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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:

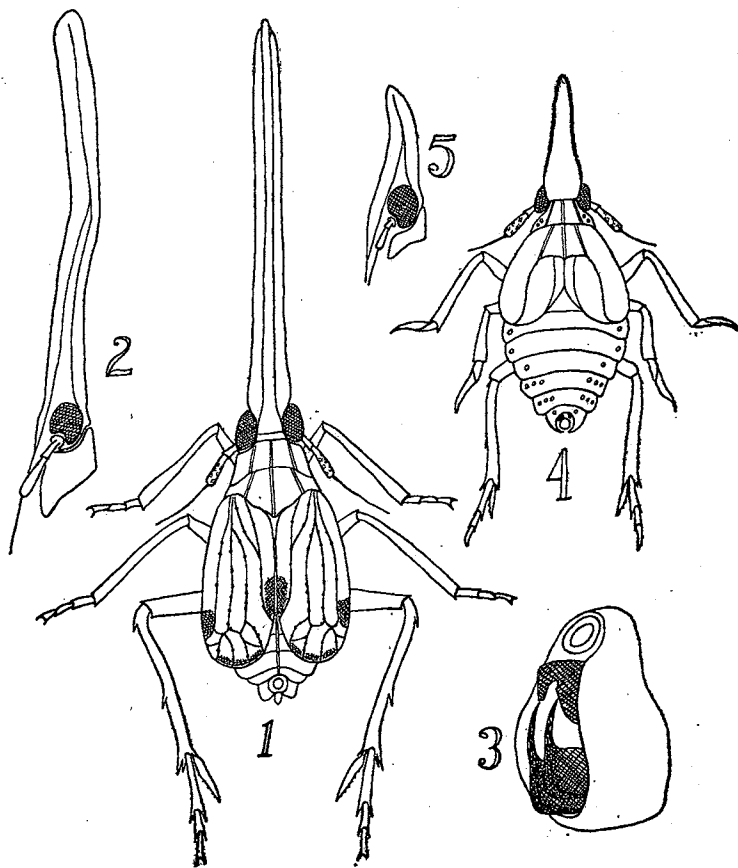
October, 1908.

**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 south-east 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

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\*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 numerous, 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 sub-dorsal 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 *Pseudobaesus*, the other *Dyscritobaesus*.

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.

**Synonymy 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.  
 = *Aglautoma molokaiensis* Ashm.  
*subrufa* D. T. & Keiff.  
 = *Aglautoma 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 Pa-waa 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 Spingid from Larat.**

BY F. MUIR.

When in Larat my attention was attracted to this Spingid 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 illepada* (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 antennae-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 illepada* 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 *Echthrodelpfax 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 *Echthrodelpfax* cocoons. The adult Ceraphronids issuing from these cocoons were smaller than those issuing from *Haplogonatopus* cocoons; the larva of *Echthrodelpfax* 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, *Echthrodelpfax 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 Eugénies 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 ♀  $5\frac{1}{2}$  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 ♀  $4\frac{1}{2}$  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.

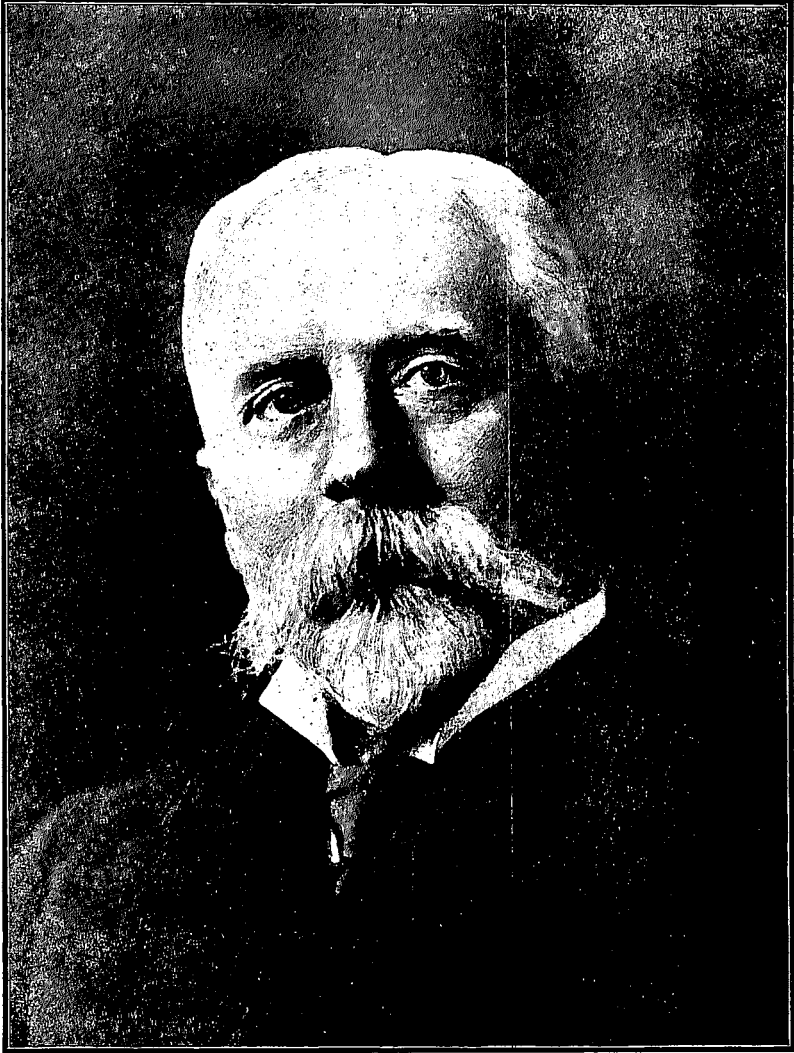
*Be it further Resolved*, That these resolutions be spread on the minutes of the Society.

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 Crow

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 Crow 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. Crow was a powerful factor in that movement. Never in our conversation in the office did he credit himself 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 *Ephesiodes 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 Bethyloid 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, ciliated 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; eighth 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 neuriation, 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 denuded of tomentum; beneath, it is conspicuously flattened or subdepressed behind the middle, rather 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 abruptly, 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 infusate 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 varying 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.

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