PROCEEDINGS

OF THE

Hawaiian Entomological Society

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JANUARY 3, 1935

The 348th regular meeting of the Hawaiian Entomological Society was held at the Experiment Station, H.S.P.A., January 3, 1935, at 2:30 p. m.

Members present: Miss Suehiro, Messrs. Bryan, Ehrhorn, Hadden, Illingworth, Keck, Marlowe, Mason, McBride, Rosa, Swezey, Van Zwaluwenburg, Williams and Zimmerman.

Visitors: Masters Emil A. Freedman, Jr. and George C. Freedman, and Mr. Spencer Tinker.

In the absence of the President, Mr. Ehrhorn presided.

The minutes of the previous meeting were read and approved. The Secretary reported that the auditor had examined and approved the Treasurer's financial report for 1934. The following appointments by the Executive Committee were announced for 1935:

Editor of the Proceedings: Mr. O. H. Swezey
Curator of Collections: Dr. F. X. Williams
Librarian: Mr. J. S. Rosa

Mr. Elwood C. Zimmerman, proposed for Junior Membership at the preceding meeting, was elected by unanimous ballot. Mr. Swezey proposed the name of Mr. Spencer Tinker for Junior membership.

NOTES AND EXHIBITIONS

Aphycus lounsburyi (Howard)—Specimens were exhibited by Mr. Swezey which had issued from *Saissetia oleae* (Bern.) on stems of *Calotropis gigantea* brought in by Mr. Ehrhorn, Dec. 18, 1934. Apparently it is the first record of the occurrence of this

valuable parasite in Hawaii. Besides this parasite several others issued from the same material as follows:

Scutellista cyanea Mots	Abundant
Aneristus ceroplastae How	"
Coccophagus sp. ?	"
Marietta carnesi (How.)	3
Aphytis chrysomphali (Mercet)	2

Mr. Swezey called to the members' attention the usefulness of Mr. Timberlake's article "Records of the Introduced and Immigrant Chalcid-Flies of the Hawaiian Islands" (Proc. Haw. Ent. Soc., vol. v, no. 3, pp. 418-449, December 1924).

Litomastix floridana (Ashm.)—Mr. Swezey reported that a good proportion of caterpillars of *Plusia chalcites* which were feeding on squash leaves at Lualualei, Oahu, December 31, were parasitized by Litomastix.

Rhyncogonus simplex Perkins—Specimens of this native curculionid were exhibited by Mr. Swezey, who had collected them on Sida leaves on the Waianae side of Oahu, December 31, 1934. The locality was about 1.4 miles back from the shore, and about 2 miles southeast from Waianae village. The beetles were quite plentiful, 17 being collected in a few minutes (2 of them on Malva) and Mr. Riley, who was along, collected some besides. It is 40 miles or more from the colony of the same species occurring on the flats near Makapuu Head. Mr. Swezey had visited the latter colony the previous day and collected 32 beetles from *Gossypium tomentosum* in about 15 minutes. These beetles are ovipositing freely, and he will attempt rearing to maturity.

Plagithmysus muiri Perkins—Specimens of this longicorn beetle were exhibited by Mr. Swezey. Four had issued from a section of the trunk of a fallen Sideroxylon tree brought in from Haleauau Valley, Oahu, Nov. 13, 1934.

Cryptolucilia caesarion (Meig.)—A specimen of this fly was exhibited by Mr. Swezey, collected by him at Kawela Bay, Oahu, Dec. 16, 1934. It is the first record of its occurrence on Oahu. It

is the fly which he reared from bluish maggots in cowdung at Kapapala Ranch, Hawaii, June 21, 1934.

Murgantia histrionica (Hahn).—Mr. Swezey stated that a homesteader on the Waianae coast reported having had bugs on his cabbages, which, from his description, must have been the harlequin cabbage bug. Apparently this bug has not been recorded on cabbages here, but in the H.S.P.A. collection are 6 of the bugs collected on Chinese cabbage at Ewa Plantation, Jan. 17, 1930, by Mr. Bond, apparently not recorded at that time. The bug was previously found in 1923, infesting *Capparis sandwichiana* on the Ewa coral plain.

Chloridea obsoleta (Fab.)—Mr. Swezey reported the finding of a few caterpillars of this moth on cane leaves where there was an infestation of *Spodoptera mauritia* (Boisd.) which had migrated from grassy roadside, at Waianae Plantation, December 31. Probably the Chloridea caterpillars had similarly migrated from weeds in waste land. When confined on cane leaves in a jar, these caterpillars did not feed, only nibbling a little, but ate amaranth when it was put in later. Small Chloridea caterpillars were recently found common on Malvastrum at Koko Head.

Pyroderces rileyi (Walsm.)—Mr. Swezey reported this moth in the role of a leafminer, its larva having been found feeding in an aloe leaf, and also in Rochea leaf in a greenhouse at the Foster Garden, Dec. 12 and Dec. 28, 1934, respectively. Larvae of this moth are usually scavengers, but in both instances above they fed in the green leaves.

New Fly Records—Dr. Williams mentioned that among a small collection af aquatic and subaquatic Diptera sent to Dr. G. A. K. Marshall of the British Museum for identification, were two new records of Ceratopogoninae identified by Dr. J. W. S. Macfie. One was a new species of *Dasyhelea hawaiiensis* from Hering Valley, Oahu, and the other *Forcipomyia ingrami* Carter, from various points on Oahu and Hawaii. The latter is found also in other tropical regions. The description and record are published in Stylops, iii, pp. 133-134, 1 fig., June, 1934.

Dasyhelea has a long wormlike larva living in wet algae alongside waterfalls, while Forcipomyia breeds in very thin sheets of slow or stationary water, in and about water held by plants, etc.

Canaceoides nudata (Cresson).—Mr. Bryan reported that E. T. Cresson, Jr., in the Transaction of the American Entomological Society, vol. lx, p. 221, 1934, had described a new genus of ephydrid flies, Canaceoides, for *Canace nudata,* which is a little blackish fly found commonly on moist rocks and tidal pools in Hawaii. The species was originally described from California, but has been collected on the beaches of southeastern Oahu, and on Lisiansky and Wake Islands. Cresson thinks that it may be the same as *Procanace panamaensis* Curran from the Canal Zone.

Palmaricoccus pritchardiae Stickney.—Mr. Swezey called attention to the description of this new species of palm scale in U.S.D.A. Technical Bulletin No. 404, pp. 67-72, 1934. It is described from material sent by Mr. Ehrhorn, collected by J. F. Rock on *Pritchardia hardyi* on Molokai in 1919 and by O. H. Swezey on *P. rockiana* on Oahu in 1916.

In the same paper is listed *Palmaricoccus nesiotes* (Laing) from Lord Howe Island, and "on palm", "Macheno", Hawaii 1906 (Kotinsky No. 134), p. 72. (This latter locality is unknown to local entomologists.)

Another new species of palm scale for Hawaii is *Platycoccus tylocephalus,* p. 108 of the same bulletin. This was collected by L. A. Whitney on palm, Honolulu, 1920.

Ammophorus insularis Boh.—The finding of this tenebrionid on Dec. 10, 1934, under stones in a dry section of central Maui (near reservoir, Field C-1, H. C. & S. Co.) was reported by Mr. Van Zwaluwenburg. This is a new island record for the species.

Latrodectus mactans (Fab.).—The presence of the black widow spider in unusual numbers in December on Maui, was reported by Mr. Van Zwaluwenburg. A very dry field in the Kihei district (Maui Agricultural Company) had been plowed and left fallow for about a year. Over about 200 acres of this field the horizontal webs of the spider were very numerous, being spread from clod to clod, and across irregularities of soil. Nearly every

clod turned over revealed male or female Latrodectus, and often both sexes were found in the same hiding place. Mr. Zimmerman mentioned that Dr. S. F. Bailey, of Davis, California, has recently found a new dipterous species which is parasitic on the egg-sacs of the black widow spider.

Notes on Guatemala.—Dr. Williams gave an interesting account of his recent stay in Guatemala, which he has summarized as follows:

An array of fine volcanic peaks confronts you on approaching the Pacific coast of Guatemala. These peaks range from about 8,000 to nearly 13,000 feet high.

Some 30 miles inland from the port of San Jose is the finca or plantation El Salto, in the district of Escuintla. El Salto is situated at about 1,000 feet elevation in a well watered and rather rugged country.

There is a great abundance of insect life here and I am sure one could easily collect 200 or more species of butterflies in a season. Among the attractive insects is a large day-flying swallow-tailed moth (Uraniidae) that alights in wet spots. The open spaces and the shady forests have their particular insects—in the forests are butterflies well-nigh invisible because of their largely transparent wings. We (Mr. Bianchi and I) collected our parasite material to a great extent on weed flowers. Here we noted many chrysomelid beetles, fine skipper butterflies, moths that greatly resembled a certain dark vespoid wasp, Mantispidae in abundance, aculeate Hymenoptera, etc. In digging for larvae in pastures and old corn fields, we sometimes exhumed tiny snakes, bolboceroid beetles, and, of course, as many as 8 or 10 species of scarabaeid grubs. Passalid beetles are very common. A large active spider was common on boulders bordering streams or on those surrounded by water. It ran actively over running water.

Of curious animals noted here were the "cutete" lizards (Basiliscus) that run on their hind legs and dash across the water, the huge *Bufo marinus,* the "chameleon" or Anolis, etc. Vultures, chiefly the black headed species or "zopilote", were extremely common and of almost omnivorous habit.

Of familiar lowland plants were the huge ceiba trees, the palmate-leaved Cecropias of forest clearings, wild Plumeria, etc.

Heliconoids were plentiful, also gingers, thorny legumes and stinging Jatropha and nettle plants.

In the highlands 5-leaved pines made loose forests and were greatly dwarfed at the timber line. So also was the alder. Elderberry plants grew to over 10,000 feet. Labiates were abundant even to 13,000 feet, as also Scrophulariaceae and lupines. Hummingbirds flew with a whistling noise in the pine forests at 12,500 feet.

Insects familiar in temperate U.S.A. were represented here by yellow butterflies (Colias?), the mourning cloak (*Vanessa antiopa*) and others. Salamanders were found in pine forests and in bromeliaceous plants. Vespoid and sphecoid wasps congregated in the bromeliads and under loose bark. Boring the bases of these plants one sometimes found the larva of a weevil.

We passed two nights at altitudes of over 12,000 feet. Here it gets very cold immediately after sunset, and in the early morning frost sparkles on the ground and icicles hang where the afternoon before water was dripping. On all four mountains visited—Pacaya, 8,200 feet, Agua, 12,200 feet, Tahumulco, 13,800 feet, and Atitlan, over 11,000 feet—were species of dahlias, and we sometimes quenched our thirst by using the old stems as straws through which was sucked up the water accumulated among the leaf bases of bromeliads.

One usually starts the ascent of the volcanoes from considerable altitude; for example, the starting point for the Tahumulco climb at over 9,000 feet, is reached by automobile over a very rough road. Tahumulco, near the Mexican border, is regarded as the highest peak in Central America. The ascent of Atitlan was the most difficult, involving a climb of 8,200 feet, much of it over very rough country: pumice and scoriae. The craters of Pacaya and of Atitlan had steam cracks. The craters are all relatively small as compared with those of Hawaii.

An airplane trip of about 75 miles from Guatemala City to Quezaltenango was very scenic, as we passed over the large lakes of Amatitlan and of Atitlan, as well as along the flanks of several volcanoes.

FEBRUARY 7, 1935

The 349th regular meeting of the Society was held at the Experiment Station, H.S.P.A., February 7, 1935, at 2:30 p. m.

Members present: Miss Suehiro, Messrs. Au, Bryan, Ehrhorn, Hadden, Illingworth, Ito, Keck, Marlowe, Mason, McBride, Pemberton, Rosa, Sakimura, Schmidt, Swezey, Tinker, Van Zwaluwenburg, Willard, Williams and Zimmerman.

Visitors: Miss Mabel Chong, Messrs. Tai Hee Hong, F. Darwin Kirschman, Frank Kitamura, George Miller of South Bend, Ind., Donald Murakoshi and Lorrin H. Smith.

In the absence of the President, Mr. Ehrhorn presided.

Mr. Spencer Tinker, whose name had been proposed for Junior membership at the previous meeting, was elected by unanimous ballot.

An invitation was read from the Museum National d'Histoire Naturelle of Paris, to send delegates to its tercentenary celebration to be held June 24 to 29, 1935. The matter was referred to the Secretary with the suggestion that Dr. Perkins be asked to serve as delegate.

A letter from President Carter was read, suggesting, at President Crawford's request, a discussion by the Society of "the scientific aspects of a Mediterranean fruitfly and melon fly control program, funds for which might materialize out of the processing taxes." The President suggested that the matter be referred to a committee for detailed consideration. At the conclusion of considerable discussion a motion made by Dr. McBride was adopted, after being amended to the following final form: That the President appoint a committee of not less than six members, to be headed by himself, to draw up a research program for a project on fruit fly control, this program to be submitted, after consideration by the Society in special meeting, to the committee of the Agricultural Adjustment Administration.

NOTES AND EXHIBITIONS

Egg-parasite of "black widow" spider.—Mr. Zimmerman reported further on the parasitism of egg masses of *Latrodectus mactans* (Fabr.). Dr. S. F. Bailey of the University of California

at Davis lately found a dipterous parasite tentatively determined as a species of the genus Gaurax, family Chloropidae; this is an effective parasite on the egg masses of the spider in the Sacramento Valley. Material is in the hands of Dr. Cole for specific determination. Dr. Bailey writes that a manuscript on the biology of the spider, prepared by Prof. Herms, Miss McIvor and himself, is in the hands of the University's editorial committee.

Nutgrass weevil.—Mr. Zimmerman reported taking an adult of *Athesapeuta cyperi* Marshall on the top of Puu Palikea, in the Waianae range, Oahu, at about 3,000 feet, on Feb. 3rd, 1935. This capture of a lowland insect at such altitude is unusual.

Cyrtorhinus mundulus (Bred.).—Mr. Swezey reported capturing two of this mirid bug on Puu Palikea at an elevation of 3,000 feet on Feb. 3, 1935. This is the introduced bug which is so efficient in the destruction of the eggs of the sugarcane leafhopper. Cane fields were several miles away on either side of the ridge on lowlands below. These bugs may have been carried up by air currents, or possibly they subsisted on eggs of native leafhoppers, as there were several species of these at the place.

Proterhinus xanthoxyli Perkins.—Mr. Swezey exhibited a specimen of this rare species of Proterhinus collected by him in a dead twig of Xanthoxylum on Puu Palikea, Waianae Mountains, Feb. 3, 1935. Three specimens were obtained. The only time that this species was collected previously was on a Xanthoxylum tree at about 2,500 feet on the trail to Mt. Kaala.

Cryptolucilia caesarion (Meig.).—Mr. Swezey exhibited a specimen of this fly captured by him on the ranch at Koko Head, Oahu, Jan. 13, 1935.

Volucella pusilla Macq.—A specimen of this syrphid fly was exhibited by Mr. Swezey who had reared several from maggots found in rotten stems of the Punahou cactus (*Hylocereus undatus*), Jan. 9, 1935.

Palorus ratzeburgi (Wissm.).—Mr. Swezey exhibited two specimens of this tenebrionid beetle which he had collected under rotten bark at a woodpile in the Experiment Station, H.S.P.A.

grounds, Honolulu, Jan. 29, 1935. It has not been previously recorded from Hawaii. In U.S.D.A. Farmers' Bulletin 1260 it is called the "small-eyed flour beetle".

Plagithmysus muiri Perkins.—Mr. Swezey exhibited specimens of this cerambycid beetle reared from a section of Sideroxylon tree brought in by Messrs. Bryan, Zimmerman and himself from Haleauau Valley, Waianae Mountains, Nov. 13, 1934. A portion of a tree was found to have fallen on the trail, and larvae of the beetle were found abundant in and under the bark. The section brought in was 11 inches long and about 6 inches in diameter. The first beetle to mature and issue from it was on Dec. 26. Between that date and Jan. 31, 20 beetles issued. On Jan. 12, 3 larvae were removed and pickled; also one pupa. Later on one pupa was found, but was injured and died. Altogether the total was 27. At this rate there would have been hundreds from the rest of the fallen tree.

Chaetogaedia monticola (Bigot).—Mr. Swezey made the following observation on the development of this tachinid fly: On Jan. 3, in examining a pupa of *Plusia chalcites* which had formed the previous day, a maggot 3 mm. long was observed within the transparent wall at the base of the abdomen. This was observed from day to day as it made a rapid growth, and on Jan. 9 (after 6 days) the puparium was found already formed within the chrysalis. From this the adult fly issued Jan. 26, 17 days within the puparium.

Litomastix floridana (Ashm.).—Mr. Pemberton reported the recovery of this parasite from larvae of *Plusia chalcites* Esp. at Grove Farm Company, Ltd., on Kauai, and at Lihue, Kauai, on Jan. 11, 1935. This is the first record of the occurrence of this insect on Kauai. Mr. Swezey sent living specimens to that island during 1929, 1930, 1931 and 1932.

Scyphophorus acupunctatus Gyll.—Mr. Pemberton reported the finding, in company with Mr. Swezey, of adults and larvae of this weevil in the stems and fleshy leaves of young Agave plants at the residence of Mr. J. W. Waldron, Nuuanu Valley, Honolulu, on Jan. 30, 1935. In a few cases the larvae had been sufficiently

numerous in the stems to kill the plants. Specimens were exhibited of the adult and larvae. This weevil was first observed in Hawaii by Mr. Muir in December, 1918, when a single specimen was collected.

Necrobia rufipes (DeG.).—Mr. Pemberton called attention to the large numbers of copra beetles now infesting the waterfront and adjacent parts of Honolulu, owing to the presence of a copra-laden freight ship at one of the docks. As this ship has been in port over two weeks, quantities of the beetles have left the ship and become scattered over the town, thus causing considerable alarm among residents as to the outcome. Since copra, carcasses of animals and similar food is not available for breeding on a large scale about the city, there is no likelihood of the beetle becoming a nuisance, especially since it has been known in Hawaii for 30 or more years.

Mr. Bryan supplemented these remarks by describing the enormous abundance of the beetle on the ship in question; within a comparatively brief time they had cleaned the carcass of a bird which had died aboard, in this way lightening the burdens of the Museum taxidermist.

Lacon modestus (Boisd.).—An island record for this species which was overlooked in preparing the Check List of the Elateridae of Oceania (Bishop Museum, Occasional Papers, vol. ix, no. 23, 1932) has been noticed by Mr. Swezey in the H.S.P.A. collection. It is a specimen taken by Mr. Swezey in March, 1905, at Puako Plantation on the island of Hawaii, near Kawaihae.

Mr. Sakimura, who recently returned from more than two years in the Orient, where he searched for enemies of pineapple pests, gave a summary of his work. During two summers he shipped to Honolulu from the Tokyo region some 65,000 specimens of *Thripoctenus* sp., a parasite of *Thrips tabaci* Lind. Visits to Formosa and the Japanese mandated islands showed few new enemies of pineapple mealybugs with the possible exception of a coccinellid (*Nephus,* near *bipunctatus*); pineapple mealybugs are comparatively few in Formosa; wilt is present.

FEBRUARY 15, 1935 (Special Meeting)

A special meeting, the 350th gathering of the Society, was held at the Experiment Station, H.S.P.A., February 15, 1935, to consider the recommendations of the committee appointed to consider the possible use of processing tax moneys for further work on Mediterranean and melon fruit flies.

Members present: Miss Suehiro, Messrs. Bryan, Carter, Ehrhorn, Fullaway, Hadden, Illingworth, Ito, Keck, Marlowe, Mason, McBride, Pemberton, Rosa, Sakimura, Schmidt, Smith, Swezey, Tinker, Van Zwaluwenburg, Weinrich, Willard and Williams.

President Carter called the meeting to order and announced that the committee appointed in accordance with the motion passed at the previous meeting consisted of Messrs. Carter (chairman), Fullaway, McBride, Pemberton, Schmidt and Williams. He then read the following report of the committee, which, after spirited discussion, was unanimously adopted by the Society:

REPORT OF COMMITTEE ON FRUIT FLY PROJECT

The committee begs leave to present the following report:

At the first meeting of the Fruit Fly Committee, held Tuesday, February 12, 1935, the various angles from which the problem of control of Mediterranean and Melon fruit flies could be approached were thoroughly canvassed. As a result two sub-committees were formed, one to prepare a working outline for a biological control project and the other to present plans for work along other lines.

The committee as a whole met again on Thursday, February 14, 1935, to consider these outlines. As a result the following program is recommended for the Society's approval:

A. Biological Control:

The natural enemies of the Mediterranean Fruit Fly *Ceratitis capitata* and related fruit flies should be carefully investigated in tropical West and East Africa south of 8 degrees N. Latitude and along the east coast of Brazil. Though *Ceratitis capitata* does not occur in India, similar studies should be also made of allied fruit flies in some tropical portion of this country. All promising parasites and other enemies found in each region should be introduced to Hawaii.

F. Silvestri, in a rapid survey of African fruit flies and their parasites from July, 1912, to March, 1913, recorded some 25 different parasites, mostly from tropical West Africa. As a result of his efforts, three of these were introduced to Hawaii and established. A fourth was successfully introduced by him from Australia at the same time. In a subsequent expedition D. T. Fullaway succeeded in introducing and establishing two more of the West African parasites. It is evident that much is yet to be done.

Silvestri's survey, though fruitful of results, was of necessity hasty and incomplete. Some of the remarks in the report of his work indicate the great need for further study. They suggest the probability that other natural enemies of fruit flies, superior to those already found and introduced, may occur. We quote him briefly as follows:

> "At Aburi (Gold Coast) in the locality where, according to the observations of Armstrong, *Ceratitis capitata* exists, I did not get a single individual from fruits of coffee, of *Eugenia malaccensis,* from guavas, from Anonas, from the fruit of Landolphia or of Passiflora.
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> "It is worthy of note that while in Nigeria there were some trees of Alberia laden with fruit infested by *Ceratitis anonae,* not one gave *Ceratitis capitata*; and, again, many fruits of *Eugenia uniflora* examined were all uninfested, while on one of the trees belonging to this species I captured two specimens of *Ceratitis capitata.* In Dahomey there was an extraordinary abundance of Chrysobalanus in perfect condition as regards ripeness, but from thousands of fruit I obtained only four individuals of *Ceratitis capitata.*
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> " . . . these facts . . . seem to be very important, as indicating that in West Africa *Ceratitis capitata* is largely held in check by important inimical factors, which prevent it from becoming numerous enough to be of serious consequence . . . I believe that all of the Hymenopterous parasites I detected attacking other species of Ceratitis and species of Dacus also attack *Ceratitis capitata,* and that very probably the rarity of the latter is due to them; though I do not wish to deny that the species may also have some special parasite which I did not find."

Studies of parasites and other natural enemies of fruit flies in tropical East Africa have not been made, to the best of our knoweldge, though two investigators, Gowdey and Anderson, report the occurrence of *Ceratitis capitata* in this region. Here is a field also rich in possibilities. Silvestri states that in his opinion "it would be very useful to continue the study of *Ceratitis capitata* and other fruit flies in East Africa from Natal to Uganda, since there may be important parasites in that region". It is our belief that investigations in the states of Uganda and Kenya would be sufficient to our purpose in East Africa.

In the vicinity of Bangalore, India, the larval parasite *Syntomosphyrum indicum* is said to occur in Indian species of Bactrocera. This parasite, which enters infested fruit to parasitize the larvae, will attack and develop in the larvae of *Ceratitis capitata,* as demonstrated in South Africa, Western Australia and Italy, where it has been introduced. As it is reported to be a parasite of Bactrocera species in India, its introduction to Hawaii would seem to be of great importance, since we have both Bactrocera and Ceratitis in the Islands. In this case the presence of an alternate host for the parasite might very well enable it to become widely prevalent and easily maintain itself during periods when Ceratitis and its host plants are scarce in any given community. Other natural enemies of fruit flies in India should be investigated. This applies particularly to the melon fly *Bactrocera cucurbitae,* which is considered indigenous to India.

No egg-parasites of fruit flies are known. Efforts should be made in all countries visited to locate these, if such exist.

Predatory insects, especially Staphylinids, which may enter fallen fruit in search of fly maggots, should be studied. Species of the parasitic Staphylinid genus Aleochara, which develop within fly puparia, are known. Such may occur on fruit flies and should be kept in mind.

It is recommended that from four to six trained entomologists be employed for the foreign work, in order that each region may be worked simultaneously. It is believed that the personnel can largely be selected from entomologists already in Hawaii, who are familiar with the problem; some of whom have had previous foreign work in parasitic introductions.

One year of field work is advised. Existing organizations in Hawaii have sufficient facilities and staffs on hand to handle the imported material expeditiously, with some assistance in labor.

It is believed that $50,000 would cover the costs of the work outlined.

B. Artificial Control:

In addition to parasite introduction as a partial control measure, the undertaking of other studies is recommended. Supplementary to the control effected through parasites, artificial measures are practical under many conditions. The development of attractants, repellents and poison baits may be greatly improved through chemical studies on preferred and or highly resistant host fruit varieties. A particular case in point is the wide variation in the resistance of mangoes as shown by Mason, Haw. Ent. Soc. Proc. 7:170. (1932):

Table 1. Fruit Fly Infestation in Mangoes

Variety	Number examined	Number infested	Per cent infestation
Bierbach	18	0	0
Victoria	182	2	1.1
Pirie	121	2	1.6
Smith-Wootten	150	3	2.0
Cowasjee-Patel	37	1	2.7
Whitney	113	4	3.5
No. 9	112	5	4.4
Mullgoa	38	2	5.3
Ehrhorn	214	12	5.6
No. 5	43	3	7.0
Scott-Pirie	53	4	7.5
Wootten	144	11	7.6
Holt	63	5	8.0
Manila	100	14	14.0
Chinese	25	6	24.0
Hawaiian	643	227	35.3
French	85	50	58.8

Many other fruit varieties show similar characteristics. A determination of the factors responsible for susceptibility or resistances may lead to the development of valuable attractants for practical baits and sprays. For a study of these factors the following project is proposed:

PROPOSED OBJECTIVE

The chemist assigned to this project would organize and outline the problem with a view to determining:

(a). Preferred host fruit chemical constituents responsible for attracting the fruit flies and the resulting high oviposition.

(b). To determine the correlation between the chemical constituents and fruit infestation of varieties highly resistant to fruit fly.

(c) The information gained from paragraphs (a) and (b) to be utilized in the development of more potent attractants and repellents.

(d). The compounds developed under paragraph (c) to be checked by entomologists under field and laboratory conditions and methods of practical application developed.

After careful consideration of the personnel and equipment it is estimated that to pursue the project for one year would cost as follows:

Chemist	$ 4,500.00
Chemicals, equipment and miscellaneous supplies	3,500.00
Unskilled labor	2,000.00
Laboratory space	----------
	$10,000.00

The committee would also urge the desirability of close and formal co-operation between federal and territorial agencies in conducting this investigation.

WALTER CARTER, *Chairman.*

In the discussion which preceded the adoption of the committee's recommendations, Mr. Willard made a strong plea for inclusion in the report of a study of sterilization methods which might make possible the exportation of fruits and vegetables. This, he pointed out, would be of greater immediate benefit to island growers than a further reduction of fly infestation by additional parasites, important as he considered the biological control work to be. President Carter explained that this subject, among others, had been carefully considered by the committee, but that their opinion was that considering the limited period during which the proposed funds would be available, more could be accomplished by the projects which had been recommended in the committee's report. It also developed in further discussion that the investigation of the problems involved in produce sterilization is being considered by the Federal Department of Agriculture at the request of President Crawford of the University, with the idea of proposing it as an additional project in the near future.

Mr. Pemberton appealed to the members to support the proposed biological control work, pointing out the considerable accomplishments in parasitic control of fruit flies already attained locally with comparatively insignificant expenditures of time and money. Now, he said, there arises the opportunity to accomplish results on a scale hitherto impossible.

The following resolution to accompany the committee's report to the officials of the Agricultural Adjustment Administration, was unanimously approved:

WHEREAS, the Hawaian Entomological Society believes that the lack of fruit fly control is an important factor operating against successful agriculture in the Hawaiian Islands; that this problem is amenable to solution if vigorously and adequately attacked; that measures leading to this solution which have been considered by the Society are fundamentally sound,

BE IT RESOLVED that the Hawaiian Entomological Society pledges its support to any program which has fruit fly control as its objective and offers the attached program as an earnest of its technical and professional co-operation.

MARCH 7, 1935

The 351st meeting of the Hawaiian Entomological Society was held at the Experiment Station, H.S.P.A., March 7, 1935, at 2:30 p. m.

Members present: Messrs. Au, Bryan, Carter, Ehrhorn, Hadden, Illingworth, Ito, Keck, Marlowe, Mason, McBride, Pemberton, Rosa, Sakimura, Schmidt, Swezey, Van Zwaluwenburg, Williams and Zimmerman.

Visitors: Miss Mabel Chong; Messrs. Frank Kitamura, George Miller and Donald Murakoshi.

President Carter presided. The minutes of the two previous meetings were read and approved. The President called attention to a recently received list of Coccidae from Professor Jorgensen of Brigham Young University, Logan, Utah, offering mounted coccids in exchange for material not in his collection.

NOTES AND EXHIBITIONS

Geocoris punctipes (Say).—Mr. Swezey exhibited a specimen of this bug, collected at Pearl City, Oahu, in Bermuda grass, January 22, 1935. It had been determined by Mr. E. P. Van Duzee.

Athesapeuta cyperi Marshall.—Mr. Swezey exhibited two specimens of this nutgrass weevil which were collected on orchids by Dr. Lyon, one some time in 1934, the other March 5, 1935. These were probably only incidental, or accidental guests of the orchid house.

Coccophagus hawaiiensis Timb.—Mr. Swezey reported having received the determination of male specimens of this parasite which had issued from *Saissetia oleae* (Bern.), December 24, 1934.

Protaenasius sp.—Mr. Swezey reported collecting this mealybug parasite quite abundantly by sweeping on roadside weeds at Wailuku, Maui, February 24, 1935. Apparently it is the first recovery of this parasite on Maui. On Oahu he had reared this parasite in 1934 from *Ferrisia virgata* (Ckl.).

Mangarevan expedition.—Mr. Zimmerman reported that the task of mounting the insect collections of the Mangarevan expedition to the south Pacific in 1934 had about reached completion.

Pacific Entomological Survey.—Mr. Bryan called attention to two recently issued publications of the Bishop Museum, one entitled "Society Island Insects" (Bulletin 113) and the other, the second part of "Marquesan Insects" (Bulletin 114). Both are based on the collections of the Pacific Entomological Survey. Seven of nine proposed publications on the Survey field work have now appeared. Another bulletin of taxonomic papers is in preparation, as well as one summarizing the distribution and relationships of the Marquesan fauna.

Thripoctenus sp.—Dr. Carter reported finding on Kauai a new parasite of the onion thrips, unlike any other Thripoctenus hitherto known here. Although not actually bred from its host, the parasite was found as a living adult in a colony of onion thrips; hence the relationship is strongly implied.

Hyperaspis sp.—Dr. Carter reported bringing to Hawaii with him in January, living specimens of a Brazilian Hyperaspis given him by Dr. Harry Smith of the Riverside laboratory. The species is now breeding in captivity on *Pseudococcus brevipes* (Ckll.).

Dr. Carter discussed some features of his recent trip to the mainland. Among the recent aims in economic entomology is the search for a satisfactory substitute for arsenicals; the problem of arsenical residues has become an acute one of late years. The rearing of a nematode parasitic upon scarabaeid beetles by Dr. Rudolph Glaser at Princeton, was described, and Dr. Carter suggested that a further attempt be made to introduce this parasite into Hawaii. *Neoaplectana glaseri* Steiner was sent to the H.S.P.A. some years ago, but for one reason or another the introduction was unsuccessful at that time. In Florida Dr. Carter found typical mealybug wilt on pineapples, as well as green-spotting; the Red Spanish variety while very susceptible to the latter malady is resistant to wilt. Dr. Carter found evidence of an internal hymenopterous parasite of *Pseudococcus brevipes* in Florida. The sand-fly problem in the eastern part of that state is being met successfully by leaching the salts from tidal mud-flats, the larvae being dependent for development upon a high salt content.

APRIL 4, 1935

The 352nd meeting of the Hawaiian Entomological Society was held at the Experiment Station, H.S.P.A., April 4, 1935, at 2:30 p.m.

Members present: Miss Suehiro; Messrs. Au, Carter, Ehrhorn, Hadden, Illingworth, Keck, Marlowe, Mason, Rosa, Sakimura, Schmidt, Swezey, Tinker, Van Zwaluwenburg, Wilder, Williams and Zimmerman.

Visitors: Miss Mabel Chong and Mr. F. Kitamura.

President Carter presided. The minutes of the preceding meeting were read and approved.

PAPERS

Mr. Swezey presented two papers, one entitled "Miscellaneous Observations on Maui," from which he read extracts, and the other "A Day on Mt. Olympus."

NOTES AND EXHIBITIONS

Adoretus versutus Har.—Dr. Gerrit Wilder, just returned from the South Seas, told of having to give up his plans to spend some months at Tahiti and at Raratonga, due to unusually rough seas in February which made landing impossible. He mentioned the severe depredations on ornamentals in Fiji of a scarabaeid beetle (probably *Adoretus versutus* Har.) similar to the oriental beetle present in Hawaii.

Rhycogonus koebelei Perkins.—Dr. Williams reported finding a specimen of this weevil, while collecting with Mr. Swezey, on the summit of Mt. Olympus about 2400 feet elevation, on March 31. It was found in the central leaves of ieie vine (*Freycinetia arborea*).

Hercothrips femoralis (Reuter).—Mr. Swezey reported for Mr. Whitney that this thrips had been found on orchids in Mr. F. C. Atherton's orchid house in Manoa; and that *Taeniothrips xanthius* (Williams) had been found on orchids at Mr. Anderson's, at Leahi Home, Kaimuki. These are apparently the first records of these two species of thrips occurring on orchids in Honolulu.

Phloeobius gigas horaeus Jordan.—A specimen of this large anthribid beetle was exhibited by Mr. Swezey, who had captured it on dead Hibiscus at his home in Manoa Valley, March 13, 1935. This is the same insect recorded in Proc. Haw. Ent. Soc. V, p. 344, 1924, and VI, p. 250, 1926, from a specimen collected by Mr. Bissell. A second specimen was recorded in the same publication, IX, p. 1, 1935. The present specimen is the third collected in Honolulu.

Trichogramma minutum Riley.—Mr. Swezey reported that on March 11 he had collected 9 eggs of *Herse cingulata* (Fab.) on leaves of *Ipomoea pentaphylla* at Pearl City, and that 26 *Trichogramma minutum* had issued from 3 of the sphingid eggs.

Volucella pusilla Macq.—Specimens of this syrphid fly were exhibited by Mr. Swezey, who had reared them from maggots found in a rotten branch of *Opuntia megacantha* on the top of Punchbowl crater, March 18, 1935. It appears to be the first record of the breeding of this fly from this cactus, but it has been reared previously from *Hylocereus undatus* in Honolulu. Apparently it is a scavenger fly partial to rottten cactus.

Harmolita swezeyi Phil. & Poos.—Mr. Swezey exhibited a specimen of the Bermuda grass stem chalcid collected by him at Pearl City, March 11, 1935, while sweeping on a heavy growth of the grass. He had not taken this insect since 1914. Prior to that it had been collected quite widely on Oahu, Maui, Hawaii and Kauai.

Asterolecanium pustulans (Ckll.).—Mr. Ehrhorn exhibited a branch of fig, collected on March 25, heavily infested with this burrowing scale, and stated that it seemed more prevalent now than at any other time in the past few years.

Thecla echion (L.).—Mr. Keck exhibited an egg-plant fruit in which the larva of this lantana lycaenid was feeding. This is one of the rare instances of this butterfly attacking a food-plant other than the lantana for which it was originally introduced.

Symbionts in a native delphacid.—Mr. Swezey exhibited a freshly prepared slide showing the symbiont, yeastlike organisms, present in the body of the native *Aloha dubautiae* (Kirk.).

MAY 2, 1935

The 353rd meeting of the Hawaiian Entomological Society was held at the Experiment Station, H.S.P.A., May 2, 1935, at 2:30 p.m.

Members present: Miss Suehiro; Messrs. Au, Bianchi, Bryan, Carter, Ehrhorn, Hadden, Illingworth, Ito, Marlowe, Mason, Pemberton, Rosa, Sakimura, Schmidt, Swezey, Van Zwaluwenburg, Weinrich, Wilder, Williams and Zimmerman.

Visitors: Miss Mabel Chong; Messrs. J. Linsley Gressitt, H. D. Kirschman, Frank Kitamura and Donald Murakoshi.

President Carter called the meeting to order. The minutes of the preceding meeting were read and approved. The chair suggested the desirability of inviting the Pacific Slope branches of the national entomological societies to hold their annual summer meetings here at some future date. After discussion Mr. Swezey moved that the secretary be instructed to extend the Society's invitation to the Pacific Slope branch of the American Association of Economic Entomologists and to the Pacific Coast Entomological Society to hold their summer meetings in Honolulu in 1937. Being seconded, the motion was unanimously approved.

PAPERS

Mr. Swezey presented the following paper: "A List of Fruit and Seed-eating Insects in Hawaii."

Mr. Sakimura read a paper: "Host Ranges of Some Hawaiian Thrips (Preliminary Report)".

NOTES AND EXHIBITIONS

Local moths.—Mr. Swezey exhibited a box of moths recently described by Mr. E. Meyrick, most of them species of Hyposmocoma.

Anomalochrysa cognata Perkins.—Mr. Swezey exhibited two specimens of this native lacewing fly caught in Palolo valley, April 14, 1935. Apparently this is the first capture of this species since the original capture by Dr. Perkins in 1896, when he secured the single specimen which was described. It was collected at 3,000 feet in mountains near Honolulu.

Banza unica (Perkins).—A specimen of this rare native grasshopper was exhibited by Mr. Swezey, who captured it in Palolo Crater, April 14, 1935. This was described from a single specimen collected by Dr. Perkins in mountains near Honolulu in 1896. An occasional specimen has been taken since by some of the entomologists.

Geocoris punctipes (Say).—Mr. Swezey reported that Walter Donaghho had collected two specimens of this bug from Ewa coral plain, April 14. The first record since the original specimen collected by Mr. Swezey at Pearl City, Jan. 22, 1935.

Opogona omoscopa (Meyr.)—Mr. Swezey reported having reared two moths from dead bark of *Hibiscadelphus giffardianus* from James Henderson's place at Kilauea, Hawaii, sent in by L. W. Bryan on Feb. 23rd, 1935.

Latrodectes mactans (Fabr.).—Mr. Swezey reported results of observations on eggs of this spider as to parasitism. He had collected 18 egg cocoons at Keahua, Maui, Feb. 25, 1935. Young spiders hatched from all of these during the period from March 1-28. None had parasites. The number hatching from six of these cocoons were respectively 354, 241, 191, 220, 225 and 291, an average of 254. In discussion Mr. Swezey mentioned a parasite of this spider found in Haiti by Dr. H. L. Dozier, and Mr. Zimmerman again mentioned the Chloropid fly parasitizing this species in California, remarking that its introduction to the Islands should be easily accomplished.

Rhyncogonus saltus Perkins.—Mr. Zimmerman reported that on a visit to Kolokole Pass, Waianae Mts., Oahu, in November, 1934, the adults of *Rhyncogonus saltus* Perkins were observed feeding abundantly on the foliage of *Bidens,* and egg masses were not uncommon in the hollows of specially folded leaves. On April 28, 1935, the site of the colony was revisited, but no adult weevils were found. Numerous remains of dead adult beetles were found scattered about the ground beneath *Bidens* plants, and digging revealed the larvae about the root areas of the plants. The larvae were all found within six or seven inches from the surface. The larvae of *Asynonychus godmani* (Crotch) were also found in the

same area in a ratio of 12 *Asynonychus* larvae to 17 *Rhyncogonus* larvae. In November, the adults of *Asynonychus godmani* were also abundant on the foliage of the *Bidens* but were rather scarce in April. The larvae of the introduced elaterid *Monocrepidius exsul* Sharp were found in numbers among the two species of weevil larvae. These wireworms are effective predators, for few weevil larvae were found in the immediate vicinity where a wireworm was working. Surly, these predators must account for the destruction of large numbers of introduced as well as native soil inhabiting grubs.

The larvae of *Rhyncogonus saltus* are similar in size and general appearance to those of *Asynonychus godmani,* but they can immediately be distinguished even by the naked eye. The *Rhyncogonus* have large, conspicuous heavily chitinized, yellowish anal plates which are not found on the larvae of *Asynonychus godmani.*

Adoretus sinicus Burm.—Dr. Illingworth called attention to an apparent increase in damage by this species during the past few weeks. Mr. Swezey pointed out the lack of seasonal studies on this species, and added that its apparent abundance in dry seasons may be due to the fact that the Metarhizium fungus is less effective at such times. Mr. Ehrhorn reported finding Adoretus damage on Impatiens, which he believed to be an unrecorded feeding plant.

Odonata.—Dr. Williams mentioned that while on a collecting trip with Messrs. Swezey and Zimmerman on Mt. Kaala, Waianae range, on April 28, 1935, Odonata (dragonflies and damselflies) were well represented. The following nymphs or larvae of these insects were found:

1. *Anax strenuus* Hagen—Usually in the larger pools; Haleauau stream, eggs in honohono (*Commelina nudiflora* L.).

2. *Nesogonia blackburni* (McLachl.)—Haleauau stream, small stagnant pool; Gunnera spring, 3600 ft.

3. *Megalagrion oceanicum* (McLachl.)—Haleauau stream, under stones, among roots and algae in running water, etc.

4. *Megalagrion calverti* (Perkins)—On dripping wet bank, Gunnera spring.

5. *Megalagrion nigrohamatum* (Blackburn) var. *nigrolineatum* Perk.—Haleauau stream, under stones, stagnant or clear water.

6. *Megalagrion leptodemas* (Perkins)—Haleauau stream, on exposed ledges, submerged leaves, etc.

7. *Megalagrion amaurodytum* (Perkins) race *waianaeanum* Perkins—3,300-4,000 ft. Between leaf bases of *Astelia* and *Freycinetia.*

Thus all these nymphs have usually well defined to very specialized habitats.

The free-swimming Megalagrion have comparatively large leaf-like caudal (swimming) gills; those that crawl more have shorter and narrower gills, while the nymphs at the leaf-bases of plants have these gills thickened and much reduced. According to habitat the food of these carnivorous insects varies to some extent.

The acquisition of such data as the above is a matter of many field trips over an extended period.

Coptotermes formosanus Shiraki.—Dr. Carter exhibited a piece of redwood (sapwood) from a high-pressure water pipe which had been severely damaged by this immigrant termite. The pipe had been buried in the ground. Mr. Ehrhorn told of shorting of electric cables due to this species having eaten its way through the lead sheathing which covered the cable.

Aphididae—Mr. Au exhibited a slide collection of Hawaiian aphids, and also drawings and a slide mount of an unusual species of the subfamily Hormaphinae, collected on Araucaria pine, Kipapa Gulch, south ridge, 1,400 ft. elevation, Feb. 10, 1935. This species was collected on the same host by P. H. Timberlake in 1916 and recorded as an undescribed species.

Itasca trip to the Line islands.—Mr. Bryan gave a very interesting account of the recent trip of the revenue cutter Itasca to Palmyra, Jarvis, Howland, Baker and Swain's islands, illustrating his remarks with excellent pictures. The entomological features of the expedition he reserved for a future date, only mentioning the severe damage to taro leaves at Leone Bay, Tutuila, Samoa, by a sphingid caterpillar and a noctuid larva.

JUNE 6, 1935

The 354th meeting of the Hawaiian Entomological Society was held at the Experiment Station, H.S.P.A., June 6, 1935, at 2:30 p. m.

Members present: Miss Suehiro; Messrs. Au, Bianchi, Bryan, Carter, Chock, Ehrhorn, Fullaway, Hadden, Illingworth, Keck, Marlowe, McBride, Swezey, Van Zwaluwenburg, Wilder and Zimmerman.

President Carter presided. On motion by Mr. Bianchi it was voted that the committee appointed in 1934 to further the compilation of a manual of insect pests of minor Hawaiian crops, consult with President Crawford with a view to preparing such a manual from the information now available. It was felt that the preparation of such a manual might be a proper project for the use of processing tax money by the local committee of the Agricultural Adjustment Administration, of which Mr. Crawford is a member.

On motion by Mr. Zimmerman it was voted that the secretary provide Miss Suehiro with the proper credentials as the Society's delegate to the Sixth International Congress of Entomology, to be held in Madrid in September.

NOTES AND EXHIBITIONS

New host of Ceratitis capitata Wied.—Mr. Marlowe presented the following note: On May 6, 1935, on the grounds of the Hawaii Experiment Station, fruits of the akee tree, *Blighia sapida* Kon., (Sapindaceae), which were open and lying on the ground, were examined for maggots. Larvae of *Ceratitis capitata* were found in the soft staminal-like part of the fruit located above the seed. The fruit, as is shown on the right of the accompanying figure, remains closed until maturity. At maturity the pod opens as is shown on the left, and remains on the tree in this stage for approximately a week. While the fruit is open and on the tree, the adult fruit fly oviposits in the soft white flesh above the hardened black seed. As many as forty larvae, in various instars, have been taken from one fruit.

Entomologists have held *Blighia sapida* for infestation records and their results have been negative. However, the fruits which

were held by these men were not open at the time of collection, so were not infested. During the past month fifty unopened fruits were held and found to be uninfested, while eighty opened fruits, collected from the tree and the ground, yielded 395 third instar fruit fly larvae. From these emerged 245 *C. capitata,* 78 *Diachasma tryoni* Cam., 13 *Opius humilis* Silv. and some *Tetrastichus giffardianus* Silv. A description of *Blighia sapida* is given by N. Taylor in L. H. Bailey's "Standard Cyclopedia of Horticulture," volume I, p. 515.

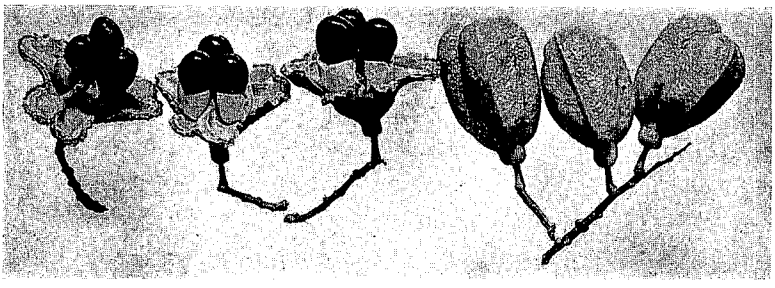

FIGURE 1. Fruits of *Blighia sapida.*

Chalybion caeruleum (Linn.).—Mr. Swezey exhibited one of these blue wasps collected by Phil Weber at Moanalua May 26, where several were obtained. Mr. Weber had also seen the wasp in Manoa Valley at the terminus of the bus line.

Crocidosema plebeiana Z.—Mr. Swezey reported having reared this tortricid moth from seeds of *Abutilon menziesii* and *Abutilon eremitopetalum* collected April 25, 1935, from plants growing in the planting of native forest trees on the grounds of the Kamehameha Girls' School. These are new hosts for this moth, the larvae of which commonly feed on the flower buds of Sida, and have also been reared from seed pods of the weed *Abutilon molle.* It is not a native moth, but occurs in Australia, the West Indies, Central and South America, and has been known in the Hawaiian Islands since 1881. Two adults were reared from the seeds of *A. eremitopetalum* and eight from *A. menziesii*; two parasites, *Microbracon mellitor* (Say), issued from larvae in seeds of *A. menziesii.* This moth is a new host for this parasite.

Argyroploce illepida (Butl.).—Mr. Swezey reported rearing this tortricid from seeds of *Dodonaea viscosa* collected at the same time and place as the preceding species. It is a new host for this moth, which usually infests koa seeds so badly. Five moths issued from a handful of seed capsules.

In some recent collections of koa pods the infestation by this species was as follows: Pupukea, May, 19, 99 percent; Halawa, May 26, 23.5 percent. About a dozen *Pristomerus hawaiiensis* Ashm. issued from the material from Pupukea.

Cremastus flavo-orbitalis (Cam.).—Mr. Swezey reported on the high parasitism of the coconut leaf-roller, *Omiodes blackburni* (Butl.) by this ichneumonid at the present time. He had secured many hundreds of the caterpillars from coconut leaves at Ala Moana Park, May 30. From these, within three days, several hundred Cremastus cocoons were formed. The remaining caterpillars appeared to be nearly all parasitized as shown by dissection of quite a number. The whole lot of parasitized caterpillars and Cremastus cocoons were given to Mr. George L. Windred who was returning to Fiji June 3rd, after a short visit in Honolulu. It is desired to introduce Cremastus into Fiji as a parasite on the banana scab moth, *Nacoleia octosema* Meyrick, which is related to *Omiodes blackburni.*

Brachymeria obscurata (Walker).—Mr. Swezey reported the rearing of this chalcid from cocoons of *Cremastus flavo-orbitalis* (Cam.). From 100 cocoons of *Cremastus* collected from coconut leaves May 14, *Brachymeria* issued May 29-31, after the cocoons had been in the refrigerator for 21 days. Normally *Brachymeria* is parasitic on the pupae of the coconut leafroller, and evidently on account of the *Cremastus* cocoons being more numerous than the *Omiodes* pupae, *Brachymeria* had made use of the former. All adults were smaller than those which issued from the *Omiodes* pupae.

Insect observations on Lanihuli.—Mr. Swezey submitted the following notes for Dr. Williams, who could not be present: Dr. Williams made a trip on June 2nd, 1935, to the rain-guage on the summit of Lanihuli, Koolau range, Oahu, about 2,700 feet high. There were large numbers of the ichneumonid wasp *Ecthromorpha*

fuscator (Fabr.), and the Mexican tachinid fly, *Archytas cirphis* Curran, was also abundant. One or two specimens of the metallic blue and green sphecid wasp (*Chalybion caeruleum* (Linn.)), a recent immigrant, were observed. This insect is now widely distributed on Oahu. Many *Anax junius* Drury dragonflies were coursing back and forth on the summit. Two female *Agrion oahuense* Blackb. were taken. At about the 2,000 foot level two specimens of the fern weevil *Syagrius fulvitarsis* Pasc. were found resting on a large sedge.

Orthezia insignis Dougl.—Mr. Ehrhorn called attention to the prevalence of this scale upon *Coleus* spp., *Hemigraphis colorata, Strobilanthus dyerianus* and the cultivated, dwarf variety of Lantana. He commented upon the current scarcity of the coccinellid *Hyperaspis jocosa* (Muls.), which preys upon the *Orthezia*. Dr. Illingworth stated that he found an oil-pyrethrum spray to be very effective against this pest, not injuring even the tenderest plants.

Comperiella bifasciata How.—Mr. Fullaway reported rearing, for the first time since 1916, this encyrtid from *Chrysomphalus aonidum* (Linn.).

Bufo marinus (Linn.).—Dr. Illingworth reported finding a dozen or more large specimens of this giant toad in his garden at 12th Avenue, Kaimuki. This beneficial toad is rapidly becoming established in various new localities about the city.

Rhynchophorus palmarum (Linn.).—Mr. Bianchi exhibited specimens of this weevil reared from the bole and larger roots of a papaya tree in Guatemala, probably constituting a new host record. Another specimen, which had been given him, was reported to have been taken within a ripe pineapple. A description and full account of the habits of the various stages of this species is given by Blandford in the Kew Bulletin for 1893, pp. 27-60. The list of host plants given there includes *Cocos nucifera, Attalea cohune, Oreodoxa oleracea, Sabal umbraculifera, Acrocomia selerocarpa* and seed pieces of sugarcane.

Mass migration of tenthredinid-larvae.—Mr. Bianchi exhibited a vial of unidentified tenthredinid larvae collected in September,

1934, near the town of Retalhuleu, Guatemala. They formed part of a massed group which was seen one bright morning crawling across a dusty road in a very peculiar manner. The mass was about seven inches in diameter, irregular, but more or less oval in outline, about one inch high in the center and tapering somewhat toward the periphery. It consisted of larvae piled four or five deep. The larvae all faced in the same direction, but as they crawled at obviously unequal rates of speed their relative positions in the group were constantly changing. The outline of the mass, however, changed very slowly, and its thickness evidently not at all. Most remarkable was the manner in which all the larvae, without exception, stopped and resumed their crawling simultaneously; for all the world as if in so doing they followed commands inaudible to the observer. They would move along for about half a minute, stop suddenly to complete inactivity for an equal space of time, and then just as suddenly resume their march again. At each spurt they covered between three and four inches.

This meeting was the last to be attended by Mr. Zimmerman before returning to the mainland for further study. He expressed his enjoyment of his stay in the Islands and his reluctance to leave. He departs with the Aloha of the Society, which hopes to have him return when his college work is concluded.

JULY 11, 1935

The 355th meeting of the Hawaiian Entomological Society was held at the Experiment Station, H.S.P.A., July 11, at 2:30 p. m., with President Carter in the chair.

Members present: Messrs. Au, Bianchi, Bryan, Carter, Chock, Ehrhorn, Fullaway, Illingworth, Ito, Mason, Pemberton, Rosa, Swezey, Van Zwaluwenburg, Weinrich and Williams. The following visitors were present: Master Emil A. Freedman, Jr., Messrs. Neil Macintyre, Robert L. Usinger and Phil Weber.

The minutes of the previous meeting were read and approved.

Mr. Swezey and Mr. Bryan, the committee on the compilation of a handbook of minor crop pests, reported that upon consulting with Pres. Crawford of the local Agricultural Adjustment Administration, they found the prospects of such a handbook being com-

piled under the auspices of the A.A.A. to be very good. In fact among the projects already recommended to Washington by the local officials is one for the study of the insect pests of minor crops, and the Society's suggestion of a handbook fits naturally into such a project. Publication by the University of Hawaii of any manuscript resulting from such study is practically assured.

Mr. Bryan introduced Mr. Robert L. Usinger and nominated him for junior membership.

PAPERS

Mr. Swezey read a paper on "The Insect Fauna of Ieie (*Freycinetia arborea* Gaud.)".

Mr. Van Zwaluwenburg presented a paper entitled "A New Species of Pyrophorus (Coleoptera, fam. Elateridae) from Guatemala, Recently Introduced into Hawaii".

Mr. Fullaway presented a paper on "*Opius fijiensis* n. sp.", a description of an insect which in Fiji is probably parastic in *Dacus passiflorae* Coq.

NOTES AND EXHIBITIONS

Ginger weevil.—Mr. Rosa exhibited specimens of *Pteroporus subtruncatus* Fairm., which he had reared June 21, 1935, in Nuuanu Valley, from upland taro (*Colocasia esculenta*), a new host for this weevil.

Formicaleo perjurus Walk.—Mr. Pemberton exhibited a specimen of this insect which he had collected at the southern border of Hawaiian Commercial & Sugar Co., Maui, on April 19, 1935. This species has not been taken on Maui since 1883, when it was collected by the Rev. T. Blackburn.

Copris incertus var. *prociduus* Say.—Mr. Swezey exhibited some earthen pupal cells of this dung-beetle which were sent for identification by the county extension agent on Maui.

Ceratitis capitata Wied.—Mr. Swezey reported having reared 109 of the Mediterranean fruitfly from eight fruits of a thin-skinned cooking banana. These were from a bunch which grew in his garden. Every banana of the bunch was infested, some of them

having several egg-punctures. The bunch had been left hanging until many of the fruits were already ripe. Perhaps if it had been cut soon enough, so great an infestation would have been avoided. Two *Diachasma tryoni* (Cam.) issued from the above.

Chaetodacus cucurbitae (Coq.).—Mr. Swezey reported a considerable infestation by this fly of the passion fruits on a vine in his garden. A dozen fruits were found infested at one time, which was one-third of the ripe fruits present at the time.

Silversword insects.—Mr. Swezey exhibited the following insects collected from silversword in Haleakala Crater in June, 1935, by Hawaii National Park ranger Sam H. Lamb:

Proterhinus fuscicolor Perk.
Aeschrithmysus terryi Perk.
Nysius coenosulus Stal.
Allograpta obliqua (Say).
Nesoprosopis nivalis Perk.
Odynerus nubicolor Perk.
Tephritis cratericola Grims.
Ilburnia argyroxiphii (Kirk.).
Rhynchephestia rhabdotis Hamps.
Euxoa epicremna (Meyr.).
Small noctuid, not collected previously.
Larvae of dermestid.

Anagyrus nigricornis Timb.—Mr. Swezey reported having reared three of this encyrtid from *Pseudococcus citri* (Risso) on a leaf of a Solanum vine in his garden, June 8, 1935. Also from the same material 14 cecidomyids issued, which may be *Lobodiplosis pseudococci* Felt, introduced from Mexico in 1930 as a parasite of the pineapple mealybug.

Belonuchus ephipiatus (Say).—Mr. Swezey exhibited two specimens of this staphylinid beetle which were collected by Charles Hoyt in rotten papaia trunks on Thurston Avenue, May 21, 1935. It is the first record of this species in Hawaii. It is an immigrant from California, occurring in the southern part of the state, Arizona and Mexico. It was identified from a specimen in

the Giffard collection of California Coleoptera, collected by Dr. Blaisdell at San Diego.

Polistes olivaceus (De G.).—Mr. Swezey reported on the census of a nest of this wasp collected from the eaves of his garage. It seemed to be a large nest for so early in the summer (June 7), and he thought it would be of interest to take a count of the wasps present in all stages. The nest was 3 inches in diameter, and was secured early in the morning when all adults were present. The count was as follows:

57 ♀ ♂	adults clustered on nest.
4 ♀	adults in capped cells.
14 ♀	pupae about mature except for unexpanded wings.
35 ♀	soft pupae.
21	fullgrown larvae in sealed cells.
11	larvae nearly fullgrown in unsealed cells.
16	eggs.
159	total population.

Electric insect trap.—Mr. Swezey called attention to an article in the Pacific Rural Press (issue of June 22, 1935) describing the successful use of an electric trap against the artichoke plume moth.

Lema nigrovittata Guerin.—Mr. Ehrhorn said that the egg-clusters of this chrysomelid beetle laid upon a Datura plant in his yard are removed by some agency at night, and wondered if anyone present knew of an insect which might thus prey upon the eggs. Mr. Swezey suggested that the green lacewing fly larvae might be doing this. Discussion by Messrs. Chock, Ito and Fullaway revealed that adults of Lema have been taken on Oahu from Koko Head on one extreme, to Kunia and even Mokuleia on the other.

Zelus renardii Kol.—Mr. Weber reported that he had seen adults of the assassin bug feeding on the bruchid beetle.

Myzocallis kahawaluokalani Kirk.—Reporting the reappearance of this uncommon aphid, Mr. Au said that on June 22 he

collected 30 specimens of winged and nymphs of the winged form of this species on crepe myrtle, *Lagerstroemia indica,* at a nursery on School Street near the Foster Garden, formerly the old Hillebrand home. The species was described by Kirkaldy in the Proceedings, Vol. 1, p. 101, 1907. Fullaway in his Synopsis of Hawaiian Aphidae (Ann Rpt. Haw. Agr. Expt. Sta., 1910) mentioned the fact that he had never seen specimens of this species. Timberlake in his Notes on Hawaiian Aphidae (Proc. Haw. Ent. Soc., vol. 5, p. 451, 1924) said: "This species has not been found since Kirkaldy's description was published in 1907, and is unknown to me". Through conversation with Mr. Fullaway, Mr. Au learned that about five years ago Mr. Mason also had collected the species.

Aphis swezeyi Fullaway.—Mr. Au reported that specimens of this species, of which Timberlake (l. c., p. 454) wrote: "This species recorded by Fullaway on *Gnaphalium* sp. has not been collected since,", were collected March 27, 1935, by Mr. Ito at Wahiawa, Oahu, on the roots of *Emilia sonchifolia.* Subsequently he took another specimen in a wind trap at Maunaloa, Molokai. On May 17 Dr. Carter also found the same species on *Emilia* roots at Haiku, Maui.

A New Aphid.—Mr. Au exhibited a slide mount of a small dark green aphid with large, irregular, ciliated sensoria, which was blown into the laboratory of the Pineapple Experiment Station by the wind. It is a genus and species apparently new to Hawaii, and fails to "key out" in A. C. Baker's generic classification of the Aphidiae. Specimens have been sent to Dr. O. W. Oestlund of Minnesota, for identification.

Tenebrionid beetles.—Mr. Weber reported finding both *Ammophorus insularis* Boh. and *Blapstinus dilatatus* LeC. extremely abundant under cowdung in the Punahou pasture. Mr. Bryan said that he once saw the former species crawling in great numbers within Diamond Head Crater.

Drasterius dorsalis (Say).—Mr. Van Zwaluwenburg exhibited an elaterid beetle, identified as *D. dorsalis* (Say) var. *comis* (LeConte), which was collected by Mr. Neil Macintyre at Nanakuli

Beach, Oahu, on the evening of June 16, 1935. The insect was taken on food at 8 p. m. on the sandy beach. This is an immigrant hitherto unknown in the Islands; it is widespread in North America from the Atlantic to the Pacific, and from Canada to central Mexico. It is in the Leng Catalogue under *Aeolus,* but properly belongs in *Drasterius. D. livens* (LeConte) is a synonym, and so probably is *comis* (LeConte), which is at best a variety. The larvae are predacious, having been reported by Cartwright (South Carolina Station Bulletin 257, p. 31, 1929) to attack the pupa of the maize billbug, *Calendra maidis* (Chittenden).

Lathridiidae.—Mr. Bryan showed a copy of the first publication of results of the Bishop Museum's Mangarevan expedition. It is by E. C. Zimmerman and is entitled: "A New Lathridiid from Tahiti" (Bishop Museum, Occ. Papers, vol. xi, no. 9, 7 pp., 1 fig., July 6, 1935) and describes *Mumfordia monticola* from 4 specimens on Mt. Aorai trail, Tahiti, 5,500-6,300 feet, on undersides of dead *Freycinetia.* The publication also contains a check list of the Lathridiidae of Polynesia and eastern Melanesia with 13 species enumerated.

AUGUST 1, 1935

The 356th meeting of the Hawaiian Entomological Society was held at the Experiment Station, H.S.P.A., August 1, 1935, at 2:30 p. m. with President Carter in the chair.

Members present: Messrs. Bianchi, Carter, Illingworth, McBride, Rosa, Van Zwaluwenburg and Williams.

Visitors: Master Emil A. Freedman, Jr., and Mr. Hugo T. Cler.

The minutes of the previous meeting were read and approved. Mr. R. L. Usinger was elected to membership in this society.

NOTES AND EXHIBITIONS

Koa seed tortricid in Macadamia nuts.—Dr. Williams mentioned that Macadamia nuts from Kauai had been sent by Mr. C. C. Barnum to the H.S.P.A. Experiment Station for examination. The nuts had been damaged by the Koa seed caterpillar *Argyroploce illepida* (Butl.) (Tortricidae), that fed chiefly in the

outer coat or rind. In two cases, however, a caterpillar had bored through the hard woody shell and eaten of the meat of the nut. A third nut that was undersized and evidently imperfect had been quite destroyed. This seems to be the first record of damage to the meat of the Macadamia nut by this or any other insect.

Flight of Ponera perkinsi Forel.—Dr. Carter reported a mating flight of this ant, at Helemano, Oahu, on July 1, 1935, a bright sunny day. Flight was about 6 feet above the ground, and must have been general, for on the same date mating individuals of the same species were blown into the Pineapple Experiment Station laboratory at the University. This ant is well distributed, but not commonly seen; it is carnivorous, living in the ground.

Ants in Koa galls.—Master Freedman reported finding ants in outgrowths occurring on Koa limbs on Wilhelmina Rise.

SEPTEMBER 5, 1935

The 357th meeting of the Hawaiian Entomological Society was held at the Experiment Station, H.S.P.A., on September 5, 1935, at 2:30 p. m. with President Carter in the chair.

Members present: Messrs. Bianchi, Bryan, Carter, Ehrhorn, Hadden, Illingworth, Keck, Krauss, Mason, McBride, Rosa, Schmidt, Usinger, Van Zwaluwenburg, Weinrich and Williams.

Visitors: Avery S. Hoyt, G. B. Marvin, and Phil Weber.

The President installed Dr. F. X. Williams as Secretary-Treasurer in place of Mr. R. H. Van Zwaluwenburg, who will be away from the Territory for some months.

The minutes of the previous meeting were read and approved.

President Carter introduced Mr. Avery S. Hoyt, Assistant Chief of the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, Washington, D. C. Mr. Hoyt responded with a brief and interesting talk.

PAPERS

Mr. E. H. Bryan, Jr., read a paper entitled "Lonchoptera in Hawaii".

Mr. R. L. Usinger read a paper on "New Distributional Records of Hawaiian Heteroptera".

NOTES AND EXHIBITIONS

Lagocheirus obsoletus Thoms.—Dr. Illingworth reported as follows on this cerambycid beetle: This beetle has appeared frequently in our notes. It has been bred from Kukui, Araucaria, Plumeria, Alamanda, Euphorbia, Pseudopanax, etc. Recently I found geraniums badly attacked at Kaimuki. The whole stems were bored out and killed, the cavities filled with frass, in which the larvae pupated.

Apomecyna pertigera Thoms.—Dr. Illingworth reported as follows on this cerambycid beetle: This introduced beetle, though present in the Islands for many years, has appeared only twice in our Proceedings. Fullaway reported it from cucumber stems and Swezey found it breeding extensively in a gourd vine. Subsequent to 1912, I have bred it repeatedly from stems of squash, cucumber and pumpkin, but have failed to report it at our meetings. The specimens exhibited are from Kailua, where they proved very destructive to the watermelon crop, boring the stems before the fruit had matured.

Conoderus eveillardi Le Guillou.—Mr. Van Zwaluwenburg reported that specimens of the recent immigrant *Conoderus* have recently been determined as the above species by Dr. H. J. Carter of Wahroonga, New South Wales. Dr. Carter writes: "Your examples are very close to the type of Macleay's *C. rubicundus,* placed as a synonym of *eveillardi,* being more red and less densely hairy on the pronotum than with the fresh examples of *eveillardi,* but it is, I think, only a slight variation of the 'fawn' colored normal form". The species was described from New South Wales, and was first taken in Honolulu at light in Manoa Valley in August, 1931, by Mrs. Van Zwaluwenburg. Subsequent captures were made at Waikiki, Kahala and again in Manoa.

Conoderus sp.—Mr. Phil Weber reported the capture of this elaterid August 22, 1935, at light globe of store near Waialua Fresh Air Camp, 9:30 p. m., weather cool. Legs eaten by ants in camp, due to poor storage facilities.

Vanessa tammeamea Esch.—Mr. Phil Weber reported that on August 5 before the CCC cut the Mt. Tantalus trails, there was a wounded koa tree right above the trail after the third bend, about 50 yards straight up from the Hawaiian Warrior marking Tantalus summit. A friend and he used to go to this tree catching *Vanessa tammeamea,* which drank the sap issuing from the wound. Beneath the tree were approximately 500 wings of *V. tammeamea,* scattered on the grass. His guess was that the butterflies became intoxicated by the sap, which smelt exactly like beer, and fell to the ground, where they were either wet by rain, so as to render them incapable of flight, or were attacked by ants. The sap smelt and tasted exactly like beer. It was white and foamy. The tree is no more, having been taken by the CCC because it overhung the path.

Milichiella lacteipennis (Loew).—Mr. Bryan exhibited three crushed specimens of this phyllomyzid fly which had been captured on board the Pan American Airway's "Oriental Clipper" upon its arrival from Wake and Midway Islands, August 23rd. These three small black flies were the only insects noted by Mr. Fullaway during his inspection of the plane. This species has been previously reported from Midway (Bryan, B. P. Bishop Museum Bull. 31, 1926) but had not been captured on Wake. It is believed that the flies went aboard the Oriental Clipper at Midway Islands.

Megalagrion oahuense (Blackburn).—Dr. Williams reported the discovery of a nymph, wanting about 3 moults to full growth, of this damselfly. It was found in the wet mat of uluhi, or false staghorn fern, (*Gleichenia linearis*), on a ridge back of Manoa Valley, Oahu. This nymph is of the non-swimming type and is rough and thickset with thick almost furry caudal gills. Dr. Williams had been hunting for the early stages of this insect since March, having made 14 trips to the mountains behind Honolulu. He also mentioned the moulting of the giant dragonfly nymph *Anax strenuus.* One specimen that hatched in mid June has to date, September 5, moulted 11 times and is about half grown. The nymphs become very tame when hungry and look up expectantly for food.

Mr. Ehrhorn read an interesting letter from Mr. Swezey from the South Seas.

BOOK REVIEWS

Mr. E. H. Bryan reviewed "Insects of Samoa—Concluded", by Dr. P. A. Buxton.

Mr. R. L. Usinger reviewed "Wigglesworth's Insect Physiology", and "Snodgrass on Insect Morphology".

OCTOBER 3, 1935

The 358th meeting of the Hawaiian Entomological Society was held at the Experiment Station, H.S.P.A., October 3, 1935, at 2:30 p. m., with President Carter in the chair.

Members present: Messrs. Bryan, Carter, Ehrhorn, Hadden, Illingworth, Keck, Rosa, Usinger and Williams.

Visitors: Emil A. Freedman, Jr., Geo. P. Gray, R. E. Green and T. Mitamura.

The minutes of the previous meeting were read and approved.

NOTES AND EXHIBITIONS

Agrilus extraneus Fisher.—On behalf of Mr. Phil Weber, Mr. J. S. Rosa exhibited specimens of this buprestid beetle, described from Oahu. Mr. Weber had taken 17 specimens on a Poinciana stump in Honolulu.

Lacon modestus (Bdv.).—Mr. Rosa exhibited the first rearing here of this elaterid beetle. Two larvae of this insect were secured under a stone in the Koko Head region.

Eopenthes divisus Sharp.—Mr. Usinger spoke of capturing specimens of this elaterid beetle. Apparently it has not been recorded since its original description in 1908. The type series was from Oahu, Honolulu, 2,000 ft., 1896, Perkins. Mr. Usinger beat three specimens from *Metrosideros polymorpha* on the Manoa-Palolo Ridge, Sept. 22, 1935.

He also exhibited some Hemiptera from collections in the University of Hawaii.

Dr. Carter exhibited potted pineapple plants to which, through the use of certain aphids, he had been able to transmit the *Commelina* virus disease.

Mr. Bryan exhibited two boxes and a list of the contained species of aquatic and subaquatic diptera which he had determined for Dr. Williams.

Master Freedman said that upon watering a certain *Coleus* plant in a dish, a hump of quaking dirt was revealed, from which a *Bufo marinus* toad peeped up.

President Carter introduced Mr. Geo. P. Gray, now stationed with the Federal fruit fly laboratory in Honolulu. Mr. Gray responded appropriately.

NOVEMBER 7, 1935

The 359th regular meeting of the Society was held at the Experiment Station, H.S.P.A., November 7, 1935, at 2:30 p. m.

Members present: Messrs. Bryan, Carter, Ehrhorn, Hadden, Illingworth, Keck, Marlowe, Mason, Pemberton, Rosa, Swezey, Usinger and Williams.

Visitors: Messrs. Walter Donaghho, Geo. Gray, Robert E. Green, Charles Hoyt and Donald Starr.

President Carter called the meeting to order. The minutes of the previous meeting were read and approved.

The President, as authorized, reported progress on the matter of inviting the Pacific coast branch of the A.A.A.S. to hold a meeting in Honolulu in the near future.

The matter of a suitable obituary notice for the late Dr. Gerrit Wilder was taken up. Mr. Bryan suggested that a committee of two, composed of Messrs. Ehrhorn and Swezey, be appointed to this end. Approved and appointed by the president.

Mr. O. H. Swezey read an interesting letter from Bro. Mathias Newell, a veteran member of the Hawaiian Entomological Society and now at Dayton, Ohio.

PAPERS

On behalf of Dudley Moulton of California, Mr. Swezey presented a paper entitled "Thysanoptera of the Hawaiian Islands". A box of thrips named by Mr. Moulton was exhibited.

Mr. R. L. Usinger presented a paper entitled "The Genus Geocoris in the Hawaiian Islands".

Mr. E. H. Bryan, Jr., presented a review of C. H. T. Townsend's Manual of Myiology, Pt. II, Sao Paulo, Brazil, 289 pp., 9 pls., 1935.

On behalf of Harold Compere, Dr. Carter presented a paper on "A New Genus and Species of Encyrtidae parasitic in the Pineapple Mealybug, *Pseudococcus brevipes* (Ckll.)".

NOTES AND EXHIBITIONS

Coccinella californica Mann.—Mr. Charles Hoyt exhibited a specimen of this ladybeetle found in Dole's pasture, Honolulu. It has probably become established from a single female found in an apple box in Honolulu years ago by Mr. Swezey, who reared a generation and turned some loose. This is the first recovery since.

Periplaneta brunnea Burm.—Mr. Swezey reported having a letter from Mr. Morgan Hebard in which this name is given for the roach that we have been calling *P. ignota* Shaw. Specimens of the latter had been sent to Mr. Hebard, who states that *ignota* is a synonym of *brunnea.*

Opius anastrephae Vier.—Mr. Mason stated that this parasite on the West Indian fruitfly, *Anastrepha fraterculus* Wied. in Puerto Rico, was introduced into Hawaii on October 22 and 24. Two shipments of adult parasites totaling 490 living insects were received. Attempts at oviposition on larvae of both the Mediterranean fruit-fly (*Ceratitis capitata*) in kamani nuts and on the melon fly (*Chaetodacus cucurbitae*) in cucumbers were observed, when the parasites were placed in cages with the infested fruits. A heavy mortality occured within a few days after arrival and 80 living parasites were liberated October 30 under kamani trees in Queen Emma Park.

Marine midge.—Dr. Williams exhibited male specimens of a midge (Chironomidae) that he had taken on tidepool rocks on the Waianae coast, Oahu, on November 3, 1935. This inconspicuous species resembles in form, at least superficially, and considerably in its activities, flies of Terry's genus *Charadromyia,* that frequent

torrents and rapid flume and ditch water. It is probably a marine species and the first such, as far as known, recorded from the Hawaiian Islands. Marine Chironomidae, however, occur on other islands of the Pacific and at least one species should be expected here.

Australian ants.—Mr. Swezey exhibited a collection of ants he had made while in the Antipodes and mentioned items of interest concerning the scenery and fauna of New Zealand.

Pseudococcus brevipes parasite.—Dr. Carter exhibited a promising chalcidid wasp parasitic on the pineapple mealybug *Pseudococcus brevipes.* It was collected by Sr. Garcia Salas in Columbia.

Check List of Ants of Oceania.—Mr. Bryan exhibited a copy of a "Check List of the Ants of Oceania" by Dr. William Morton Wheeler, just issued by B. P. Bishop Museum as Occasional Papers, vol. XI, no. 11, 1935. In addition to a systematic list of about 560 forms (339 species, 108 subspecies, 113 varieties), with notes on their distribution and place of original description, and a bibliography of 123 papers, there is a general discussion of the distribution of ants in Oceania. Prof. Wheeler assigns the Pacific island ants to four zoogeographical categories: (1) Wide-ranging, or pantropical species of Indian, Malagasy, or Indonesian origin. (2) Wide-ranging paleotropical species, which have not yet succeeded in establishing themselves in the neotropical region. (3) A considerable number of interesting indigenous or precinctive forms, also with Old World affinities, but confined to particular island groups or islands. And (4), A small number of neotropical forms confined to the islands off the coast of South America and Central America, because they have not been able to cross the broad belt of open water to the westward. The only exception is *Brachymyrmex aphidicola,* which has recently succeeded in reaching Honolulu. Examples of restricted or sporadic distribution are given; and methods whereby ants may have invaded Pacific islands are discussed.

Cicadellidae of Hawaii.—Mr. Bryan exhibited also a copy of "Cicadellidae of Hawaii" by Dr. Herbert Osborn, it being B. P. Bishop Museum Bull. 134, 62 pp., 27 figs., Aug. 10, 1935. It con-

tains a list of host plants of the species so far as known; table of distribution on the different islands; keys to subfamilies and genera. Of the 12 genera, 2 are new and there is one new subgenus. Of the 79 species included, 25 are new and there is one new variety. *Nesophrosyne* is the largest genus with 38 old species and 16 new species, and one new variety. In addition, in its subgenus *Nesoreias* there are 2 old and 4 new species. Immigrant species of somewhat recent introduction are: *Draeculacephala mollipes* (Say), *Bythoscopus robustus* (Uhler), *Opsius stactogalus* (Amyot), *Empoasca solana* DeLong.

For each species there is a description, reference to place of description, distribution throughout the islands, and there are illustrations for the new species.

DECEMBER 5, 1935

The 360th regular meeting of the Hawaiian Entomological Society was held at the Experiment Station, H.S.P.A., on December 5, 1935, at 2:30 p. m.

Members present: Miss Suehiro; Messrs. Au, Bryan, Carter, Chapman, Chock, Ehrhorn, Illingworth, Ito, Keck, Marlowe, Mason, McBride, Pemberton, Rosa, Swezey, Usinger and Williams.

Visitor: Master Emil A. Freedman, Jr.

President Carter called the meeting to order.

The minutes of the preceding meeting were read and approved.

An Obituary of Dr. Gerrit P. Wilder was presented by the committee appointed for that purpose: Messrs. E. M. Ehrhorn and O. H. Swezey. It was moved by Mr. E. H. Bryan, Jr., and seconded by Dr. R. N. Chapman that the report of this committee be accepted and that a copy of this report be sent to Mrs. Gerrit Wilder. It was passed.

The Secretary-Treasurer read the financial statement of the Society for the year 1935. The president appointed Mr. J. S. Rosa to audit the Treasurer's books.

The President and others discussed the invitation to the American Association for the Advancement of Science to hold a meeting in Honolulu. As a result, it was moved by Mr. Ehrhorn and sec-

onded by Mr. Marlowe that Mr. O. H. Swezey be appointed to write up an article relative to the varied and interesting aspects of Entomology in the Hawaiian Islands; said article to be presented to the proper official of the above A.A.A.S. Passed.

The Secretary then reported on the results of the Executive Committee Meeting, held just before the present meeting, with nomination as follows: President, C. B. Keck; Vice President, Carl T. Schmidt; Secretary-Treasurer, F. X. Williams; additional members of the Executive Committee, Mr. C. E. Pemberton and Dr. Walter Carter. Mr. Pemberton moved that the rules of the Society be suspended and that the Secretary be instructed to cast the ballot for the above nominees. Seconded and passed and the nominees thus duly elected to office.

President Carter then reappointed Mr. O. H. Swezey as Editor of the Proceedings, Mr. J. S. Rosa as Librarian, and F. X. Williams as Curator of Collections.

PAPERS

Presidential address. Mr. Keck took the chair while Dr. Walter Carter delivered the presidential address entitled "Insects and Plant Diseases".

Dr. F. X. Williams presented a paper entitled "Biological Studies in Hawaiian Water Loving Insects—Part I, Coleoptera or Beetles; Part II, Odonata or Dragonflies".

"Notes on Hawaiian Heteroptera, with Descriptions of New Species" by E. P. Van Duzee; presented by Mr. Swezey.

NOTES AND EXHIBITIONS

Mr. R. L. Usinger spoke of his reecnt trip to Lanai and of the insect conditions there.

Periplaneta brunnea Burm.—Mr. Swezey exhibited a series of 11 adults and 12 nymphs of this roach which were collected by Mr. Ito on Nov. 22, 1935, in the stable at the Wahiawa Branch of the Pineapple Experiment Station. The series shows that the anchor shaped pale spot on the thorax is not a reliable character for separating this species from *americana* as there was considerable vari-

ation. For accurate determination, the structural characters of the supra-anal lamina should be used, for both sexes.

He also exhibited a collection of Hawaiian Hemiptera-Heteroptera worked on by Mr. E. P. Van Duzee, and recently returned.

Mr. Bryan announced the receipt from Wake Island, by the first return trip of the Pan-American Airways plane "China Clipper", of a collection of natural history specimens including insects and spiders. These were collected by Dr. M. L. Kenler and Col. G. W. Bicknell.