE 2ND, 1910.

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

ENTOMOLOGICAL PROGRAM.

A Few Notes on Solenopsis Geminata.

BY L. V. LEWIS

Dr. Wheeler says that this species is common everywhere in the warmer parts of the world, and is both highly carnivorous and highly vegetarian; that is, it will prey on any defenseless or moribund insect and stores seeds in the chamber of its nest.

One day while hunting for Coccids on the roots of grass I noticed a small bare spot with a little hole in the center, out of which a Solenopsis would come at frequent intervals, and

thinking that there might be some species of Coccid in the vicinity of the hole I proceeded to carefully remove the soil, and after going down about three inches unearthed what might be called an "underground grainary." This was a hollow of about four inches wide by four inches high, with galleries leading off into other "grainaries," the main nest itself being several feet away.

The grain consisted of every kind of grass seed to be found in the neighborhood and was closely and carefully packed.

These observations were taken as hurriedly as possible for the little insect certainly earns the name given it in Central America, viz., "Homega brava," or fire ant.

Solenopsis might safely be placed in the list of beneficial insects. W. E. Hinds, of the Department of Agriculture, reports that it is an established enemy of both the Cotton leaf worm and Cotton boll weevil, while I have personally seen these ants capture and carry off several leaf roller larvae.

The different kinds of insect remains found in a nest is in itself an afternoon's work for an entomologist.

A great deal of information has been collected with reference to the supposed intelligence of ants, but I never realized this until experimenting with some ant poison. The ants would come and carry into the nest a certain amount of food, which was in the form of a dough, when suddenly a large number of ants would issue from the nest, take a small particle of dirt in the mandible and completely cover the poison, also making galleries under the tin containing the poison; this was the result each time I experimented with the dough, in fact they soon recognized the poison and covered it over without touching it.

To test the sense of smell in Solenopsis a big one was tethered to a board by a thread; when her excitement had subsided and she was quite motionless, I approached her with a stick very quietly so as almost to touch first one and then the other antenna, which, however, did not move. I then dipped the stick in benzine and repeated the operation; the antennae was slowly retraced and drawn quite back. I was, of course, careful not to touch the antennae. Then I cut the head off and tried the same experiment with exactly the same results.

Mr. McCook considers that ants recognize each other by scent and states that if ants are more or less soaked in water they are no longer recognized by their friends but are attacked.

Solenopis, as Dr. Wheeler informs us, and which can be verified, stings very severely, and as the sting is an interesting weapon not only because of its structure, but for the reason that we are acquainted with it, I will make a few remarks upon it.

The palpi or feelers instead of being hairy, as in a bee, are broad and set sparingly with thick tactile bristles. The sheath, as in the bee, does not inclose the darts, but is split down the side, with dove-tailed grooves running its entire length.

When one of these ants gets upon the hand it does not immediately thrust its sting into the flesh, but seems to be trying to find a suitable place for the deposit of the poison. Upon finding such a position it grasps the flesh with the mandibles, draws the abdomen towards the head and thrusts the sheath into the tightly drawn flesh, which, no sooner gets a hold than the darts are driven forward until the little weapon can go no further, the poison in the meantime flowing into the wound, a drop of which is capable of killing any insect.

I have found upon further observations that the darts are continued far above the bulbous portion of the sheath, being still held in place by the dove-tail process before referred to, and that towards the head of the bulb the darts separate, forming arms shaped like a Y ending in two points, which are attached to a couple of chitinous muscles, which for convenience sake and also because that is their purpose, I will call levers, the levers again being attached to muscles terminating in the body wall of the abdomen. These muscles by contracting revolve the levers around so as to force the two points at the end of the darts to approach each other, upon which both the darts and sheath are thrust into the flesh. A muscular contraction of a strip joining the end of the Y-shaped arms and the muscle attached to the abdomen, brings the end of the darts down, thereby forcing them alone into the wound, while the sheath is left steady, the next movement drives the sheath further in, and vice versa, until the sting is lost sight of.

It has no doubt been noticed by those who have examined a bee's sting that the darts have at their extremities several loosely fixed barbs which are left in the wound; while no trace of them can be found in the wasp. The darts of the ant, while possessing these interesting barbs, instead of being loosely attached are firmly fixed, and set so numerous, there being only two or three at the top, so that they are not left in the wound.

The sting also is not torn from the body of the insect and left in the wound when the ant is brushed off, as the case of the bee.

While dissecting one of the ants, by mistake I broke the poison sack, whereupon a yellowish liquid ran out upon the parafin which immediately melted, as if a match had been applied to it.

All forms but the male have a sting. I have been unable to find any resemblance to a sting in the male, although there are two organs resembling the palpi of the workers.

The paper was discussed at length. Mr. Ehrhorn made a few remarks on his observation with poisons for killing ants. He was particularly struck with the efficiency of Cyanide of Potassium finely ground and scattered about the exit holes of *Solenopsis geminata*. He reported that after disturbing the nest by stamping the ground it would only take about five minutes until the bulk of the crawling ants would succumb to the fumes of the Cyanide. His observations on *Pheidole megacephala* made him think that species did not succumb as easily, although the fumes would kill great numbers. Mr. Ehrhorn thought that Cyanide could be used to great advantage and that would in a measure supplant Carbon bisulphide, which is expensive and dangerous to handle. He mentioned that experiments with sprays of Cyanide and water had given good results used at the rate of 1 oz. to 1 gallon of water.

Mr. Fullaway said that the Pineapple growers could no doubt be greatly relieved from the Mealy bugs if they would go after ants.

Dr. Perkins made some remarks on Termites. Mr. Giffard asked if anybody could give a remedy for the work of Termites. Dr. Perkins recommended powdered arsenic.

Mr. Terry exhibited a sample of Chinese inlaid feather work representing an insect. The feathers were of a small Kingfisher.

Dr. Perkins gave a general account of Rev. Thomas Blackburn's old collection of Hawaiian insects, of which he had recently become possessed.

Mr. Terry exhibited the pupa of a Japanese beetle *Adoretus tenuimaculatus* in its split larval skin. He gave the incubating period as four days and the larval period seventy-seven days.

JULY 7TH, 1910.

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

ENTOMOLOGICAL PROGRAM.

Mr. Ehrhorn exhibited a collection of remarkable galls made by scale insects and made the following remarks:

"Until a few years ago Gall-making coccids were only reported from Australia. Recently new forms have been reported from other countries. One species *Ollifiella cristicola* from the United States and at the February meeting I recorded a new species, *Cissococcus? oahuensis,* found on Opuhe (*Urera sandwichensis*) on Tantalus, Oahu. Mr. O. H. Swezey brought me a semi-gall-forming coccid, a *Pseudococcus* species, probably new, which he found on Sandalwood. From outward appearance of this gall one would take it for that of a Psyllid, but it is a true *Pseudococcus.*

Many of the Galls made by coccids could be taken for seedpods, and the resemblance for instance of *Cylindrococcus spiniferous* to the young seedpods of Ironwood, *Casuarina,* is indeed very striking. Most of the gall-forming coccids belong to the subfamily Dactylopiinae, and their structure is at times strikingly specialized, the abdomen is usually prolonged and at times ends in a peculiar tube, through which the honeydew is discharged. Some galls contain a single individual, while others consist of colonies, containing many individuals, each owning its own gall, the whole forming a very striking gall. The galls of the male coccids are usually smaller than those of the females. The gall of *Apiomorpha duplex* resembles the seedpod of *Martynia probocidea* when the probocis-like hood is open."

The talk was a very interesting one and Chairman Terry thought that Dr. Lyon ,the H. S. P. A. Pathologist, would be interested in them, so he excused himself and called Dr. Lyon. He had never seen galls made by scale insects before and agreed with the other members that they did resemble seedpods of trees. One in particular made by *Apiomorpha duplex* resembled the seedpod of the Mexican *Martynia probocidea* after the pods had opened.

Mr. Ehrhorn also exhibited a pair of very rare *Leucanid* beetles from New Guinea.

Mr. Terry exhibited a fly of the genus *Dyscritomyia,* which

was bred from living land shells, probably *Achatinella lymaniana* Bald., collected by D. B. Kuhns in the Waianae Mountains. This fly produces living young.

Some corrections in literature on Hawaiian insects; and other remarks.

BY DR. R. C. L. PERKINS.

At various times I have come across more or less serious errors in my description of Hawaiian insects, which have not been corrected by myself in print, nor so far as I know noticed by others.

In P. H. E. S., p. 63, and in various other tables of species, in referring to the genus Pseudopterocheilus I have inadvertently written "maxillary" for "labial palpi." In my original description of *Odynerus pseudopterocheiloides* (Fauna Haw. I, 69), however, the words used are quite correct, *"palpi labiales pilis longis utrinque ciliatae."*

In P. H. E. S., I, p. 124, for "dotted" read "clothed." Op cit., p. 112, our *Lithurgus* is stated to have 4-jointed palpi, but there are really only three joints

There is a curious error (F. Haw. II, p. 65) in respect to the dragon fly which I identified as *Agrion koelense* Blackburn. The description of the ♂ characters agrees well with the series taken, but for the figure of these parts (loc. cit. Pl. V, Figs. 7 and 7a) a mutilated example was chosen, in which the terminal segments were detached, as being easier for the artist to draw. Now this example, assumed through carelessness to be the same species as the rest of the series, happens to belong to *A. amaurodytum,* and therefore the figures do not represent *A. koelense* at all. Whether Blackburn's *A. koelense* is what I considered it to be, or what I have called *A. amaurodytum,* I cannot tell with certainty till I examine his species. The members of the "Koelense" group of Agrions, that superficially resemble one another, show much variability, the species are closely allied, and frequently occur mixed in the field, so they are not extraordinarily easy to distinguish. The males are best distinguished by the form of the appendages.

Fauna Haw. III, p. 25, line 3 from top, for "femora" read "tibiae."

Table of Agrionidae.

1 (2) Process or tooth on lower margin of superior appendages situated at or near the middle of the length of the appendages. *A. amaurodytum.*

2 (1) This process or tooth situated far apical of the middle of the length of the appendages.

3 (4) Superior appendages viewed laterally on the inner surface with the lower process as strong and large as the upper one. *A. asteliae.*

4 (3) Superior appendage in the same aspect with the lower process, notably smaller than the upper one. *A. koelense.*

AUGUST 5TH, 1910.

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

NOTES AND EXHIBITIONS.

Dr. Perkins exhibited a beautifully mounted collection of Carabid beetles made by Mr. Giffard, principally on Tantalus. Dr. Perkins stated that the Carabidae were extremely hard to identify and that the specimens must be well cleaned and mounted in order to identify them at all.

Mr. Terry exhibited ♂ and ♀ specimens of the genus *Xenos* in the body of *Polistes aurifer.* He stated that the males are extremely active, making a distinctly audible buzzing with their wings. He exhibited a Rhipiphorid collected by Mr. Muir from Java, also adult and cocoon of *Saprinus lugens,* which he stated was a very efficient check for the horn fly.

OCTOBER 6TH, 1910.

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

Member elected .....H. O. MARSH

ENTOMOLOGICAL PROGRAM.

Mr. Ehrhorn exhibited some specimens of several species of ants taken in course of quarantine inspection work, and in Honolulu, and made remarks on distribution of the species. The following species were exhibited: *Monomorium vastator, M. pharaonis, M. floricola, Tetramorium guinense, Tetramorium* sp., *Plagiolepis exigua, Solenopsis* sp., *Pheidole javana.*

Mr. Swezey gave an account of his visit to the Gypsy Moth Parasite laboratory at Melrose Highlands, Mass., in August, and of the work there with introduced parasites and predaceous insects; also gave an account of what he saw of the work in control and prevention of the spread of the Gypsy and Brown-tail moths.

NOVEMBER 3RD, 1910.

The sixty-eighth regular meeting of the Society was held in the usual place.

Member elected .....H. H. SEVERIN

ENTOMOLOGICAL PROGRAM.

Prof. Severin read a very interesting paper on the "**Host ovipositing Tachinid of the Walking Stick, Diapheromera femorata.**"* A very interesting discussion by the members followed.

Mr. E. M. Ehrhorn exhibited a collection of beautiful insects from the headwaters of the Amazon.

Prof. Severin remarked on the inaccuracy of the Nature Study being taught in the Public Schools. He stated that in one school the teacher exhibited the lantana bug (*Teleonemia lantanae*) as the lantana leaf miner.

Mr. Swezey announced that Mr. Busck, of the U. S. National Museum, had described the Lantana Leaf-miner as *cremastobombycia lantanella,* in Proc. Wash. Ent. Soc. XII, p. 133, 1910.

Mr. Ehrhorn asked the members if they had observed the Mediterranean fruit fly (*Ceratitis capitata*) in the fruit of the cactus. He stated that he was getting together a list of the

*Withdrawn for publication elsewhere.

fruits attacked by this pest. So far he had not observed it attacking guavas. No one had yet observed the fruit fly in cactus.

Three New Species of Hawaiian Moths.

BY OTTO H. SWEZEY.

CAPUA CASSIA N. SP.

Male and female. 10-12 mm. Antennae ochreous, barred above with brownish; basal joint brownish in front. Palpi pale ochreous, median joint brownish on outer side, terminal joint brownish. Head brownish in front of antennae, whitish or ochreous on vertex. Thorax and tegulae ochreous. Abdomen pale gray. Ground color of forewings ochreous, varying from pale ochreous to brownish ochreous, with chestnut-brown markings as follows: two or three dots on basal third of costa; a wide, oblique band across wing from middle of costa, widening on dorsum, so that it covers tornal two-fifths of dorsal margin; a large, triangular spot projecting inwards from outer third of costa, a little before apex; an undefined terminal streak, sometimes a spot on dorsum near anal angle; usually a few whitish or bluish scales in the oblique band; sometimes the whole wing is suffused with brownish ochreous, sometimes only the outer two-thirds, and occasionally a specimen with a few scattered fuscous scales; cilia ochreous, brownish at base. Hindwings and cilia pale gray. Tibia and tarsi pale brown, joints whitish at apex.

Costal fold in forewing of male extends to about two-fifths of the costa, extending openly a little farther.

Described from a series of 10 specimens reared from larvae feeding on the leaves of *Cassia gaudichaudii*, growing on Niu Ridge, Oahu, May 16 and August 22, 1909; and 28 specimens reared from larvae feeding on the same plant at Kaena Point, Oahu, February 19, 1910. The larvae feed singly, eating the lower epidemis and parenchyma, leaving the upper epidermis; with a web the leaflet is folded together for a hiding place, often along the midrib, sometimes a portion of the margin of the blade is folded over, or contiguous leaflets fastened together for this purpose.

The full-grown larva is about 9 mm. in length, uniform leaf-green; head concolorous, eyes black and a black spot at the postero-ventral angle; anal comb of green spines.

The pupa is formed in the same place where the larva has

fed, in a slight cocoon. It is 5 mm. in length, greenish, wing-cases bright green, extending to apex of fourth abdominal segment; abdominal segments, except first, with two transverse dorsal rows of minute spines, the basal row on segments 3 to 8 larger; cremaster with a few hooked bristles fastened into the silk of cocoon.

A parasite larva (*Sierola* sp.) was found feeding on one of the moth larvae. It was feeding externally, and was about 2.5 mm. long, plump, greenish with white spots all over—perhaps the fat-bodies showing through. This larva spun a silken cocoon, from which the adult parasite emerged in 12 days.

Bedellia oplismeniella n. sp.

Male, female. 7-8 mm. Antennae whitish, with dark, fuscous annulations; palpi, head and thorax pale fawn, sprinkled with fuscous, often a few white scales at back of head. Forewings pale fawn, unevenly sprinkled with dark, fuscous scales, most numerous along outer two-thirds of costa and sometimes one or two discal dots, and sometimes along middle of dorsum; cilia pale gray, sprinkled with fuscous at apex. Hindwings and cilia pale gray. Abdomen pale gray, sprinkled with fuscous beneath. Legs brownish fuscous, tarsi with pale annulations.

Very close to the species of *Bedellia* mining the leaves of various species of *Ipomoea,* concerning whose identity there is some uncertainty, Walsingham in The Fauna Hawaiiensis (1907) having determined it as *B. minor* Busck, while Busck has more recently determined it as *B. orchilella* Walsm. I cannot with certainty separate specimens of my species from the *Ipomoea* one; but, as my specimens are all bred from a grass, I have considered it a different species, particularly as the pupae have several differences. The pupa of the *Ipomoea* species has an elevated median dorsal ridge on the thorax, a median dorsal ridge on the abdomen, and the wing-sheaths are roughened with minute points; while in *oplismeniella,* the thorax has a low median dorsal ridge, median dorsal ridge lacking on the abdomen, and the wing-sheaths are not roughened with minute points.

Described from numerous bred specimens. I first noticed this species mining the leaves of a grass (*Oplismenus compositus*) along the Castle Trail on the Pauoa side of Mt. Tantalus, August 8, 1909. Since then I have found it wherever I have examined this grass in the mountains of Oahu, and also on Hawaii.

This is a very common grass in the mountains, and its leaves are usually found extensively mined by the larvae of this moth. In the Waianae Mountains I once found a larva mining a leaf of another grass (*Panicum nephelophilum*) growing in the vicinity of *Oplismenus*. The mine is usually lengthwise in the leaf, widening as the larva has grown in size.

The full-grown larva is about 5 mm. in length, pale green with a mid-dorsal purplish-red stripe, also some more or less lateral mottlings of the same color, especially anteriorly; head green, sutures, lateral edges and mouth-parts brown, eyes black; head retracted into second segment which is wider than following segments, green with some blackish dots on sides and posterior part; hairs pale. When full-grown, the larva emerges from the leaf, spins a few fibers beside the mid-rib of the leaf, at the base, or in some other partially secluded place; then pupates among these fibers without making a cocoon.

The pupa is about 4 mm. in length, pale yellowish, with several fuscous streaks ventrally, also two pairs of conspicuous blackish spots, eyes reddish brown; head with a compressed triangularly pointed projection in front, a large lateral projection behind each eye with sharp point directed anteriorly; thorax with low median dorsal ridge; abdomen with broad lateral flange on each side just on the line of spiracles so that the latter are just beneath its outer edge, no dorsal median ridge; setae "iii" are situated on upper surface of this flange, they as well as setae "i" and "ii" are quite long and stout and hooked into silk which the larva has spun on the surface of leaf; setae "i" and "ii" in a straight line; cremaster bilobed, a number of hooked bristles fastened into the silk by which pupa is suspended, dorsal side towards leaf; antenna-sheaths extend to apex of abdomen, wing-sheaths almost as far, not roughened with minute points as in the *Ipomoea* species. Pupa stage occupies 8 days.

Bedellia boehmeriella n. sp.

Male, female. 7 mm. Antennae fuscous, with whitish annulations; basal segment heavily clothed in front with long scales, whitish and brownish mixed. Palpi fuscous. Head yellowish brown on vertex; face and thorax purplish brown. Forewings uniform purplish brown, cilia pale gray, spotted with fuscous at apex. Hindwings and cilia pale gray. Legs brownish; tarsi whitish spotted. Abdomen pale gray, purplish at base, brownish beneath.

Distinct from the other species in Hawaii by its purplish

coloration. Described from a series of 14 specimens bred from larvae mining leaves of a native tree (*Boehmeria stipularis*) in the mountains of Oahu, and from pupae found on the leaves of the same tree. I first noticed the work of this leaf-miner September 5, 1909, in the mountains at the head of Manoa Valley, and bred specimens from material collected that day. Since then I have observed it wherever I have seen its food-plant in the mountains of Oahu.

The full-grown larva is a little over 6 mm., strongly constricted between segments, segment behind head large, head much retracted in it, remaining segments gradually narrowing to posterior end of body; pink on dorsal surface except head and following segment which are yellowish, yellowish below; eyes black; spiracles minute, circular, very pale brown; prolegs on segments 7-10. When full-grown the larva emerges from the leaf and pupates on the under side of the leaf beside a rib, especially in an axil at base, after having spun a few fibers of silk in which to fasten itself.

The pupa is 4.5 mm. long. Head triangularly pointed; a lateral projection behind each eye, curved a little anteriorly; a small longitudinal lateral curved projection on mesothorax; a much larger one on metathorax; a low median dorsal ridge on thorax; a lateral thin narrow flange along abdomen, containing the spiracles on its margin; no median dorsal ridge on abdomen; wing-sheaths extend nearly to tip of abdomen; antenna-sheaths extend a little beyond tip of abdomen; cremaster bifid with two widely diverging projections, each having 2 or 3 hooked bristles; all the dorsal setae are hooked into the few fibers of silk in which the pupa is suspended, ventral surface turned outward. Color yellowish, with a pink tinge on the back; projections on thorax, lateral flange of abdomen and eyes pale brownish; tips of antenna-sheaths black, also two short oblique black lines ventrally between anterior leg-sheaths and antenna-sheaths. One larva under observation produced a pupa which was very pink above and brown below. The adult emerged in 9 days.

DECEMBER 15TH, 1911.

On account of small attendance, the regular meeting of the Society for December (being the annual meeting and election of officers) was postponed from December 1 to December 15.

ENTOMOLOGICAL PROGRAM.

PRESIDENTIAL ADDRESS.

Biological Notes on Hawaiian Diptera.*

BY F. W. TERRY.

(This was accompanied by exhibition of specimens.)

Some Hitherto Unrecorded Non-Endemic Insects for the Hawaiian Islands.

BY OTTO H. SWEZEY.

Pompilus sp.

In October of this year I caught a specimen of a Pompilid at the Experiment Station, H. S. P. A. grounds. Dr. Perkins informs me that he had taken a specimen of this insect on his office window the previous month. Later in the month Mr. Terry caught a specimen on the road at Aiea. During the month of November I observed another specimen on a cane leaf at the Experiment Station grounds, and Dr. Perkins spoke of seeing an occasional one also.

About noon on December 4, I was astonished at seeing 10 or a dozen specimens in the grass on my own lawn at Kaimuki. The next day I saw 3 or 4 all at once in the edge of a cane field of the Honolulu Plantation. This was probably at the distance of a mile from Aiea. December 11 I saw quite a number of specimens in grassy places on Niu Ridge at an elevation of 1000-1200 feet.

From these observations it is seen that this wasp is already well established in this part of the Island of Oahu, and must have increased very rapidly recently, not to have been observed sooner by any entomologists. This is a member of the family Pompilidae, hitherto not represented in the fauna of the Hawaiian Islands. The species is as yet undertermined, and it

*Not available for publication.

is not known where it has come from, nor how long it has been established here. It may not become of any economic importance, as it is the habit of the members of this family to store their nests with spiders, making burrows in the ground for this purpose. They are not likely to cause much more inroads on the abundance of spiders here than is already done by *Sceliphron* and *Pison*.

Hippoboscid.

In October, also, two specimens of a Hippoboscid were obtained by a Honolulu pigeon fancier, from some of his flock, and forwarded to me via Bishop Museum. There are three species of these insects present in the islands inhabiting such birds as the owl and some of the native birds. Our present species is different from any of these, and differs also from any common to fowls in the United States. It yet remains to be determined. It is not known at present how prevalent it is in Honolulu, nor how injurious it may be.

Membracid.

November 24 I captured two specimens of a Membracid of the genus *Tricentrus* in the lower part of the Tantalus Eucalyptus Forest. It comes very near to *Tricentrus albomaculatus* Dist., which occurs in India. Our specimens may be an Oriental or Australian species, but it is yet to be determined with certainty. The family Membracidae is not represented in the native fauna of the Hawaiian Islands, and no introduced forms are known besides this, except that Dr. Perkins reported a year or two ago finding a specimen, but of what genus I know not, nor whether it might be the same species that I have now collected.

I present these captures at the present time that records may be made of their first notice here.

In the discussion that followed, Mr. Giffard wished to record that in the beginning of November he saw one or two specimens of the *Pompilus* in Nuuanu Valley on stone walls, and last Sunday on Tantalus at an elevation of 1500 feet he caught another running on a bank.

Prof. Severin read extracts from his paper on "**An Experimental Study on the Death-Feigning of Belostoma (Zaitha aucct) flumineum Say and Nepa apiculata Uhler.**"

Election of officers for ensuing year:

President	E. M. EHRHORN
Vice-President	D. T. FULLAWAY
Secretary-Treasurer	D. B. KUHNS

OBITUARY NOTICE.

It becomes our painful duty to record the death of one of our respected and valued members, Mr. F. W. Terry. He was one of the original members of the Hawaiian Entomological Society and its Vice-President during the year 1910, occupying the President's chair, however, throughout the year, by reason of the untimely death of the President, Mr. G. W. Kirkaldy.

Mr. Terry was born in England February 14, 1877, and the early part of his life was spent there. For a short time previous to his coming to Hawaii he was engaged as an insect preparator at the British Museum and prominent in his work was the preparation of exhibits of economic insects. In the summer of 1903 he was engaged as Assistant Entomologist at the Territorial Board of Agriculture, Honolulu, and the following year was transferred to the entomological staff of the Hawaiian Sugar Planters' Experiment Station, holding this position at the time of his death.

In the summer of 1911 he undertook a vacation trip to England, and was on his return when taken seriously ill with pleuropneumonia. He was met in New York City by an aunt, who rendered every possible aid, but, failing to rally from the attack, he died November 7, 1911, at the Roosevelt Hospital.

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PROCEEDINGS

OF THE

HAWAIIAN ENTOMOLOGICAL SOCIETY

FOR THE YEARS

1911-1912

(With two Plates and one Cut)

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All correspondence should be addressed to the Secretary, Hawaiian Entomological Society, Experiment Station, H. S. P. A., Honolulu, Hawaii, from whom copies of the Proceedings may be purchased.

Volume 1 of the Proceedings, for 1905-07 (in five numbers), contains 210 pages, 4 plates and 5 text figures. Price of the complete volume, $2.00. Volume II, No. 1, contains 35 pages, 1 cut and 1 portrait. Volume II, No. 2, contains 53 pages, 2 plates and 3 cuts. Vol. II, No. 3, contains 57 pages and 2 plates. Vol. II, No. 4, contains 45 pages and 1 plate. Price of any single number, 50 cents.

JANUARY 5TH, 1911.

The seventieth regular meeting of the Society was held in the usual place.

ENTOMOLOGICAL PROGRAM.

Notes on Cynipidae.*

BY D. T. FULLAWAY.

Mr. Fullaway had recently been working on an extensive, hitherto un-named collection of California gall-making Cypinids, at Leland Stanford University. In working it up, he found 72 species, of which 20 were new to science. He exhibited specimens of the insects and also galls; and gave interesting notes on the family as brought out in his work. Discussion followed, entered into by all members.

Effect of Exposing Aquatic Hemiptera to Atmosphere.**

BY H. H. SEVERIN.

In this paper, Mr. Severin gave results of some experiments on *Belostoma, Ranatra* and *Benacus griseus.*

Mr. Terry exhibited a wasp (*Odynerus* or closely related genus) caught on his window January 1, 1911. Undoubtedly a somewhat recent introduction, not having been taken by anyone previously.

FEBRUARY 2ND, 1911.

The seventy-first meeting of the Society was held in the usual place.

ENTOMOLOGICAL PROGRAM.

Mr. Fullaway gave an interesting account of his recent visit to California.

Mr. Swezey exhibited a collection of insects taken at the Grand Canyon, Arizona, while on a visit to that place.

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*Published in Annals Ent. Soc. Am., IV., No. 4, pp. 331-380, pl. XXIII, 1911.—[Ed.]

**Published elsewhere.—[Ed.]

Mr. Ehrhorn exhibited a rubber leaf badly infested with *Coccus hesperidum*. Every insect showed the exit holes of a Hymenopterous parasite. He was unable to determine the parasite as all had issued previous to the time the leaf had been collected.

Mr. Kuhns exhibited specimens of the Orange aphis *Myzus citricidus* Kirk. which had been preserved by heating on a tin plate over a gas jet.

Note on Echthromorpha fuscator (Fab.)*

BY R. C. L. PERKINS.

In his paper "On the Ichnenmonidae of the Banksian Collection in the British Museum," Entomologist 1909, page 136, Morley refers to "*Ich. fuscator* Sw. MSS. Ex. Ins. Sandwich." This is doubtless that very common species of Hawaiian Pimplinae, generally known as *Echthromorpha maculipennis* Holmgr. There is no other Hawaiian insect of the Icheumonoid group with which the Fabrician description would agree, the character of red front legs and a black mark before the apices of the wings being quite sufficient to distinguish it.

Mechanism of the Hatching of the Walking Stick, *Diapheromera femorata* Say.**

BY H. H. SEVERIN.

MARCH 2ND, 1911.

The seventy-second regular meeting of the Society was held in the usual place.

ENTOMOLOGICAL PROGRAM.

Life History of the Walking Stick.**

BY H. H. SEVERIN.

Mr. Fullaway wished to record the capture of *Eucymatoge crateras* Meyr. probably the first from this island.

*Presented by Mr. Swezey.

**Published elsewhere.—[Ed.]

Mr. Terry stated that he had sent specimens of the Horn Fly to a specialist, Prof. M. Bezzi of Florence, Italy, and they had been identified as *Lyperosia irritans* L. a south European form.

Prof. Bryan gave an interesting account of his travels during the past year and of his efforts to get the next meeting of the American Association for the Advancement of Science at Honolulu.

Miscellaneous Notes.

BY O. H. SWEZEY.

(*a*) The Lantana Butterflies. (Lycaenidae).

These two species of butterflies were introduced from Mexico by Mr. Koebele at the same time as the other lantana insects, about 10 years ago. The larvae of these butterflies feed upon the flower clusters and also on the leaves to some extent. A few months ago these were identified by Dr. Dyar from specimens that I sent to the U. S. National Museum. *Thecla echion* L. is the larger prettier species with delicate tails to the hind wings. *Thecla agra* Hewitson is the smaller species without tails to the hind wings.

(*b*) *Lithurgus albofimbriatus* Sich. (Megachilidae).

This is the large black bee discussed by Dr. Perkins on page 112 of Vol. I of the Proceedings of the Hawaiian Entomological Society, and listed on page 605 of Vol. II, Part VI, of Fauna Hawaiiensis. Mr. T. D. A. Cockerell recently determined the species from specimens sent him by Dr. Perkins. The species occurs in Tahiti. Mr. Cockerell stated that the Hawaiian specimens were larger than those from Tahiti.

(*c*) *Alaptus* (?) sp. (Mymaridae).*

This is the tiny black insect that has occasionally been taken on windows of recent years; but no one has learned its habits. Feb. 5, I collected a nest of *Megachile palmarum* in an old *Sceliphron* nest at Koko Head. A few days later on examining it for *Melittobia*, I found that this parasite had bred out in every cell of the nest and nothing remained but dead male melittobias and

*Probably *Leimacis peregrina* Perkins. See Fauna Hawaiiensis II. Part VI, p. 661, 1910.—[Ed.]

pupal skins of the females; however, there were Psocids amongst the leaves and debris of the nest, and also several specimens of this tiny *Alaptus* were obtained. Dr. Perkins expressed it as his opinion that they had bred from eggs of the Psocid, as the latter were breeding in the nest. Perhaps further observations or study may prove this to be the case.

(*d*) Parthenogenesis in *Melittobia.*

Previous observations on the habits and breeding of this insect show that there are many more females produced than males. I recently performed an experiment to ascertain if possibly the insect might not reproduce parthenogenetically. Jan. 28, I placed four freshly emerged females with three larvae of *Sceliphron.* Very few eggs were laid. In about 10 days a few larvae were observed. The first adults were three males Feb. 21; up to March 1, 5 more males have matured; and all the pupae remaining are males. This experiment indicates that *Melittobia* can reproduce parthenogenetically; but when it does, only a very small number are produced and these are males. I intend to repeat the experiment for further proof.

(*c*) "Injurious Insects of Formosa, Vol. I."

I recently received a copy of this publication from the author, T. Shiraki, who made us a visit here a year or so ago while passing through from the United States. I find the following insects treated of or figured therein which also occur in the Hawaiian Islands: *Pyrameis cardui* C., *Agrotis ypsilon* Rott., *Heliothis armigera* Hb., *Hellula undalis* F., *Nymphula fluctuosalis* Zell., *Odezia hecate* var. *formosana* Shiraki (apparently is what we know as *Hymenia recurvalis* Fab.), *Omphisa anastamosalis* Guen., *Plutella maculipennis* Curt., *Bruchus chinensis* L., *Cylas formicarius* Tryon, *Adoretus umbrosus* Fab., *Lasioderma serricorne* Saun., *Oxya velox* Fab., *Gryllotolpa africana* Fab., *Icerya purchasi* Mask., *Aspidiotus ficus* Riley, *Parlatoria zizyphi* Lucas, *Coccus longulus* Dougl., *Lepidosaphes citricola* Pack., a total of 19 species.

APRIL 6TH, 1911.

The seventy-third regular meeting of the Society was held in the usual place.

ENTOMOLOGICAL PROGRAM.

Mr. Severin exhibited a box containing 17 specimens of the Japanese beetle (*Adoretus tenuimaculatus*) caught on the barbed awns of the heads of a grass (*Chaetochloa verticillata*) growing in Kapiolani Park, Waikiki. There were also a few other beetles and a roach (*Eleutheroda dytiscoides*) which had molted since becoming caught, but failed in making its escape.

Mr. Severin also exhibited a number of insects caught in a Japanese Nursery on Young Street near Thomas Square, Honolulu, among them 4 species not hitherto recorded in these islands: 1 Zygaenid moth; 4 pupae of a leaf-roller on Japanese cherry; 1 Chrysomelid beetle; 1 Otiorhynchine beetle.

Mr. Ehrhorn exhibited a specimen of a slug-caterpillar moth (*Cnidocampa flavescens* Walker) and its cocoon, the latter fastened to a twig of a pear tree, found in the course of inspection in a shipment from Japan. He also exhibited an ant from Japan taken in inspection work (*Strumigenys lewisi*) remarkable for having very long falcate mandibles.

Mr. Sweezey exhibited the following insects taken on Mt. Olympus April 2nd:

One female *Brachymetopa unica* P., quite a rare insect, only an occasional specimen being taken.

One adult *Heterocrossa distincta* Walsm., with a parasite worm (*Gordius*) partially emerged from it. The moth was brought home alive and the worm emerged the following day.

Eight *Proterhinus maurus* P. A large species, possibly the largest one known. They were found at base of *Myrsine* leaves and in cavities in the twigs. He had taken a specimen or two of the same species on previous occasions, once on Palolo Ridge and another time along the trail towards Konahuanui; always on the same species of *Myrsine*.

Experiments in the Hatching of the Eggs of Chaetogaedia monticola.*

BY H. H. SEVERIN.

*Not available for publication.—[Ed.]

MAY 4TH, 1911.

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

ENTOMOLOGICAL PROGRAM.

Notes on the Large House Spider, Heteropoda regia.

BY E. M. EHRHORN.

On January 29th, 1911, I caught a female *Heteropoda regia* with a rather large abdomen, and placed her in a breeding jar. I fed her on flies and other insects, and on February 8th, during the night she made her egg cocoon and laid the eggs, at least on the morning of February 9, I found the egg-sac complete under her body and she carried it about without much inconvenience. On March 17th, I noticed that the edges of the egg-sac were opening and I could see a few small spiders, the egg-sac had turned much darker. On March 25th all the young spiders had left the egg-sac and I counted 197 of them, and in the egg-sac I found 10 eggs, probably unfertile ones, making a total of 207 individuals had all hatched.

Mr. Fullaway gave some breeding notes of life history, etc., of *Hyalopeplus pellucidus* and *Lycaena baetica*. They were to be published in full in the Annual Report of the Hawaii Experiment Station.

Mr. Ehrhorn exhibited specimens of an unidentified, probably recently introduced Ichneumonid,* collected by Mr. W. Weinrich on Sisal plant at Sisal, Oahu. Messrs. Swezey and Fullaway recognized it as the same that they had been catching lately in various places on Oahu.

Mr. Ehrhorn also reported that Mr. Weinrich had found the Mediterranean fruit fly breeding in oranges at Kalauao. Mr. Fullaway said that Mr. Austin had found the peaches infested with this fly at Mokuleia. These observations show that it is now probably distributed over the entire island.

Mr. Terry exhibited an illustration of beetles caught on heads of grass, *Cenchrus echinatus,* in Cuba. This was in a paper by E. A. Schwarz, and is a similar phenomenon to that exhibited by Mr. Severin at the previous meeting.

Cremastus hymeniae Crawf. See Proc. U. S. Nat. Mus., Vol. 40, p. 189, 1911 and U. S. Bureau Ent., Bul. 109, pt I, p. 7, 1911.—[Ed.]

JUNE 1st, 1911.

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

Member elected .....Mr. J. C. Kershaw

ENTOMOLOGICAL PROGRAM.

Mr. Giffard gave notes on *Odynerus,* and exhibited his collection consisting of six cabinet drawers, containing 80 species of this and closely related genera of Hawaiian wasps. The President declared a recess to allow members opportunity to examine the collection. This is the largest collection of these wasps in the islands, at the present time.

Mr. Ehrhorn exhibited some galls on koa leaves which were sent him from Haleakala, Maui, by Mr. Hannestad. The larvae of a Tortricid moth were feeding in them, but it was considered that the galls were due to some other unknown cause.

Reaction of the Walking Stick to Gravity.*

BY H. H. SEVERIN.

JULY 6th, 1911.

The seventy-sixth regular meeting was held in the usual place.

ENTOMOLOGICAL PROGRAM.

Mr. Swezey reported having reared two species of Tortricid moths from the galls on Koa leaves from Maui, exhibited by Mr. Ehrhorn at the previous meeting: *Cryptophlocbia illepida* and *Enarmonia Walsinghami.*

The former usually feeds in the pods of various legumes; and the latter in twigs of Koa, both living and dead. Their presence in the galls was considered a secondary matter and not the cause of the galls.

A Day's Collecting at Punaluu, Oahu.

BY OTTO H. SWEZEY.

The northwest portion of the Koolau Mountain Range is

*Not available for publication.—[Ed.]

very difficult of access and has not been visited by entomologists except when Dr. Perkins and Mr. Koebele made a trip into them about 15 years ago. They reached the main ridge from Wailua, following a large valley and taking three days to reach the higher part of the mountains, where they remained in camp for a few weeks collecting in the surrounding regions. It was found to be a rich collecting field. This part of the Range has now been made easily accessible by a trail which has been cut up the Punaluu Ridge on the windward side of the mountains. This trail was cut in an investigation of the water resources of the region, and there is a galvanized iron roofed camp used by the men engaged in that work, and which now furnishes a convenient shelter for tramping parties, this having become a favorite place for those desiring to camp a few days in the mountains.

On June 11th, 1911, I spent the day up this trail, not reaching the top, but getting into some good collecting ground where I spent the short time available before beginning the descent, as I had to return the same day. The best arrangement would be to plan on staying over night, or several nights at the camp, for the best results. In my short time for collecting, I was able to secure a great deal more than I have been accustomed to in a day in the mountains in the vicinity of Honolulu. As an indication of the possibilities of this region, I give the following list of my captures though I am not able at present to give the determinations of all the species. Several of the moths listed are not from specimens collected, but from caterpillars observed. Several species of dragonflies were also observed, but not captured.

Aculeate Hymenoptera.—*Odynerus oahuensis, Pompilus* sp., *Nesoprosopis unica, Nesoprosopis* sp.

Parasitic Hymenoptera.—*Echthromorpha fusator,* five species of Ophionids, several Bethylids and related species, one species of *Eupelmus,* two species of Mymarids.

Macrolepidotera.—*Vanessa tammeamea,* caterpillars of two or three species of *Scotorythra* were observed, *Genophantis iodora, Omiodes accepta, O. localis, O. asaphombra, O. monogramma, O. maia, Phlyctaenia eucrena, P. pyranthes, P. stellata, Pyrausta constricta, Scoparia ombrodes, S. lycopodiae.*

Microlepidopetera.—*Batrachedra sophroniella, Hyposmocoma atropurpurea, Heterocrossa divaricata, Bactra straminea, Archips* sp., *Epagoge infaustana, Opostega maculata, Philodoria micropetala.*

Diptera.—*Dicranomyia* sp. (larvae mining in leaves of *Cyrtandra), Pipunculus* sp., *Dyscritomyia* sp., several species of Drosophilidae and of other families.

Coleoptera.—*Coelophora inequalis, Scymnus viridus*, eight species of *Proterhinus*, one Anobiid, two Carabids, two Nitidulids, four Elaterids.

Orthopetera.—*Brachymetopa blackburni, Paratrigonidium* sp., *Loboptera extranea.*

Heteroptera.—*Reduviolus lusciosus, R. subrufus, Oechalia grisea, Nysius* sp., several species of Capsids.

Homoptera.—One species of Psyllidae (on native palm), *Iolania perkinsi, Oliarus montivagus, O. nubigenus, Oliarus* n. sp., eight or ten species of Delphacidae, four or five species of Jassidae.

OCTOBER 5TH., 1911.

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

ENTOMOLOGICAL PROGRAM.

A Newly Introduced Wasp (Odynerus.)

BY W. M. GIFFARD.

(Specimens exhibited.)

A few weeks ago whilst in my garden at Makiki I observed what appeared to me to be a peculiar species of wasp flying rapidly over certain low-growing trees. The lateness of the day prevented more than a casual observation but on the following morning I watched for its reappearance. The weather being sunny and with little wind every opportunity was afforded for the occasion with the result that several individuals were observed and a few captured. These all proved to be males of a species of *Odynerus* which I had never before seen in the Territory and which certainly did not belong to our indigenous or endemic Aculeate fauna. For a few days I continued without success my search for female specimens meanwhile securing a sufficient number of males to form a series of that sex. With the object of capturing females I finally decided to closely ob-

serve the flights of the males, which appeared always to take a direction toward the dwelling near by. A close examination of the exterior of the building as well as of the shrubbery adjacent thereto resulted in noticing more than the usual number of males flying around and over Hibiscus bushes alongside a latticed porch. Having watched these for a short while it was observed that after flying around the flowers for a few minutes several of the wasps would direct their flight toward a window near by, the blinds of which had been securely closed and fastened for sometime past. A closer examination revealed the fact that numbers of the wasp were buzzing around the partly opened slats of the blinds. Noting several of the largest individuals which at first sight appeared to be females, I was again unsuccessful in securing that sex. Why so many male Odynerus were buzzing around the slats of these blinds without any apparent object was certainly puzzling. I finally came to the conclusion that a peculiar spot for their nests had been selected on the inside of the blinds and these males were waiting for the emergence of females. Eventually opening the blinds I discovered three large nests of our common mud-dauber (*Sceliphron caementarium*) adhering to the glass and window sash. After detaching these they were placed in separate breding jars in the laboratory. The results obtained have been altogether satisfactory as from these mud-dauber nests there have so far emerged 10 females and 18 males of this peculiar but apparently common wasp. With exception of a sufficient number for examination and determination all of the bred males were liberated.

This newly introduced *Odynerus* uses the vacant cells of *Sceliphron* for its nests in the same manner as our indigenous *O. nigripennis* is now known to do. In some of these cells were found fairly large supplies of caterpillars with which the larvae of Odynerus are fed. Specimens of the caterpillars have been kindly determined for me by Mr. O. H. Swezey as *Cryptoblabes aliena* Sw. It is of economic interest to note that this particular species of Lepidopterous larva has thus far not been found in the nests of any of our local species of *Odynerus*. The mud-dauber nests also appeared to be well stocked with the larvae and pupae of *Sceliphron* as well as those of the *Odynerus* although up to the present I have only bred out the latter. The larvae of both these Aculeates I found attacked by *Melittobia hawaiiensis* Perk., swarms of these small Chalcidoid parasites being found in both larval and pupal stages. Thousands have since bred out in the jars as well as in individual tubes where both larvae and

pupae of the Aculeates were placed for experimental purposes. At this time I should judge that the larvae of *Sceliphron* are more susceptible to attack from these parasites than that of the *Odynerus*. *M. hawaiiensis* has previously been bred from the larvae of *Sceliphron caementarium, Odynerus nigripennis, Pison hospes* and *Megachile palmarum*. It is quite probable that this Chalcid and others are, to a more or less extent, accountable for the occasional rarity of many species of our endemic wasps.

A careful study of available literature on the Eumenids (unfortunately confined here to three works) leads me for the present to determine this newly introduced wasp as *Odynerus nasidens Latr.* If it is not that species then it is either *O. simplicornis* Sauss., or a variety of one or the other.

Saussure in his Synopsis of Am. Wasps, Pt. I, pp 228-229, 1875, places the *O. nasidens* of Latreille in his Division *Pachodynerus* (also see Sauss. Mon. des Guepes Sol. p. 169, 1852, and Supl. pp. 229, 252, 1856, Division Epsilon), this division of the Odynerus having the antennae of the males simple, that is, not terminated by a hook. He has described three species in the Section of his Division *Pachodynerus* to which *O. nasidens* belongs, viz.:—*O. brevithorax,* Sauss, *O. nasidens,* Latr., and *O. simplicornis,* Sauss. All of these three species evidently have a close resemblance to each other and Saussure himself states that without comparing numerous specimens of each of the species one easily confounds all under the same description, taking them for *O. nasidens* of Latreille. He further states that even after the examination of his numerous specimens he still remained in doubt although he *thought* that he could distinguish *O. brevithorax* quite clearly and in consequence determined it as a new species. On the other hand in referring to his *O. simplicornis* he admits that "one should perhaps consider this species as a variety of *O. nasidens.*" Unfortunately there are no named specimens of foreign Eumenids available locally for reference purposes so that a comparison of such with either tables of genera or species is altogether impossible. The available literature on the subject is also incomplete and because of these facts I have sent a small series of both sexes of this introduced wasp to the U. S. National Museum at Washington. In due course we will no doubt secure a conclusive determination of the species.

According to Saussure, *O. nasidens* and its close allies are species peculiar to tropical America, 1st—from the hot parts of Mexico, 2nd—from Colombia and Venezuela, 3rd—from Bahia

and Brazil. It is possible that the wasp under discussion was introduced here from Mexico amongst freight received from Salina Cruz by the American-Hawaiian line of steamers.

For examination I have captured 16 males flying over garden plants and shrubs, and 18 males and 10 females have been bred from the nests of *Sceliphron caementarium* as previously noted. A much larger series could, if necessary, be captured as I still notice many of these wasps flying around.

Note—Since writing the above I have received a small lot of endemic *Odynerus* from Kauai collected for me by Mr. G. P. Wilder, and among these I noticed two males and one female of this newly introduced wasp. This indicates that it is already established elsewhere than on Oahu, and also that the species must have been here for some time past. It is somewhat strange that a series has not been captured long ere this. I now think it possible that the single individual wasp which Mr. F. W. Terry captured a few months ago in the window of a room on Punchbowl and which he exhibited at a meeting of the Entomological Society a few months ago may be the same species. As he is away at this time this fact cannot be ascertained and his specimen is therefore not available for comparison.

Mr. Severin related some observations he had made a few weeks previously on the occurrence of Nematodes in sugar beet fields in California.

Mr. Ehrhorn, who had recently returned from a vacation trip to California, spoke of the unusual dryness of the regions surrounding San Francisco and Central California, and the consequent scarcity of insects, making it exceedingly unfavorable for doing any collecting.

NOVEMBER 2ND, 1911.

The seventy-eighth regular meeting of the Society was held in the usual place.

Mr. Swezey exhibited a collection of about 50 species of moths collected by Mr. Giffard at his new bungalow near the Volcano House, Kilauea, Hawaii. The moths were collected as they came to lights at night, during the summer of 1911, when Mr. Giffard was making a short stay there at several different

times. Some of the species exhibited were very common, some rather rare, and a few apparently new to science.

Mr. Giffard added that he collected *Banchogastra nigra* and other Ophionids also at lights.

Mr. Giffard further reported having found *Pachodynerus nasidens* very numerous at Makaweli, Kauai. This is the new wasp exhibited by Mr. Giffard at the previous meeting. Mr. Severin reported collecting it at the College of Hawaii. Mr. Swezey reported rearing two specimens from a *Sceliphron* nest at the Experiment Station, H. S. P. A.; and Mr. Muir reported collecting a specimen on the window at the same place.

DECEMBER 21ST, 1911.

The seventy-ninth regular and sixth annual meting of the Society was held in the usual place.

ANNUAL ADDRESS.

Suggestions for the Future Growth of the Hawaiian Entomological Society.

BY E. M. EHRHORN.

The Hawaiian Entomological Society is now seven years old, for on December 15, 1904, the first meeting to consider the advisability of forming the society took place and the first regular meeting was held January 26, 1905. As the seventh president of the Society, I desire to say that in looking over the Proceedings I find that the society today is not doing as much nor possibly as important a work as it did in the first three or four years of its existence. It is true that many of our members have been absent and we have lost several by death and resignation. Article II of our Constitution says: "The objects of the Society shall be to promote the study of Entomology in all possible bearings, and to encourage friendly relations between those in any way interested in the science." In 1905 we had a membership of twenty of which two were honorary members; today we have a membership of twenty-five with four honorary members. Our Constitution in Article III says: "The society shall consist of active, corresponding and honorary members. No

corresponding members shall be elected from residents on the Island of Oahu." Many of our members are supporting members, that is; many of our rich influential men have become members so as to financially aid us, and some have in the past contributed money to help publish our Proceedings. Only a small number of our members take an active part in the meetings and at times it is hard to even get a quorum.

It seems to me that it would be advantageous to our Society to follow other societies in regard to membership. We find that on account of the small number of strictly professional members, some societies have divided their membership into two groups; namely, active members and associate members. Other societies add foreign and corresponding members. I believe that some steps should be taken to encourage the study of Entomology in these Islands and to that end we should provide a section into which would fall members who are interested in Entomologoy such as teachers and students. I believe that that class of membership will help the Society and we shall be able to promote our favorite study in all possible bearings and encourage those who now feel diffident and yet might, by a little encouragement, show their hidden talents. I personally know of several individuals, who never got the fever until they were shown interesting phases of Entomology and they are today not only enthusiasts, but very good Entomologists, some even specialists in certain groups. Our various departments today are in need of willing workers as assistants in Entomology, some of our young men or women who have a fairly good education would be able to become proficient in many phases of Entomology, mounting specimens, rearing injurious as well as beneficial insects, etc., if we could encourage them in these studies. I believe that it is possible to interest and encourage many students of our various colleges in the many interesting branches of our study and some no doubt would become good working members in the end.

Now that the Territorial Government is undertaking inspection work in various ways, we who come in direct contact with the situation fully realize the scarcity of available men, especially those who have the smallest knowledge of Entomology. Our colleges and schools are not taking up the study of Entomology in a way which would encourage the student to make this his future work. This is possibly due to the lack of funds or to the lack of time, which is usually consumed by other studies.

Associate members or junior members could be taken in on a smaller fee but certain privileges of active members could be withheld from them. The educational features would be their greatest benefit, and if encouraged by this, they would have a chance to soon become active members, in other words, by such arrangements the Society would run a good chance of acquiring a good working membership in the near future.

Many of our professional men, our medical fraternity, our health authorities, even men working in vegetable pathology would be interested in our work. The medical men have always various cases where insects seem to have a direct bearing, the health authorities especially at the present moment have many problems which come in direct touch with Entomology and the vegetable pathologist has interesting work in the fungi which attack insects and in those insects which feed on fungi. We have enormous fields for investigation, but our force is now in very limited numbers.

The demand for our Proceedings has increased and are very valuable to other societies. It is true that we have not published as frequently lately as in the past and unless some new life be introduced into the Society, I am afraid that we shall weaken considerably in the future. I am not making these remarks to throw cold water on our work, but merely to try and bring before the Society the absolute necessity of considering some ways and means to promote it.

I would recommend that a committee be appointed by the incoming president to take up this matter and formulate some plan by which we can increase the membership of the Society and possibly broaden the field of Entomological work.

Further Notes on "A Newly Introduced Wasp (Odynerus)."

BY W. M. GIFFARD.

In the course of my remarks on the above subject read before the September meeting of the Hawaiian Entomological Society I referred to the species as possibly *O. nasidens* Latr. *(Pachyodynerus* Sauss.) or else Saussure's *P. simplicornis.* Having sent specimens to Mr. S. A. Rohwer of the U. S. National Museum, Washington, D. C., I am in receipt from him of the following note, viz.:

Pachodynerus simplicornis Sauss.

"Brethes calls attention to the fact that *Pachodynerus* has only 12-jointed antennae (the 12th joint being small and knob-like) and considers it to be a genus. Brethes also figures the genitalia of the male of *nasidens* and *brevithorax*. Your insect differs from these but agrees with what we have as *simplicornis*. As the types have never been examined it is possible that error may have crept in, but for the time being it may be well to consider your insect *simplicornis*. It is my impression that there are more species in this group.

"If it were possible to examine the types of the species in question, especially in reference to the genitalia, I thing it possible that your insect would be classed as a new species. As this is entirely out of the question it is best to leave it as I have determined it."

NOTES AND EXHIBITIONS.

Mr. Swezey reported that *Caryoborus gonagra,* the tamarind weevil, had been found on Kauai; quite a number of specimens having been sent to the Experiment Station H. S. P. A., that had been collected in Mr. Hans Isenberg's gardens at Lihue, where they were thought to be some new bug destructive to all kinds of garden vegetables. Mr. Swezey thought that they were probably only hiding in the dead or crumpled leaves, as he had found them quite numerous in the dried up dead leaves on papaia trees at his place in Kaimuki.

Mr. Ehrhorn read a letter from Q. Q. Bradford, Formosa, in which he reported having seen but one specimen of the Japanese rose beetle there; also that he considered the melon fly scarce there, having seen a few cucumbers with the spots where the eggs had been laid.

Mr. Ehrhorn also reported having discovered the presence of the mite which causes the "Kiawe itch," it being the same species (*Pediculoides ventricosus* Newport) that attacks the joint worm in straw, in the States, where severe cases of itch have been traced to it from that source. He expects to continue observation and experiments with this mite. It breeds on the larvae of weevils feeding in the Kiawe beans.

Mr. Ehrhorn further called attention to the abundance of the pigeon fly (a species of pupiparous fly), at a place on the

corner of Young and Keeaumoku streets, Honolulu. In discussion, it was brought out that this fly is now very common in Honolulu. It is but little more than a year since its presence here first came to the attention of the entomologists. It has not yet been determined specifically, nor from what locality it came.

Mr. Fullaway exhibited specimens of parasites bred from the cotton moth *(Gelechia gossypiella),* the following now being known: *Chelonus blackburni, Pristomerus* sp., *Parasierola* sp., *Hockeria* sp.

ELECTION OF OFFICERS FOR 1912.

President	D. T. Fullaway
Vice-President	F. Muir
Secretary-Treasurer	O. H. Swezey

JANUARY 4TH., 1912.

The eightieth meeting of the Society was held in the usual place.

ENTOMOLOGICAL NOTES.

Mr. Swezey exhibited a collection of 30 or more species of moths, collected by Messrs. Giffard and Ehrhorn at Mr. Giffard's house near the Volcano House, Kilauea, Hawaii, during the early part of the evening of three nights in December, 1911. Among them there was one new species: an *Aristotelia* larger than any species previously described for the Hawaiian Islands. There were also a few other species not previously seen by Mr. Swezey.

Mr. Ehrhorn exhibited a few species of ants, recently determined by Mr. W. M. Wheeler. Two of them were: *Monomorium minutum* var. *liliuokalani,* collected at Kaimuki; and *Tetramorium guinense,* collected at Hilo. Two species had not previously been recorded from the Islands. *Plagiolepis exigua* Forel, taken at Kalihi; and *P. mactavishi,* taken in Honolulu. Dr. Perkins recognized *exigua* as a species that he had been seeing a good deal of lately, his first notice of it having been specimens that were sent in from Hutchinson Sugar Plantation, Naalehu, Hawaii, two or three years ago. Mr. Swezey had the

past year found their nests in rotten sugar canes at the Experiment Station in Honolulu and at Aiea, Oahu. This was followed by a general discussion of several of our species of ants. Mr. Ehrhorn related an interesting experiment in which he sprinkled pulverized Cyanide of Potassium on the surface of the ground around the entrance of a nest of *Solenopsis geminata,* and then by stamping on the ground, the ants were disturbed, and many came forth and were very quickly overcome as they crawled over the Cyanide.

Mr. Giffard called attention to the spread of the introduced fern weevil (*Syagrius fulvitarsis* Pasc.), on the mountain ridges near Honolulu. It was first known on Pacific Heights Ridge as early as 1903. By 1906, it was common on the Pauoa side of Tantalus; and has now spread to the Manoa side of Tantalus. It is attacking and killing off nearly all the ferns of the species *Sadleria cyatheoides,* and is causing some concern lest it later on attack some other species of tree ferns of the region, none of which so far have been observed to be attacked by it. During all this time, several of the florists in Honolulu were having their maidenhair ferns attacked by this weevil. In the latter fern, it is the underground rhizome that is attacked, while in the *Sadleria,* the weevils attack the stem of the frond, the larvae burrowing all through it.

Moths from Olinda, Maui.

BY OTTO H. SWEZEY.

The following is a list of moths collected by Mr. J. F. Rock as they came to lights at night, at Olinda, Maui. Among them are a few that I have never collected, and are somewhat rare, one of them being *Hymenia exodias,* which was only collected once before and that by Dr. Perkins on Molokai.

FAMILY CARADRINIDAE.

2—*Cirphis unipuncta* (Haw.)
3—*Lycophotia saucia* (Hub.)
1—*Agrotis cinctipennis* (Butl.)

FAMILY PLUSIADAE.

2—*Nesamiptis obsoleta* (Butl.)
6—*Cosmophila noctivolans* (Butl.)
27—*Cosmophila sabulifera* (Guen.)

FAMILY SELIDOSEMIDAE.

4—*Scotorythra rara* (Butl.)
2—*Scotorythra paludicola* (Butl.)

FAMILY PYRAUSTIDAE.

10—*Omiodes continuatalis* (Wall.)
16—*Omiodes accepta* (Butl.)
3—*Omiodes localis* (Butl.)
4—*Omiodes monogona* Meyr.
3—*Hymenia exodias* Meyr.
1—*Phlyctaenia micacea* (Butl.)
1—*Scoparia siderina* Meyr.
6—*Scoparia frigida* Butl.

FAMILY CARPOSINIDAE.

1—*Heterocrossa trigononotata* Walsm.

FAMILY TORTRICIDAE.

2—*Crocidosema plebiana* Z.

FEBRUARY 1st., 1912.

The eighty-first regular meeting of the Society was held in the usual place.

The secretary read Resolutions of Sympathy on the death of Mr. F. W. Terry and an Obituary Notice*, prepared by the President and secretary as instructed by the Society at the previous meeting. Both adopted.

ENTOMOLOGICAL PROGRAM.

Mr. Swezey reported breeding *Pentarthron flavum* P. from eggs of *Vanessa tammeamea* collected on Mt. Olympus, Oahu, January 21, 1912. He had observed a parasite sitting on an egg in situ; and of 11 eggs collected, 5 had already yielded parasites. He exhibited 24 that had emerged from one egg of the butterfly. This is believed to be the first record of this butterfly's eggs being parasited.

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*Published in Proc. Haw. Ent. Soc. II., 4, p. 189, 1912 [Ed.].

Mr. Fullaway reported finding 20 per cent of the eggs of *Caryoborus* and *Bruchus prosopis* on algeroba pods parasitized by a Trichogrammid (*Uscana semifumipennis* Girault).* This parasite is thought to have been introduced at the time he was receiving weevil parasites from Texas a few years ago.

A New Endemic Fern Weevil of the Genus Heteramphus.

BY OTTO H. SWEZEY.

On January 14th, 1912, while following up the ridge on the west side of Palolo Crater on the trail leading to the summit of Mt. Olympus, fronds of ferns of the genus *Elaphoglossum* were observed to be mined by some insect. Examination of several mines resulted in the finding of one adult beetle, a pupa, and several larvae. The fronds of the ferns of this genus being broad and entire are quite suitable for the work of leaf-miners. Three species of *Elaphoglossum* were found to have the fronds mined. Larvae of the miner were first found in *E. micradenium,* but later in *E. gorgoneum,* and *reticulatum* also. The adult beetle found was in its own mine, where it had transformed to the adult stage and had not yet emerged, furnishing on the spot, proof of what insect was responsible for the mines.

On January 21st the same locality was again visited, and more of this miner collected in all stages. It was found that this weevil existed wherever these particular ferns were found all the way up Mt. Olympus, and then down the ridge between Palolo and Manoa Valleys, as evidenced by the mines in the fern fronds. Many of these mines showed the exit holes of some parasite. Searching for the parasite, finally a parasite pupa was found in one mine and in another a weevil larva was found to have a tiny parasite larva feeding on it. Attempts to rear these to maturity failed, but from mines in fern fronds collected, five parasites emerged, one each on the following dates: February 2, 5, 8, 12, 13. These were *Omphale metallicus,* a small Chalcid which parasitizes many Lepidopterous leaf-miners in the Hawaiian Islands.

Several adult weevils also emerged from mines in these fronds somewhat later. On comparison these were found to differ from the previously known species, some of which are known to inhabit the trunks of tree-ferns, and Dr. Perkins has

*Trans. Am. Ent. Soc. XXXVII, No. 1, p. 23, 1911.

pronounced it a new species. It is quite a different habit as compared with the others of the genus, as the larvae of those whose habits are known, live at the base of the fronds or in the trunks of tree-ferns, and at the base of the leaves and in the stems of *Astelia veratroides,* a plant of the Lily family.

Notes on Two Galleriids.

BY OTTO H. SWEZEY.

Paralipsa modesta Butler.

I have reared two specimens of this moth from larvae handed me by Mr. E. M. Ehrhorn, July 8th, 1911. A large importation of Japanese rice was found by him to be infested with some hitherto unknown Lepidoterous larvae. The shipment was therefore fumigated. A few of the larvae were retained for rearing to ascertain the species.

The larvae were apparently full-grown at the time. They were larger than the larvae of *Ephestia elutella,* dirty whitish, with two or three of the segments at either end tinged with fuscous; head reddish; tubercles minute, fuscous.

By July 20th several cocoons were made. Several of them were inside the cork of the tube containing the specimens, the larvae having burrowed into the cork for that purpose. At intervals of two or three weeks, some of these cocoons were examined, and the larvae found to be lying dormant without pupating. These observations were continued up to October 31st, without finding that any pupae had been formed; but on November 17th, it was found that two moths had emerged; one was still living, but the other had died. To the present date (Feb. 1, 1912) no more moths have appeared, and examination revealed a living larva in one cocoon.

I have recently been able to determine this moth as *Paralipsa modesta* Butler. It is described in Ann. Nat. Hist. (5), IV., p. 455, 1879, where the venation of forewing of the male is given. The peculiarity of the genus is the enlarged cell in forewing of male, and the mass of appressed hair-scales just before middle of cell on underside. Butler described the genus and species from a collection of Japanese moths collected at Yokohama. No habits are given. I have not found anything further of it in literature.

Corcyra cephalonica Stn.

This moth first came to my attention when Mr. J. Kotinsky found it breeding in a feed warehouse in Honolulu in July, 1908. Later, I caught a specimen in my house in Kaimuki, January 10th, 1909. The latter part of January of this year, the moths were found emerging from the remnants of a package of cracked wheat obtained from some Honolulu grocery store some time previously. From these specimens, I have determined it as *Corcyra cephalonica* Stn., a European moth, apparently not yet recorded in the United States, though it certainly must occur there from whence it has reached Honolulu.

MARCH 7TH, 1912.

The eighty-second regular meeting of the Society was held in the usual place.

ENTOMOLOGICAL PROGRAM.

A Leaf-Mining Proterhinus.

BY OTTO H. SWEZEY.

While on a collecting trip up Mt. Olympus, Oahu, February 11, 1912, I observed that the leaves of *Broussaisia arguta* were very extensively mined. Examining some of these, I was surprised to find in the mines larvae of some beetle, footless grubs of the Curculionid type. Examining the tree further, I found adult beetles of the genus *Proterhinus* very abundant at the tips of growing shoots, feeding on the buds and young leaves, between the latter where they are close together previously to their unfolding in the growth and development of the shoot. Many of the larvae found appeared to be full-grown. No pupae were found. I did not succeed in rearing any adults from the larvae collected. They all died a few days after they were brought down from the mountains. However it is beyond a doubt that the larvae found in the mines in the leaves belong to the species of *Proterhinus* whose adults were so numerously feeding on the same tree. Dr. Perkins has kindly determined the species as *excrucians* P., a very variable species which has been abund-

antly collected by him in numerous places on Oahu; Waianae, Mokuleia, Wahiawa, N. W. Koolau Range, Pauoa and Mt. Tantalus.

All along the trail from Olympus to Konahuanui, the *Broussaisia* trees have their leaves much mined by this weevil. The mines largely follow the larger veins and the midrib, though they also traverse to some extent the parenchyma between veins. This leaf-mining habit has not been previously observed for any species of *Proterhinus,* their larvae being largely dead-wood and bark feeders.

In one mine a pupa of a parasite was found, from which the adult emerged later. One beetle larva was found having a parasite larva feeding on it externally; but it failed to go through to maturity. The parasite was examined by Dr. Perkins, who says that it belongs to the genus *Toxeuma,* or to *Neolelaps*—two genera that are not readily separated and perhaps should be considered identical.

Dr. Perkins, who had determined the species for Mr. Swezey, remarked that of the considerable number collected by Mr. Swezey all were males. He said that this was a very variable species, some being entirely black; and that in his former collection of this species from different localities, those from each locality differed from those of the other localities.

Mr. Swezey exhibited a collection of moths made by Messrs. Giffard and Fullaway at the mountain home of the former, Kilauea, Hawaii during a few nights in the past month. There were about 70 species, several rare ones and three or four new ones. Mr. Giffard said that at the time these moths were being collected, great numbers of Tipulids also came to the lights.

Mr. Fullaway exhibited a specimen of a wingless species of *Phenopria* collected by him March 3, 1912; along the trail going up from Nuuanu Valley at the mauka or back end of Pacific Heights Ridge. He also reported finding a specimen of the Pipturus Delphacid *(Nesosydne pipturi)* parasitized by *Gonatopus perkinsi.* Dr. Perkins said that there was a hyperparasite on this *Gonatopus* that had not yet been described.

Mr. Fullaway also reported having bred two parasites from *Hemichionaspis minor: Aphelinus diaspidus* and *Aspidiotiphagus citrinus.*

Mr. Swezey exhibited some eggs and freshly hatched nymphs of *Prognathogryllus* sp., one of a group of crickets peculiar to the Hawaiian Islands. The eggs of any of the species had never

been observed before. Mr. Swezey had found these eggs on Mt. Olympus, Feb. 11, 1912, in two leaves of a native tree, *Labordea membranacea,* at an elevation of about five feet from the ground. They were placed in the midrib of the leaf, nearly regularly, about 10mm. apart. Apparently the female cricket had bitten off a little of the upper surface of the midrib, then inserted the egg at this place, directing it downward, the end being left exposed. The egg is cylindrical in shape, curved a little near the outer end, the latter being truncate where exposed; whitish, 6mm. long and nearly 1mm. in diameter.

Mr. Swezey reported *Lineodes ochrea* as a pest on egg-plant, having received caterpillars that were feeding on this plant at Kilauea, Kauai, from which he had reared the moth. The habits of the 2 species of *Lineodes* in the Hawaiian Islands had not previously been known. Mr. Swezey said that the only record of the habits of any species of the genus that he could find was that of two species in the Southern States, one feeding on Capsicum and the other on species of Solanum, both related to the egg-plant. Dr. Perkins thought that it was very likely that the Hawaiian species were introduced, probably from America.

Mr. Swezey also reported finding the eggs of *Caryoborus gonagra* on some bananas. Examination had shown that they had hatched and that the young larvae had eaten a little into the rind of the fruit and then died, as though poisoned by some chemical substance in the juice.

APRIL 4TH, 1912.

The eighty-third regular meeting of the society was held in the usual place.

ENTOMOLOGICAL PROGRAM.

Synoptic List of Ants Reported from the Hawaiian Islands.

BY MISS LOUISE GULICK.

(Specimens of ants were exhibited, and a presentation of synonomy with references in literature to the descriptions of all the species of ants known in Hawaii, with remarks on the same; also a key for identification of species. In the list 21 species were included as known to occur without a doubt, and a few others that have been reported, but not at present to be found in any collection in Honolulu. See Appendix.)

Preliminary List of the Hymenopterous Parasites of Coccidae And Aphidae in Hawaii.

BY D. T. FULLAWAY.

CHALCIDOIDEA.

Encyrtidae.

Ectromini.

Parasite.	Host.
Anagyrus sp?	on *Pseudococcus* sp.

Encyrtini.

Encyrtus fuscus	on *Saissetia hemispherica.*
Encyrtus sp., (banded ant.)	on *Saissetia* sp.
Encyrtus sp.	on *Saissetia hemispherica*

Mirini.

Blepyrus insularis	on *Pseudococcus aonidum, P. virgatus.*
Aphycus terryi*	on *Pseudococcus saccharifolii.*
Aphycus sp?	on *Lepidosaphes* sp.
Microterys flavus	on *Pulvinaria mammae, P. psidii, Ceroplastes rubens, Saissetia hemispherica, S. nigra.*
Apentelicus kotinskyi	on *Lepidosaphes* sp.
Adelencyrtus odonaspidis	on *Odonaspis graminis.*
Cerapterocerus sp.	on *Saissetia hemispherica, Aspidiotus* sp?
Hemencyrtus sp?	on *Saissetia nigra.*
Aphidencyrtus sp?	on *Aphis maidis.*
Encyrtus sp?	on *Pseudococcus citri.*
Encyrtus sp. (near *Aphidencyrtus*)	on *Coccus viridis.*

Pteromalidae.

Eunotinae.

Scutellista cyanea	on *Saissetia hemispherica.*

Sphegigasterinae.

on *Asterolecanium pustulans,Tomocera californica*
Saissetia hemispherica, S.
nigra.
on *Ceroplastes rubens.* *Tomocera ceroplastis*

Eulophidae.

Entodoninae.

Astichus sp. on ?

Aphelininae

Aneristus coroplastae on *Ceroplastes rubens.*
Coccophagus orientalis on *Pseudococcus* sp., *A. rapax, Coccus viridis?*
Coccophagus lecanii on *Aspidiotus rapax.*
Encarsia sp. on *Aleyrodes sonchi*
Thysanus sp. on *Asterolecanium pustulans, Aspidiotus cydoniae, A. rapax.*
Aphelinus mali on *Aphis* sp. (on sedge.)
Aphelinus diaspidis on *Diaspis bromeliae, Aulacaspis rosae, Hemichionaspis minor Aspidiotus camelliae, A. rapax.*
Perissopterus sp. on *Lepidosaphes* sp., *Pseudococcus?*
Pteroptrichoides perkinsi on *Coccid* (n. g., n. sp.) [Kot.]
Pteroptrichoides sp. on *Asterolecanium pustulans, Howardia biclavis.*
Aspidiotiphagus citrinus on *Hemichionaspis minor, Chrysomphalus aonidum*
Eretmocerus corni on *Aleyrodes hibisci.*

ICHNEUMONOIDEA

Braconidae.

Aphidiinae

Diaeretus rapae on *Aphis brassicae, Macrosiphum* sp.,*Myzus perisicae.*

CYNIPOIDEA.

Figitidae.

Eucoilinae

Eucoila sp. on *Macrosiphum* sp., *Aphis sacchari.*

Mr. Muir exhibited a deformed specimen of *Dictyophorodelphax mirabilis,* which he caught on Kaumuohona Ridge, March 24th. The prolongation of the head was curved and bent downward, almost doubled on itself below.

JUNE 6TH, 1912.

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

ENTOMOLOGICAL PROGRAM.

Mr. Ehrhorn exhibited specimens of egg-case, young and adult of a mantis. The egg-case was taken off an azalea from Japan, and 246 young hatched from it. There was a great mortality on the second day after hatching; only one had lived through to adult, and one nearly adult. The young fed an aphids. The dates of moulting were as follows: Born Feb. 13; first moult Feb. 29; second moult March 23; third moult April 9; fourth moult May 1; fifth moult May 13; sixth moult June 1. This makes 109 days from hatching to maturity.

Mr. Fullaway exhibited a specimen of *Tettigonia mollipes?* (an American Jassid) taken for the first time in these islands, May, 1912. It was taken by his assistant, J. Nunes, in Ward's meadow at the foot of Sheridan street, Honolulu. Mr. Muir had later visited the spot and found the species numerous on the reeds and grasses round about the swamps in that district.

AUGUST 1ST, 1912.

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

In a communication from Mr. Muir, the information was given of the death of the Rev. Thomas Blackburn. On motion of Mr. Giffard, the chair appointed Messrs. Muir and Swezey as a committee to draft resolutions and obituary of Mr. Blackburn.

ENTOMOLOGICAL PROGRAM.

Some Notes on Insects in Kona, Hawaii.

BY D. T. FULLAWAY.

Mr. Fullaway gave interesting notes on the occurrence of the following insects in that region: The *Pompilus* that made its appearance in Honolulu in 1910; *Crabro fulvicrus;* the recently-introduced Trichogrammid, *Uscana semifumipennis,* on the eggs of the algaroba bean weevil; *Coccus viridis* on coffee, parasitized by *Coccophagus orientalis,* and *Encyrtus* sp.; the caterpillars of *Cryptoblabes aliena* causing some alarm amongst coffee growers, as they occurred on the branches among the berries and occasionally did some eating on the latter; *Ceratitis capitata* breeding in the heaps of decaying pulp from the coffee-cleaning mills, and the maggots considerably preyed upon by ants and other insects that are commonly found in cow dung preying on maggots of hornfly and other flies; *Psilopus* sp.; *Omiodes* caterpillars feeding on wild bananas, apparently a new species, differing little from any of the four other species of *Omiodes* feeding on banana.

Mr. Swezey reported having recently observed a place up in one of the side branches of Makiki Valley where all of the ferns had been killed by the weevil *(Syagrius fulvitarsis)* which is spreading across Mt. Tantalus killing some kinds of ferns, especially *Sadleria cyatheoides.* There was considerable discussion of this insect. Mr. Ehrhorn said that Brother Matthias had reported its occurrence at Hilo, Hawaii, several years ago (1908).

Mr. Swezey gave quite an account of his recent vacation trip to New Zealand, and his experiences in collecting insects in the New Zealand "bush." Although it was their winter season, he was able to secure many interesting specimens and intended to have them mounted for exhibition at some future meeting of the Society.

SEPTEMBER 5TH, 1912.

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

Mr. C. J. Austin was reinstated to active membership.

Mr. Muir exhibited specimens of *Anomala orientalis,* a beetle whose grubs he had found destructive to the roots of sugar cane in certain spots of Honolulu Plantation, Oahu, in June, 1912. He had compared the grubs with some which Mr. Ehrhorn had collected at various times at the roots of plants imported from Japan, and had found them to be the same. They are quite similar to the grubs of the Japanese rose beetle *(Adoretus tenuimaculatus),* and probably have previously been mistaken for them, as the indications are that the *Anomala* has been present for a number of years, grubs having been taken from these same spots but no adult beetles were seen previous to June of this year.

Miscellaneous Notes.

BY O. H. SWEZEY.

Uscana semifumipennis.—An algaroba pod picked up under a tree along the Roundtop Trail, Sept. 2; 1912, was found to have 88 Bruchid eggs on its surface. A later examination showed that 83% of these were, or had been parasitized by this Trichogrammid, introduced by Mr. Fullaway a few years ago, and which is now known to be very widely spread.

Syagrius fulvitarsis.—In conversation with Brother Matthias at Hilo, August 17th, it was learned that the occurrence of this weevil, that he had reported in Hilo in 1908, was at the Shipman house, and that the weevils were in ferns brought from Honolulu. He had not ascertained whether they had gotten rid of the pest or not.

Pompilus sp.—This Pompilus that first appeared in 1910, was observed abundant in the cane fields of the Hilo district, in August of this year.

Mr. Kuhns reported having seen this wasp on Molokai in June.

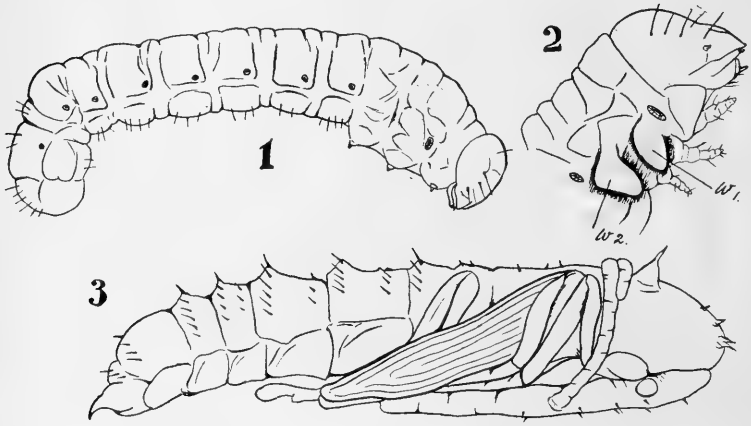
On an Abnormal Larva of *Lasiorhynchus barbicornis* (Fabr.)

BY F. MUIR.

Among the insects collected by Mr. O. H. Swezey on his recent trip to New Zealand are the larvae, pupae and adults of *Lasiorhynchus barbicornis;* one of these larvae is of particular interest, it being a good instance of the precocious development of wings and legs.

The normal larva has very small, two-jointed legs, the thorax is slightly larger than the abdomen, the eighth and ninth abdominal segments are turned ventrally nearly at right-angle to the rest (Fig. 1). In the abnormal specimen, which is not a fully grown one, there arises from each side of the second and third thoracic segments a well-defined wing-pad supplied with tracheae; the legs of this specimen, instead of being minute two-jointed organs, are very much larger and distinctly six-jointed. (Fig. 2.)

In the male pupa the antennae, arising from near the apex of the rostrum, lie along each side of the head, the head and rostrum being deflexed and lie on the ventral surface of the thorax; in the female the antennae, which arise about the middle of the rostrum, encircle the thorax (Fig. 3). Mr. Swezey states that the burrows in which the beetle pupates is only slightly larger than the beetles in circumference, and as half and wholly mature beetles are found in the burrows with the head extended in front, in the normal adult position, it would appear that the head and rostrum are straightened out immediately upon emerging from the pupa, while the insect is still soft. The writer has observed a similar state of things with Brenthids in Larat and it is probably the usual thing with Brenthids.



Lasiorhynchus barbicornis.

Fig. 1—Normal larva. Fig. 2—Abnormal larva. Fig. 3—Female pupa.

Leaf-Miners of the Hawaiian Islands.

BY O. H. SWEZEY.

My first interest in the insects mining leaves in these Islands, was in connection with those that are the larvae of moths. While making observations on these, and being on the lookout for others that I was not already familiar with, I have come across a number of leaf-miners belonging to some of the other orders of insects. Some of these are of extreme interest on account of their differing so widely in habit from their near relatives. I take this occasion to bring my notes together in the form of a paper that they may go on record for publication. Of the leaf-miners herein treated, 21 belong to Lepidoptera, 4 to Diptera, and 2 to Coleoptera.

LEPIDOPTERA.

FAMILY PYRAUSTIDAE.

Promylaea pyropa Meyr.—This is a very rare moth. I have on two or three occasions reared it from larvae found feeding in leaves of *Peperomia pachyphylla,* a low thick-leaved succulent plant. As the larva becomes nearly full-grown, it eats the entire mesophyll of the leaf, then breaks through the epidermis and migrates to another leaf, boring through the epidermis and entering to feed on the mesophyll. This habit is of great interest, as the other Pyraustids here, whose habits are known, are leaf-rollers or feed between leaves, and in moss. The two genera to which *Promylaea* is perhaps nearest related, *Mestolobes* and *Orthomecyna* have many species, but the larvae of none of them have as yet been discovered. It remains yet to be discovered whether they have unusual habits like *Promylaea* or not.

FAMILY GELECHIADAE.

Aristotelia mendax Walsm.—The larvae of this moth mine the leaves of *Gouldia.* I have often found the leaves of very small young plants of this tree all mined, so as to fall off, leaving the plant defoliated. The mine is at first slender and serpentine. As the larva becomes nearly full-grown, it eats out the whole parenchyma of the leaf and sometimes eats down through the petiole of the leaf to the stem, and sometimes also migrates to another leaf. It emerges from the leaf to form its cocoon on the surface of a leaf, or other suitable situation.

Phthorimaea operculella (Zell.)—This is the potato moth, a

pest in the Pacific Coast states of the United States, and in Australia and New Zealand. Here its larvae mine the leaves of potato, tomato, *Datura* and some other Solanceous plants. The larvae also bore into the stems and often into the green fruits of tomato, destroying a good many before they are grown, and also attacking the full-grown or ripening fruit. Tobacco leaves are sometimes mined by the larvae, in which case it is called the "tobacco split-worm." The larvae pupate in some part of the tunnel or place where they have been feeding.

FAMILY HYPONOMEUTIDAE.

Euhyposmocoma trivitella Sw.—This species I have reared from pupae found in their mines in the fronds of *Elaphoglossum gorgoneum* and *E. reticulatum,* in the mountains back of Lihue, Kauai. The larva produces a trumpet-shaped mine at first, but eventually eats all of the mesophyll for a considerable space. Pupation takes place within this in a slight cocoon.

FAMILY CARPOSINIDAE.

Heterocrossa crinifera Walsm.—The larvae mine the leaves of *Rollandia racemosa.* They feed largely in the midrib, following it outwardly, but eat lateral tunnels out into the mesophyll on both sides as they proceed. Usually there is but one larva in a leaf. I have found this in but one locality so far, on Mt. Olympus, Oahu. The leaves of the shrub were very commonly attacked by it. The leaves are quite large and are not entirely killed by the injury, but many may be seen with the injured portion decayed away leaving an irregular hole or space in midportion of the leaf. The full-grown larva emerges and passes below to pupate in a slight cocoon amongst dead leaves or trash.

FAMILY TINEIDAE.

Philodoria micropetala Walsm.—The larvae of this very small moth mine the leaves of *Pipturus albidus* very extensively, and also one or two related trees to a slight extent. In *Pipturus,* there are often a hundred and more to a leaf—in extra large leaves. The larvae emerge to pupate in white silken cocoons constructed along beside a rib on the under side of the leaf. This species occurs on all of the Islands.

Philodoria basalis Walsm.—I have reared this species but

once. It was from mines in *Pipturus* leaves in the Kohala Mts., Hawaii. It is a larger species than the preceding, and makes fewer mines per leaf. The larva emerges to pupate within an oval cocoon made flat-wise on the surface of the leaf.

Philodoria splendida Walsm.—The larvae of this species mine the leaves of *Metrosideros polymorpha*. They are found common on all the Islands. The larva emerges to form its oval cocoon, which is made on the surface of the mine, the dead epidermis being cut around a little distance from the cocoon so that it readily falls away carrying the cocoon with it. The silk of the cocoon is light brownish resembling the dead epidermis of the mined leaf.

Philodoria auromagnifica Walsm.—I have reared this beautiful little moth from the leaves of *Myrsine*, in the mountains of Oahu. The larvae emerge from the mines to pupate in oval cocoons on the surface of the leaves.

(Three other species of this genus have been described from these Islands and are probably leaf-miners in some native trees; but so far I have not reared them.)

Gracilaria marginestrigata Walsm.—The larvae of this moth mine the leaves of *Sida* on the lowlands. It is very abundant, often a dozen mines in one leaf. Leaves of the cockle-bur *(Xanthium)* and *Abutilon* are also mined by them. The cocoon is formed within the mine.

Gracilaria dubautiella Sw.—The larvae mine the leaves of *Dubautia plantaginea*. The mine is at first slender and more or less straight, lengthwise in the leaf; later, it becomes an irregular blotch. The cocoon is made within the mine, its position being indicated by a little of its silk being visible through a slit that was made in the epidermis for emergence. I have found this very abundant generally in the mountains back of Honolulu.

Gracilaria epibathra Walsm.—This mines the leaves of *Dubautia laxa*. The mine is more of an irregular blotch than the preceding. The larva usually pupates in cocoon within the mine as in preceding species, but sometimes emerges to pupate in a flat oval cocoon on the surface of the leaf. I have found it only on Mt. Olympus, Oahu.

Gracilaria mabaella Sw.—The larvae mine the leaves of *Maba sandwicensis* and *M. hillebrandii*. The mine is long and slender, and often follows up near the margin of the leaf, gradually widening, and then returns toward the base of the leaf as a wide streak down the middle, which turns deep black with age. The larva emerges to pupate in an oval cocoon on the surface of

the leaf. I have found this species wherever the host trees were found in the Koolau Mts., from Niu to Wahiawa, Oahu.

Gracilaria hauicola Sw.—This species very abundantly mines the leaves of the "hau" tree, *Partitium tiliaceum,* in the mountains, and the lowlands as well, of all the Islands. There are often many mines per leaf. The larvae emerge to pupate in white oval cocoons on the surface of leaves and other objects.

Gracilaria hibiscella Sw.—I found this species quite numerous, mining the leaves of the native Hibiscus on Mt. Tantalus, and occasionally on Hibiscus hedges in Honolulu. There are sometimes several mines per leaf. The mine is at first slender, but eventually widens and forms a blotch. The larva emerges to pupate in a white oval cocoon on the surface of the leaf.

I have found a Lepidopterous larva mining very abundantly the fronds of *Pteris irregularis* on Mt. Tantalus, but have failed to rear any adults. I have also occasionally found a Lepidopterous larva mining fronds of *Polypodium spectrum,* in various parts of the mountains of Oahu, but have not yet been able to rear an adult, so I do not know whether they belong to the above genera or not.

Opostega maculata Walsm.—The larvae produce serpentine mines in one or more species of *Pelea* in the mountains of Oahu, and perhaps all of the Islands. The larva is very slender and elongate, and quite different from the other Lepidopterous leaf-mining larvae. The mines were known for a ling time, and several entomologists had tried rearing them at various times; but without success. I have finally had the good fortune to rear a pair of moths, and thus the mystery of these mines is settled. The larva emerges from the mine for pupation. In my breeding jar it spun a small brownish lenticular cocoon in moss.

Opostega dives Walsm.—On certain species of Pelea, a closely-wound spiral mine is often very abundant. The larvae in these are quite similar to the preceding, and I have no doubt but what this is the other described species of *Opostega,* though no one has yet reared it.

Cremastobombycia lantanella Busck.—This is the introduced Lantana leaf-miner. It is very abundant now, wherever Lantana is found. The mine is a sort of inflated blotch, usually several per leaf. The cocoon is slender spindle-shaped and suspended in the mine by a thread at each end.

Bedellia minor Busck, and *B. somnulentella* Z.—The larvae of these two species are said to mine the leaves of sweet potato and various other vines of the genus *Ipomoea*.. I consider that

the leaf-miners in sweet potatoes and all other *Ipomoea* vines here are the same species, whatever it may be, whether it is the *minor* or *somnulentella* that occurs in America, or something else. Dr. Perkins thinks there must have been an error in the determination of the specimens of *Bedellia* that Lord Walsingham had from him, for Walsingham has identified as *somnulentella* specimens which came from an elevation of 4000 feet, whereas Dr. Perkins says that there are no *Ipomoea* vines growing at that elevation. Some of the specimens that he determined as *minor,* came from an elevation of 4000 also, while others of them Dr. Perkins had bred from *Ipomoea* at lower elevations. More recently, Mr. Busck has determined specimens reared from sweet potato as *orchillella* Walsm.

The species of *Bedellia* are so similar and so difficult to separate, especially if not in a perfect condition, that I now think that the specimens from 4000 feet elevation determined by Walsingham as *minor* and *somnulentella* belong to my species *oplismeniella.*

Bedellia oplismeniella Sw.—This species is very abundant, mining the leaves of *Oplismenus compositus*, a native grass in the mountain forests. It is difficult to distinguish the adult moths from those reared from *Ipomoea* leaves, but there are larval and pupal differences. (See Proc. Haw. Ent. Soc., II. No. 4, p. 184, 1912.) In species of *Bedellia,* the larvae emerge and form pupae unprotected by cocoons. The pupae are suspended amongst a few fibers of silk, there being hooked bristles on the dorsal side which are fastened into the web of fibers. They may be on the surface of a leaf, or in some other protected place. I have sometimes found them 10-15 feet away from the plant that the larvae fed on. The pupae of *oplismeniella* are usually placed on the lower surface of the leaf near the base.

Bedellia boehmeriella Sw.—The larvae of this species mine the leaves of *Boehmeria stipularis,* a native shrub of the nettle family. I have found them on Mts. Olympus and Konahuanui, Oahu.

Bedellia struthionella Walsm.—This must be a miner in some native tree, but I have not yet discovered its food-plant.

DIPTERA.

FAMILY LIMNOBIIDAE.

Dicranomyia n. sp.—I have found the elongate larvae abundantly mining the leaves of a certain species of *Cyrtandra,*

along the trail up Punaluu Ridge, Oahu. It is a very unusual habit for the larvae of this group of flies. They usually feed in rotten wood, beneath dead bark, beneath leaf-sheaths of banana and other plants, also at the roots of plants. I have found no records of any as leaf-miners. Pupation of this species takes place within the mine. I reared several specimens, but none in good enough condition for description. When I next visit the place I shall obtain more of them.

FAMILY AGROMYZIDAE.

Agromyza diminuta (Walk.)—This is a very common introduced insect. The larvae mine the leaves of many plants and weeds, as: beans, peas, radish, melons, *Bidens, Nasturtium, Sida, Datura, Indigofera, Solanum, Sonchus,* etc. They emerge to pupate in the ground.

Agromyza n. sp.—I reared one specimen from a mine in a leaf of *Labordea membranacea,* on Mt. Olympus, Oahu. I found quite a number of mined leaves. The mine is conspicuous, showing by its deep black color. It is very large in comparison with the insect producing it. The larva emerged and formed its puparium on the surface of the leaf.

Agromyza n. sp.—I reared several specimens from mines in leaves of *Cocculus ferrandianus,* on the trail from Nuuanu valley up to the back end of the Pacific Heights Ridge, Oahu. The plants sometimes have nearly all of the leaves mined. The larvae emerge and form their puparia on the surface of the leaf.

Agromyza (?) n. sp.—I have found a miner in the fronds of a fern *Marattia douglassi.* It is probably another species of *Agromyza,* but I have not yet succeeded in rearing adults.

No native species of the family Agromyzidae have as yet been described. I consider these three last species as native, since they occur on native plants in the mountains.

COLEOPTERA.

FAMILY PROTERHINIDAE.

Proterhinus excrucians Perkins.—I have found this species very abundantly mining the leaves of *Broussaisia arguta,* along the Olympus—Konahuanui trail, Oahu. This is quite an exceptional habit for a *Proterhinus,* as those whose habits have been known heretofore are mostly bark beetles, or feed in dead wood, dead fern stems, etc.

FAMILY COSSONIDAE.

Heteramphus n. sp.—I found the larvae of this species mining the fronds of several species of *Elaphoglossum* on Mt. Olympus and the upper part of Palolo Valley, Oahu. Larvae, pupae and adults were found in the mines. The larvae of the other species of *Heteramphus,* whose habits are known, are found in the stems of tree ferns, and at the base of leaves and in stems of *Astelia.*

OCTOBER 3RD, 1912.

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

ENTOMOLOGICAL PROGRAM.

Mr. Swezey exhibited some sugar cane mealybugs, calling special attention to a species first noticed by Mr. Erhorn, and which makes three species now known to attack sugar cane in the Hawaiian Islands.

Mr. Giffard remarked on the apparent diminishing of the numbers of ants recently, and inquired if others had noticed it. Different members gave their observations on the question, some of which agreed with the observations of Mr. Giffard while others reported the usual abundance. The apparent scarcity was evidently local and due to some temporary, or unusual conditions.

Mr. Muir exhibited specimens of leaf hoppers representing four new genera and eight new species. These were collected by him on sugar cane in China and the Malay Islands.

NOVEMBER 17TH, 1912.

The eighty-eighth regular meeting of the Society was held in the usual place.

Dr. E. A. Back was elected to active membership.

NOTES AND EXHIBITIONS.

Mr. Giffard reported that on a recent trip to Maui, he found

the introduced *Pompilus* in Iao Valley; and *Pachodynerus* at Wailuku and at 1200 feet elevation in Iao Valley. The latter species is now known on three Islands: Oahu, Kauai, and Maui.

Mr. Giffard also exhibited 5 specimens of *Formicaleo wilsoni* taken in Kau, Hawaii, December, 1911.

Mr. Kershaw told of seeing *Formicaleo perjurus* near Diamond Head, Oahu, when in company with Dr. Perkins one day last May. This species had not been seen for many years.

Mr. Swezey told of seeing a specimen of *Formicaleo wilsoni* just below Pahala Mill in Kau, Hawaii, in 1905, but was unable to catch it.

Mr. Giffard exhibited a large weevil (*Sipalus gigas*?) taken by Mr. Kuhns on a kiawe tree at the Immigration Station grounds March, 1910; also a large "horntail" taken by Mr. Kuhns on shrubbery at Palama, May, 1910. Mr. Ehrhorn considered the latter the other sex of a 'horntail" exhibited by Mr. Giffard, July, 1908, and was probably the American species, *Tremex columba.*

Mr. Ehrhorn reported having taken a "harlequin" cabbage bug on merchandise on dock.

Mr. Fullaway exhibited *Apomecyna pertigera* bred from cucumber stems; *Crossotarsus externedentatus* from avacado; and *Bracon* sp. from *Gelechia gossypiella,* August 3, 1912.

Mr. Muir exhibited a dead branch of Koa from Mr. Frank Atherton's grounds in Manoa, that had been killed by a scale, *Aspidiotus rapax.* Some of the scales were parasitized, and the following species were bred out; *Aphelinus diaspidus, Coccophagus orientalis, and Thysanus sp.*

Mr. Muir also exhibited specimens of new species of leaf hoppers, to be described in a forthcoming paper.

PAPER READ.

Description of Two New Species of Hawaiian Wasps.

BY WALTER M. GIFFARD.

Odynerus perkinsi sp. nov.

♂ Black; wings deeply infuscate and with blue iridescence. Mandibles largely red. Clypeus very sparsely and obscurely punctate, the apex subtruncate and subdentate, impressed. Head very dull, obscurely and shallowly punctate; face between the eyes narrow.

Mesonotum very dull with surface roughened, subobsoletely and shallowly punctate and clothed in lateral view with extremely short erect pubescence. Scutellum extremely dull, almost flat, obsoletely punctate, having together with post-scutellum (the anterior margin of which is somewhat shining) a longitudinal impressed line through the middle. Propodeum dull, reticulately rugose excepting the posterior concavity which is almost smooth and very obscurely punctate. Abdomen more shining than the head and thorax; the basal segment subvertical in front, with shallow, large and irregular punctures anteriorly, and smaller and deeper posteriorly; the second segment dorsally, slightly more than convex, evenly and somewhat closely punctate; ventrally, similarly punctate except at the base, with the costae always distinct but variable in development and the segment behind these not at all raised, the depression being but very slightly indicated. *Length, 6-9 mm.

♀ Superficially the female is unlike the ♂, the structural differences being as follows: Head with the face in front between the eyes very much wider. Clypeus truncate. Thorax extremely dull and smooth with the anterior portion of the mesonotum distinctly, evenly but not deeply punctate; posteriorly the surface of the mesonotum is either impunctate or the punctures are scattered. Scutellum flat, very sparsely and obscurely punctate. Propodeum dull, less reticulately rugose, posterior concavity being slightly more roughened. Second ventral segment of the abdomen has the costae longer and better developed whilst in certain lights there are signs of a narrowly defined depression. Length, 10 mm.

HAB. Kau, Hawaii, 2,000 feet elevation. Described from 47 ♂ ♂ and 2 ♀ ♀ taken December, 1911, (Giffard), February, May and July, 1912, (Giffard and Fullaway). Both types are in the author's collection. The species is found in localities on the a-a flows flying in company with *O. peles* P., *O. scoriaceus* P., *O. sociabilis* P., *O. rubropustulatus* P., *Nesodynerus egens* P., *Pseudopterochilus pterocheiloides* P. and *Chelodynerus chelifer* P.

I have named this species out of compliment to Dr. R. C. L. Perkins to whom the collectors of Hawaiian *Odynerus* are much indebted for his comprehensive tables of all the species described in Fauna Hawaiiensis.

Odynerus koolauensis sp. nov.

♂ Black, shining with erect but short gray pubescence; rarely with the apical margin of the first abdominal segment faintly and narrowly yellow. Mandibles black, the extreme apex piceous. Wings

*The measurements are taken from the vertex of the head to the apical margin of the second abdominal segment.

darkly infuscate and with violaceous blue iridescence. Clypeus punctate, dentate and emarginate, impressed at the apex the true emargination not very deep but distinct. Head and thorax very closely, strongly and deeply punctate. Propodeum reticulately and strongly rugosely sculptured throughout but more particularly so at the sides near the posterior concavity. Abdomen with the first segment strongly and closely punctate, the punctures becoming larger towards the base. Second segment above, strongly raised from the base (tuberculate when viewed dorsally) the highest point being well before the middle of its length; very distinctly and evenly but shallowly punctate; beneath shining, finely and deeply but not closely punctate, the depression faint and narrow the segment at the sides rising but feebly from the level of the apices of the costae which latter are well developed and at their middle where these meet the base of the depression, long. Length, 7-9 mm.

♀ Clypeus evenly and deeply punctate; apex dentate and slightly emarginate, the emargination distinct; the impression at the apex is less than that in the ♂. The puncturation of the head and thorax is generally the same as in the ♂ excepting that the interstices between the coarse punctures on the mesonotum (which in both sexes is shining), show more definite and more visible signs of being punctulate. In the ♂ these smaller punctures are only microscopically visible. The propodeum and basal segment of the abdomen are practically of the same general sculpture as the ♂. The second dorsal segment of the abdomen is less raised at the base whilst ventrally it is much more shiny, the costae stronger and longer at the middle, whilst the impression is better defined. The sides of this segment where they meet the apices of the costae are more raised than in the ♂. Length, 9 mm.

HAB. Koolau district, Maui, 1,000-1,200 feet elevation in the lower wet forest. Not uncommon. Described from a series of 15 ♂ ♂ and 6 ♀ ♀ taken October, 1912, (Giffard), flying over mixed scrub ohia (Metrosideros) and bamboo, in company with *O. nigripennis* Holmgr., *O. purpurifer* P., and *O. camelinus* P. A single specimen of *O. erythrostactes* P. was taken at the same place. Both types in the collection of the author.

OBS. Evidently allied to *O. hiloensis* Perk. and *O. konanus* Perk., and whilst like these superficially is readily distinguished from *O. konanus* by the difference in the characters of the propodeum and the second ventral segment of the abdomen. From *O. hiloensis* it particularly differs in the emargination of the clypeus, the length of the costae and general appearance of the second ventral segment. In *O. hiloensis* the second dorsal segment of the abdomen is also much more tuberculately raised than in this species. In the ♀ there are further

characters, particularly those of the clypeus and costae, which very readily distinguish it from both *O. konanus* and *O. hiloensis*. It may also be allied and nearer related to *O. lipocharis* Perk. of Kauai, an unique species but lately described (See Suppl. F. H., Vol. II., p. VI., p. 610), by Dr. Perkins from a male only, but of this I cannot be certain as specimens of the latter are not available.

Notes on Certain Undescribed Species Or Varieties of Hawaiian Wasps (*Odynerus*).

BY W. M. GIFFARD.

It is not altogether improbable that at some future period when a general revision and further classification of our Hawaiian Odyneri are made possible that not only will some of these form several distinct genera or sub-genera*, but some species already described and since determined as varieties or island forms may be eliminated from the fauna. As however the prospects for any such new classification and revision are somewhat remote it appears reasonable that the system heretofore adopted of separating and describing the insular forms, should in the meantime continue, particularly when these show sufficient sculptural and constant minor structural characters, as well as differences in coloration, as to easily separate them from their allies of one or more of the islands in the group.

Among others I have for the present selected the following as deserving recognition under the present systm of identification and determination, viz.:

(1). A sea coast species, allied to *O. newelli* Perk. from the island of Hawaii and *O. smithii* D. T. from the islands of Maui and Lanai. A large series of both sexes were taken by the writer on three different occasions in the early spring months of 1911, flying over low-growing vegetation along the rocky coasts of Oahu. This species differs from both its allies in the structure at the apex of the clypeus, the puncturation of the head, thorax and propodeum and in the form of the depression of the second ventral segment of the abdomn. The system of pubescence on the thorax is also quite different from one of the above named species. It further differs in coloration from either, the clypeus of the ♂ being very largely bright yellow and in both sexes the bands at the apex of the first and second segments of

*Fauna Haw. Perkins, Vol. I, pt. I, p. 30.

the abdomen are very widely (consistently so) of the same color, whilst in its allies these latter are very narrowly whitish yellow and in instances inconspicuous.

(2). A species at 1000-1500 ft. elevation on the island of Lanai of which a series of both sexes were taken by the writer in 1907-8, follows the description of *O. monas* P. of Molokai with some of the following exceptions, viz.:

The wings are shining fuscous with a bronze appearance and not with blue iridescence. The head and thorax are very finely and sparsely punctured and the propodeum is practically impunctate and smooth. The coloration of the abdominal segments of the species presents a further difference from that described. There are no specimens in Honolulu of *O. monas* available for comparison, the species having been taken on Molokai and described by Dr. Perkins from one or two ♂ ♂ only.*

*Since writing these notes I have secured a male example of *O. monas* from Molokai and the specimen follows Dr. Perkins description of that species. In this single example there are further differences between it and the species from Lanai which it would be unwise to refer to until a series have been captured.

Under the circumstances I would hesitate to determine this Lanai wasp either as *O. monas* or as a variety of that species.

(3). Another wasp which may be allied to *O. monas* of Molokai is a species of which the writer captured a series of both sexes in 1910-11 on the scoriae in the district of Kau, Island of Hawaii, at an elevation of approximately 300 feet. Notwithstanding the different structure of the second ventral segment of the abdomen and of the propodeum as well as a difference in the system of puncturation of the thorax and abdomen from that published in the description of *O. monas,* I hesitate for the present and for similar reasons to those explained in the reference to the Lanai examples, to determine this Hawaii *Odynerus* as a good species. There is still a possibility that both this and the Lanai examples are representatives of the *O. monas* of Molokai. Should a series of the latter be secured later on, as is very possible, it may be found that either one or the other of the Hawaii and Lanai examples are intermediate or that they may be determined as varieties only.

(4). On Kauai at an elevation of 3000 feet both sexes of a species were taken by Mr. A. Jordan in 1909 which closely resembles *O. xerophilus* P. of Oahu and is possibly the Kauai variety of that species. The variation is principally in the

puncturation which is generally more rugose and in the coloration which is much more distinct. *O. xerophilus* was not described by Dr. Perkins possibly for the reason that he considered it as a variety or insular form of *O. molo'aiensis* Perk. of Maui and Molokai. On the other hand and for the same reasons it is equally possible that *O. molokaiensis* may be only a variety of *O. scoriaceus* P. of Hawaii.

The question of insular forms or varieties among Hawaiian *Odynerus* will undoubtedly be decided sooner or later (possibly later than sooner), but the writer sees no reason why these should not in the meantime be named and described providing series are captured which present acceptable structural or sculptural differences. This would only be following the system heretofore adopted with certain other species of these Hawaiian Aculeates.

Note—All the specimens representing the four species above referred to are in the writer's collection.

Kilauea Moths.

BY OTTO H. SWEZEY.

I hereby present a tabulated list of moths collected at lights by Messers W. M. Giffard, E. M. Ehrhorn, D. T. Fullaway and J. F. Rock at Mr. Giffard's bungalow at 29 miles, Kilauea, Hawaii. These moths were collected at various times indicated in the table whenever Mr. Giffard and one or another of the above mentioned gentlemen visited the place for a few days or weeks during the past twelve months. They were handed to me for determination. I have exhibited the different lots of them at various times, and now present this tabulated list of the whole lot. Among them there are 112 species, ten of which I find to be new, and will describe along with others in a later paper.

Family Caradrinidae.	Aug. 1911	Sept. 1911	Dec. 1911	Feb. 1912	May 1912	July 1912	Aug. 1912
Hyssia compsias (Meyr.)		1				1	1
Eriopygodes euclidias (Meyr.)	17	14	14	27	27	25	15
Cirphis macrosaris (Meyr.) ..		1					
Cirphis typhlodes (Meyr.)					1		

	Aug. 1911	Sept. 1911	Dec. 1911	Feb. 1912	May 1912	July 1912	Aug. 1912
Cirphis pyrrhias (Meyr.)							1
Cirphis amblycasis (Meyr.)				3	1	2	2
Cirphis unipuncta (Haw.)		1	1	1	3	2	2
Agrotis ypsilon Rott.	1	2		1	4	1	2
Agrotis crinigera (Butl.)	3		1				1
Agrotis selenias Meyr.					1		
Agrotis cinctipennis (Butl.)				3			
Lycophotia saucia (Hub.)		1		1	1	1	
Episilia ceramophaea (Meyr.)					2	2	
FAMILY PLUSIADAE.							
Hypenodes epichalca Meyr.	1			1	2		
Hypenodes altivolans (Butl.)			2	4	1		
Plusia biloba Steph.		1					
Plusia chalcites Esp.							1
Plusia giffardi n. sp.		1			1	3	1
FAMILY HYDRIOMENDIAE.							
Eucymatoge dryinombra Meyr.		4		2			
Eucymatoge orichloris Meyr.	2	8	2	1	4	11	2
Eucymatoge craterias Meyr.	1	2	1		6	1	
Eucymatoge monticolans (Butl.)	1	3	2	14	30	13	8
Hydriomena aphoritis Meyr.			1	3	3		1
Hydriomena roseata n. sp.	1	1		2	1	4	
Hydriomena giffardi n. sp.	1				1		
FAMILY SELIDOSEMIDAE.							
Scotorythra arboricolans Butl.	1						
Scotorythra aruraea Meyr.				2	18	1	2
Scotorythra paludicola (Butl.)				6	43	58	23
Scotorythra ortharcha Meyr.			1				
Scotorythra oxyphractis Meyr.	2		1	9	16	6	1
Scotorythra capnopa Meyr.		5	1				
Scotorythra pachyspila Meyr.				1	9	1	
Scotorythra rara (Butl.)	10	11		3	63	17	4
Scotorythra hyparcha Meyr.		1		9	21	16	21
FAMILY SPHINGIDAE.							
Sphinx convolvuli Linn.			1				
FAMILY PHYCITIDAE.							
Homoeosoma amphibola Meyr.			1				

	Aug. 1911	Sept. 1911	Dec. 1911	Feb. 1912	May 1912	July 1912	Aug. 1912
FAMILY PYRAUSTIDAE.							
Omiodes accepta (Butl.)	3	4	1	3	2		
Omiodes accepta (white variety)		1					
Omiodes localis (Butl.)		2		1			
Omiodes scotaea Hampson	1	4		4	12	2	1
Omiodes fullawayi n. sp.					1	1	
Phlyctaenia synastra Meyr.	5	1			11	12	
Phlyctaenia iocrossa Meyr.			1	1			
Phlyctaenia micacea (Butl.)				1			
Phlyctaenia eucrena (Meyr.)	1	1		3	20	4	2
Phlyctaenia platyleuca Meyr.				1			
Phlyctaenia metasema Meyr.	2		1	6	16	4	1
Phlyctaenia caminopis Meyr.				1	1		
Phlyctaenia stellata (Butl.)		2		1	1		
Phlyctaenia argoscelis (Meyr.)					1		
Phlyctaenia liopis Meyr.					1		
Phlyctaenia pyranthes Meyr.	2		1	1	7	6	
Pyrausta chloropis Meyr.			2	1	2		
Pyrausta thermantoidis n. sp.	1				2	1	
Nomophila noctuella Schiff.				1			
Mestolobes mesacma Meyr.					6		
Mestolobes ochrias Meyr.	2		4		2		
Orthomecyna metalycia Meyr.	13	8			3	59	7
Orthomecyna epicausta Meyr.	1						
Scoparia balinopis Meyr.	1				5		
Scoparia halirrhoa Meyr.					4	1	
Scoparia actias Meyr.				1	4	1	
Scoparia crataea Meyr.	6		6	10	16		
Scoparia parachlora Meyr.			1	1			
Scoparia ianthes Meyr.			1	3	1		
Scoparia marmarias Meyr.				6			
Scoparia nectarias Meyr.				7	18	2	
Scoparia nectarioides n. sp.			1	4	4		
Scoparia pyrseutis Meyr.					3		
Scoparia erebochalca Meyr.	6		3	16	7		
Scoparia thyellopis Meyr.	1			1			
Scoparia melichlora Meyr.	2		1	3	4	4	
Scoparia hawaiiensis (Butl.)	1		2	4	9	3	
Scoparia geraea Meyr.			1				
Scoparia epimystis Meyr.			2				

	Aug. 1911	Sept. 1911	Dec. 1911	Feb. 1912	May 1912	July 1912	Aug. 1912
Scoparia meristis Meyr.	2		2	22	7	2	
Scoparia platyscia Meyr.	4		6	3	2	1	
Scoparia venosa Butl.			1	3			
FAMILY PTEROPHORIDAE.							
Platyptilia rhynchophora Meyr.					2		
Platyptilia litoralis Butl.			2	2	1		
FAMILY GELECHIADAE.							
Aristotelia gigantea n. sp.			1				
Thyrocopa albonubila Walsm.	1					3	
Thyrocopa fraudulentella Walsm.					1		
FAMILY HYPONOMEUTIDAE.							
Hyposmocoma lupella + *suffusella* Walsm.	1						
Hyposmocoma dorsella Walsm.	1						
Hyposmocoma quinquemaculata Walsm.				3	2		
Hyposmocoma chilonella + *triocellata* Walsm.						1	
Hyposmocoma chilonella + *chilonella* Walsm.							1
Hyposmocoma chilonella + *percondita* Walsm.						1	
Hyposmocoma subnitida Walsm.	1						
Semnoprepia petroptilota Walsm.							1
Diplosara lignivora (Butl.)				1			
Endrosis lactella Schiff.				1			
**Prays fulvocanellus* Walsm.		4					
FAMILY CARPOSINIDAE.							
Heterocrossa herbarum Walsm.					2		
Heterocrossa gemmata Walsm.						1	
Heterocrossa plumbeonitida Walsm.					3		
Heterocrossa latifasciata Walsm.					3		
Heterocrossa inscripta Walsm.				2			
Heterocrossa gracillima Walsm.					2		

	Aug. 1911	Sept. 1911	Dec. 1911	Feb. 1912	May 1912	July 1912	Aug. 1912
FAMILY TORTRICIDAE.							
Eccoptocera foetorivorans (Butl.)				1			
Enarmonia walsinghami (Butl.)			1				
Bactra straminea (Butl.)	1			1			1
Archips longiplicatus Walsm.			1	1	2		
Archips lichenoides Walsm.							
Archips subsenescens Walsm.			1	2	1		
Archips fuscocinereous n. sp.				1			
Archips sublichenoides n. sp.					7		
Tortrix semicinereana n. sp.				1			
Panaphelix marmorata Walsm.			1				1
Capua pleonectes Walsm.							1
FAMILY TINEIDAE.							
Opogona apicalis Sw.	6		13	24	1		1
Philodoria basalis Walsm.				1			

*Reared from flowers of *Zanthoxylum hawaiiense*.

DECEMBER 12TH, 1912.

The postponed eighty-ninth regular and eight annual meeting of the Society was held in the usual place.

NOTES AND EXHIBITIONS.

Mr. Ehrhorn exhibited an ant taken at Maunawili, Oahu, April 13, 1912. It had been identified for him by Mr. W. M. Wheeler as *Technomyrmex albipes* F. Smith. The species occurs in India, Papua, and Oceania.

Mr. Giffard reported collecting the introduced *Pompilus* at Kilauea, Hawaii, Nov. 23, 1912; at an elevation of 4000 feet. This being the highest elevation at which it has yet been taken.

PAPERS READ.

On Some New Fulgoroidea.

BY F. MUIR.

(Read October 3, November 7 and December 12, 1912.)

The types of the following new species, seven of which are

generic, are in the collection of the Sugar Planters' Experiment Station, Honolulu. Except where otherwise stated they were collected by the writer.

The writer takes pleasure in acknowledging the obligation he is under to W. L. Distant for comparing specimens with types in the British Museum, and for the help he has given him while working on Homoptera.

Delphacidae.

Geoneossus gen. nov.
Type *sacchari.*

Head broader than thorax, vertex at base as wide as an eye, truncate, narrowing slightly to apex, very short, about one-fourth the width of base, medianly, longitudinally keeled, slight keels along all edges and between vertex and face, a little pit in center of each half of vertex. Face broad, widest at lower corner of eyes, then slightly narrowing to apex, keels along sides, also two medio-longitudinal keels from base to apex, a keel down gena from beneath the antenna to base of clypeus. Clypeus a little shorter than face, in profile slightly curved, sides flattened, broad at base, medianly and laterally keeled. Eye as broad as face, with very deep antennal emargination on lower edge. First joint of antenna slightly shorter than second, subtriangular, apex much wider than base, very flat and thin, especially on outer edge; second joint subpyriform in outline, outer edge fairly thick and nearly straight, inner edge thin and broadly curved in outline; other edge beset with several sense organs; arista arising from apex. Ocelli at lower corner of eye. Pronotum medially very slightly longer than vertex, hind margin obtuse-angularly emarginate, medially keeled, lateral keels obscure, arising anteriorly at inner hind angle of eye, curving round and reaching anterior margin at hind angle of eye, not reaching the posterior edge of pronotum; a pit in center of each half. Scutellum distinctly tricarinate. First hind tarsal joint twice the length of the other two together; spur half as long as first tarsal joint, flattish, pointed, inner edge straight, outer edge convexly curved, beset with small spines; hind tibiae with five apical and one small basal spines. Tegmina pointed at apex; subcosta and radia forking before middle, radia joining media for a short distance (no radial cross-vein), first median sector arising at junction of radia and media, touching cubitus (no media cross-vein), cubitus three-veined, bent nearly at right-angle after joining media; clavus reaching five-eighths from base.

This genus is near to *Cochise* Kirkaldy, but has a narrower face, with the keels separate to apex, the antennae also are very distinct.

(1) *G. sacchari,* sp. nov. (♂ ♀)
Pl. 6, ff. 5, 6.

Stramineous, slightly darker on clypeus and apex of face; legs with longitudinal brown marks. Tegmina hyaline, veins white, finely bordered with brown, especially on apical half, veins studded with brown, hair-bearing granules; wings hyaline, white-veined.

Pygophor with a pair of spines arising from medio-ventral edge, reaching one-third across pygophor, contiguous to near their diverging apices; spines on anal segment short, thick, with converging apices; genital styles long, simple, horn-shaped, making one complete inwardly-turned spiral, the apical third bent anteriorly.

In the young stages the vertex and face is round, somewhat as in *Paranda,* the antennae small and sunk into pits at side of rounded face; two rows of sense pits along the lateral margin of vertex and face; keels absent.

Length 2.6 mm.; tegmen 3.8 mm.

Hab. Macao, China. The young and adult female were taken underground, feeding on the roots of grasses and sugar-cane, attended by ants. The adult was also taken feeding on the leaves of sugar-cane.

Cochise Kirkaldy.

(1) *C. apache* Kirkaldy.
Pl. 6, fig. 3, 3a.

I figure the head of this species. I cannot separate the genus from *Bostaera* by any good character.

Belocera gen nov.
Type, *sinensis.*

Head wider than thorax. Width of vertex about twice the length, base truncate, slightly anterior of the middle of the hind margin of eyes, longitudinally keeled in middle; face widest between lower angles of eyes where it is about two-thirds the length of the face, keeled on sides and in middle, the central keel being furcate very near the base forming a small diamond-shaped area, two small semi-obsolete keels from the bifurcations to sides of face slightly anterior to the transverse keel between vertex and face; genal keels distinct, meeting the lateral facial keels at their apices; eyes deeply emarginate on lower margin; first and second antennal joints subequal in length, basal joint sagitate, second joint somewhat longer than broad, slightly flattened, beset with sense organs, arista apical; clypeus bent at sharp angle near base where the median keel is prominently angled. Pronotum slightly longer than vertex, widely and angularly emarginate on hind margin, median keel distinct, reaching hind mar-

gin, lateral keels following hind margin of eyes, then curving inward and reaching hind margin. Scutellum more than twice the length of vertex and pronotum, tricarinate, lateral carinae slightly curved and reaching hind margin. Hind tibia with one small basal, one small submedian and four or five small apical spines; spur more than half the length of first tarsus, flattened, inner edge straight, outer edge convexly curved, one small spine at apex. Tegmen as in *Geoncossus*, but the apex just pointed and the radia and media only just touching, not amalgamated for any distance.

This genus is near *Stobaera* but the shape of the antennae and the angular clypeus distinguishes it.

(1) *B. sinensis* sp. nov. (♂ ♀)

Plate 6, figs. 4, 4a.

Light yellow-brown; face below eyes yellow, legs and ventral surface of thorax and abdomen lighter brown, lateral edges of pronotum and tegulae dark, spines on legs dark brown. Tegmina hyaline, smoky, lighter along costal area, veins light closely beset with light granules, a darker brown mark over base of costal cell, a darker mark along apical half of radia and a brown spot at tip of each apical vein.

Male pygophor with even margins; anal segment without spines; styles narrow, of even width till apex where it is unequally bifurcate, the inner prong being very short, the outer longer and slightly spatulate at end.

Length 2.5mm.; tegmen 3 mm.

Hab. Macao and Sheiklung, China.

Perkinsiella Kirkaldy.

(1) *P. thompsoni* (♂ ♀)

Vertex, face between eyes, antennae and clypeus dark brown, with two darker marks across face between eyes; face below eyes, thorax, legs and apex of clypeus yellow; pronotum and scutellum darker than ventral side, especially along the sides; a brown spot on each front coxa and a round spot on each mesopleurum; front and middle femora longitudinally striped with brown, a faint brown ring on tibia, spur yellow with black teeth; abdomen brown, pleura and margins of segments yellow. Tegmina hyaline, semiopaque, yellowish over clavus; veins light, studded with brown granules, fuscous along edges of third radial and first median apical veins, and over the base and apex of second median and the entire of third median and first cubital apical cells, except for a round white spot at apex of each cell; wings hyaline with brown veins.

Male pygophor rounded, dorsal edge roundly emarginate where anal segment fits in, ventral edge with two thin, long, subparallel, median spines nearly reaching to anal segment; anal segment

with a long, slightly curved, strong spine from each ventral corner reaching more than half across pygophor; styles broad and flattened on basal half, the apical portion thinner, bent inward with the apex broadened out into a small, flat surface, the outer and posterior edges of which are produced into short points.

Length 2.7 mm.; tegmen 3.6 mm.

Hab. Island of Guam, on sugar-cane. No. 3095 of Mr. D. T. Fullaway's collection. I take the pleasure of naming this insect after Mr. J. B. Thompson of Guam.

This species, the fourteenth of the genus, comes next to *sinensis* from which it differs by the greater amount of infuscation on apex of tegmen and the very distinct genitalia.

Stobaera Stal.

I consider Fowler's *Goniolcium* to be this genus. The species of this genus all have somewhat similar facies, and with the additions to it that is sure to be made by more extensive collecting in Mexico and the more southern countries, there will arise great difficulties in identification unless the male characters be studied carefully.

(1) *S. concinna?* Stal.

Specimens from Mexico Valley agreeing with Stal's description have a very distinct feature in the shape of the anal segment. The anus is situated near the base, where the segment is short; beyond the anus the ventral edge is produced into a broad, flattened process, turned down at right angle to the basal portion, the apex being spatulate and trilobed, the process reaching down to the ventral wall of pygophor; the medio-ventral edge of pygophor slightly emarginate, each corner of the emargination being produced into a small spine, the lateral edges cut back so as, in side view, to expose the styles; styles slender and cylindrical at base, slightly broadening to the truncate apex which has each corner produced into a little spine; a spine projects from the base of the styles.

(2) *S. tricarinata* Van Duzee.

The specimens I identify as this species have the ventral edge of pygophor roundly emarginate in the middle, the sides being cut away, exposing the styles in lateral view; anal segment short with a short downwardly turned, apically rounded process on the ventral edge; styles thinly cylindrical at the base, broadening and flattening towards the apex, which is truncate and produced into a spine on the

inner corner, the outer edges of the styles curved, the inner edges sinuous, spine at base pointing upward, not outward.

(3) *S. granulosa* (Fowler)

The specimens I have from Orizaba under this name differ slightly from Fowler's description; from *koebeli* they differ in having the process on anal segment very much shorter and the styles are widest shortly before apex.

(4) *S. koebeli* sp. nov. (♂ ♀)

A very short furcation at base of median facial keel. Scutellum, pronotum, vertex, antennae and face between eyes brown, face below eyes and genae yellow, speckled with brown at apex; clypeus brown; keels on head and thorax lighter in color; female abdomen yellowish with brown spots, male abdomen brown with small yellowish marks near base; femora brown, especially in male, all tarsi and tibiae banded with brown. Tegmina hyaline, veins not colored, dotted with large, brown, hair-bearing granules, a curved brown mark over first median sector and cubitus, a light brown spot in median cell and the clavus slightly fuscous.

Medio-ventral edge of pygophor deeply and roundly emarginate, the corners of the emargination forming subacute points; anus at base of anal segment, the ventral portion of segment beyond anus flattened, gradually narrowed to the acutely pointed apex, and curved under; genital styles curved, meeting together at their bases and forming a "horse-shoe," narrow, subequal in width to truncate apices, which are slightly widened, from their bases where they touch arise two small, stout spines.

Length 2.5 mm.; tegmen 3.4 mm.

Hab. Morelos, Mexico. (A. Koebele coll.)

I take pleasure in naming this species after Mr. A. Koebele.

(5) *S. azteca* sp. nov. (♂ ♀).

Facies very similar to *koebeli*, but inclined to have the lighter marks more extensive. The male pygophor medio-ventrally emarginate, the sides cut back; the anal segment short, the ventral edge beyond anus forming a downward-pointing, short spine reaching about two-thirds to ventral margin; styles slightly curved, thin and cylindrical at base, slightly flattened on apical half, truncate at apex with each corner drawn into a small spine, an outwardly pointing spine at the base of each style, joined together at their bases. This differs from *granulosa* by having a spine on the anal segment and not

a flattened, apically pointed process and by the styles not swelling out before the apices.

Length 2.5 mm.; tegmen 4.0 mm.

Hab. Morelos, Mexico. (Koebele coll.)

(6) *S. testacia* (Fowler.)

I have one female which may be this species. It differs from the typical species in having the pronotal carinae not quite reaching the hind margin and not angulated; the lateral carinae of the face are not sub-parallel but outwardly curved and widest apart at lower angles of eyes. The furcation of median keel more distinct. It is likely to represent a new genus.

Purohita Distant.

(1) *P. cervina* Distant.

One specimen (♀) from Macao on bamboo.

(2) *P. fuscovenosa* sp. nov. (♀)

Two specimens which differ from the type species by their darker color, veins of tegmina broadly fuscous-brown from base to apex and larger size.

Length 4.8 mm.: tegmen 5.4 mm.

Hab. Macao, China, on bamboo.

The absence of males for comparison is regrettable.

Tropidocephala. Stal.

Owing to there being both specific and individual variation of the head, and the facies of many species very similar, the species of this genus are hard to identify with certainty unless the genitalia be described or, still better, figured; it is unfortunate that Matsumura makes no remarks on the genital characters in his monograph. A characteristic of this genus is the long, curved penis and penis guide. All the species I have studied feed on sugar-cane as well as grasses.

(1) *T. neogracilis* sp. nov. (♀)

Vertex slightly longer than pronotum (2.2 to 1). Dorsally green or yellowish green, ventrally inclining to yellow; medio-apical portion of face and the genae below the eyes black; a black triangular spot on mesopleuron; legs yellow with small black spines, abdomen yellowish below, fuscous above. Tegmina hyaline, slightly greenish, granu-

lations very small, a brown triangular mark over inner apical portion, the veins in this portion being darker, cubitus, media and radia each with a small brown spot before cross-veins.

Length 3 mm.; tegmen 3 mm. (with apex of tegmen deflexed.)

Hab. Pontianak, Borneo, on sugar-cane. This species is very near *gracilis,* under which name it is likely that Matsumura has more than one species, it also comes near to *hamadryas.*

(2.) *T. festiva* (Distant)
Plate 6, Figs. 9, 9a

There are specimens in our collection from Borneo and Java that agree with Distant's and Matsumura's descriptions, but the head is just double the length of the pronotum. I figure the male genitalia.

(3) *T. atrata* (Distant).
Plate 6, Figs. 10, 10a.

There are two specimens from Macao, China, which appear to be this species; the male agrees with Distant's description, but the female is more yellowish-brown than green. I figure the male genitalia which differs from *festiva* by having narrower styles, and the prong from the base is more slender, also the outline of the pygophor is different. The vertex is slightly less than twice the length of pronotum. (1.9 to 1.)

(4) *T. saccharivorella* Matsumura.

One specimen from Macao, China.

(5) *T. amboinensis* sp. nov. (♂ ♀)
Plate 6, fig. 12.

Vertex one and a half times the length of pronotum (1.5 to 1). Brownish yellow, darker dorsally; keels on vertex, pronotum and scutellum finely bordered with black; antenna with a black ring on basal segment and two on second segment, the one near apex faint; face yellowish, lateral keels finely streaked with black; genae beneath eyes and the clypeus brown; legs yellowish with black spines; abdomen yellow with brown segmental markings. Tegmina approaching *brunnipennis;* brown with transparent, viteline patches, one from base along inner border of clavus, from end of clavus across to costa, and a small one in the apical subcostal and radial cells, veins darker,

bordered on each side with light granules bearing long, dark hairs, a dark, oval spot on the radia, media and cubitus just behind the cross-veins; wings hyaline, dark-veined. Pygophor with small medio-ventral spine, lateral edges not produced; style somewhat like *atrata* but more curved, broader at apex and with the apical, inner corner produced into a long, narrow process with rounded apex.

Length 2.3 mm.; tegmen 2.6 mm.

Hab. Amboina, on sugar-cane and other grasses.

(6) *T. saccharicola* sp. nov. (♂ ♀)

Plate 6, figs. 7, 7a.

♀ Vertex slightly less than one and a half times the length of the pronotum (1.4 to 1). Yellowish brown, the keels of vertex, pronotum and scutellum finely bordered with black; antenna with a dark ring on each segment; dorsum of abdomen and ovipositor fuscous; tegmina like *amboinensis* but lighter in color and the hyaline marks more extensive. ♂ Like the female, but marks on tegmina not so well defined.

Male pygophor with a small medio-ventral spine and a small spine from the latero-ventral edges; styles narrow and curved, the apices twisted half a turn, a small keel along the basal third; besides the penis and guide there is a long, thin spine from the ventral left side of the anal segment. This species approaches *dryas* in the shape of the male genitalia.

Length 2.8 mm.; tegmen 3.3 mm.

Hab. Pontianak, Borneo.

(7) *T. neoelegans* sp. nov.

Plate 6, fig. 8.

Vertex and pronotum of equal length. Yellowish brown; vertex pronotum and scutellum with keels finely bordered with dark brown, especially the median keels; genae beneath eyes darker, two faint rings on second joint of antenna. Tegmina very like *amboinensis*, with the clear hyaline spaces larger, the black spots on radia, media and cubitus larger and plainer and the granulations along nerves white. Male pygophor with a small, medio-ventral spine, the lateral edges not produced into spines, the styles somewhat like *amboinensis*, but broader and more truncate at apex, with the inner corner developed into a long, narrow, roundly-tipped process.

Length 2.8 mm.; tegmen 3 mm.

Hab. Telok Ayer, Borneo, on sugar-cane.

This is evidently allied to *elegans*, but as I have no description or figure of the genitalia I cannot be sure.

(8) *T. neoamboinensis* sp. nov. (♂)
Plate 6, fig. 11.

Vertex and pronotum of equal length. This species has the facies of *neoelegans* and *amboinensis*, but the genital styles differ considerably, the base being produced into a rounded, thin, concavo-convex process, the apex is less truncate and the apical corner produced into a much wider process..

Length 2 mm.; tegmen 2.5 mm.
Hab. Amboina; Cairns, Queensland.

(9.) *T. brunnipennis* Sign.

I have specimens from Amboina and Java which agree with Kirkaldy's *eximus,* which Matsumura considers the same as the African species *brunnipennis.*

(10) *T.* sp. nov.

I have one damaged specimen from Macassar in which the vertex is much shorter than the pronotum, (.75 to 1) and does not reach to the anterior margin of eyes, the face slopes forward, the apex of face being the most anterior portion of the head. It is too much damaged to describe, but the remarkable shape of the head makes it worthy of mention.

Sardia Melichar
(1) *S. rostrata* Melichar.

Specimens from Java and the Malay Peninsular agree fairly well with Melichar's description, but they are darker in color. The genitalia is near to *pluto* but the styles differ in having the basal portion larger in proportion to the apical portion and produced more acutely, the apical portion also differs. These differences are best seen in a side view of the styles. As there are no figures or descriptions of the male genitalia of *rostrata* from Ceylon I am unable to be sure of my identification. I have one brachypterous female from Java which is lighter in color than Melichar describes.

Phyllodinus Van Duzee.
(1) *P. macaoensis* sp. nov.

Brown; keels on head and thorax lighter, four small light spots

on apical portion of face, with some very indistinct ones at base; front legs dark brown, a small light mark at apex and one at base of tibiae, hind legs lighter brown; thorax and abdomen dark brown marked with lighter spots. Tegmina hyaline, veins light with small brown granules, a light brown mark from apex of costal cell over cross-veins and over cubital and last median apical cells, also fuscous along the sides of third and fourth median apical veins.

Length 2.8 mm.; tegmen 3.3 mm.

Hab. Macao, China.

This is the first Oriental species of this genus. I have only one American species for comparison, viz.: a brachypterous form of *P. nervatus;* from this species it differs in having the forking of the median facial keel reaching to the lower angle of eye, the anterior legs flattened but not quite so wide. The neuration of the tegmen is different from any other Delphacid with which I am acquainted, there being three veins to the subcost-radial system and an extra branch to the cubital system, the media touching both the radia and cubitus; a similar number of veins is also plainly recognizable in the brachypterous *P. nervatus.*

Sogatopsis gen nov.

Type, *pratti.*

In profile face and vertex flattened, subangular at their junction. Head narrower than thorax; vertex longer than wide, slightly narrowed towards apex, divided from face by an indistinct, wide V-shaped keel, a very obscure median keel bifurcate at apex, disk concave, base truncate; length of face nearly three times the breadth, sides parallel, tricarinate; clypeus shorter than face, tricarinate, genal keel distinct, running from beneath antenna to meeting of facial and clypeal lateral keels; antennae longer than face, first and second joints of equal length, first joint triangular in section, second cylindrical. Pronotum tricarinate, lateral carinae slightly diverging, reaching posterior margin, which is shallowly emarginate; scutellum tricarinate, lateral carinae very slightly diverging, reaching posterior margin. Hind tibia with one small basal, one small submedian and six small apical spines, spur cultrate (not lamellate) straight on inner edge, curved on outer, with one small apical tooth. Radial and median cross-veins small but distinct.

This genus is near to *sogata* but the antennae alone place it in a different genus.

(1) *S. pratti* sp. nov. (♀)

Yellow or light brown marked with dark brown and black. Head

and thorax yellowish brown pronotum and scutellum laterad of outer keels darker, two black lines from base of scutellum to apex of clypeus, broadest on face and clypeus where they fill all the space between the yellowish keels, genae beneath eye black, antennae yellowish with three longitudinal black marks, regular on first segment, irregular on second; front legs yellowish, longitudinally striped with brown, hind legs irregularly so; abdomen brown with hind margins of segments broadly yellow. Tegmina whitish hyaline marked with brown the brown marking forming a broad mark from costa across tegmen to middle of clavus extending over outer half of clavus and to base between cubitus and subcosta, also from costa over the yellow cross-veins to posterior border and to first median vein, leaving a triangular hyaline mark with its base from end of costal cell to near first median veins, and its apex touching middle of second median vein, small light mark in apex of first and second median and first cubital apical cells, apex of radial vein fuscous.

Length 3.4 mm.; tegmen 4 mm.

Hab. Amboina.

I take pleasure in naming this species after Mr. Felix Pratt, who took it in my company in Amboina.

Eumetopina Breddin.

(1) *E. flavipes* sp. nov. (♂ ♀)

Dark, shiny brown; clypeus, rostrum, apex of face, legs and posterior edge of pronotum yellowish; abdomen brown, margins of segments lighter brown or yellow. Tegmen brown with a lighter mark at end of costal cell and over cross-veins, veins dark with fine, hair-bearing granules; wings fuscous hyaline, veins dark.

Male pygophor short dorsally, long ventrally, rounded, a small medio-ventral spine; anal segment short with a strong, curved median spine from the ventral edge. Styles small, narrow, parallel-sided, apex pointed, arising from well within the pygophor.

Length 3.8 mm.; tegmen 3.8 mm.

Hab. Pontianak and Telok Ayer, West Borneo; Laloki, Papua; on sugar-cane.

(2) *E. caliginosa* sp. nov. (♂ ♀)

Dark brown; frons, except the base, genae below eyes, sides and posterior margin of pronotum and spur on hind tibia yellow or whitish, trochanters of hind legs and margins of abdominal segments yellowish. Tegmina uniformly brown, veins dark, granules small, dark, hair-bearing; wings smoky hyaline, veins brown.

Male pygophor with two small, contiguous, median spines on ventral border, with a very small projection a little laterad of these;

spine on ventral edge of anal tube fine; styles narrow, subparallel-sided, arising well within the pygophor, apical third slightly curved and the inner edge emarginate, apex rounded.

Length 3 mm.; tegmen 3 mm.

Hab. Amboina; Ceram; Toeal, Kei Islands; Larat; on sugar-cane.

In these two species the median carina on scutellum is obsolete; *caliginosa* appears to be very near to *krugeri*, but the antennae are all dark brown.

Eocurysa gen. nov.

Type *flavocapitata*.

This genus differs from *Eumetopina* in having the junction of vertex and face acutely angular, the median keel on face and scutellum distinct and the genital styles articulated on the ventral edge of pygophor, not within it.

(1) *E. flavocapitata* sp. nov. (♂ ♀)

Vertex, base of face, pronotum, except the lateral margins, and pleura of abdomen yellowish, rest brown, hind legs lighter. Tegmen lighter brown, veins darker with small, hair-bearing granules; wings smoky hyaline with brown veins.

Male pygophor slightly emarginate medio-ventrally; anal segment short, a strong, inward-pointing spine on each ventro-lateral edge; genital styles reaching to anal segment, attached to the medio-ventral edge of pygophor, gradually enlarged on basal half then gradually tapering to apices which are curved outward.

Length 2.8 mm.; tegmen 2.8 mm.

Hab. Malay Peninsula and South China, on sugar-cane and sorghum.

Punana gen. nov.

Type *brunnea*.

In profile angular at junction of vertex and face, face and clypeus forming a continuous, slight curve, clypeus not angular. Vertex as long as broad, slightly rounded at apex, truncate at base which is slightly in front of middle of eye; an inverted V-shaped keel from middle of apex to latero-basal corners and continuing along back of eye, disk slightly excavate; face about one-third longer than wide, apex and base of equal width, laterally convex and keeled, also medially keeled; clypeus distinctly shorter than face, tricarinate; eyes with very slight antennal emargination on lower edge; antennae as long as face, first joint a little shorter than second, cylindrical, slightly

enlarged towards apex, beset with small spines, second joint flattened ovate, beset with sense organs and small spines, arista at apex; no carinae on genae below antennae. Pronotum as long as vertex, tricarinate, with a puncture in each half of disk, lateral carinae diverging, following curvature of hind margin of eye; scutellum 5-carinate. First joint of hind tarsus longer than the following two together, tibia with one basal, one sub-basal, one sub-apical and three apical spines, tibial spur a little more than half the length of first tarsal joint, awl-shape. Tegmina as in *melanesia*, but the neuration obscured by irregular granulation.

This genus is near *Melanesia*, but the shape of face and antennae easily separate it.

(1) *P. brunnea* sp. nov. (♀)

Brown; face with small light dots along keels, a yellowish mark dividing face from the dark brown clypeus, antennae with three dark rings, legs banded yellow and brown. Tegmina brown with a few lighter spots, thickly studded with light-colored granules, mostly along each side of veins, but irregular; wings brownish, dark-veined. Anal style small, spatulate; ovipositor reaching to end of anal style.

Length 3.5 mm.; tegmen 3.8 mm.

Hab. Mowong, Borneo.

Perimececer gen. nov.

Type *giffardi*.

Head in profile rounded at junction of vertex and face, extending slightly beyond eyes; clypeus continuous with face, not angular. Eyes transverse, antennal emargination on lower edge, extending half across eye; antennae very long, first joint small, claviform, second joint more than four times the length of first, cylindrical, beset with spines and sense organs, apex truncate, arista as long as second joint, arising from apex. Vertex subquadrate, truncate at base which is about level with middle of eyes, slightly rounded apically, depressed in middle, keels obsolete; face long, slightly convex and keeled laterally, a pair of median keels subobsolete at base, gradually converging together and meeting at apex, no keels on genae; clypeus longer than face, tricarinate, median keel reaching apex, lateral ones reaching a little beyond middle. Pronotum a little shorter than vertex, anteriorly truncate in middle, posteriorly shallowly emarginate, median keel subobsolete, lateral keels wide apart, diverging, following curvature of back of eyes. Scutellum slightly broader than long, lateral angles well in front of middle, 5-carinate, medio-lateral keels converging anteriorly. Tegmina narrowly rounded at apex; subcosta and radia amalgamated for basal third, radial cross-vein missing or very

short, radia furcate beyond cross-vein, two median sectors, basal portion of first joining cubitus, four apical cubital veins, a large stigmal spot at end of costal cell. First joint of hind tarsus about twice as long as second and third together, tibial spur awl-shape with one basal, one preapical and four apical spines.

This genus is near to *Ugyops* (and *Bidis*) but its longer antennae, wider vertex and the distance between its median facial keels distinguishes it.

(1) *P. giffardi* sp. nov. (♀)
Plate 6, fig. 13.

Face below eyes, clypeus, legs, ventral surface of thorax and abdomen, vertex and middle of thorax light yellow, eyes, antennae, face between eyes, lateral portions of pronotum and scutellum and dorsal surface of abdomen dark reddish brown; abdomen somewhat mottled. Tegmina brownish, darker over the costal area up to stigma and over the posterior half of apex; veins darker, a row of hair-bearing granules along each side of veins to cross-veins, then a single row on the veins; wings dusky hyaline, veins brown.

Length 4.4 mm.; tegmen 7.8 mm.

Hab. Piroe, Ceram.

I take the pleasure of naming this species after my friend Mr. W. M. Giffard.

Ugyops Guer.

(1) *U. liturifrons* (Walker.)

Specimens from Amboina, Ceram and Larat show considerable variation in extent of markings on tegmina; in some the brown apical mark extends along clavus to base. The genitalia in all these specimens are identical, the medio-ventral edge of pygophor is drawn out into a rounded tongue, the lateral edges curved; anal segment about half the length of ventral surface of pygophor, with a v-shaped excavation on its ventro-basal surface; anal style lanceolate, long, narrow; styles slender, subcylindrical, curved inwardly to near tips which are straight and meet together.

(2) *U. amboinensis* sp. nov. (♂ ♀)

Face with two approximate median keels joined together at apex. Light yellow, vertex and sides of face, genae and apex of clypeus spotted with brown, second joint of antenna with two brown bands, a brown band on apex of front femora and three bands on front tibiae, the bands on middle and hind legs much fainter, lateral edges and keels of thorax darker, abdomen mottled with brown, especially along medio-lateral line of dorsum. Tegmina hyaline, veins yellow with

brown bands, a brown mark in first apical median cell; wings hyaline, brown-veined. Besides being smaller and lighter this species differs from *liturifrons* in having the pygophor and anal tube much smaller, the anal style shorter and broader and the genital styles less curved and their apices, where they meet, not straight.

Length 5.2 mm.; tegmen 5.7 mm.

Hab. Amboina.

(3) *U. lalokensis* sp. nov. (♂)

A single median facial keel, meeting the V-shaped keel of vertex; the first median sector touching the cubitus (no median cross-vein). Light brown; the facial keels, distal half of second antennal joint, apical portion of tibiae and marks on dorsum of abdomen dark brown. Tegmina hyaline, veins brown with very fine, hair-bearing granules, a large stigma at end of costal cell, a brown spot at end of each apical vein, extending along cubital vein to clarus; wings hyaline, fuscous at border, brown-veined. Length of ventral surface of pygophor more than twice the breadth, medio-ventral process about as long as broad, angularly emarginate at apex, ventro-lateral edges of pygophor produced into angular, bent plates; anal segment long, compressed, forming a keel along medio-dorsal line, a long, acutely angular depression on ventral basal surface; anal style very small, narrowly lanceolate, genital styles small, slightly curved, flattened, the apices crossing one another.

Length 6 mm.; tegmen 7.7 mm.

Hab. Laloki, Papua.

This probably represents a new genus, but as there appears to be two forms mixed under *Ugyops* and *Bidis* which I cannot separate I place this form with them.

Melanesia Kirkaldy.

(1) *M. borneoensis* sp. nov. (♀)

Stramineous; a small, black, spatulate-shaped mark on each side of the V-shaped keel of xertex, a round black spot on each side of pronotum behind eyes, ovipositor dark; tegmina hyaline, slightly opaque and yellowish, veins colourless on basal half, brown apically, with numerous inconspicuous granules, a black spot in clavus, another small one at base of subcosta, radia, media and cubitus each with small brown spot; wings hyaline, brown-veined, slightly opaque.

Length 4.6 mm.; tegmen 5.4 mm.

Hab. Mowong, Borneo.

TROPIDUCHINAE.

Tambinia Stal.

(1) *T. macaoana* sp. nov. (♂ ♀)

Length of vertex about two-thirds the width (1 to 1.6), two small keels in a medio-lateral position at base of vertex not reaching half way to apex, length of face slightly more than greatest width below the eyes, median keel broad and distinct at *base*, very fine towards *apex*; posterior margin of pronotum deeply and angularly emarginate; tips of tegmina slightly deflexed at cross-veins; the characteristic apical cross-veins present.

♀ Light green, stramineous or light brown, lighter ventrally; eyes, spines on posterior legs and the ovipositor brown. Tegmina hyaline, slightly stramineous, all the cells of corium slightly granulate. Anal style longer than broad, apex rounded.

♂ One specimen light green, others light brown to yellow. Genital styles broad, thin, convex, similar in shape and size to the median process which lies between and contiguous to them, the three together forming a hemisphere; anal style long, elliptic, projecting well beyond the genital styles.

Length 4 mm.; tegmen 4.6 mm.

Hab. Macao, China.

(2) *T. terryi* sp. nov. (♀)

In color and form of head this is identical with the brown *macaoana* but the granulation over the cells of corium is more distinct and the anal style is lanceolate, with the apex acutely pointed whereas in *macaoana* it is rounded.

Length 4.4 mm.; tegmen 5.2 mm.

Hab. Manila.

Collected by my late friend, Mr. F. Terry.

(3) *T. concolor* sp. nov. (♂ ♀)

Shape of head similar to *macaoana*. Stramineous, legs and thorax ventrally slightly lighter, abdomen slightly fuscous; granulations on corium faint. Male genital styles spoon-shaped, their rounded apices meeting together; between them, in a median position, rises a very small conical process; anal segment longer than broad, slightly widened at apex which is shallowly and roundly emarginate, anal style small, lanceolate.

Length 3.8 mm.; tegmen 5 mm.

Hab. Amboina; Ceram.

The female I associate with this is from Ceram. The anal

segment and style agree with the Amboinese males. The corium is slightly more granulate.

(4) *T. fuscocoriata* sp. nov. (♂ ♀)

The small medio-lateral keels at base of vertex missing, otherwise head and thorax as in *macaoana*. Head and thorax greenish, yellowish or stramineous, on vertex, pronotum and scutellum more or less scarlet between keels, apical half of face brown, legs and abdomen fuscous. Clavus and corium up to apical cross-veins fuscous brown, with a hyaline spot at base of corium and another in the middle, the latter of variable size, corium beyond apical cross-veins hyaline, veins in hyaline portion brown, granulation more distinct in costal cell and clavus where they sometimes form minute white dots; wings hyaline with brown veins.

The one female specimen in the collection has the dark marking on the tegmen reduced to the clavus, base of corium and over the cross-veins.

The genitalia differs from *laratica* only in the apices of the genital styles which are smaller and the apical half of anal style more circular.

Length 3.2 mm.; tegmen 3.7 mm.
Hab. Larat.

(5) *T. laratica* sp. nov. (♂ ♀)

The small medio-lateral keel at base of vertex is obsolete and the median keel sometimes very faint, otherwise this species has the form of *macaoana*. Stramineous to light brown, the dorsum of abdomen fuscous, more or less tinged with scarlet between keels of head and thorax; one specimen has head, thorax and veins of tegmina green and the scarlet more distinct. Tegmina hyaline, slightly stramineous, veins stramineous, brown or green, fuscous over cross-veins making a distinct mark across tegmina separating the apical area, granulation on corium obsolete; wings hyaline with dark veins.

Anal segment of male and female a little longer than wide, broadest at apex where it is roundly emarginate, anal style projecting well beyond end of segment, constricted in middle, apical half circular; genital styles broadest at base, gradually narrowing to apex where it has a very small bifurcation curved round and touching at their apices, from the upper edge arises a curved, pointed process; median process small about twice as long as broad; sides of pygophor slightly and roundly projecting.

Length 3.2 mm.; tegmen 4 mm.
Hab. Larat.

(6) *T. formosa* (Kirkaldy).

Ossa formosa Kirkaldy, H. S. P. A. Ent. Bul. I., p. 413.

The deep emargination of the pronotum and the presence of apical cross-veins as well as the cross-veins places this species in *Tambinia;* it has the head narrowing from front of eyes to apex and comes near to *capitata.* Width of vertex to length as 1 to 1.4.

(7) *T. venusta* (Kirkaldy).

Ossa venusta Kirkaldy, l. c.

This species is congeneric with *formosa,* the head is not gradually narrowed, the length of vertex subequal to width.

Trichoduchus Bierman.

The species I add to this genus agrees in its generic characteristics with *biermani;* there is a small, pointed tubercle in the middle of the clypeus. I follow Bierman in placing this genus in *Tropiduchidae,* but it is so like *Ommatissus* that I consider they must eventually be placed next to one another. *Paruzelia* has a neuration approaching this genus.

(1) *T. biermani* sp. nov. (♀)

Yellowish, marked with brown. Head and thorax yellowish. clypeus and genae below antennae brown, legs and under side of thorax speckled with brown; abdomen yellowish mottled with brown, a round shiny black spot on pleura of penultimate segment. Tegmen reaching slightly beyond end of abdomen, very irregular, disk convex, the disk of each individual cell somewhat concave, the veins elevated; centrally dark brown to black, with yellow veins, margin lighter brown, colorless at apices of veins; three round vitiline spots, one in each of the first and second median cells and the third over the radia; wings totally absent.

Last dorsal plate emarginate in middle where anal segment is situated, the sides of emargination projecting as a rounded plate on each side of anal segment. Anal segment short, anus in middle, apex shallowly emarginate; sheaths of ovipositor broad, rounded at apices, which turn slightly upward.

Length 3.5 mm.; tegmen 2.50 mm.

Hab. Macao, China.

CIXIINAE.

1. Vertex angularly emarginate at apex..... *Kirbyana*
   Vertex truncate at apex 2
2. Vertex with a distinct transverse keel.....*Leptoclamys*
   Vertex without a transverse keel..... 3
3. Vertex with a distinct medio-longitudinal keel, quadrate, base subequal to apex..... *Ptoleria*
   Vertex without a medio-longitudinal keel, or with a very obscure one 4
4. Vertex distinctly wider than long, base shallowly and roundly emarginate ..... *Austroloma*
   Vertex not distinctly wider than long, base less roundly emarginate 5
5. Apex of vertex not perceptibly narrower than base *Saccharias*
   Apex of vertex narrower than base, the median facial keel breaking the truncate outline of apex.. *Dystheatias*

I cannot find the type material of *Saccharias* among the late Mr. Kirkaldy's collection, but I took specimens in Java which I consider to be topotypes; they agree with the specific description, his generic description being quite inadequate.

The above six genera are closely allied, the first three are easily distinguished, but the last three are very difficult to keep apart; their generic distinctions are not likely to bear the strain that more extensive collecting will place upon them.

Ptoleria Stal.

(1) *P. granulinervis* sp. nov. (♂ ♀)

Lateral carinae of scutellum sinuate.

Light brown, the keels on head and thorax slightly lighter, dorsal part of abdomen fuscous, front legs with faint fuscous rings on femora and tibiae; tegmina light brown, small brown granules covering nerves, darker over stigmal spot; wings hyaline, slightly fuscous, veins brown. Male pygophor laterally compressed, a large emargination on dorsal side in which the anal segment fits, lateral edges sinuate, a small, rounded, median process; anal segment longer than broad, anus a little beyond middle, beyond anus flattish, slightly turned down, truncate at apex, a small, down-turned spine at each apical corner; styles flattish, widest at apex, inner edge convex outer edge concave, apex with a small point.

Female slightly darker in color, with more infuscation over apical portion of tegmina.

Length 2.4 mm.; tegmen 3.5 mm.

Hab. Larat, Timor Laut Islands.

(2) *P. brunnea* sp. nov. (♀)

Lateral keels on scutellum sinuous. Dark brown, keels on head and thorax and the legs lighter, front tibiae with three darker bands; tegmen with apical half fuscous, a small angular light mark at end of costa, and a small spot at end of each apical vein, a brown band from near base of costa to middle of clavus and then to cubitus a little above the furcation, veins with brown granules; wings fuscous hyaline with brown veins.

Length 2.5 mm.; tegmen 3.7 mm.

Hab. Larat, Timor Laut Islands.

(3) *P. communis* sp. nov. (♂ ♀)

Lateral keels on scutellum slightly curved, not sinuous. Brown, keels and legs lighter, front tibiae with fuscous bands, male styles and ventral portion of pygophor light; tegmina hyaline, light brown, apical half fuscous, the veins brown with brown granules, tips of apical veins with small dark spots with light spots on border between them, a faint mark from corium to base of costa; wings smoky with brown veins. Male pygophor compressed laterally, long ventrally, short dorsally, sides roundly produced, medio-ventral process small, conical; anal segment longer than broad, anus two-thirds from base, apex rounded, sides deflexed, forming a hollow on ventral side; styles flattened, curved, narrow at base, gradually increasing to rounded apex.

Length 2.5 mm.; tegmen 4.2 mm.

Hab. Singapore.

This species is near *brunnea* but the absence of the angular light mark at end of costa and the presence of the light and dark marks along the apical border easily distinguishes it.

(4) *P. maculata* sp. nov. (♂ ♀)

Lateral keels on scutellum slightly curved but not sinuate. Female head, thorax and legs light brown, abdomen dark brown, no bands on legs; tegmina hyaline, uniformly yellow brown, veins of same color with light granules, cross-veins dark and a dark spot at tip of each apical vein.

Male with infuscation on cross-veins and spots at apex of apical veins less pronounced, abdomen light brown. Pygophor laterally compressed, sides roundly produced, medio-ventral process small, round; anal segment slightly longer than broad, apex pointed, edges deflexed, anus slightly beyond middle, the whole somewhat like an inverted boat; styles flattish, widening to the rounded apex.

Length 2.8 mm.; tegmen 4.4 mm.

Hab. Malay Peninsula.

(5) *P. magna* sp. nov. (♀)

Lateral keels on scutellum slightly curved but not sinuate; vertex considerably narrowed apically but base much broader than length. Head, thorax and legs brown, abdomen darker, keels on head and thorax lighter, legs without marks, spines on tarsi dark; tegmina broadened towards apex which is more truncate than in the other species, uniformly brown, veins lighter and thickly studded with small brown granules, the darker color spreading out around granules into the cells, a small light spot on boarder in each median apical cell.

Length 3.6 m.m.; tegmen 5.3 m. m. This is not quite as large as the type species but larger than the other four species.

Hab. Mowong, West Borneo.

(6) *P. australis* sp. nov. (♂)

Lateral keels on scutellum nearly straight, medio-longitudinal keel on vertex distinct, first median sector touching cubitus. Vertex and middle of pronotum and scutellum light brown, sides dark brown, face, clypeus, legs and ventral side of thorax brown, face irrorated with small light spots; hind tibiae with a longitudinal brown stripe; abdomen brown, anal segment and pygophor yellowish. Tegmina hyaline, light yellowish brown, with a slightly darker fascia as in *arcuigera*, five or six small dark spots along second claval vein, veins colorless with very small, light granulations. Male pygophor laterally compressed, short dorsally, long ventrally, lateral edges roundly produced, medio-ventral process very small constricted at base (subcordate); anal segment longer than broad laterally compressed, rounded at apex, anus about one-third from base, sides deflexed forming a narrow bonnet over the styles; styles curved, slightly broadened on apical half, in transverse section subangular or sublunate.

Length 2.2mm.; tegmen 3.8mm.

Hab. Cairns, Queensland. Coll. Messrs. Perkins and Koebele.

Austroloma Kirkaldy.

(1) *A. austrina* Kirkaldy. (♂)

Male pygophor laterally compressed, medio-ventral process very small, angular, lateral edges broadly angular; length of anal segment about twice the breadth, slightly narrowed to rounded apex, lateral edges near apex turned down and slightly produced, anus slightly behind middle; styles curved, narrow at base, slightly spatulate at apex, keeled longitudinally and bent so that it is angulate in cross section.

Female unknown.

(2) *A. pallidula* sp. nov. (♂)

Yellow or light brown, scutellum lateral of outer keels and dorsum of abdomen darker; tegmina hyaline, yellowish, veins yellow with a stigmal spot; wings hyaline with brown veins. Male pygophor laterally compressed, long ventrally very short dorsally, medio-ventral process small, conical, lateral edges roundly produced; length of anal segment about twice the breadth of base, gradually narrowing to rounded apex. The edges near apex turned down and produced into a fine spine on each side, anus a little beyond middle; styles small, curved, basal portion thin, apex roundly spatulate. This species differs from *austrina* by the large anal segment with spines on sides of apex, rounded sides of pygophor and the styles being more roundly spatulate at tip and without a longitudinal keel.

Length 2.50mm.; tegmen 4mm.

Hab. Larat, Timor, Laut Islands.

(3) *A. pallida* sp. nov. (♂)

Yellow or light brown, very slightly fuscous on dorsum of abdomen; tegmina hyaline slightly yellowish, veins yellow, a minute fuscus spot in clavus, the tips of first three apical veins slightly fuscus. Male pygophor laterally compressed, long ventrally, short dorsally, lateral edges roundly produced, medio-ventral process angular, broader than long, length of anal segment slightly more than twice width of base, anus in middle, in dorsal view constricted before anus and gradually narrowed after anus to the roundedly-pointed apex, two downward pointing knobs on ventral edges about middle; styles small, flattish, regular about middle, apex slightly widened.

Length 2.50 mm.; tegmen 4mm.

Hab. Amboina; Larat.

(4) *A. fusconervata* sp. nov. (♀)

Dark brown; face, legs, pleurae and edges of abdominal segments and keels of head and thorax lighter; tegmina hyaline with dark brown veins with small graulations, three small brown spots, one in clavus, one on cubitus and one on media, all apical cells more or less fuscous, darker along veins. There are twenty specimens from Amboina of which the above description is typical, the infuscation varies in intensity, the two spots on the corium being absent in some specimens; there are also seventeen specimens from Larat which conform to the lighter Amboina specimens. It is possible that we have here the females of *pallida* and *pallidula*.

Length 3mm.; tegmina 4.6mm.

Hab. Larat, Timor Laut Islands; Amboina.

(5) *A. bicolor* sp. nov. (♀)

Scutellum, lower portion of face, clypeus, legs and ventral aspect of thorax yellow, upper portion of face, vertex, pronotum, tegulae and abdomen dark brown or black; tegmina dark fuscous, veins dark and granulated; wings dark fuscous with dark veins.

Length 2.8mm.; tegmina 4.8mm.

Hab. Piroe, Ceram.

(6) *A. grandis* sp. nov.

Vertex and middle of pronotum and scutellum, sides of pronotum and scutellum, face clypeus and genae dark brown, keels of face and clypeus with light spots, legs yellow with fuscous bands, one on femora, two on tibiae and one on first tarsal joint, abdomen brown marked with yellow. Tegmina hyaline marked with brown, veins mostly white with brown granules; the brown markings are over middle of clavus and forking of cubitus to near costa, at base of costa, an irregular broad angular mark from end of costal cell to cubitus and then to radial apical vein, apical area suffused with brown; wings hyaline with brown veins, slightly suffused with fuscous.

Length 3.6mm.; tegmen 5.4mm.

Hab. Amboina.

This species has the typical wing of the genus, but there is an indication of a median longitudinal keel on vertex which confuses it with *Ptoleria*.

Kirbyana.

(1) *K. javana* sp. nov. (♀)

Stramineous; keels of head and thorax lighter, pronotum and scutellum outside the lateral keels darker; all tibiae with a longitudinal brown mark; tegmina stramineous, veins light, granules very small and colorless; wings hyaline with white veins. This species is easily recognized from *pagana* by the absence of the dark granules.

Length 2.6mm.; tegmen 4.4mm.

Hab. Doro, Java.

(2) *K. pratti* sp. nov. (♂ ♀)

Yellowish brown; keels on head and thorax lighter, face with small light spots, lateral edges of pronotum and scutellum darker, pygophor lighter, tibiae with longitudinal brown mark; tegmina hyaline variegated with brown, veins colorless with small brown granules; the brown markings covering inner half of clavus and extending to cubitus and, near base, to costa, a large, irregular, brown, triangular mark with its base from middle of costa to second radial vein

and its apex reaching the cubitus, dark over apical portion of tegmina, especially along apical veins, some small dark spots on claval veins.

Male pygophor narrow, compressed laterally, the sides produced into obtuse angles, a small median process on ventral edge; anal segment short, anus in middle where it is raised, the edges turned downward, apical edge with small, round emargination; styles short, reaching to end of anal segment, flattened; with end shaped like a bird's head.

Length 2.8mm.; tegmen 4.2mm.

Hab. Parit Buntar, Malay Peninsula.

I take the pleasure of naming this little insect after Mr. C. Pratt who caught the first of my specimens.

Mundopa Distant.

The species I place under this genus agree with *cingalensis* in neuration, shape of head, etc. The vertex is short, divided from face by transverse keel, with or without a longitudinal keel; median keel of face furcate at base.

(1) *M. lunata* sp. nov. (♀)

Yellow or yellowish brown; pronotum and scutellum darker, a brown mark across posterior portion of scutellum, brown over front and middle coxae, middle of pronotum, edges of tegulae and apex of abdomen; tegmina hyaline, very slightly yellowish and opaque with waxy secretion, veins brown, a brown stigmal mark, a curved mark at base from subcosta to edge of clavus which joins with the band over scutellum when wings are at rest and forms a crescent-shaped mark.

Length 3mm.; tegmen 4.4mm.

Hab. Mowong, Borneo.

(2) *M. fasciolata* sp. nov. (♂)

Vertex without a median longitudinal keel. Dark castaneous; clypeus, legs, ventral surface of thorax, anal styles, keels of vertex, lateral keels of face and antennae yellow, margins of ventral plates of abdomen yellowish; tegmen hyaline slightly opaque and dirty with waxy secretion, veins yellowish, base of tegmina fuscous, a mark at stigma, a spot at end of clavus, another a little beyond clavus, a broad band across tegmina over the cross-veins; wings hyaline, veins brown, apices broadly fuscous.

Male pygophor compressed laterally, ventral edges produced an-

gularly, lateral edges evenly curved; anal segment large, anus about middle, sides curved and turned down; styles small, clavate.

Length 2.5mm.; tegmen 3.8mm.

Hab. Mowong, Borneo.

(3) *M. caliginea* sp. nov.

Dark brown; the coxae of hind legs yellowish, tegmina and wings brown with dark veins. Male pygophor very large; ventral edge sinuate and slightly emarginate, lateral edges curved and turned slightly inward, medio-ventrally there projects a plate which in ventral view is thin with two small projecting points at apex, in lateral view wide at base and curving off to thin apex; styles a little longer than median process, slightly swollen in middle, bifurcate at apex, the ends of the bifurcations rounded; anal segment very large, projecting well beyond styles, in dorsal view flat, subovate, the anus at apex, the edges turned down and apically meet beneath anus, thus forming a large concavity on the ventral side of segment, in which lies the large and complex penis.

Length 2.8mm.; tegmen 3.8mm.

Hab. Mowong, Borneo.

(4) *M. neocaliginea* sp. nov. (♂ ♀)

This differs from *caliginea* by the lateral keels of vertex and face being yellowish. Male pygophor with a medio-ventral spine, lateral edges evenly and roundly produced; anal segment not reaching to end of styles, little longer than broad, in dorsal view subtruncate at apex, where anus is situated, edges turned down thus forming a concavity on ventral side; styles boomerang shape, narrowest at base, outer edge concave inner convex.

Length 2.8mm.; tegmen 4.2mm.

Hab. Malay Peninsula; Mowong(?). I have specimens of females from Mowong which I associate with this species, but it is possible that they are only light forms of *caliginea*.

(5) *M. albocacuminis* sp. nov. (♀)

Brown; apex of face, clypeus, legs and ventral surface of thorax light yellow, lateral keels on face, keels on vertex and scutellum yellow, the lateral keels on scutellum broadly so; tegmina brown tinged with yellow over the clavus and across middle of cubitus, a crescent-shaped dirty white mark over apex from radial to last median apical veins.

This species differs from the former four in having a median longitudinal keel on vertex, and the transverse keel is v-shaped in

middle so that, together with the bifurcation of median facial keel, it forms a small diamond-shaped area.

Length 2.6mm.; tegmen 4mm.

Hab. Mowong, Borneo.

Borysthenes Stal.

This genus, like *Mundopa,* has the subcosta and radia separated from near the base, the radia being furcate about the middle and one or both branches again furcate near the apex; the media has three sectors, the first furcate near the apex. The tegmina are ampliated on the hind margin beyond the clavus, and when at rest these areas overlap and are not appressed as in *Mundopa Kinnara* etc., Another feature which separates this genus from *Mundopa* is the presence of a keel across the gena below the antenna (subantennal keel) which touches the edge of the face at its widest point, from which point the face narrows to the apex. It is difficult to separate the species of this genus without the help of the male genitalia. The tomentosity on species of this genus mentioned by their describers is due to waxy secretions and not to hairs or scales, and may be present or absent.

(1) *B. certus* sp. nov. (♂)

Head, thorax, legs and base of abdomen stramineous, rest of abdomen fuscous; tegmina hyaline, slightly fuscous, subopaque with waxy secretion, veins brown on basal half, fuscous apically, infuscation darker over apical cells and along base of subcosta, radia and media, and over cross-veins; third apical median and first and second apical radial cells each with a lighter spot.

Male pygophor compressed laterally; ventral edge deeply and roundly emarginate, a small, rounded, median process, slightly longer than wide; on each side of the emargination the edges are produced into a small, flat, spine above which on the right side the edge is slightly produced, then straight for a short distance and then cut away to the base of the anal segment, on the left side it is not produced but nearly straight to the base of the anal segment; anal segment large, anus near base, beyond which the segment curves under, the apex being irregular. Styles asymmetrical, right one flattened, the apical portion projecting nearly at right angle to basal portion, but in the same plane, at the angle the inner edge drawn out into a small point, the apex spatulate and rounded, the bent apical portion nearly as long as the straight basal portion, a minute emargination on inner edge near base, left style of the same shape as the right but the

bent apical portion much shorter and the spatulate apex slightly larger.

Length 3mm.; tegmen 4.4mm.

Hab. Telok Ayer, Borneo.

(2) *B. incertus* sp. nov. (♂)

The color and marking of this species is nearly the same as *certus* but the male genitalia differs as follows: Ventral emargination not so deep, median process broader, the spines at the sides of emargination broader and shorter, the lateral edges project as broad angles, the right much longer and more acute than the left; anal segment long, anus about third from base, the apex pointed, turned downward slightly and swollen; styles not so flat as in *certus*, the apical portion shorter and turned in an opposite plane to the base, the apical portion on left side being pointed and curved, not spatulate.

Length 3.4mm.; tegmen 5.2mm.

Hab. Mowong, Borneo.

(3) *B. simulans* sp. nov.

Color and marking as in *certus* but the hyaline spots larger. Ventral edge of pygophor deeply emarginate, the median process thin and spine-like, the sides roundly produced, forming a continuous curve with the sides of emargination without any spines on edge; anal segment large, anus near base, beyond anus broadened and flattened, the apex drawn out and slightly spatulate, turned downward and split down the middle, forming two contiguous processes; styles broad, flat, apical portion curved slightly outward, rounded at apex, a round emargination on inner edge near base.

Length 3mm.; tegmen 5mm.

Hab. Mowong, Borneo and Malay Peninsula.

(4) *B. magnus* sp. nov. (♂ ♀)

Clypeus, back of genae below eyes, scutellum, middle of pronotum and all of abdomen brown, rest of body and legs yellow; tegmina brown with white hyaline areas, costa and first branch of subcosta red, other veins brown; the hyaline areas are a patch over basal area, cut up by the brown veins, and nine or ten spots in the disk, the spot in second radial cell continued as a fine hair-streak to near apex; wings fuscous brown, veins dark with the darker color spreading into the cells.

Male pygophor slightly compressed laterally, medio-ventral edge produced into an angular plate, the basal half narrowing slightly, the apical half more acutely; lateral edges obtusely angularly produced;

anal segment in dorsal view projecting slightly beyond lateral edges, widest at base where anus is situated, the apex produced into two contiguous processes which are turned down at right angle to main portion; styles reaching end of anal segment curved narrow at base, wide at apex, the inner edge convex, with a small emargination at base, outer edge concave, bent along the longitudinal axis so that a transverse section shows a right angle, the apex at the bend drawn out into a point, the outer apical angle pointed, the inner apical angle rounded.

Length 4.6mm.; tegmen 6.5mm.

Hab. Mowong, West Borneo.

The bifurcation of the apex of anal segment and the shape of the styles places this species next to *simulans*.

Kimara. Distant.

The presence of the median ocellus and the large anal wax plate of the female shows that this genus should be placed among the Cixiidae and not among the Achilidae. When at rest the tegmina have their posterior borders beyond the clavus appressed, and not overlapping as is normally the case with the Achilidae. The meeting of the claval suture with the claval vein is very obscure and should not overbalance the characters mentioned. A distinguishing feature of this genus is the large costal cell and the conspicuous stigmal area near its apex, also a subantennal keel across the gena.

(1) *K. brunnea* sp. nov. (♀)

Shiny dark brown; lateral keels of face and the legs lighter brown, pleurae of abdomen red; tegmina dark brown with three minute transparent spots near apex; wings fuscous with dark veins.

Length 2.8mm.; tegmen 3.8mm.

Hab. Mowong, West Borneo.

(2) *K. flavifrons* sp. nov. (♂ ♀)

Head, pronotum, tegulae and legs yellow or brownish yellow, scutellum dark, shiny brown, lateral facial keels tinged with darker brown, abdomen brown with reddish pleurae; tegmina dark brown with lighter spots in the middle of the apical cells; wings fuscous with dark veins.

Male pygophor compressed laterally, ventrally long, dorsally very short, ventral edge truncate, lateral edges cut back squarely to base of anal segment; from near the base of the styles a thin process arises

and remains attached to the lateral edges to their angulation when it continues as a long, free process, finely pointed and slightly twisted; styles small, not reaching to end of lateral spines, subparallel sided and rounded at apex; anal segment large, with its edges deflexed, forming a large hollow on ventral side, anus near the rounded apex; penis large and complex. Female styles (outer sheaths of ovipositor) with an indentation near apex or inner edge with a projecting flange at base.

Length 2.7mm.; tegmen 4.3mm.
Hab. Java; Mowong, Borneo.

The type is from Java, the Borneo specimens being all females and differing slightly from the female from Java. Males from Borneo may show them to be a distinct species.

(3) *K. fulva* sp. nov. (♂ ♀)

Yellow; dorsal portion of abdomen and anal segment fuscous; tegmina hyaline, subopaque with waxy secretion, slightly infuscate over the apical cells from radia to cubitus; wings hyaline, semiopaque with waxy secretion, veins dark.

Male pygophor long, compressed laterally, the ventral edge truncate, the lateral edges roundly produced, foliate and turned outward slightly, from each side near to the attachment of styles, arises a long, thin, curved process reaching to the extremity of the anal segment; anal segment long, anus about middle, beyond anus segment drawn out into a long, curved, downward-turned spine; styles not so long as the lateral processes, keeled along the outer edge, slightly expanded at apex, penis large and complex. Female styles broad, without a process at base, truncate at apex where there is a small emargination and another slight indentation below the apex on the upper edge.

Length 3.2mm.; tegmen 5.3mm.
Hab. Mowong, Borneo.

(4) *K. sordida* sp. nov. (♂)

Dorsally a sordid brown, ventrally yellowish also lower portion of face and the clypeus; tegmina hyaline, subopaque with waxy secretion, veins slightly yellowish, wings slightly fuscous, subopaque with waxy secretion, veins dark. Male pygophor compressed laterally, a thin cylindrical, roundly-pointed process arises from each lateral edge near the attachment of styles, another sharply pointed and curved process arises from the lateral edges near the base of the anal segment; anal segment long, rounded and slightly broadened at apex where anus is situated; styles shorter than lateral processes,

curved, slightly flattened, with the inner corner of apex slightly produced and rounded at apex.

Length 2.3mm.; tegmen 3.4mm.

Hab. Mowong, Borneo.

Ommatissus Fieber.

(1) *O. lofouensis* sp. nov. (♂ ♀)

This species differs from *binotatus* in the vertex narrowing slightly more towards the apex and the face towards the base, the medio-apical portion of clypeus raised as a short, angular keel. Median ocellus absent, clypeus rounded at base, keelless. Subcosta and radia amalgamated to near apex where three small apical veins arise, media simple with one sector arising a little before the branching of radia from subcosta, cubitus forking slightly before first median sector, claval vein joining commissural margin very near apex of clavus.

Dirty yellow or light brown; eyes dark brown, keels slightly lighter, abdomen darker, a dark fuscous spot on each side of pronotum as in *binotatus*, a dark patch at base of face, basal half of clypeus dark; tegmina and wings hyaline, veins brown. Male pygophor slightly compressed, ventral and lateral edges subtruncate; anal segment less than half the length of genital styles, slightly narrowed to the broadly rounded apex, anus about middle; styles large, subangular, length greater than width at base, apex slightly rounded.

Length 2.6mm.; tegmen 3.2mm.

Hab. Lo-fou Mountains, South China; 3500 feet elevation, on grasses.

(2) *O. chinsanensis* sp. nov.

This species is in form and color like *lofouensis*, but the genitalia differs; the anal tube is short, not reaching to end of genital styles; genital styles nearly circular, with a small indentation on the dorsal edge. This appears to be near to *O. binotatus*, but the styles are much larger in proportion to the anal segment.

Length 2.5mm.; tegmen 3mm.

Hab. Chin san, China (near Macao.)

Neommatissus gen. nov.

Type *spurcus*.

Head narrower than thorax; vertex longer than wide, deeply excavate so that the apex and sides stand up as deep, laminate keels, especially above the eyes, base slightly emarginate, with a very small keel; face much longer than wide, sides subparallel, slightly widening at apex, tricarinate, the median carina continued down middle of

clypeus and strongly curved before apex of same, sides of clypeus rounded, without keels; eyes round, slightly emarginate on lower posterior edge; first joint of antennae small, second cylindrical, little longer than broad, truncate at apex, arista long. Pronotum deeply and roundly emarginate on posterior margin, tricarinate, lateral keels strongly diverging, sharply bent and partly interrupted just before they reach the hind margin above the tegulae; scutullum more than twice the length of head and pronotum, with three large carinae, lateral ones diverging, reaching posterior border. Tegmina with subcosta and radia amalgamated to a little beyond middle, both with short furcation near apex, media with three sectors, first arising about middle of tegmen and furcate about its middle, cubitus furcate about middle of tegmen, radial cross-vein from radia to near base of second median sector, median cross-vein from near base of first median sector to near furcation of cubitus, claval veins amalgamating about one-third from base, joining commissural margin near apex; first joint of hind tarsus a little shorter than the others together, hind tibia with a median and a subapical spine.

This genus is near *Ommatissus* but is easily distinguished by the laminate keels on sides of vertex and the more complex neuration of tegmina.

(1) *N. spurcus* sp. nov. (♂ ♀)

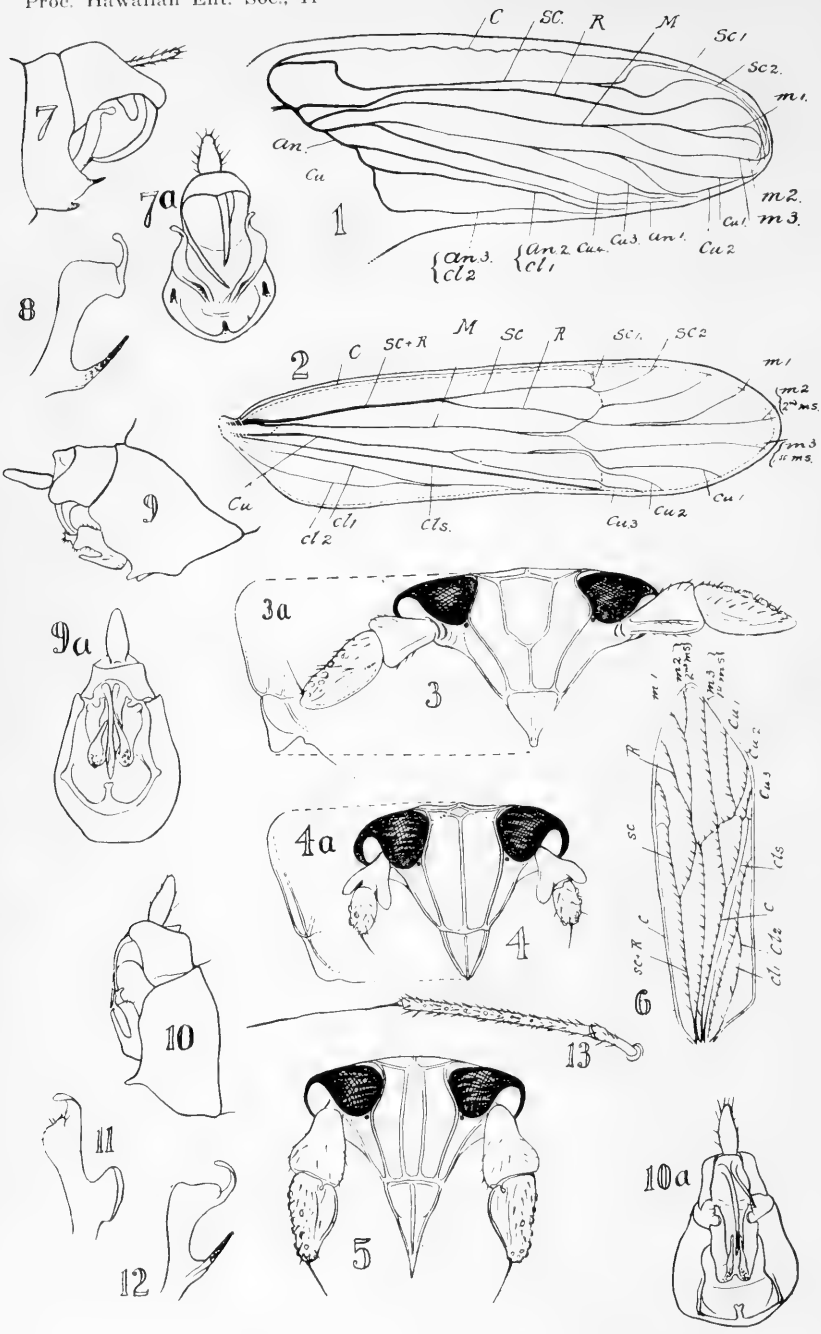
Sordid yellow or sordid light brown; abdomen and between keels of scutellum darker, two small dark marks on apex of vertex; tegmina and wings hyaline, veins yellow, beset with fine hairs on the *underside*. Male pygophor small, slightly compressed laterally, vertex and lateral edges subtruncate, dorsal edge with deep emargination in which anal segment fits; anal segment very short, rounded; genital styles narrow at base, gradually widened to truncate tip, apical corners rounded, outer apical angle with a small outward and downward turned spine, a small spine near apex.

Length 2.3mm.; tegmen 3.8mm.

Hab. Amboina.

Note.

The reason for the horismology of the tegmen employed in this paper is fully explained by figures 1 and 2 of Plate 6, which illustrates the tracheal system in the nymph and recently hatched adult of *Perkinsiella saccharicida*, a typical Delphacid tegmen. The radia and media both bend out of the straight and amalgamate for a short distance, likewise the first median sector (third median vein) and the cubitus, the latter taking a sharp bend immediately afterwards; thus there are neither radial


C
SC.
R
M
Sc1
Sc2.
m1.
an.
Cu
m2.
m3.
Cu1.
Cu2
Cu3.
an1.
an2
Cu1.
an3.
cl2
cl1
1
7
7a
8
2
C
SC+R
M
SC
R
Sc1.
SC2
m1
m2
2nd ms.
m3
3rd ms.
Cu
cl1
cl2
cls.
Cu3
Cu2
Cu1
9
9a
3a
3
4a
4
6
m1
m2
2nd ms.
m3
3rd ms.
Cu1
Cu2
Cu3
R
SC
cls.
C
SC+R
cl1 cl2
13
10
10a
11
12
5

nor median cross-veins. The fourth cubital vein lies close to, and parallel with, the second anal vein, and together they form the claval suture, the second and third anal forming the first and second claval vein.

In using the neuration of Homoptera for systematic purposes care must be exercised in the selection of the characters used, especially for generic purposes, as there is a fair amount of variation, as in the wings of all insects.

Explanation of Plate 6.

1. Nymphal tegmen of *Perkinsiella saccharicida*, showing tracheae.
2. Immature adult tegmen of same.
3. Head of *Cochise*, front view.
3a. Ditto, profile.
4. Head of *Belocera*, front view.
4a. Ditto, profile.
5. Head of *Geoneossus*, front view.
6. Tegmen of *Geoneossus*.
7. Male pygophor of *Tropidocephala saccharicola*, side view.
7a. Ditto, full view.
8. Right genital style of *T. neoelegans*.
9. Male pygophor of *T. festiva* (?), side view.
9a. Ditto, full view.
10. Ditto of *T. atrata* (?), side view.
10a. Ditto, full view.
11. Right genital style of *T. neoamboinensis*.
12. Ditto of *T. amboinensis*.
13. Antenna of *Perimececera*.

C—costa, SC—subcosta, R—radia, M—media, Cu—cubital, Cl—claval, An—anal, MS—median sector.

One New Genus And Eighteen New Species of Hawaiian Moths.

BY O. H. SWEZEY.

During the past three years, in rearing moths from caterpillars found in the mountains and elsewhere, I have discovered a number of species not hitherto described. I have for description also a number of new species found amongst a lot of spe-

cimens collected by Mr. W. M. Giffard at lights, at his bungalow at 4000 feet elevation, Kilauea, Hawaii, at various times in 1911 and 1912. I have also one new species from Brother Matthias Newell of Hilo, Hawaii, and one from Mr. D. T. Fullaway. Some of these new species may have been included in a later collection of Dr. Perkins, sent to the British Museum, but which were never worked up completely.

Family Plusiadae.

Nesamiptis newelli n. sp.

Female; 31mm. Head cinereous-fuscous, pale ochreous on vertex. Antennae ochreous, profusely speckled with fuscous. Palpi cinereous-fuscous. Thorax pale ochreous. Abdomen ochreous and fuscous mixed. Forewings light ochreous, first line dark fuscous angulated outwardly at middle; second line dark fuscous nearly straight, slightly angulated inwardly at one-third from dorsum; space between the lines medium fuscous, somewhat suffused with whitish between cell and costa; a slight suffusion of fuscous on costa near apex; a few fuscous scales in terminal fourth of wing; cilia cinereous-fuscous. Hindwings cinereous-fuscous, darker terminally; a darker discal spot; a median darker line, sinuate in dorsal half; cilia cinereous; termen waved. Legs cinereous-fuscous.

Hab. Hilo, Hawaii, one female, 1911 (Brother Matthias Newell.)

Plusia giffardi n. sp.

Female, 40mm. Antennae fuscous-ochreous, basal half above barred with black and ochreous, bipectinate for three-fourths of length. Palpi very dark fuscous-brown with a few fuscous scales, terminal segment minutely tipped with ochreous. Head and thorax very dark brownish fuscous; collar, patagia, and crests of thorax tipped with violet. Forewings dark fuscous-brown suffused with pale violet, especially in basal and subterminal areas; sub-basal, first, and second lines metallic brassy-yellow; first line angulated outwardly near costa; second line angled outwardly just before middle, dorsal portion irregularly sinuate-dentate; subterminal line incomplete, indicated by metallic brassy-yellow scales; three spots of metallic brassy-yellow scales in disc, first beginning just beyond second line, extending along submedian vein for about one-third of the width of the median band, an extension along vein 2 which terminates in a roundish enlargement dorsal of vein 2, in the disc above this spot and connected with it are a few scales of the same color crescentically arranged: second spot sub-circular, beyond the first, situated dorsal of vein 2; in one specimen connected with first spot; third spot irregular and situated in a dark fuscous discal spot; a slight suffusion of brassy-

yellow scales in dorsal portion of the area before first line; considerable of the same scales in tornal half of the area beyond second line. Abdomen light grey fuscous, dorsal tufts very dark fuscous tipped with violet. Legs very dark brownish fuscous, with tibiae and tarsal joints tipped with white. Hindwings fuscous, darker terminally, a darker transverse discal mark; termen waved, cilia spotted fuscous and dirty whitish.

Hab. Kilauea, Hawaii, 6 females collected at lights, Sept., 1911, May, July, August, 1912 (W. M. Giffard).

Evidently this is related to *pterylota* from its bipectinate antennae and general pattern of wings. It may prove to be the female of that species. Dr. Perkins informs me that Hampson so considered some female Plusias collected by him at Kilauea several years ago. However, my specimens differ very much in general coloration from Meyrick's description of *pterylota*, and in the color and shape of the metallic spots in the disc.

Family Hydriomendiae.

Hydriomena roseata n. sp.

Male and female. 27-31mm. Antennae cinereous. Palpi pale brown. Head and thorax cinereous mixed with a few rosy-pink scales. Forewings whitish much strigulated with rosy-pink and scattered fuscus scales; median band with some suffusion also of brownish ochreous, anterior edge wavy, posterior edge wavy outwardly prominent in middle; discal spot small, of a few fuscous or brown scales. Hindwings of the same color and stringulation as forewings, but median band not so distinct. Abdomen cinereous, rosy-pink and fuscous mixed, apical margins of segments ringed with white, a series of dark fuscous dorsal spots. Legs cinerous and fuscous mixed, anterior pair with femora and tibiae much suffused with rosy-pink, tarsi banded with fuscous.

Hab. Kilauea, Hawaii, 9 specimens taken at lights, Aug., Sept., 1911, Feb., May, July, 1912 (W. M. Giffard).

Hydriomena giffardi n. sp.

Male and female. 23-24mm. Antennae and palpi pale ochreous. Head and thorax white, slightly mixed with fuscous. Forewings white with a few scattered fuscous scales and much strigulated with fuscous; median band with anterior and posterior edges nearly straight and marked with blackish lines, the anterior line discontinued between cell and costa; discal dot round, black. Hindwings similar to forewings but with the strigulations less distinct. Abdomen fusco-cinereous with segmental margins white. Legs cinereous-fuscous, front pair darker.

Hab. Kilauea, Hawaii, 2 specimens taken at lights, Aug. 1911, May, 1912 (W. M. Giffard).

Family Pyraustidae.

Omiodes fullawayi n. sp.

Male, 32mm. Color and markings of *musicola*, but the first line of forewings is bent above middle at an acute angle instead of being almost rectangular as in *musicola*, it is also bent outwards at its termination on dorsum instead of ending straight as in *musicola*; the outward angulation of second line below middle terminates acutely, whereas it is rounded in *musicola*.

Hab. Kona, Hawaii, July, 1912; one specimen reared from caterpillar on wild banana (D. T. Fullaway); Kilauea, Hawaii, May, July, 1912; two specimens taken at lights (W. M. Giffard).

Omiodes anastreptoidis n. sp.

Male and female, 25-28mm. Color and markings of *anastrepta*, except that second line of forewing is not sinuate outwardly beneath costa, and is sinuate outwardly below middle; and the sinuation of the postmedian line of hindwings is more pronounced.

Hab. Kohala Mts., Waimea, Hawaii, 5 specimens reared from caterpillars on sedge, Dec. 1911; one specimen reared from caterpillar on sedge, Kilauea, Hawaii, April, 1906.

Caterpillar 20-25 mm., grass green; head green, eyes black, with a dark streak extending obliquely upward from them, the usual roundish black spot in each lobe in front with a black streak extending obliquely upward and outward connected with it, a black spot between this and the streak from the eyes, a black spot near suture in front, a spot between this and the frontal spot, three or four blackish spots near vertex, a blackish line on margin above postero-ventral angle; cervical shield sometimes faintly black on lateral margin, two black dots in each lateral lobe the anterior one about thrice the size of the other; tubercle "ii" of segment 3 ventrally black-margined; tubercle "ii" of segment 12 faintly ventrally black-margined, tubercle "iii" of segment 12 dorsally black-margined most conspicuously posteriorly; spiracles yellowish.

The caterpillar has the head markings nearly like *anastrepta*, but with more black spots; and there are not such prominent markings on the tubercles. They were in spun together leaves of a small sedge. The pupa was formed in same place. Pupa

11-12mm. long, brownish, and simliar to the pupa of other species of *Omiodes*. Pupal period is 12-13 days.

Pyrausta thermantoidis n. sp.

Male and female, 18-20mm. Antennae whitish-ochreous, barred with fuscous above. Palpi projecting about one and one-half the length of head in front of it, ochreous mixed with fuscous, white at base. Head white on vertex, ochreous and fuscous mixed on face. Thorax white. Forewings brownish ochreous, with a few dark fuscous and whitish scales mixed; base white on dorsal half; first line white, angled outwardly at middle, bent outward on dorsum, indistinct towards costa; second line white, waved, broadly curved outward at middle, broken inward below discal spot on vein 2; roundish orbicular and reniform discal spots faintly outlined with black scales; a terminal white suffusion from tornus touching second line and narrowing to near apex; a terminal series of black dots and four or five black spots on apical third of costa; cilia whitish, barred with dark fuscous. Hindwings pale brownish to cinereous-fuscous, two obliquely placed darker discal spots, a postmedian outwardly-curved whitish line; a terminal series of blackish dots; cilia cinereous, darker at base. Abdomen cinereous-fuscous, segmental margins white. Legs cinereous-fuscous, fore legs darker.

In Meyrick's table this runs to *thermantis*, but it differs from that species in being paler, not ferruginous, thorax and head white, and the first and second lines not having the same form.

Hab. Kilauea, Hawaii, 4 specimens taken at lights, Aug. 1911, May, July, 1912 (W. M. Giffard).

Scoparia nectarioides n. sp.

Male, female, 17 mm. Antennae and palpi light brownish-fuscous. Head ochreous. Thorax white, patagia ochreous with tips of some of the scales fuscous. Forewings ochreous, considerably mixed with dark fuscous especially the anterior half of middle third of wing; first line white, double, very oblique, indented in middle, often suffused with ochreous in middle; claviform, orbicular, and discal spots not distinct in outline, represented by undefined darker fuscous spots, between orbicular and discal a transverse white spot, often a white dot beyond discal; second and subterminal lines well-marked, white, confluent in the middle; a terminal line of dark fuscous dots; cilia ochreous-fuscous, barred with white. Hindwings pale cinereous-ochreous; cilia white. Abdomen cinereous. Legs cinereous, outer side and tarsi fuscous spotted with cinereous.

Related to *nectarias*, to which it runs in Meyrick's table in

Fauna Hawaiiensis. It differs particularly from that species by the undefined orbicular, claviform, and discal dots, and the dark fuscous suffusion on costal region between first and second lines.

Hab. Kilauea, Hawaii, 9 specimens taken at lights, Dec., May, 1912 (W. M. Giffard).

FAMILY GELECHIIDAE.

Aristotelia gigantea n. sp.

Female, 28 mm. Antennae ochreous barred with dark fuscous above. Palpi, head and thorax brownish ochreous. Forewings whitish ochreous, a few orange scales at base; middle half of costa fuscous, bordered irregularly with a streak of ochreous brown; a fuscous spot near middle of fold, another near dorsum about midway between this and anal angle; an orbicular and a discal fuscous dot; a streak of brownish suffusion in dorsal half of cell, extending to termen, gradually widened to apex; cilia whitish ochreous, black-spotted at base on termen. Hindwings with termen bisinuate; pale brownish ochreous; cilia whitish ochreous, light fuscous near base. Abdomen brownish fuscous. Legs brownish fuscous, tibiae and tarsi tipped with ochreous, middle and hind tibiae ochreous in middle.

This is much larger than any other species described from the Hawaiian Islands.

Hab. Kilauea, Hawaii, one specimen taken at light, Dec., 1911 (W. M. Giffard).

Thyrocopa sapindiella n. sp.

Male, female, 18-21 mm. Entire insect pale whitish-cinereous. Forewings sometimes with a slight sprinkling of light fuscous scales; sometimes a fuscous dot in cell, another beyond it on fold, and two dots at end of cell. Is nearest to *argentea*, but of more uniform coloration.

Hab. Niu, Oahu, 8 specimens reared from caterpillars feeding on leaves of *Sapindus oahuensis*, June, August, 1909, Dec., 1910.

An egg-mass was found on the upper surface of a leaf beside the midrib near base. It contained 25 eggs, each one pale yellowish, roundish, about 1mm. in longest diameter, finely reticulated, flat and overlapping shingle-like similarly to the eggs of *Omiodes*.

The caterpillars were quite numerous on some trees. The small ones feed on the under surface of the leavs, each producing a web covered with frass under which it feeds, eating off the

surface of the leaf. The larger ones hide in rolled-together leaves, often several leaves in a bunch fastened together and there may be two or more caterpillars, each in a silken tunnel.

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

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

FAMILY TORTICIDAE.

Archips fuscocinereus n. sp.

Male, 21 mm. Antennae, palpi and head cinereous. Thorax brownish cinereous, patagia with some olive green basally. Forewings cinereous, a little orange suffusion basally; basal fourth lightly suffused with pale olive green with dorsal extension between vein 1b and dorsum to near middle of wing, bounded outwardly by a whitish sinuate line inwardly indented on fold; and bordered on inner side with dark fuscous; five fuscous spots on costal fold; from near middle of costa a broad whitish-margined fuscous band crosses the wing, much widened in the cell, a roundish protuberance forward and the backward extension nearly reaching the end of cell dorsally terminating in an obtusely rounded point near vein 1b, near this on dorsum a rounded dark fuscous spot bordered with whitish except on outer side; a little before this spot a dark fuscous posteriorly whitish-edged bar extending from dorsum to vein 1b; median band slightly

suffused with olive green in cell; beyond median band 4 dark fuscous spots on costa, diminishing in size towards the apex. Hindwings cinereous with a faint fuscous transverse submedian streak and several scattered pale fuscous markings. Abdomen fuscous cinereous. Legs cinereous, fore and middle legs with tibiae and tarsi and hind tarsi fuscous, dotted with cinereous.

Hab. Kilauea, Hawaii, one specimen taken at lights, Feb., 1912 (W. M. Giffard).

Archips sublichenoides n. sp.

Male, female, 28-37 mm. Antennae brownish-fuscous, in male with middle third serrated and all finely short-ciliated. Palpi brownish-fuscous, yellowish-brown on outer side, extending twice the length of head beyond it. Head and thorax very dark brownish-fuscous. Forewings very much mottled with dark brownish-fuscous and purplish grey; an oblique basal fascia with crenate outer margin; an oblique median fascia with crenate margins; a triangular black blotch at end of cell; a costal series of black spots; dull orange scales plentifully sprinkled all over wing, most numerous at base and tending to margin the black fascia. Costal fold of male on basal third. Hindwings cinereous, much mottled with fuscous. Abdomen cinereous. Legs dark fuscous-brown, posterior pair paler.

Much resembles *lichenoides,* except that it lacks the olive green of that species.

Hab. Kilauea, Hawaii, May, 1912, 2 males and 6 females taken at lights. (W. M. Giffard).

Tortrix semicinereana n. sp.

Male (?), 20 mm. Antennae greyish-fuscous. Palpi whitish internally, greyish-fuscous externally. Head brownish-ochreous. Thorax dark brownish-fuscous, patagia greyish. Forewings cinereous, basal sixth fuscous; a dark fuscous triangular spot extending from one-fourth of costa half across wing; apical portion of wing suffused with light fuscous, the inner boundary of which extends from just before middle of costa obliquely to three-fourths of dorsum; a few darker fuscous costal spots, also a dark fuscous spot at end of cell; a few scattered spots of yellow scales. Cilia light greyish-fuscous. Hindwings and cilia uniformly light greyish-fuscous. (Abdomen missing). Legs cinereous, front and middle tibiae and tarsi fuscous externally.

Hab. Kilauea, Hawaii, Feb., 1912; one male (?) taken at light. (W. M. Giffard).

Capua santalata n. sp.

Male, 10-11 mm. Antennae brownish-ochreous, banded with brown above. Palpi very short, brownish-ochreous. Head brownish-

ochreous. Thorax brownish-ochreous, light yellow posteriorly, patagia pale yellow on apical portion. Forewings rich chestnut; outer half of costal fold yellow; basal portion before an oblique line from the end of costal fold to middle of dorsum has 10 or 12 light yellow spots; a large yellow spot extending inward from middle of costa, another similar one a little beyond it; a large oval white spot occupying the outer fourth of cell; a few scattered bluish scales in the chestnut portion; terminal cilia pale yellow, dorsal cilia fuscous. Hindwings pale ochreous-whitish, terminal portion a little darker, cilia pale whitish-ochreous. Abdomen pale grey. Anterior legs brownish; mid and posterior legs whitish.

Female, 12-13 mm. Antennae whitish-ochreous, ringed with brownish above. Palpi very short, bright yellow. Head and thorax bright yellow, in places slightly tinged with brownish. Forewings bright yellow; a chestnut patch at base of costa, two or three spots on basal portion of wing towards dorsum; an oblique straight chestnut band from one-third of costa to two-thirds of dorsum, connecting with a broader subterminal band extending from dorsum to apex; a few scattered bluish scales in the chestnut portion; cilia pale yellow. Hindwings and cilia pale whitish-ochreous, terminal portion of wing a little darker. Abdomen and legs pale whitish-grey.

Hab. Diamond Head, Oahu, May, June, July, 1911; 24 specimens reared from caterpillars on leaves of sandalwood. Palolo Ridge, Oahu, June, 1912; one specimen reared from sandalwood.

Full-grown caterpillar about 8 mm.; pale green; head concolorous, eyes black and a black dot at postero-ventral angle; anal comb of 6 pale stiff bristles.

Pupa 5mm.; pale greenish or yellowish; wing-sheaths and posterior leg-sheaths extend about to apex of fourth abdominal segment, antennae-sheaths not quite so long; two transverse rows of short backwardly-directed spines on abdominal segments 3-7, one row on segments 2 and 8; cremaster with two strong downwardly-curved hooks wide apart, and a few hooked bristles. The pupa is formed within the folded-over edge of a leaf. The pupal period is about a week.

FAMILY HYPONOMEUTIDAE.

Euhyposmocoma n. g.

Has the characters of *Hyposmocoma*, except that the labial palpi have a large spreading tuft extending forward on the median segment. The male has no subcostal hair-pencil on hindwings.

Type, *Hyposmocoma ekaha* Swezey,, Proc. Haw. Ent. Soc., II, No. 3. p. 105, Pl. 3, figs. 3, 4; 1910.

Euhyposmocoma trivitella n. sp.

Male, female, 13-16 mm. Antennae whitish-ochreous, fuscous above. Palpi white, median segment with large forward-projecting tuft of hair-scales fuscous externally on basal half; terminal segment minutely fuscous at apex. Head white, sometimes a few fuscous scales on vertex. Thorax white, tipped with brown posteriorly, patagia brown. Forewings distinctly three-banded longitudinally; costal band white, not quite reaching base or apex; dorsal band extending from base to and including apex, pinkish; between these bands a more-or-less irregular light brown band extending from base and terminating on costa just before apex, about its middle is a slight widening into the white costal band; a series of black dots on margin around apex and on termen, three of them on costa before apex; cilia brown on costa before apex, on termen white with wide brown basal band, dorsal cilia white. Hindwings and cilia white. Abdomen whitish-ochreous. Forelegs fuscous, mid and hindlegs whitish mid-tarsi spotted with fuscous.

Hab. Lihue, Kauai, March, 1912; 6 specimens reared from mines in the fronds of ferns *(Elaphoglossum reticulatum* and *E. gorgoneum)* in the mountains in the vicinity of the head of the Grove Farm ditch.

Full-grown larva 8 mm.; dirty whitish yellow; head very pale brownish, much retracted into segment 2; eyes dark brown; cervical shield concolorous; tubercles concolorous, "i" and "ii" almost in a longitudinal line, "iii" close above spiracle and a little anterior of it, "iv-v" below spiracle and farther from it than "iii" is; setae long, pale; spiracles minute, circular, pale; abdominal prolegs on segments 7-10.

Pupa 7 mm., light yellowish-brown; eyes black; wing-sheaths and antennae-sheaths extend to apex of seventh abdominal segment; a cluster of bristles at apex of abdomen hooked into silk cocoon. The pupa is formed within the mine in a slight cocoon covered with pellets of frass.

Gracilaria dubautiella n. sp.

Male, female, 7 mm. Antennae one and one-third, light fuscous. Palpi whitish, a fuscous spot at apex of median segment and near middle of terminal segment. Head dirty whitish. Thorax brownish-ochreous. Forewings brownish-ochreous, with three outwardly oblique white dorsal streaks, and two slender outwardly oblique white costal streaks at middle and two-thirds of costa respectively; all of these streaks margined with a few black or fuscous scales; three white costal spots near apex; a spot of bluish scales at apex and a few

bluish scales in a more or less fuscous streak between apex and end of third dorsal white streak; cilia whitish, at apex terminally fuscous, at tornus fuscous at base also. Hindwings and cilia greyish-fuscous. Abdomen greyish-fuscous. Legs fuscous with white tarsal spots.

Hab. Pacific Heights Ridge, Oahu, Aug., Sept., 1909; Hillebrand's Glen, Oahu, Dec., 1912; Mt. Olympus, Oahu, Jan., 1913; numerous specimens reared from mines in leaves of *Dubautia plantaginea*.

The eggs are deposited singly on the surface of the leaves; circular, about .5 mm. in diameter, broadly convex and with the surface reticulated and somewhat irridescent. The young larva on hatching, immediately eats into the leaf, at first producing a very slender mine lengthwise in the leaf and back and forth a few times, but eventually broadening to a blotch. A purplish discoloration is produced in the leaf by the mining larva, forming streaks following the course of the mines. Often several mines are begun in the same leaf. I have found as many as 11, but not all of the larvae reach maturity, however, often 3 or 4 cocoons are found in the same leaf.

The full-grown larva is 6-7 mm. long; pale greenish-yellow, head pale brownish, eyes black; head very deeply notched and retracted into segment 2 which is widened and has a fuscous longitudinal dorsal streak each side of median line, darkest at posterior margin; ventrally there is a large squarish patch of fuscous which is minutely roughened, cervical shield also slightly roughened. Abdominal prolegs on segments 7-10.

Pupa 4mm., pale greenish, a little browned on thorax, and middle of dorsum of abdomen, leg—and antenna-sheaths; wing-sheaths extend about to apex of fifth abdominal segment; antenna-sheaths extend beyond apex, curved up over abdomen to near middle. The pupa is formed in a cocoon within the mine, its position being indicated by a bit of white silk showing where the larva ate a slit through the epidermis for the emergence of the moth.

Gracilaria hibiscella n. sp.

Male, female, 9-10 mm. Antenna one and one-third, pale ochreous barred with dark fuscous. Palpi pale ochreous-whitish, terminal segment somewhat fuscous on outer side. Head and thorax pale brownish-ochreous. Forewings ochreous, three dorsal outwardly-oblique white streaks, widened and black-margined at base; a white slender outwardly-oblique narrowly black-margined costal streak at three-fourths of costa, beyond this 3 or 4 white costal spots; a wide sub-

terminal streak black with a few bluish scales; cilia at apex black, on termen grey with a black line at base. Hindwings and cilia greyish-fuscous. Abdomen greyish. Legs pale ochreous, anterior legs fuscous on outer side.

Hab. Tantalus, Oahu, October, 1911, 3 specimens reared from mines in leaes of native Hibiscus.

The mine usually begins towards base of leaf, proceeding upward irregularly and following the margin for a part of its course, it eventually reaches the apex, then follows down the opposite margin of the leaf rapidly widening until the larva has finished its growth. It then breaks through the epidermis to form its white oval cocoon on the surface of the leaf.

The full-grown larva is about 9 mm.; pale bluish-green; head with blackish mouth-parts, eyes, and 2 lines bordering the paraclypeus, much retracted into segment 2 which is widened and has a large black spot ventrally and 2 black spots near anterior margin dorsally; thoracic legs minute; abdominal prolegs on segments 7-9.

Pupa 5 mm.; pale testaceous-greenish, with a few fuscous markings ventrally; wing-sheaths extend to apex of fifth abdominal segment, free beyond fourth segment, dark fuscous at tip; posterior leg-sheaths extend to apex of abdomen; antenna-sheaths extend beyond apex of abdomen, recurved over the back forward to base of fourth abdominal segment. Pupal stage about a week.

Opogona purpuriella n. sp.

Male, female, 10-11 mm. Antennae and palpi whitish-ochreous. Face in front and between antennae whitish-ochreous, vertex dark purple. Thorax dark purple. Forewings dark purple, iridescent, with two lemon yellow costal spots at one-third and three-fourths of costa; a wide lemon yellow streak along basal half of dorsum; cilia dark fuscous. Hindwings brownish-fuscous, cilia dark fuscous. Abdomen brownish-fuscous. Legs whitish-ochreous, hind tibiae fuscous externally and tarsi dotted with fuscous.

Hab. Kona, Hawaii, Oct., 1912, 18 specimens collected from leaves of sugar cane. Several pairs were in cop., end to end in the position so often observed in *Opogona aurisquamosa*. Probably the larvae feed in cane trash or rotten cane the same as those of the latter species. No doubt it is a species that has recently become introduced from some southern Pacific region.

A New Species of Mealybug Parasite (Aphycus terryi).

BY D. T. FULLAWAY.

Aphycus terryi n. sp.

♀ Length of body 1.09 mm., expanse of wings 1.85 mm., greatest width of forewing .37mm. Microspocilally reticulate and finely punctured, punctures bearing short hairs; orange yellow, head, pronotum superiorly and antennae paler (shading into white), scape below, pedicel and first four funicle joints, pronotum anteriorly, scutellum, metathorax and a broad band on abdomen infuscated (shading into black). Head transverse, fairly wide anterior-posteriorly, indistinctly lenticular, eyes large, somewhat bulged, front between, rather narrow, face slightly retracted and widening immediately below the eyes to meet the cheeks which are also rather broad below, ocelli arranged in a slightly acute triangle, the lateral members close to margin of eye, antennae arising just below middle of face, moderately long, with 6-jointed funicle, scape long but not greatly widened below, pedicel obconic, funicle joints extremely short but lengthening and expanding outwardly, the last about half as long as wide, the club expanded and indistinctly jointed. Pronotum extremely thin, mesonotum short, about half as long as wide, without parapsides, axillae meeting in the middle, scutellum almost triangular, apex bluntly pointed. Abdomen conic ovate, collapsing after death so that the dorsal surface is deeply concave, ovipositor slightly protruding. Legs moderate, middle tibiae with long apical spur, tarsi with several rows of spines on inner face. Wings hyaline, marginal vein short and thick, submarginal extremely long, reaching middle of wing, postmarginal a mere spur, stigmal well developed, a hairless line reaching obliquely inwardly from stigmal and a faint infumation below it.

Male—Length about 1 mm., slenderer, the body and legs reddish yellow, eyes red, antennae brownish black, scape beneath paler, head thin, anterio-posteriorly and lenticular, eyes smaller, front between wide, lateral ocelli as far from margin of eye as from each other, inner margin of eyes parallel and far removed, face widening below to narrow cheeks, antennae arising far apart on level with lower margin of eye (as in female), funicle long, as long as scape and pedicel together, the joints submoniliform, first a little longer than wide, width increasing on length outwardly but not becoming extremely transverse as in female, scape slender (not expanded leaflike, as in female) nearly twice pedicel, club longer than pedicel by half and rather thick. Thorax and abdomen rather depressed, the latter acutely triangular, apex truncated. Wings hyaline, the fumation beneath the stigmal vein absent.

Hab. Hawaiian Islands. Bred from *Pseudococcus saccharifolia* at Olowalu and Hana, Maui by F. W. Terry, June, 1909, and at Hilo, Hawaii, August, 1912, by O. H. Swezey.

ANNUAL ADDRESS.

Report on a Collection of Hymenoptera Made in Guam, Marianne Islands.

BY DAVID T. FULLAWAY.

The species of hymenoptera listed and described below were taken by the writer in 1911 on the island of Guam in the course of some entomological work for the local government experiment station. Fifty-three species are included, of which 11 are described as new to science. It is regretted that many species can only be referred to their genera but in view of natural difficulties surrounding descriptive work in certain groups of the hymenoptera and the inability of the writer to use any of the large collections for comparison of material, it seemed the only safe plan. The most interesting feature of the work is the recovery and comparatively easy recognition of Holmgren's species collected by the Swedish expedition in the "Eugenie" in 1851-3. This list does not include the Formicidae, which were done by Dr. W. M. Wheeler of Harvard University, cf. Jour. N. Y. Ent. Soc. vol. XX (1), p. 44.

APIDAE.

1. *Apis mellifera* Linn.
   Introduced from the Hawaiian Islands in 1907.

MEGACHILIDAE.

2. *Lithurgus* sp.
3. *Megachile* sp.
4. *Megachile* sp.

ANDRENIDAE.

5. *Halictus* sp.

PROSOPIDAE.

6. *Prosopis* sp.

Dr. Perkins has kindly furnished me with the following note on this species: "Belongs to group with largely developed wings of 7th ventral segment, a bifurcate apex to 8th segment,

the bifurcations expanded as in *Prosopis cressoni;* see Metz's paper, Tr. Am. Soc. XXXVII., pl. IV, fig. 53 etc. This group is American, Austral. and European, and probably cosmopolitan."

LARRIDAE.

7. *Pison* sp.
8. *Pison* sp.
9. *Pison* sp.

VESPIDAE.

10. *Polistes hebraeus* Fab.
11. *Polistes semiflavus* Holm.
12. *Icaria marginata* Sauss?=*I. cagayanensis* Ashm.

EUMENIDAE

13. *Rhynchium brunneum* Sauss.

BETHYLIDAE.

14. *Gonatopus* sp.
15. *Scleroderma duarteanum* n. sp.

♀ dimorph. Length 5mm. Black, smooth and shining, with a delicate miscroscopic reticulation, and sparsely clothed with pale golden hairs set in shallow punctures. Antennae 13-jointed, honey yellow, outwardly fuscous, scape long, clavate and curved outwardly, pedicel much shorter, obconic, funicle filiform, less than twice the length of the scape, joints short and subequal except the last, which is nearly twice as long as the preceding. Legs honey yellow, short and stout, femora greatly swollen.

Wings narrow with two short completely closed basal cells, the basal nervure reaching the costa, the nervures brown and the disc largely infuscate.

Hab. Chance's ranch, Jigo, Guam. Described from 9 specimens bred from a coleopterous larva in cacao *(Theobroma cacao)*. Named for Cap't. P. Duarte.

16. *Parasierola cellularis* Say.

SCELIONIDAE.

17. *Calotelcia elegans* Perk.
18. *Macroteleia manilensis* Ashm.
19. *Platyscelio wilcoxi* n. sp.

♂ Length about 4mm. Greatly flattened, with a sparse clothing of fuscous hairs which is thicker on the two last abdominal segments.

Head subquadrate, horizontal, very thin anterior-posteriorly (dorso-ventral), smooth and shining, the vertex somewhat striated, a medial furrow on the face which bifurcates dorsally just below the apical ocellus and ventrally above the insertion of the antennae; eyes elonggate elliptic and convex, basal ocelli distant on the summit of the vertex; antennae 12-jointed and flattened, the scape greatly dilated apically, pedicel small, obconic, joints of the flagellum small, expanding outwardly, the last three or four subquadrate. Prothorax, mesothorax except scapulae and abdomen longitudinally punctuate-striate, thorax otherwise smooth and shining; prothorax narrowed before into a neck, mesonotum ample, parapsidal grooves well defined, the anterior portion of the scapulae punctate, the scutellum transverse, posteriorly a single row of punctures interrupted in the middle; metathorax with some fine striations and a medium furrow bifurcating behind. Abdomen broadly attached, elongate elliptic and depressed, the intersegmental furrows broad but shallow, a well-defined lateral carina on both sides from base to middle of 5th segment. Legs slender, wings fairly long and narrow, the disc hairy, more or less clouded, marginal vein moderately long, about one-fourth the length of the submarginal, the distal end at about the middle of the wing, radius short, postmarginal absent.

Black except the scape, pedicel, first five joints of the flagellum and the tip of the abdomen, which are rufo-testaceous. The legs are testaceous; the veins of the wings brown.

Hab. Guam. Described from a single specimen. Named for Mr. George N. Wilcox, U. S. Navy.

PLATYGASTERIDAE.

20. *Allotropa thompsoni* n. sp.

♀ Length .75mm. Brown, smooth and shining, feebly but uniformly punctate, the punctures enclosing short hairs. Head transverse, slightly convex, eyes black, ocelli red, arranged in a triangle, the lateral members of which are close to the inner margins of the eyes, antennae 9-jointed, inserted on either side and at about the middle of the clypeus, scape large, clavate, pedical smaller, obconic, the three funicle joints filiform, a little longer than the pedicel, four-jointed club about as long as the pedicel and funicle together and somewhat expanded. Prothorax broadly joined to the head and extremely narrow, mesothorax convex, mesonotum subquadrate, parapsidal grooves distant, scutellum obtusely triangular; metathorax indistinct. Abdomen short ovate, depressed. Legs moderate. Wings with a fuscous cloud in the middle of the disc, submarginal vein ending in a club near the costal margin, before the middle of the wing.

Hab. Guam. Described from a single specimen bred from a mealybug (*Pseudococcus* sp.) on *Abrus abrus*. Named for

Mr. J. B. Thompson, Director of the Government Agricultural Experiment Station at Guam.

DIAPRIIDAE.

21. *Phaenopria* sp.
22. *Tropidopria* sp.

CHALCIDIDAE.

23. *Chalcis* sp.
24. *Neochalcis* sp.
25. *Stomatocerus* sp.
26. *Conura* sp.

EUCHARIDAE.

27. *Chalcura upeensis* n. sp.

♂ Length about 4mm. Punctate, the notum coarsely folded or reticulate, and hairy, the abdomen with a few punctures, otherwise smooth and shining. Head fairly large and convex, triangular in outline, anterior-posteriorly thin, the front longitudinally striate, eyes small and convex, the lower margin distant from the base of the mandibles, face and cheeks rather broad, occipital margin distinct on the vertex, the ocelli in a straight line below, antennae 12-jointed, pubescent, inserted on the middle of the face, scape scarcely as long as the first joint of the flagellum, pedicel very short, 2nd flagellar joint a little more than half the length of the first, joints 5 to 10 subequal, joint 11 one and one-half times 10, and 12 twice 11, joints 4 to 11 with a long ramus apically on the outer side; clypeal sutures distinct; mandibles large and falcate with two strong teeth near the base; trophi slender. Thorax extremely short and convex, pronotum invisible from above, mesonotum well developed, parapsidal furrows convergent but not quite meeting at the base, inner angles of the axillae almost or quite meeting in the middle, scutellum triangular, rounded behind, posterior face and the metathorax almost vertical. Abdomen long petiolate, hatchet shaped, the petiole longitudinally striate. Legs slender, the coxae fairly stout. Wings much narrowed basally, the disc hairy and clouded, marginal and post-marginal veins fairly long, radius short and stigmatic.

Metallic green with purplish reflections, the abdomen with the exception of the petiole dark brown. Legs and basal joint of the antennae light brown, the flagellum fuscous brown, mandibles honey yellow, wing veins almost black, a brownish suffusion beneath the stigma.

Hab. Upe, Guam, in the forest. Described from a single specimen.

AGAONIDAE

28. *Blastophaga innumerabilis* n. sp.

♀ Length 1.25mm. Black, smooth and shining, the anterior portion of the head including the oral cavity, mandibles and first three joints of the antennae, and the legs honey yellow. The head horizontal, subquadrate, thin anterior-posteriorly (dorso-ventral), a broad and deep groove on the face from the vertex to the mouth, which has a rather large opening, defined laterally by the large, bidentate and acutely pointed mandibles, which reach the base of the eyes; antennae 11-jointed, inserted together just above the mouth, 1st joint short and stout, dilated in front, 2nd slenderer and about twice as long as wide, 3rd with the basal portion short while the outer face is produced apically into a long spine and the inner face receives the short 4th joint, 5th and 6th joints larger than the 4th, a little longer than wide, 7th to 11th joints widening outwardly, the individual segments (except the last) cyathiform, and each from the 5th outwardly bearing broad plate-like hairs. Thorax rather flat, pronotum transverse, narrowed before, the posterior lateral angles produced, the hind margin therefore curved inwardly; mesonotum also transverse, parapsidal furrows merely indicated behind, scutellum fairly long, the hind margin rounded and two longitudinal grooves on the disc laterally; metathorax broad and truncate, posterior angles well defined. Abdomen about as long as the thorax and somewhat compressed, broadly joined basally, and apically produced to a point, the dorsum ridged; ovipositor hair-like and longer than the abdomen. Legs moderate, front and hind femora swollen. Wings hyaline, marginal and postmarginal veins subequal, stigmal vein a trifle shorter and almost perpendicular.

Hab. Guam. Described from many specimens.

ENCYRTIDAE.

29. *Eupelmus* sp.
30. *Eupelmus* sp.
31. *Pentelicus* sp.
32. *Ooencyrtus* sp.

PTEROMALIDAE.

33. *Pteromalus* sp.
34. *Isoplata* sp.
35. *Tomocera californica* How.
36. *Spalangia cameroni* Perk.
37. *Spalangia metallica* n. sp.

♀ Length about 1mm. Smooth and shining, the head oblong.

wider than the thorax, moderately thick and convex, the anterior margin medially incised; ocelli arranged in a small triangle close to the vertex, eyes small and dorsal, face and cheeks broad; antennae fairly long, cylindrical and hairy, 10-jointed, inserted above the recessed mouth, scape not reaching the level of the vertex, pedicel small and obconic, joints of the flagellum small and subequal except the last which is small and indistinctly separated from hte penultimate joint. Thorax convex, prothorax well developed, nearly as long as the rest of the thorax and narrowed in front to a small neck which is transversely striated, mesothorax fairly long, the parapsidal furrows on mesonotum distinct and much bent towards the sides, the inner angles of the axillae meeting in the middle, scutellum flat, a trifle longer than wide, parallel sided and straight across the hind margin; metathorax transverse, the hind margin rounded. Abdomen small, petiolate, broadly oval and depressed, the ovipositor slightly exserted. Posterior legs longer than the others, the coxae especially long and well developed. Wings rather narrow, with a marginal fringe, marginal vein rather long, stigmal short, a brownish cloud on the disc beneath; where the marginal and submarginal veins merge, the costal cilia are greatly thickened and tangled, forming a pseudo-spine.

Pale or reddish to olivaceous brown with metallic reflections, the head, last five antennal joints, mesothorax and abdomen dark, blue to black and metallic; basal joints of the antennae and the legs from straw yellow (or almost white) to reddish brown.

Hab. Guam. Described from a single specimen.

ELASMIDAE.

38. *Elasmus philippinensis* Ashm.

EULOPHIDAE.

39. *Closterocerus* sp.
40. *Coccophagus orientalis* How.
41. *Aphelinus* sp.
42. *Tetrastichus hagenowii* Ratzeburg.
43. *Cirrospiloideus guamensis* n. sp.

♀ Length 2.5mm. Microscopically reticulate and shining with a few sparse hairs. Head transverse but not especially thin, eyes fairly large and convex, face and cheeks wide, the temples rounded, occiput deeply impressed, ocelli arranged in a triangle on the vertex, antennae filiform, 10-jointed, inserted on the middle of the face, scape reaching the vertex, pedicel obconic, four funicle joints longer by half than the scape, club short and pointed, indistinctly divided; clypeus distinct, the labrum shortly projecting. Prothorax greatly narrowed in front, mesonotum transverse, parapsidal grooves distinct.

inner angles of axillae not quite meeting in the middle, scutellum broad and flat with two distinct longitudinal grooves, the hind margin very slightly curved; metathorax declivous, with two median carinae which converge behind. Abdomen conic-ovate, collapsed after death. Legs fairly long and slender. Wings hairy, marginal vein long, postmarginal and stigmal veins shorter and equal.

Yellowish to testaceous, the ocellar triangle, upper margin of occiput, pronotum, metathorax and part of the abdomen black, eyes red, antennae outwardly fuscous brown.

Hab. Guam. Described from several specimens bred from lepidopterous miners in "abas duendes" and *Terminalia catappa*.

Closely corresponding male specimens differ as follows: Length less than 1mm. Antennal scape expanded and leaf-like. Abdomen short, depressed and broadly rounded at the apex. Head, prothorax, and abdomen outwardly black. Bred from lepidopterous miners in *Heritiera littoralis*.

TRICHOGRAMMIDAE.

44. *Trichogramma* sp.

EVANIIDAE.

45. *Evania appendigaster* Linn.

ICHNEUMONIDAE.

46. *Lissopimpla nigricans* n. sp.

♀ Length 7mm. Smooth and shining, the head transverse, anteriorly punctate and hairy, the punctuation more pronounced on the clypeus and labrum, eyes large and convex, emarginate within and continguous with the occipital margin behind, ocelli large and arranged in an obtuse triangle near the vertex, face and cheeks rather narrow, antennae setaceous, nearly as long as the body, 43-jointed, inserted near the middle of the face in rather prominent sockets, labrum fairly large and subquadrate, clypeal suture distinct, a broad median longitudinal elevation between it and the antennal sockets. Thorax convex, elongate, pronotum invisible from above, mesonotum anteriorly punctate, lobed, parapsidal furrows broad and deep, meeting beyond the middle but not attaining the posterior margin, scutellum reduced to a punctate knob or disc with lateral carinate wings enclosing a broad deep basal fovea, postcutellum continuous with the knob or disc of the scutellum, the narrow transverse areas on either side towards the wings greatly sunken, mesopleura clothed with short

white hairs, the hind border costate, metathorax subquadrate and rugose, petiolar area hexagonal and more or less smooth. Abdomen highly polished, elongate, depressed, widening slightly outwardly, apically somewhat compressed, 1st segment rather long, 2nd subquandrate, others shorter and transverse, segments 2-4 with transverse median depression and anterior lateral angles separated by deep grooves. Ovipositor exserted about half the length of the abdomen. Legs moderately stout, posterior pair larger, with greatly lengthened coxae, a spine on the lower face of the femur and a double row of short spines on the outer face of the tibia and tarsus. Claws stout and simple. Wings fuliginous, veins and stigma almost black, areolet quadrate, narrowed outwardly, receiving the 2nd recurrent nervure at the lower outer angle, submedian cell a trifle shorter than the median, discoidal nervure arising from the lower third of the 2nd discoidal cell, transverse median nervure of the hind wings broken well beyond its middle.

Black with some brownish tints, face and basal joints of the antennae reddish brown, front legs brown, middle and hind legs and abdomen deep reddish brown.

Hab. Guam. Described from three female specimens.

47. *Echthromorpha continua* (Brulle). ?

48. *Paniscus latro* Holm.

ALYSIIDAE.

49. *Aspilota pitiensis* n. sp.

♂ Length about 2mm. Black, the two basal joints of the antennae, prothorax, abdomen basally and legs pale to reddish brown; smooth and shining, the head transverse, temples broad and rounded; face broad, convex, retracted below, antennae inserted at about the middle on a well-defined frontal prominence, setaceous, 21-jointed, mandibles exserted, 3-dentate, maxillary palpi 5-jointed, long; labial palpi 4-jointed, short; pronotum narrow in front and extending on sides almost to the tegulae; mesonotum convex, without parapsides, scutullum small, triangular, with a deep forvea at the base divided by a median carina; metathorax short, declivious, with a well-defined petiolar area; abdomen elongate oval, petiolate; legs long and slender; wings hyaline, veins black, stigma long and slender, marginal cell complete, radius reaching the tip of the wing, recurrent nervure joining the 2nd cubital cell.

Hab. Guam. Described from a single specimen.

BRACONIDAE.

50. *Macrocentrus pallidus* n. sp.

♀ Length 4mm. Flavo-testaceous, eyes, ocelli and tips of man-

dibles black; feebly punctate, shining, clothed with pale hairs. Head transverse, wider than the thorax and fairly thick; eyes round and bulged; ocelli large, arranged in a small triangle near the vertex; face wide, cheeks narrow; clypeus prominent; antennae setaceous, a trifle longer than the body, inserted above the middle of the face, 45-jointed; trophi pendulous, slender, maxillary palpi 5-jointed, labial palpi 3-jointed. Pronotum invisible from above; mesonotum lobed, parapsidal grooves convergent, meeting before the posterior margin, scutellum small, convex, postscutellum represented by two large, shallow foveae with smooth bottoms; metathorax arched, shallowly rugose. Abdomen elongate, slender, compressed towards the apex, 1st segment rather long, 2nd and 3rd shorter, following segments transverse; ovipositor exserted and longer than the abdomen. Legs slender, hind coxae longer than the others. Wings hyaline with well-developed stigma and parastigma, veins light to fuscous brown, marginal cell complete, radius not reaching tip of wing, 3 cubital cells, submedian cell longer than the median, subdiscoidal nervure joining the discoidal below the middle.

♂ Paler, yellowish, white beneath, abdomen slender, depressed.

Hab. Guam. Described from 2 ♀ and 2 ♂ specimens.

51. *Phanerotoma melanocephala* n. sp.

♀ Length 2.75 mm. Testaceous, the head, antennae and tip of abdomen fuscous, minutely shagreened or granulated and opaque, the abdomen longitudinally striated. Head subquadrate, slightly wider than the thorax; eyes black, prominent, bulged; ocellar area small, black; temples and face broad, antennae inserted at about the middle, a trifle shorter than the body, setaceous, 23-jointed; clypeal sutures distinct, laterally ending in a fovea, trophi short and slender; occiput concave and distinctly margined. Pronotum invisible from above; mesonotum subquadrate, parapsidal grooves only faintly indicated, scutellum small, triangular; metanotum flat and parallel sided. Abdomen oval, convex above, concave beneath, only three visible segments. Legs moderately long and stout. Wings hyaline, stigma and veins fuscous, marginal cell complete, radius not reaching tip of wing, 1st abcissa extremely short, recurrent nervure interstitial with the 1st cubital cross vein, submedian cell much longer than the median, subdiscoidal vein joining the discoidal near the posterior angle of the cell.

Hab. Guam. Described from a single specimen.

52. *Apanteles guamensis* (Holm.)

53. *Spathius* sp.

Election of Officers for 1913.

President ..... F. Muir
Vice-President ..... W. M. Giffard
Secretary-Treasurer ..... O. H. Swezey

On a New Genus of Hawaiian Chironomids.*

BY F. W. TERRY.

Only two species of this abundant family have hitherto been described from the Hawaiian Islands, namely, *Chironomus hawaiiensis* Grims, and *Tanytarsus lacteiclavus* Grims.; two other genera, *Orthocladius* and *Ceratopogon* being also represented, but none are described. The endemic genus under discussion is so far represented by two species, the larger occurring on both islands of Hawaii and Maui, and the smaller on Kauai. The latter island, owing doubtlessly to its greater age and isolation, has produced a somewhat distinctive fauna from the rest of the archipelago, and this characteristic again presents itself in the peculiar sexual structures of the Kauaian species.

The simple palpal and antennal characters of this endemic genus suggest Clunionine affinities, as represented by *Halirytus* and *Eretmoptera*. But the apparently still plastic condition of the palpi has led me to attach less importance to this similarity, and its proper location would appear to be in the *Chironominae*. The venation is extremely like that of *Thalassomyia*, and the larval habits of the latter appear to be similar; the peculiar spatulate and pectinate structure of the male claw in the Kauaian species, has a parallel apparently in *Scopelodromus*, but its real affinities are undoubtedly with *Telmatogeton*. Besides agreeing with the latter in general larval and adult characters, the remarkable obliquely-truncate formation of the pupal abdomen, with its peculiar terminal plate, is practically identical with that of *Telmatogeton* as figured by Schiner.** I therefore propose to place it near *Telmatogeton*, erecting for it the new genus *Charadromyia*. Should this position prove to be correct, its presence on this isolated archipelago in the North

*This is part of the paper, "Biological Notes on Hawaiian Diptera," presented by Mr. Terry as Presidential Address, Dec. 15, 1910. The manuscript of the address was not available for publication at the time of publication of the Proceedings for 1910, as Mr. Terry had taken it away with him on a vacation trip to England. After his demise, some manuscripts and notes were returned, among them some portions of his address were found, but not in complete form for publication. Mr. Muir has arranged this much of them for publication. It seemed desirable to do so, being descriptions of an interesting new genus and two new species, with biologic notes.—[Ed.]

**Novara Reise Zool., 1868, Bd. II, pl. II, ff, 1e, 1f.

Pacific, becomes less remarkable upon learning that *Telmatogeton alaskensis* Coq. is recorded from Alaska, Oregon and California. Strangely enough the only other recorded representatives of this allied genus (*T. sanctipauli* Schin.) occurs on the island of St. Paul (New Amsterdam) in the South Indian ocean.

Charadromyia nov. gen.

Type *C. torrenticola.*

This genus is evidently allied to *Telmatogeton*, differing in the following characters: Front not deeply excavated; palpi normally two-jointed, the basal large and bulbous, the apical smaller and more elongate. Apex of each tarsal joint bears a pair of minute ventro-lateral spines; claws not furcate at extreme tip, either simple in both sexes or bearing a peculiar spatulate comb in the male; 4th tarsal joint equal to 3rd. Wings only slightly longer than abdomen; auxiliary vein starting from wing base, but not reaching the costa; 3rd and 4th longitudinal veins connected by oblique cross-veins; furcation of 5th longitudinal vein before the middle of wing; 6th well defined, 7th obsolescent.

DIAGNOSIS OF SPECIES.

1. *C. torrenticola.* Large, black or rusty black; claws of male simple, basal antennal joint longer than broad, terminal joint much longer than the three preceding.
2. *C. abnormis.* Small, pruinose; claws of male complex; basal antennal joint not longer than broad, terminal joint not longer than the three preceeding.

Charadromyia torrenticola sp. nov.

Length 5.3mm.; wing 5mm.

♂ Head, thorax and abdomen velvety black, the body moderately pruinose especially the pronotum; legs, scutellum, postscutellum and wings rusty-black, humeral angles often dull testaceous. The small cubital head deeply inserted and hidden by the projecting mesonotum. Eyes small, oval, non-emarginate and widely separated by the projecting face, ocelli absent. Antennae short and simple, about equal to width of head, (identical in both sexes), 7-jointed and a basal ring-joint, 1st very large and thickened, length about one and the breadth, bearing several stout hairs and setae; 2nd much smaller and showing

by the presence of a median constriction evidence of the fusion of two segments, 3rd-6th small and sub-moniliform, the terminal 7th large and conical, bearing a few scattered bristles and longer than the sum of the three preceding. Maxillary palpi simple and two-jointed, bearing several fine scattered hairs, basal joint large, bulbous, apical smaller and somewhat falcate* Mesonotum large, the anterior margin arched and overhanging the head, scutellum sub-elliptical, post-scutellum large. Abdomen 8-segmented, narrow and elongate. Hypopygium forcipiform, bearing a pair of falcate, two-pointed claspers.

Hab. Types ♂ and ♀ Nahiku, Maui (400-800 ft.) also Lahaina, Maui (1000 ft.); Kohala, Hawaii (1200-1500 ft.) Terry coll.

In rapid streams and water-falls.

This species is a decidedly characteristic inhabitant of certain mountain streams in Maui and Hawaii. The black-winged, active adults continually dancing over the rushing water, fre-

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*This organ appears to be very plastic, exhibiting considerable variation of form, regardless of sex; one specimen examined possessing a single-jointed left palp, the right being normal.

Legs long and slender (anterior pair used in walking); tarsi five-jointed and cylindrical. Anterior: 1st tarsal joint nearly three times as long as 2nd, which is equal to the sum of 3rd and 4th. Median: 1st tarsal joint nearly three times as long as 2nd, which is hardly equal to the sum of 3rd and 4th. Posterior: 1st tarsal joint rather more than twice as long as 2nd, which is equal to the sum of the 3rd, 4th and 5th. Claws well developed and simple in both sexes, empodia large and pectinately plumose; pulvilli absent. Median and lateral lobes of apical tarsal joint large.

Wings large, reaching a little beyond the apex of abdomen, membrane somewhat coriaceous, posterior margin parallel with the costal, costa bearing numerous minute hairs; anal angle rectangular, mid-cross-vein arising slightly before the middle, auxiliary becoming obsolescent just before reaching the costa; 1st longitudinal bearing a few scattered hairs, and extending beyond the middle of the costa, forming an acute-angle at point of junctures; 2nd longitudinal absent; 3rd and 4th longitudinal united by oblique mid-cross-vein; furcation of 5th longitudinal before middle and forming an acute angle, the lower branch curved; 6th longitudinal well defined becoming obsolescent just before reaching the wing margin; anal angle rectangular.

♀ Very similar to the male, with the following differences: Legs shorter, the tarsal ratio however is the same; wings not extending beyond the apex of abdomen; the abdomen stout, parallel-sided, posterior extremity pointed, the terminal (8th segment) triangular in dorsal aspect, apically pointed, and bearing laterally a pair of flattened appendages. The ventral terminal segment is also triangular and also bears a pair of small flattened appendages.

quently getting caught in the spray but apparently none the worse for their temporary submergence. The females are less abundant than the males, the usual ratio being about 1 to 5.

Egg. Ovoid, the micropylar end more acuminate, bright yellow, becoming olivaceous as the contained larva develops; chorion shiny, micropyle conspicuous; length .3mm., width .2mm.

These eggs are deposited just below the water surface, on the rocks or submerged timber. They are placed in single layers, often consisting of several thousands in a mass, evidently the product of several females. The micropylar end is always uppermost and no gelatinous medium surrounds them.

Larva—The larva is elongate and cylindrical, of the usual Chironomid type, and closely resembling that of *Telmatogeton*, judging from Johannsen's figure.* The body pale greenish when young, becoming olivaceous later; full-grown larva 18-20mm. Head brown, darker along clypeal suture, oval, no eyes present; antennae very small, each consisting of a single tubular segment bearing a pair of pointed papillae; labium broadly triangular, bearing a broad apical tooth and seven lateral ones; mandibles well developed, each bearing five teeth. First segment of thorax longer than the following two (which are equal) and bearing a pair of prolegs armed with hooklets and setae. Abdomen with first eight segments cylindrical and bare, the ninth and terminal bearing a pair of prominent prolegs, each well armed with a cricket of hooklets.

The larvae construct tough silken galleries over the rock or other submerged surfaces, preferably where the water rushes over the rock ledges with greatest force. These whitish silken galleries are quite noticeable in these situations, and it is astonishing that they are not often beaten to pieces after a heavy mountain shower.

Pupa. Thorax and wing-sheaths brownish, abdomen and legs olivaceous; length 7mm.; the last abdominal segment terminates obliquely and abruptly in a large sucker-like disk, resembling in this character *Telmatogeton*.

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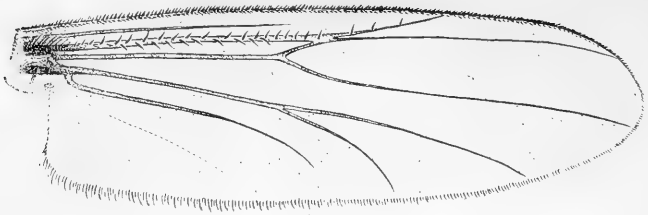
*New York Mus. Bull. 86; Entom. 23, pl. xxxiv, f. 12-13 (no description.)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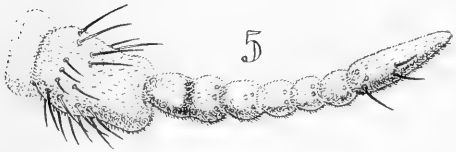
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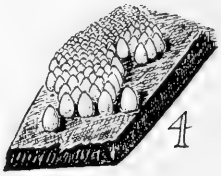
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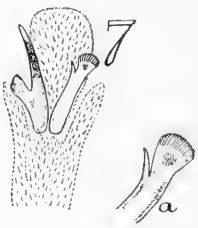
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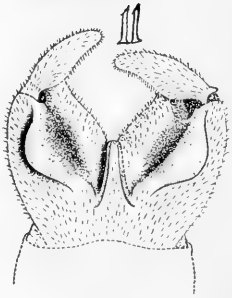
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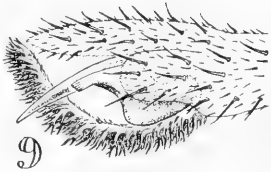
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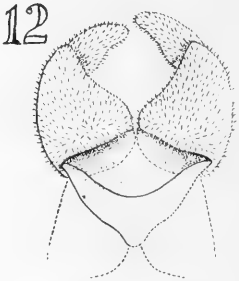
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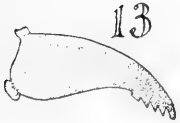
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Charadromyia abnormis sp. nov.

Length 2.7mm., wing 2.2 mm.

Except for its much smaller dimensions and the remarkable claws of the male, this species closely resembles its larger congener, differing in the following characters:

Head, thorax and abdomen dark brown, and decidedly pruinose; legs rusty brown; wings pale fuscous, having a whitish appearance in life; antennae seven-jointed and identical in both sexes, the basal joint large and bulbous, but not longer than broad and without the slight median constriction present in *C. torrenticola*; tarsal ratio as in *C. torrenticola*; claws of male with lateral pectinations, evidently an elaboration of the bifid type. Male claspers, wings and venation as in *C. torrenticola.*

Hab. Kilauea, Kauai.

Explanation of Plate 7.

1. Wing of *C. torrenticola* x15.
2. Halter of *C. torrenticola* x80.
3. Egg of *C. torrenticola* x50.
4. Egg-mass of *C. torrenticola* x10.
5. Antenna of *C. torrenticola* x80.
6. Front tarsus of *C. abnormis* ♂, ventral view, x300. a—outer claw, b—inner claw.
7. Middle tarsus of *C. abnormis* ♂, ventral view, x300. a—outer claw of same x600.
8. Hind claw of same x300.
9. Middle claw, lateral view x400.
10. Tarsus of *C. torrenticola* ♂ x59.
11. Hypopygium of male *C. torrenticola,* dorsal view x22.
12. Same, ventral view, x22.
13. Mandible of larva, *C. torrenticola* x35.
14. Labium of larva, *C. torrenticola* x25.
15. Maxillary palp, adult, *C. torrenticola* x80.
16. Antenna of larva *C. torrenticola,* x200.

Report of Committee on Common Names of Economic Insects in Hawaii.

(*Adopted March* 6, 1913.)

It is the sense of your Committee that most of us being members of the Association of Economic Entomologists it is incumbent upon us to use those popular names of economic insects

common to these islands and the mainland that were adopted and published by the Association. We have included these just as found in their list, with one or two exceptions where a local common name semed more advisable. With reference to the others, a simple short, most commonly used name is best adopted, especially such as are already extensively in use by entomologists and others. Workers elsewhere will have little occasion to use these, but if they do they will probably submit to our nomenclature. Guided by this we beg to present the following list.

E. M. EHRHORN,
D. T. FULLAWAY,
O. H. SWEZEY,

Committee on Common Names of Economic Insects in Hawaii.

HYMENOPTERA.

Big brown ant	*Camponotus maculatus, hawaiiensis* Forel.
Big-headed ant	*Pheidole megacephala* (Fab.)
California tomocera	*Tomocera californica* (How.)
Carpenter bee	*Xylocopa brazilianorum* (Linn.)
Ensign fly	*Evania appendigaster* (L.)
Fairchild's leaf-hopper parasite	*Echthrodelphax fairchildii* Perk.
Fig wasp	*Blastophaga psenes* (Linn.)
Fire ant	*Solenopsis geminata, rufa* Jerdon.
Hawaiian limnerium	*Limnerium hawaiiense* Cam.
Hawaiian pimpla	*Pimpla hawaiiensis* Cam.
Leaf-cutter bee	*Megachile palmarum* Perk.
Leaf-hopper egg-parasite	*Paranagrus optabilis* Perk.
Muddauber	*Sceliphron caementarium* (Drury).
Scutellista	*Scutellista cyanea* Motsch.
Spotted-winged ichneumon	*Echthromorpha fuscator* (Fab.)
Stable fly parasite	*Eucoila impatiens* (Say).
Yellow Jacket	*Polistes hebraeus* (Fab.)

DIPTERA.

American blue-bottle ..... *Lucilia caesar* (Linn.).
Cheese Skipper ..... *Piophila casei* (Linn.).
Chin fly ..... *Gastrophilus nasalis* (Linn.)
Day mosquito ..... *Stegomyia scutellaris* (Walk.).
English blue-bottle ..... *Lucilia sericata* (Meigen).
Heel fly ..... *Hypoderma lineata* (Villiers).
Horn fly ..... *Lyperosia irritans* (Linn.).
Horse bot-fly ..... *Gastrophilus equi* (Clark).
House fly ..... *Musca domestica* Linn.
Lantana gall-fly ..... *Eutreta sparsa* (Wied.).
Lantana seed-fly ..... *Agromyza* sp.
Mediterranean fruit-fly..... *Ceratitis capitata* (Wied.).
Melon fly ..... *Dacus cucurbitae* Coq.
Night mosquito ..... *Culex fatigans* Wied.
Pomace fly ..... *Drosophila ampelophila* Loew.
Root maggot ..... *Pegomyia fusciceps* (Zett.).
Sheep blow-fly ..... *Calliphora dux* Esch.
Sheep head-maggot ..... *Oestrus ovis* Linn.
Stable fly ..... *Stomoxys calcitrans* (Linn.).
Warble fly ..... *Hypoderma bovis* DeG.
Yellow fever mosquito ..... *Stegomyia fasciata* (Fab.) [*S. calopus* (Meigen)]

LEPIDOPTERA.

Angoumois grain-moth ..... *Sitotroga cerealella* (Ol.).
Army-worm ..... *Heliophila unipuncta* (Haw.)
Australian leaf-roller ..... *Archips postvittanus* (Walk.).
Bean pod-borer ..... *Lycaena baetica* Linn.
Beet web-worm ..... *Hymenia fascialis* (Cram.).
Black cutworm ..... *Agrotis ypsilon* Rott.
Cabbage web-worm ..... *Hellula undalis* (Fab.).
Cocoanut leaf-roller ..... *Omiodes blackburni* (Butl.).
Grass army-worm ..... *Spodoptera mauritia* Boisd.
Green garden looper ..... *Plusia chalcites* Esp.
Imported cabbage worm ..... *Pontia rapae* (Linn.).
Indian-meal moth ..... *Plodia interpunctella* (Hbn.).
Lantana leaf-miner ..... *Cremastobombycia lantanella* Busck.
Lantana plume moth ..... *Platyptilia* sp.

Lantana butterflies .....*Thecla echion* Linn. and *T. agra* Hewiston.
Mexican leaf-roller .....*Amorbia emigratella* Busck.
Larger native cutworm .....*Agrotis crinigera* (Butl.)
Pink cotton boll-worm .....*Gelechia gossypiella* (Sndrs.).
Smaller native cutworm .....*Agrotis dislocata* (Walk.).
Sugar-cane leaf-roller .....*Omiodes accepta* (Butl.).
Sugar-cane bud-moth .....*Ereunetis flavistriata* Walsm.
Sweet potato horn-worm .....*Sphinx convolvuli* Linn.
Sweet potato leaf-miner .....*Bedellia orchilella* Walsm.
Sweet potato vine-borer .....*Omphisa anastamosalis* (Guen.)
Tobacco horn-worm .....*Phlegethontius quinquemaculata* (Haw.).
Tobacco pod-borer .....*Heliothis obsoleta* (Fab.).
Tobacco split-worm .....*Phthorimaea operculella* (Z.).
Variegated cutworm .....*Peridroma saucia* (Hbn.).
White-lined sphinx .....*Deilephila lineata* (Fab.).

COLEOPTERA.

Algaroba bean-wevil .....*Bruchus prosopis* Le Conte.
Algaroba pod-weevil .....*Caryoborus gonagra* (Fab.).
Anomala beetle .....*Anomala orientalis* (Waterh.).
Bean weevil .....*Bruchus obtectus* Say.
Black ladybird .....*Rhizobius ventralis* (Erich.).
Cadelle .....*Tenebroides mauritanicus* (Linn.).
Carpet beetle .....*Anthrenus scrophulariae* (Linn.).
Cigarette beetle .....*Lasioderma serricorne* (Fab.).
Coffee-bean weevil .....*Araecerus fasciculatus* (De Geer).
Cowpea weevil .....*Bruchus chinensis* Linn.
Eight-marked ladybird .....*Coelophora inaequalis* (Fab.).
Fuller's rose-beetle (Olinda bug) .....*Aramigus fulleri* Horn.
Japanese beetle .....*Adoretus tenuimaculatus* Waterh.
Mango weevil .....*Crytorhynchus mangiferae* (Fab.).
Mealybug ladybird .....*Cryptolaemus montrouzieri* Muls.

Ochreous ladybird ..... *Chilocorus circumdatus* (Schoen.).
Oriental potato weevil ..... *Cylas formicarias* (Fab.).
Rice weevil ..... *Calandra oryzae* (Linn.).
Steel-blue ladybird ..... *Orcus chalybeus* (Boisd.).
Sugar-cane borer ..... *Rhabdocnemis obscurus* (Boisd.).
Sweet potato weevil ..... *Euscepes batatae* (Waterh.).
Ten-spotted ladybird ..... *Coelophora pupillata* (Schoen.).
Tobacco flea-beetle ..... *Epitrix parvula* (Fab.).
Vedalia ladybird ..... *Novius cardinalis* (Muls.).
Yellow-shouldered ladybird ..... *Platyomus lividigaster* Muls.

HEMIPTERA.

Assassin bug ..... *Zelus renardii* Kol.
Banana aphis ..... *Pentalonia nigronervosa* Coq.
Cabbage aphis ..... *Aphis brassicae* Linn.
Corn aphis ..... *Aphis maidis* Fitch.
Corn leaf-hopper ..... *Peregrinus maidis* (Ashm.).
Chrysanthemum aphis ..... *Macrosiphum sanborni* Gillette.
Fern aphis ..... *Idiopterus nephrolepidis* Davis.
Lantana leaf-bug ..... *Teleonemia lantanae* Dist.
Palm aphis ..... *Cerataphis lataniae* (Boisd.).
Rose aphis ..... *Macrosiphum rosae* (Linn.).
Sugar-cane aphis ..... *Aphis sacchari* Zehnt.
Sugar-cane leaf-hopper ..... *Perkinsiella saccharicida* Kirk.
Torpedo bug ..... *Siphanta acuta* (Walk.).
Violet aphis ..... *Rhopalosiphum violae* Perg.

HEMIPTERA (COCCIDAE).

Acuminate scale ..... *Coccus acuminatus* (Sign.).
Avocado mealybug ..... *Pseudococcus nipae* (Mask.).
Avocado scale ..... *Aspidiotus persearum* Ckll.
Black scale ..... *Saissetia oleae* (Bern.).
Cactus scale ..... *Diaspis echinocacti* (Bouche).
Chaff scale ..... *Parlatoria pergandii* Comst.
Citrus mealybug ..... *Pseudococcus citri* (Risso).
Cottony cushion scale ..... *Icerya purchasi* Mask.
Cottony guava scale ..... *Pulvinaria psidii* Mask.
Cottony mealybug ..... *Pseudococcus filamentosus* (Ckll.).

Fern scale ..... *Hemichionaspis aspidistrae* (Sign.).
Flat black-scale ..... *Saissetia nigra* (Niet.).
Florida red-scale ..... *Chrysomphalus ficus* Ashm. [*aonidum* (Linn.)]
Gray sugar-cane mealybug ..... *Pseudococcus saccharifolii* (Green).

Gredey scale ..... *Aspidiotus rapax* Comst.
Green scale ..... *Coccus viridis* (Green).
Hemispherical scale ..... *Saissetia hemisphaerica* (Targ.).

Ivy scale ..... *Aspidiotus hederae* (Vall.).
Latana blight ..... *Orthezia insignis* Dougl.
Large cottony scale ..... *Pulvinaria mammeae* Mask.
Long brown scale ..... *Coccus longulus* (Dougl.).
Mediterranean scale ..... *Parlatoria ziziphus* (Lucas).
Oleander scale ..... *Phenacaspis eugeniae* (Mask.).
Orange scale ..... *Aonidiella aurantii* (Mask.).
Pineapple scale ..... *Diaspis bromeliae* (Kern.).
Pineapple mealybug ..... *Pseudococcus bromeliae* (Bouche.).

Pink sugar-cane mealybug..... *Pseudococcus sacchari* (Ckll.).
Pit scale ..... *Asterolecanium pustulans* (Ckll.).

Purple scale ..... *Lepidosaphes beckii* (Newm.).
Red wax-scale ..... *Ceroplastes rubens* (Mask.).
Rose scale ..... *Aulacaspis rosae* (Bouche).
Soft scale ..... *Coccus hesperidum* Linn.
Striped mealybug ..... *Pseudococcus virgatus* (Ckll.).
Thread scale ..... *Ischnaspis longirostris* (Sign.).

MISCELLANEOUS.

American cockroach ..... *Periplaneta americana* (Linn.).
Cypress roach ..... *Eleutheroda dytiscoides* (Serv.).
Dragon-fly..... *Pantala flavescens* (Fab.).
Long-horned grasshopper ..... *Xiphidium varipenne* Sw.
Mole cricket ..... *Gryllotalpa africana* Fab.
Silver-fish ..... *Lepisma saccharina* Linn.
White ant ..... *Calotermes marginipennis* (Latr.).

OBITUARY.

The Reverend Thomas Blackburn.

On May 19th, 1912, at Woodville Vicarage, Adelaide, South Australia, the Rev. Thomas Blackburn, one of the honorary members of the Hawaiian Entomological Society, died at the age of more than 70 years.

Mr. Blackburn can justly be styled the father of Hawaiian entomology, for his pioneer work revealed the highly interesting endemism of our fauna, and eventually led to the systematic exploration by Dr. Perkins, and the publication of the "Fauna Hawaiiensis." His residence in the Hawaiian Islands extended over nearly six years (1876-1882) but his duties as Chaplain to the Bishop and as Senior Priest of the cathedral, allowed very little opportunity for entomological explorations. He availed himself of every oportunity, however, visiting each of the larger islands and doing more or less collecting thereon, though his main collecting was done on Oahu, as his residence was chiefly at Honolulu, from where he made trips almost fortnightly to the neighboring mountains. On Kauai, he spent only four days; on Molokai but a few hours. To Maui he made several visits of a few days each, taken altogether amounting to 42 days. He had a week on Lanai, and two trips to Hawaii of 17 days and 6 days respectively.

Of the collections made, the Coleoptera were worked up by himself and Dr. David Sharp; the Lepidoptera by Mr. A. G. Butler; the Hymenoptera by himself, Mr. Peter Cameron and Mr. W. F. Kirby; the Neuroptera by himself and Mr. R. McLachlan; the Hemiptera by himself and Mr. F. B. White; the Orthoptera by Mr. A. de Bormans. Apparently he did not collect in the other Orders of insects. As the result of his collecting, the number of beetles known in the Hawaiian Islands was increased to 428 species, 352 of which were not known elsewhere. The number of species in the other Orders was substantially raised also, but not to the same extent as the Coleoptera for he was particularly interested in this group.

Many species in several different Orders of insects have been named for the man who was the first to do important work on the entomological fauna of these Islands. In Coleoptera there are 15 species and 1 genus; in Lepidoptera 3 species; in Hymenoptera 4 species; in Neuroptera 2 species; in Orthoptera 1 species; and in Hemiptera 3 species. Altogether, 1 genus and 28 species.

From Hawaii Mr. Blackburn went to Australia, where he remained to the time of his death, engaged in clerical work, yet devoting every opportunity to his favorite recreation, the results of which yielded extensive contributions to the knowledge of the insect fauna of that country. His attention was mostly given to Coleoptera, of which he described several hundred species, his papers being published chiefly in The Proceedings of the Linnean Society of New South Wales.

In his death, entomology loses a valued worker, and to us it seems like the loss of a friend, for although not favored with his personal acquaintance, yet we seem to have known him through his works and our acquaintance with and interest in, the same insect fauna in which he was so keenly interested.

Species of Hawaiian Insects named for Mr. Blackburn:

COLEOPTERA.

Plagithmysus blackburni (Sharp).
Rhyncogonus blackburni Sharp.
Pentarthrum blackburni Sharp.
Proterhinus blackburni Sharp.
Goniorycius blackburni Sharp.
Itodacnus blackburnianus Sharp.
Nesopetinus blackburni (Sharp).
Nesopetinus blackburnianus Scott.
Ptillides blackburni Matthews.
Thoracophorus blackburni (Sharp).
Blackburnia Sharp (new genus).
Metrothorax blackburni Sharp.
Gnatholymnaeum blackburni Sharp
Xyletobius blackburni Perkins.
Mirostenus blackburni Perkins.
Mirostenus blackburnioides Perkins.

LEPIDOPTERA.

Lycaena blackburni (Tuley).
Omiodes blackburni (Butler).
Hyposmocoma blackburni Walsingham.

HYMENOPTERA.

Odynerus blackburni Kirby.
Nesoprosopis blackburni (Smith).
Limnerium blackburni Cameron.
Chelonus blackburni Cameron.

NEUROPTERA.

Nesogonia blackburni (McLachlan).
Agrion blackburni (McLachlan).

HEMIPTERA.

Arctocorixa blackburni (White).
Reduviolus blackburni (White).
Coleotichus blackburniae White.

ORTHOPTERA.

Brachymetopa blackburni (Bormans).

List of Papers on Hawaiian Entomology by Mr. Blackburn:

1877—"Insect Notes from the Hawaiian Isles," E.M.M., XIII, pp. 227-228.
1877—"Characters of a new Genus, and Descriptions of new species of Geodephaga from the Sandwich Islands." E.M.M., XIV, pp. 142-148.
1878—"Observations on the Known Species of *Oodemas* and their Distribution and Habits, with new Species from Hawaiian Islands." Ann. Soc. Ent. Belg., XXI, pp. 73-75.
1878—"Characters of new Genera and Descriptions of new Species of Geodephaga from the Hawaiian Islands, II." E.M.M., XV, pp. 119-123, 156-158.
1879—"Characters of new Genera and Descriptions of new Species of Geodephaga from the Hawaiian Islands, III." E.M.M., XVI, pp. 104-109.
1881—"Some new Species and Observations on Anchomenides, IV." E.M.M., XVII, pp. 226-229.

1882—"*Saronychium* new Genus and 16 new Species of Anchomenides, V." E.M.M., XIX, pp. 62-64.

1880—(Blackburn & Kirby) "Notes on Species of Aculeate Hymenoptera occurring in the Hawaiian Islands." E.M.M., XVII, pp. 85-89.

1881—"Descriptions of four new Species of Cossonidae from the Hawaiian Islands." E.M.M., XVII, pp. 199-201.

1882—"Descriptions of the Larvae of Hawaiian Lepidoptera." E.M.M., XIX, pp. 55-56.

1884—"Notes on some Hawaiian Carabidae." E.M.M., XXI, pp. 25-26.

1884—"Notes on Hawaiian Neuroptera, with Descriptions of new Species." Ann. M. N. H., (5), XIV, pp. 412-421.

1885—(Blackburn and Sharp)—"Memoirs on the Coleoptera of the Hawaiian Islands." Tr. Dublin Soc., (2), III, pp. 119-290.

1886—(Blackburn and Cameron)—"On the Hymenoptera of the Hawaiian Islands." P. Manchester Soc., XXV, pp. 134-176.

1888—"Notes on the Hemiptera of the Hawaiian Islands." P. L. S. N. S. W., (2), III, pp. 343-354.

APPENDIX.

SYNOPTIC LIST OF ANTS REPOR

By M.

KEY	Family FORMICIDAE (Heter
A1—A distinct constriction between 1st and 2nd segments of gaster Pedicel consisting of a single segment Pupae always in cocoons	PONERINAE Mayr.
a1—Antennae 12 jointed. Eyes present though small	
b1—Mandibles triangular with broad dentate masticatory margin	(Tribe PONERII) PONERA Latr.
c1—Dark brown or reddish	
d1—Median frontal groove extending to top of occiput. With hand lens head appears somewhat shiny	P. kalakauea Forel
d2—Median frontal grove extending about half way to occiput. Head dull and lusterless	P. perkinsi Forel
c2—Light, testaceous yellow; thorax above flat and depressed	P. gleadowii Forel r. decipiens Forel
b2—Mandibles edentate, long, slender curved, without distinct masticatory border	LEPTOGENYS Roger L. falcigera Roger v. insularis Smith
a2—Antennae 9-jointed. Eyes absent	(Tribe CERAPACHYSI CERAPACHYS Smith C. silvestrii Wheeler
AII—No marked constriction between 1st & 2nd segments of gaster	B (I and II)
BI—Pedicel consisting of 2 segments. Pupae naked	MYRMICINAE Mayr.
a1—Antennae 12-jointed	
b1—Antennae without distinct club	
c1—Thoracic dorsum without any traces of suture or impression	(Tribe MYRMICII) POGONOMYRMEX Mayr. [P. occidentalis Cresson]
c2—Thoracic dorsum impressed at the meso-epinotal suture	STENAMMA Westwood [S. longiceps Smith]
b2—Flagellum of antennae with distinct club	
c1—Metanotum without spines; clypeus bicarinate	MONOMORIUM Mayr.
d1—2mm. or less in length	

*1—Collection of United States Exp. Sta.; 2—Collection of Territorial Board of Agriculture and Forestry; 3—Collection of Planters' Exp. Station; 4—Bishop Museum; F—Identified by A. Forel; W—Identified by W. M. Wheeler.

M THE HAWAIIAN ISLANDS.

ISE GULICK.

lictions hich imens ound*	Reported From the Hawaiian Islands in Following Publications.	Literature in Honolulu Giving Species Description, and Libraries Where Found.**
3	Fauna Haw. Vol. 1, Pt. I, p. 116.	1, 2, 3 and 4, Fauna Haw. 1899, vol. I, Pt. I, p. 116.—(See Note 1.)
23, 4 F	Fauna Haw. Vol. 1, Pt. I, p. 117. Boll. d. Lab. Zool. et Agr. d. Portici Vol. III. p. 271.	1, 2, 3, and 4 Fauna Haw. 1899, p. 117; 2, 3, Boll. d. Lab. Zool. et Agr. d. Portici, 1909, vol. III, p. 271.
F	Fauna Haw. Vol. I, Pt. I, p. 118.	3, Fauna Brit. India, Bingham, 1903, vol II, p. 91; (r. decipiens: Fauna Haw.)
2, 3, 4F	Fauna Haw. p. 118. Ent. Mon. Mag. 1880, p. 88; (under name L. insularis)	3 Fauna Brit. India. Bingham, 1903, vol. II, pp. 52and 53.
	Boll. d. Lab. Zool. et. Agr. d Portici. Vol. III, p. 269.	2, 3, Boll. d. Lab. Zool. et Agr. d. Portici, 1909, vol. III, p. 269.
	Fauna Haw. p. 119.	(See Note 2.)
	Fauna Haw. p. 118.	

**1—United States Experiment Station Library; 2—Territorial Board of Agriculture Library; 3—Planters' Experiment Station Library; 4—Bishop Museum Library.

KEY	Family FORMICIDAE (Hete
e1—Head and thorax chestnut brown; abdomen black. Hairs sparse 2nd node of pedicel broader than 1st node.....	M. minutum Mayr. v. lilioukalani Forel
e2—Head and gaster dark. Thorax yellow to reddish brown. Hairs very sparse. 2nd node of pedicel broader than 1st node..	M. floricola Jerdan.
d2—More than 2mm. in length.....	
e1—Head and thorax reddish yellow; whole gaster dark brown.	M. gracillimum Smith
e2—Head, thorax and base of abdomen reddish yellow; apical 2-3 of gaster nearly black.....	
f1—Head more or less smooth and shining	M. destructor Jerdan
f2—Head more or less regulose, opaque	M.pharaonis Linn.
c2—Metanotum armed with well developed spines. Clypeus not bicarinate	
d1—Workers highly dimorphous. Back of occiput smooth.....	PHEIDOLE Westwood P. megacephala Fab.
d2—Workers monomorphous. Whole occiput regulose	
e1—Less than 2.5mm. in length..	CARDIOCONDYLA Emery
f1—Yellowish brown	C. wroughtonii Forel v. hawaiiensis Forel
f2—Dark brown	C. nuda Mayr. v. minutior Forel
e2—3mm. or more in length.....	(Tribe TETRAMORII) TETRAMORIUM Mayr. T. guineense Fab.
a2—Antennae 10-jointed	(Tribe SOLENOPSIDII) SOLENOPSIS Westwood S. geminata Fab.

FROM THE HAWAIIAN ISLANDS.

LOUISE GULICK.

ections which ecimens reFound*	Reported From the Hawaiian Islands in Following Publications.	Literature in Honolulu Giving Species Description, and Libraries Where Found.**
2, 4F	Fauna Haw. p. 119.	3 Novara Reise Mayr, 1865, p. 91; 2 Hymen d'Europe et d'Algerie Andre, 1881, p. 332; 3, Fauna Brit. India, 1903, vol. II, p. 210; (v. liliuokalani; Fauna Haw.)
w 3, 4F	Fauna Haw. p. 119.	3, Ann. and Mag. of Nat. Hist., 1854, vol. XIII, p. 49, Jerdon (under Atta floricola); 3 Fauna Brit. India, 1903, vol. II, p. 211.
2w		3 Fauna Brit. India, 1903, vol. II, p. 210.
4F	Fauna Haw. p. 119, (under name M. vastator Sm.)	3 Ann. and Mag. of Nat. Hist., 1854, vol. XIII, p. 47, Jerdon (under name Atta destructor); 3 Fauna Brit. India, 1903, vol. II, p. 209.
v, 3	No published report. Identified by Wheeler.	3 Novara Reise Mayr, 1865, p. 90; 3 Ann. and Mag. Nat. Hist. 1854, vol. XIII, p. 47, Jerdon (under name Atta minuta); 3 Fauna Brit. India, 1903, vol. II, p. 202.
3, 4F	Fauna Haw. p. 118. Boll. d. Lab. Zool. et Agr. d. Portici, vol. III, p. 272. Ent. Mon. Mag. 1880, p. 89, (under name P. pusilla.)	(Property of Mr. Ehrhorn) Hist. Nat. d. Fourmis. Latr. 1802, p. 232 (under name Form. megacephala) also fig. 67; 3 Cat. Hymen. Ins. Brit. Museum, Smith (under name P. Janus) 1858, Pt. VI, p. 175; 2 Hymen d'Europe el d'Algerie, Andre, 1881, p. 383; 3 Fauna Brit. India, 1903, vol. II, p. 242.—(See Note 3.)
3, 4F	Fauna Haw. p. 119.	3 Fauna Brit. India, 1903, vol. II, p. 287 (v. hawaiiensis: Fauna Haw.)
4F	Fauna Haw. p. 120.	3 Fauna Brit. India, 1903, vol. II, p. 287, (v. minutior: Fauna Haw.)—See Note 4.)
4F	Fauna Haw. p. 118. Boll. d. Lab. Zool, et Agr. d. Portici, vol. III, p. 272. Ent. Mon. Mag. 1880, p. 88.	Prop. of Mr. Ehrhorn) Hist. Nat. d. Fourmis, Latr. 1802, p. 285 (under name Formica guineensis); 2 Hymen. d'Europe et d'Algerie, Andre, 1881, vol. II, p. 287; 3 3 Fauna Brit. India, 1903, vol. II, p. 184.
2, 3, 4F	Fauna Haw. p. 119; Ent. Mon. Mag. 1880, p. 89.	3 Ann. and Mag. Nat. Hist., 1854, vol. XIII, p. 48, Jerdon (under name Atta rufa); 3 Cat. Hymen. Ins. Brit. Museum Smith, (under name Myrmica virulens); 3 Fauna Brit. India, 1903, vol. II, p. 158.

KEY	
	Family FORMICIDAE (Hetero
BII—Pedicel consisting of 1 segment. No constriction between 1st and 2nd segments of gaster	C(I and II)
CI—Anal orifice slit-shaped unciliated	DOLICHODERINAE For
Anal orifice inferior not apical	TAPINOMA Forster T. melanocephalum Fab.
Anal orifice apical	TECHNOMYRMEX Mayr. T. albipes Smith.
C-II—Anal orifice terminal, circular, surrounded by a fringe of hairs	CAMPONOTINAE Forel (Tribe PLAGIOLEPIDII
a1—Antennae 11-jointed	PLAGIOLEPIS Mayr.
b1—Antennal scapes reaching a little beyond posterior border of occiput	P. exigua Forel
b2—Antennal scapes reaching considerably beyond posterior border of occiput	P. mactavishi Wheeler
a2—Antennae 12-jointed	(Tribe FORMICII)
b1—Less than 4mm. in length	PRENOLEPIS Mayr.
c1—Scape of antennae extending beyond posterior edge of occiput by more than half its length	P. longicornis Latr.
c2—Scape not so long. Extending beyond posterior edge of occiput by less than half its length	
d1—Dark brown, 2.5 or more mm. in length	P. bourbonica Forel
d2—Abdomen brown, head and thorax brownish yellow 2.3 or less mm. in length	P. sharpii Forel
b2—More than 6mm. in length	(Tribe CAMPONOTII) CAMPONOTUS Mayr. C. maculatus Fab.

Note 1—Blackburn and Kirby report P. contracta (Ent. Mon. Mag., 1880, p. 88). Dr. Perkins believes this to be a misidentification for P. kalakauae or P. perkinsi.

Note 2—Pogonomyrmex appears not to be present in the islands now.

Note 3—There may be more than one Pheidole sp. here.

Note 4—Dr. Perkins reports that a Cremastogaster sp., probably from Japan, is established here. In Cremastogaster the apex of the

DM THE HAWAIIAN ISLANDS.

CISE GULICK.

ations which emens ound*	Reported From the Hawaiian Islands in Following Publications.	Literature in Honolulu Giving Species Description, and Libraries Where Found.**
w 3, 4F	Fauna Haw. p. 120; Boll. d. Lab. Zool, et Agr. d. Portici, vol. III, p. 272.	(Prop. of Mr. Ehrhorn) Hist. Nat. d. Fourmis, Latr., 1802, p. 261 (under name Formica melanocephala); 3 Ann. and Mag. Nat. Hist., 1854, vol. XIII, p. 108, Jerdon (under name Formica nana); 3 Fauna Brit. India, 1903, vol. II, p. 304. (See Note 5.)
w		3 Fauna Brit. India, 1903, vol. II, p. 301.
12w	No published report. Identied by Wheeler.	3 Fauna Brit. India, 1903, vol. II, p. 323.
', 3	No published report. Identified by Wheeler.	2 Bull. Am. Museum Nat. Hist., 1908, vol. XXIV, p. 166.
, 4F	Fauna Haw. p. 120.	(Prop. of Mr. Ehrhorn) Hist Nat. d. Fourmis. Latr., 1802, p. 113, (under name Formica longicornis); 3 Novara Reise, Mayr., 1865, p. 50; 2 Hymen. d'Europe et d'Algerie Andre, 1881, vol. II, p. 203; 3 Fauna Brit. India, 1903, vol. II, p. 326.
3, 4F	Fauna Haw. p. 120; Boll. d. Lab. Zool, et. Agr. d. Portici, vol. III, p. 272.	3 Fauna Brit. India, 1903, vol. II, p. 328 (under name P. bengalensis) (r. hawaiiensis: Fauna Haw.)—(See Note 6.)
4F	Fauna Haw. p. 121.	1, 2, 3 and 4 Fauna Haw. 1899, p. 121.
3, 4F	Fauna Haw. p. 122; Boll. d. Lab. Zool. et Agr. d. Portici, vol. III, p. 272.	3 Fauna Brit. India, 1903, vol. II, p. 355 (v. hawaiiensis: Fauna Haw.)—(See Note No. 7.)

pedicel is attached to the dorsal surface of 1st abdominal segment.

Note 5—There may be another Tapinoma sp. established here.

Note 6—Blackburn and Kirby report P. clandestina (Ent. Mon. Mag., 1880, p. 88). Blackburn and Cameron report P. obscura. (See Fauna Haw.). These are both misidentifications for P. bourbonica according to Dr. Perkins.

Note 7—Blackburn and Kirby report C. sexguttatus (Ent. Mon. Mag. 1880, p. 89). This probably should have been C. maculatus.

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