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c/o Department of Entomology
University of Hawaii
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PROCEEDINGS of the Hawaiian Entomological Society

VOL. XXII, NO. 3 FOR THE YEAR 1975 DECEMBER 1977

JANUARY

The 829th meeting of the Hawaiian Entomological Society was called to order by President Harris at 2:00 p.m., January 20, 1975, in the Seminar Room, National Marine Fisheries Building, Honolulu, Hawaii.

Members Present: Andrews, Beardsley, Bess, Bianchi, Brennan, Haramoto, Harris, Higa, Joyce, Lauret, Leeper, Lind, Look, Shiroma, Sprenger, Steffan, Sugerman, Tenorio, (J.A.), Tsuda.

Finance Committee Report: Mr. Tsuda reported that notice for dues for 1975 and Treasurer's Report for fiscal year 1974 had been distributed to members.

Science Fair Committee: President Harris read a letter received from Dr. Franklin Chang, Awards Chairman for the 18th Hawaiian Science and Engineering Fair, to be held 10-12 April at the Honolulu International Center, asking whether the Society wished to award a prize for an entomological exhibit. The membership voted to award a prize up to \$25 for the best such exhibit.

Unfinished Business: The matter of the Society's post office address was discussed. The members present voted to designate the University of Hawaii, Department of Entomology, 2500 Dole St., Rm. 23, Honolulu, Hawaii 96822, as the Society's postal address.

Announcement: Dr. Haramoto announced that he has been appointed Chairman of the Local Arrangements Committee for the Entomological Society of America 1976 Annual Meeting, which will be held in Honolulu, November 28 to December 2, at the Sheraton-Waikiki Hotel. Dr. W. C. Mitchell has been appointed Program Chairman for this meeting.

NOTES AND EXHIBITIONS

Balclutha rufofasciata Merino: Seven specimens of a cicadellid leafhopper, identified by Dr. Beardsley as *Balclutha rufofasciata* Merino, were recovered from material collected in three State Dept. of Health light traps operated at the Honolulu International Airport on December 15, 1974. Numerous additional specimens have been taken from light trap material from this locality since. This is a new state record. Determination confirmed by Dr. J. P. Kramer, U. S. National Museum. *B. rufofasciata* is a widely distributed tropical species. According to Linnavouri (1966. Insects of Micronesia 6(5):339) it occurs in Central America, Africa, Philippine Is. (type locality), Polynesia and Micronesia. Species of the genus *Balclutha* generally feed on grasses. J. W. Beardsley.

Meristhus sp.: A specimen of a small elaterid beetle which was recovered from a State Dept. of Health light trap at Waipahu, Oahu on August 25, 1974, was determined as *Meristhus* sp. by Dr. T. J. Spilman of the U. S. National Museum. Several additional specimens of the beetle were taken in the same trap during September and October. This is a new state record. Dr. Spilman indicated that the species is one which is not represented in the U.S.N.M. collection.

Specimens were exhibited of the new *Meristhus* sp. and of two other elaterid species which appear to be previously unreported immigrants. One of these has been present on Oahu at least since 1931, but previously was confused in local collections with *Simodactylus cinnamomeus* (Boisduval), a well known minor pest of sugarcane. Specimens have been submitted to the USDA Plant Pest Survey and Detection Service for identification. **J. W. Beardsley.**

Eumenes curvata Saussure¹: Two specimens were exhibited of a large eumenid wasp, determined by Dr. Beardsley as *Eumenes curvata* Saussure, which had been found in the collections of two students in the General Entomology course at the University of Hawaii during December, 1974. One specimen was collected at Waiahole, Oahu, during October and the other at Aina Haina in November. If these specimens have been correctly labeled, they constitute a new insect record for the state. *E. curvata* is well known in the Philippine Is. where F. X. Williams made a study of its biology (Philippine Wasp Studies. HSPA Expt. Sta. Entomol. Bul. 14:152-156, 1919). The species is similar in size to our two other large *Eumenes* species, *E. latreillei petiolaris* (Schulz) and *E. pyriformis philippinensis* Bequaert, both of which became established here shortly after World War II. It is easily distinguished from these by its more slender elongate first gaster segment (petiole) and by its blackish wings with violet iridescence. Like other *Eumenes* species, females of *E. curvata* make mud nests which they stock with paralyzed caterpillars. Additional specimens are being sought to confirm this record. **J. W. Beardsley.**

Coccinella septempunctata brucki Mulsant: This coccinellid beetle was introduced from Okinawa in 1958 and became established on Oahu. On April 4, 1973 Dr. Frank H. Haramoto released twenty-seven adult *C. septempunctata brucki* in each of two macadamia nut orchards at Keeau and Pahala, Hawaii. On April 22, 1973 another twenty adults were released at a tree nursery in Hilo. On January 14, 1975 students under the direction of Dr. Dougald C. Scott of Cabrillo College, California, reported to me that they had seen ladybird beetles in Kilauea Crater and that several had lit on them. The following day they collected a specimen which I identified as *C. septempunctata brucki*. On the morning of January 16, 1975 I collected two additional specimens around the Halemaumau overlook parking lot (el. 3640 ft.). This indicates the establishment of *C. septempunctata brucki* on Hawaii and is a new island record. **J. L. Leeper.**

Program: Dr. Harris, Dr. Steffan and Mr. Sugerman each gave a short presentation on their impressions of the Entomological Society of America Annual meeting which was held in Minneapolis during the first week of December, 1974.

¹The presently accepted name for this species is *Delta curvata* (Saussure). See Notes and Exhibitions for July (ed.).

FEBRUARY

The 830th meeting of the Hawaiian Entomological Society was called to order by President Harris at 2:00 p.m., February 10, 1975, in the Seminar Room, National Marine Fisheries Service Building.

Members Present: Beardsley, Bess, Bianchi, Burkhart, Chang (F.), Chang (V.), Gagne, Haramoto, Harris, Joyce, Khoo, Kunishi, LaPlante, Lauret, Madinger, Mau, Miyake, Montgomery, Ota, Shiroma, Sprenger, Steffan, Tenorio (J.M.), Tsuda, Yates.

Visitors: Mr. Reynold Ito and Mr. Eric Pang (Univ. of Hawaii graduate students).

NOTES AND EXHIBITIONS

Lorita abornana Busck: Dr. Klaus Sattler, microlepidoptera specialist at the British Museum, London, determined specimens of a small phaloniid moth which was first collected on Oahu in a light trap last February, as *Lorita abornana* Busck. Previously, the same moth had been determined as *Phalonia* sp. by Dr. D. R. Davis of the U. S. National Museum, and was reported as such at the November, 1974 meeting of this Society. During December, 1974, larvae of what proved to be the same species were found damaging *Chrysanthemum* blossoms in commercial nurseries at Waianae, Oahu. Dr. Sattler wrote that he had compared specimens from Oahu with authentically determined specimens of *L. abornana* which he had borrowed from the U.S.N.M. Dr. J. F. Gates Clarke, microlepidopterist at the U.S.N.M. has concurred with Dr. Sattler's determination in a letter which was received February 7. *L. abornana* was described from California (Bul. So. Calif. Acad. Sci. 38:101, 1939) where it was bred from *Cuscuta californica* (a dodder). A subspecies (*L. a. chatka*) was bred from green bell pepper. To date, *Chrysanthemum* is the only known host in Hawaii. **J. W. Beardsley.**

Imma myliias Meyrick: Dr. Sattler also identified specimens of another recent immigrant microlepidopteran from Oahu as *Imma myliias* Meyrick. This species, which is placed in the family Glyphipterigidae (previously unrepresented in the Hawaiian fauna) was first collected at Hickam A.F.B. on September 12, 1973 by Mr. Clarence Otsuka of the Hawaii State Dept. of Agriculture, during the initial banana skipper survey. The moths were reared from pupae found on a banana leaf, but the larval feeding habits were not then determined. Many additional specimens were taken from light trap collections at various points on Oahu during 1974. Also during the latter part of 1974, larvae were collected from and reared on foliage of *Albizia*, klu (*Acacia farnesiana*), monkeypod (*Samanea saman*), and opiuma (*Pithecellobium dulce*) at various localities on Oahu. Dr. Sattler wrote that *I. myliias* was described from Ceylon (Trans. Entomol. Soc. London, 1906:173) and is represented in the British Museum by specimens from India, Andaman Islands, Philippines, and Taiwan. Dr. Beardsley found the green larvae feeding on young foliage of the host trees. They were easily collected by vigorously shaking small branches of host trees, which caused

the larvae to drop down on silk threads. Apparently, larvae leave their feeding sites when mature and pupate under bark, in litter, etc. The pupa is formed within a loosely woven cocoon. Both larvae and cocoons are similar to those of the family Plutellidae. **J. W. Beardsley.**

Mesovelia amoena Uhler: Two specimens of an immigrant water treader (family Mesoveliidae), collected from light trap material from Ewa, Oahu during November, 1974, have been identified as *Mesovelia amoena* Uhler by Dr. J. L. Herring of the U. S. National Museum. This is a new state record. *M. amoena* is widespread in the Neotropical Region (described originally from the West Indies), and also occurs across the southern U. S. from Florida to southern California (see Usinger, 1956, Aquatic Insects of California, pp. 222-23). Like our other known mesoveliid, *M. mulsanti* White, *M. amoena* is polymorphic, with both apterous and winged forms known elsewhere. Usinger (loc. cit.) found *M. amoena* in protected crevices at the edges of ponds along the margins of the Colorado River, and on moss-covered rocks in a small hot spring cave in Death Valley. It is considerably smaller than *M. mulsanti*, which is said by Usinger to occupy more open water. **J. W. Beardsley.**

Paratriphleps laevisculus Champion: Dr. Herring also identified specimens of an immigrant anthocorid bug, first collected on Oahu in a light trap at Ewa during May, 1974, as *Paratriphleps laevisculus* Champion. To date, only four specimens of the species have been taken here; three from light traps located in the Ewa-Waipahu area, and one in Honolulu on produce (bell peppers) from the mainland. *P. laevisculus* was described from Panama (Champion, 1900; Biologia Centrali Americana, Zool.: Rhynchota Hemiptera 2:328). **J. W. Beardsley.**

Cardiastethus sp.: Dr. Herring also identified specimens of another anthocorid, from a series collected at Kokee, Kauai during September, 1965 by J. W. Beardsley, as *Cardiastethus* sp. This species is distinct from *C. fulvescens* Walker, a long established immigrant here, and appears to represent a previously unrecorded immigrant. **J. W. Beardsley.**

Conoderus eveillardii (Le Guillou): One of the two species of unidentified elaterid beetles which were exhibited at the January 1975 meeting has been identified as *Conoderus eveillardii* (Le Guillou) (Rev. Zool. 7:22. 1844) by Dr. T. J. Spilman at the U. S. National Museum. Interestingly, this species has been present here at least since 1931. The oldest specimen found was collected during July of that year by C. E. Pemberton. In local collections the species has been confused with the superficially similar *Simodactylus cinnamomeus* (Boisduval). Although Van Zwaluwenburg (1939. Proc. Hawaii. Entomol. Soc. 10:278) mentioned in a paper on Hawaiian elaterid larvae that *C. eveillardii* was established on Oahu, the species apparently never was included in the annual lists of new immigrants published in these "Proceedings", and no determined specimens from Hawaii were found in collections at the State Dept. of Agriculture (which includes the former HSPA collection where specimens determined by Van Zwaluwenburg might be expected) or the University of Hawaii collection. Van Zwaluwenburg (loc. cit.) states that *C. eveillardii* is an Australian species (type locality: Sydney) and that it is predaceous. In Hawaii, the species apparently has been collected only on Oahu. **J. W. Beardsley.**

Palutia stali Scott: An adult was collected at Kahului, Maui, by Nobuo Miyahira on January 28, 1975. This is a new island record for the Oriental stink bug. *P. stali* is now found on Oahu, Maui, and Molokai. This pentatomid insect was first discovered on Oahu in 1967. **R. Mau.**

Encarsia variegata Howard and two unidentified species of *Encarsia*: These three parasites emerged from orange spiny whitefly (*Aleurocanthus spiniferus*) infested rose leaves collected at Kapahulu, Oahu, on October 14, 1974. There is no record of their being purposely introduced into Hawaii. *Encarsia variegata* is listed as a parasite of *Paraleyrodes* in Puerto Rico and the U. S. The three species of *Encarsia* are easily distinguished from each other. The parasites were discovered by S. H. Au, Hawaii Department of Agriculture. Determination by G. Gordh, U. S. National Museum. **R. Mau.**

Program: Dr. Mau spoke on the subject of current biological control projects at the Hawaii State Department of Agriculture.

MARCH

The 831st meeting of the Hawaiian Entomological Society was called to order by President Harris at 2:00 p.m., March 10, 1975, in the Seminar Room, National Marine Fisheries Service Building.

Members Present: Beardsley, Bianchi, Brennan, Hara, Haramoto, Howarth, Ito, Joyce, Kunishi, Leeper, Look, Mau, Ota, Radovsky, Shiroma, Sprenger, Sugerman, Tenorio (J. M.), Tsuda, Wong.

Visitors: Ms. An-ly Yao, University of Hawaii graduate student.

Membership Committee Report: Chairman Dick Tsuda nominated four individuals for Society membership: Mr. Tim Wong, USDA Fruit Fly Lab.; Mr. Reynold Ito and Mr. Arnold Hara, graduate students, University of Hawaii; and Mr. Jerry Philipp, Technical Representative for Chemagro. These candidates were unanimously elected to membership.

Finance Committee: Dr. Mau reported that the Society is not now in a financial position to make a monetary contribution to the Wau Ecology Institute. The committee suggested that the Society donate a set of available numbers of the "Proceedings" to WEI if it did not already have these. This contribution was valued at \$300. The donation was approved unanimously by the members present.

NOTES AND EXHIBITIONS

Conoderus amplicollis (Gyllenhal): At the January meeting I exhibited specimens of two unidentified species of Elateridae from Oahu. One of these, *Conoderus eveillardi* (LeGuillou), was reported on at the February meeting. I have now received identification of the second species from Dr. T. J. Spilman of the U. S. National Museum. It is *Conoderus (Heterodes) amplicollis* (Gyllenhal), the Gulf wireworm, a known economic pest in southern North America. Concerning it Dr. Spilman wrote: "The species was first introduced into the USA at Mobile about 1909. The distribution is North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arizona, California, West Indies and South America. The larvae feed on humus in soil, tubers and root crops, roots of various plants

and on sprouting grain. Larval hosts are sweet potato, white potato (both spring and fall harvested), spring-planted corn and oats, lespedeza, and snap beans. Adults feed on pollen. The life history and description of stages can be found in Cockerham and Deen, 1936, Notes on the life history, habits and distribution of *Heteroderes laurentii* Guer., Jour. Econ. Entomol. 29:288-296, ills." The species has also been reported from sugarcane in Cuba and Florida, but its importance to this crop is unknown. This is a new record for Hawaii.

To date, only two specimens of *C. amplicollis* are known to have been collected here; one from a pit trap in a sugarcane field at Ewa, Oahu during September, 1974; and the other from a black-light trap at Kunia, Oahu, on November 2, 1974. Therefore it appears that at present it is neither very abundant or very widespread on Oahu. However, in view of the economic importance of this species in the southern U. S. mainland, it will bear careful watching. **J. W. Beardsley.**

Taeniothrips vitticornis (Karny): Specimens of this thrips were collected by Mr. Steve Nakahara of the USDA Insect Identification Laboratory, Beltsville, Md., on *Mucuna* sp. flowers at Honokohau, Maui, on Sept. 4, 1974. Determination was made by Mr. Nakahara. This thrips was previously reported on gardenia and mauna loa flowers from Oahu. (Proceedings, Vol. 15(2):285, March, 1954). This constitutes a new host and island record. **R. Kunishi.**

Neurisothrips multispinus (Bagnall): Specimens of this thrips were collected by Mr. Nakahara on *Styphelia tameiameia* flowers at about 6,000 feet elevation along the road to Haleakala, Maui, on Sept. 5, 1974. Determination was made by Mr. K. Sakimura. This species of thrips was listed as occurring only on Kauai, Oahu, and Hawaii. (Proceedings, Vol. 19(3):419-423, June, 1967). This constitutes a new island record. **R. Kunishi.**

Thrips (Isothrips) orientalis (Bagnall): Specimens of this thrips were collected by Mr. Nakahara on *Jasminum* sp. flowers in a park overlooking Waipio Valley (Lalakea), Hawaii, on Aug. 25, 1974. Determination was made by S. Nakahara. This thrips previously was reported only from Oahu. (Proceedings, Vol. 17(1):25, August, 1959). This constitutes a new island record. **R. Kunishi.**

Coptotermes formosanus Shiraki: Live trees of brush box, *Tristania conferta* R. Br.; and Java plum, *Eugenia cumini* (L.) Druce, were found infested with *C. formosanus* in Waiahole Valley. When the bark of the brush box tree was removed, a large cavity was exposed and was filled with alates. These two trees constitute a new host record for the Formosan subterranean termite. **J. Fujii.**

Xylosandrus compactus Eichhoff: A moderate infestation of the black twig borer, *Xylosandrus compactus*, was found attacking *Clidemia hirta* (L.) D. Don. in Waiahole Valley. The borer activity resulted in severe dieback of infested twigs. In the same area the *X. compactus* was also attacking 'Akia, *Wikstroemia* sp.; and Java plum, *Eugenia cumini* (L.) Druce. **J. Fujii.**

Blepharomastix ebulealis Guenee: This moth was introduced from Trinidad and Puerto Rico by the State Department of Agriculture to

control Koster's curse, *Clidemia hirta*. Adults were released during December 1970 through May 1972 in various locations in the Koolau Range. The first field recovery was made by a Sierra Club member on October 23, 1974 at the Kawaiiki Ditch trail. Since this initial field recovery I have found *B. ebulealis* on *Clidemia* at the following locations: Hauula trail, October 24, 1974; Poamoho trail, December 6, 1974; Waiahole Valley, February 11, 1975; all the above mentioned infestations were light. **J. Fujii.**

Casinaria infesta Cresson: An ichneumonid parasite, *Casinaria infesta*, was reared from a *Blepharomastix ebulealis* larva collected by Ronald Mau and myself at the Poamoho trail on 6 December 1974. This parasite, among others, may be decreasing the efficiency of *B. ebulealis* in the field. **J. Fujii.**

Plagithmysus bilineatus Sharp: Dr. Robert Scharpf, U. S. Forest Service Pathologist, and Mr. Edwin Petteys, State Division of Forestry, collected a larva of an endemic cerambycid beetle, *Plagithmysus bilineatus*, on 20 December 1974 at the 5,000 feet elevation along the Saddle Road on a live ohia tree. This larva had tunneled eight feet beneath the bark and circled the tree trunk several times. The larva was left in the gallery overnight and had tunneled an additional inch and a half. This larva was packed with ohia chips and moistened paper towel in a 7 dram vial and brought to Honolulu. The larva pupated and the adult emerged on 13 February 1975. *P. bilineatus* may play a major role in ohia decline by girdling the trees. **J. Fujii.**

Antianthe expansa (Germar): The solonaceous tree hopper, *Antianthe expansa*, was found infesting a single pohia plant, *Physalis peruviana* L., on the Mokuleia trail on 3 October 1974. This is a new host record for *A. expansa* in Hawaii. **J. Fujii.**

Steneotarsonemus pallidus (Banks): The cyclamen mite, *Steneotarsonemus pallidus*, was observed causing heavy damage to mountain naupaka, *Scaevola gaudichaudiana*, on the Waimano trail on 10 February 1975. Damage consisted of terminal leaf curling. **J. Fujii.**

Program: Dr. John Leeper gave an interesting talk on the ecology, biology and biological control of *Psylla uncatoides* on endemic *Acacia* species on Hawaii Island.

APRIL

The 832nd meeting of the Hawaiian Entomological Society was called to order by President Harris at 2:00 p.m., April 7, 1975, in the Seminar Room, National Marine Fisheries Service Building.

Members Present: Beardsley, Bianchi, Brennan, Hara, Harris, Howarth, Ito, Kunishi, Look, Mau, Ota, Philipp, Shiroma, Steffan, Sugerman, Tenorio (J.M.), Tsuda.

Visitors: Mr. Eric Pang, University of Hawaii, and Dr. Haruo Tashiro, Cornell University.

NOTES AND EXHIBITIONS

Trombiculid mites: Two species of larval trombiculid mites were recovered from specimens of the Golden Plover, *Pluvialis dominica*, taken at Bellows A.F.B. and Kahuku, Oahu by Ben Okimoto in January of 1974.

The mites belong to the genera *Neoschoengastia* and *Toritrombicula*. Specific identifications are still pending. These records constitute the first records of the genus *Toritrombicula* from the Hawaiian Islands and the first record of trombiculids from any of the main islands in the chain. The genera *Leptotrombidium*, *Neoschoengastia* and *Neotrombicula* have been reported previously from the northwestern Hawaiian Islands. **M. L. Goff.**

Probably extinct Lepidoptera from Laysan Island: Dr. Beardsley exhibited specimens of three species of Lepidoptera which were described from Laysan Island and which are believed to be extinct. The specimens, which were collected by the late D. T. Fullaway in 1912, were found in an old Schmidt box at the Bishop Museum. The label on the box indicated that the specimens had been loaned to the Museum by the Hawaii Agricultural Experiment Station, where Fullaway was then employed. The box also contained other Lepidoptera from Laysan and French Frigate Shoal, also collected by Fullaway in 1912. The present whereabouts of other insect material collected by Fullaway at that time on Laysan is unknown.

Of the three species exhibited, no additional specimens were collected by Fullaway when he visited the island of Laysan in 1923 as entomologist with the Tanager Expedition, or by any of the several collectors who have visited the island since World War II (Usinger, Butler, Beardsley, etc.). Since the rabbit plague which virtually destroyed the original vegetation of Laysan occurred between 1912 and 1923, it is presumed that these species, and several others, became extinct at that time.

One of the three species exhibited, *Agrotis procellaris* Meyrick, was not studied by E. C. Zimmerman when he prepared the Macrolepidoptera volume of the Insects of Hawaii series. Except for the single specimen collected by Fullaway, which Zimmerman apparently was unaware of, the only specimens of this species known to exist are two cotypes collected by Schauinsland in 1896 which are at the Museum in Bremen. The other two species, *Hedylepta laysanensis* (Swezey) and *Hypena laysanensis* (Swezey), apparently were collected only by Fullaway in 1912, and the specimens contained in the Fullaway material should be labeled as paratopotypes. Apparently only three specimens (including the holotype) of the former and 12 of the latter exist. Because of the value of these specimens they should be given special curatorial attention. **J. W. Beardsley.**

Program: Dr. Haruo Tashiro, Professor of Entomology at N. Y. State Agricultural Experiment Station, Cornell University, Geneva, New York, who is spending his sabbatical leave at the University of Hawaii, spoke on Turf Insects in the northeast U. S.

MAY

The 833rd meeting of the Hawaiian Entomological Society was called to order by President Harris at 2:03 p.m., May 12, 1975, in the Seminar Room, National Marine Fisheries Service Building.

Members Present: Beardsley, Bianchi, Davis, Hara, Haramoto, Harris, Ito, Kaichi, Khoo, Lai, Look, Mau, Namba, Ota, Sakimura, Samuelson, Sherman, Shiroma, Sugerman, Tanimoto, Tamashiro, Tenorio (J. M.), Tsuda, Yates, Yoshinaga, Yoshimoto.

Visitor: Mr. Eric Pang.

Common Names Committee Report: Ron Mau reported that the committee had met and members were in process of revising the List of Common Names. Copies of the draft containing additions and changes to the 1967 list were handed out to members. Some changes had been engendered by changes in ESA approved names.

Science Fair Committee: The Secretary read a letter from Wendell Ching, Aiea High School, thanking the Society for awarding him a \$25 savings bond for his science fair project, "Factors in the Biological Control of the Armyworm, *Spodoptera mauritia*."

New Business: The Secretary read a letter from Dr. Jack Fujii, Forest Entomologist, regarding the proposed inclusion of Blackburn's butterfly, *Vaga blackburni* (Tuely), in the Federal Register of threatened and endangered species. Dr. Fujii also submitted a copy of a letter from Mr. Lynn Greenwalt, Director of Federal Fish and Wildlife Service, to Governor Ariyoshi citing "sufficiently substantial evidence" to warrant a status review of *Vaga blackburni* and soliciting views and supporting evidence on the status of this butterfly. There was considerable discussion on this matter. The consensus was that *V. blackburni* is a relatively common endemic insect which is not endangered at the present time. Dr. Beardsley stated that he had written a letter to Mr. Tom Tagawa, State Forester, on April 14th supporting this viewpoint. The members present voted to direct the secretary to send a copy of Dr. Beardsley's letter to Mr. Greenwalt with a covering letter from the Society stating that to our best information *V. blackburni* is not presently endangered.

Announcement: Dr. Howarth announced that Mr. Bill Mull would give a slide show that evening on Hawaiian invertebrates at a joint meeting sponsored by the Hawaiian Botanical Society and Hawaiian Audubon Society.

NOTES AND EXHIBITIONS

Trox spp. in Hawaii: While examining material from a black-light trap operated at the Hilo Airport, I recently found a series of specimens of a small species of the genus *Trox* Fabricius (Family Trogidae; Scarabaeoidea). These specimens appear to be the same as a single specimen in the collection of the State Dept. of Agriculture which is identified as "*Trox scaber* (L)?" The latter specimen was collected in Hilo by C. E. Pemberton in August, 1919, and was reported by him at the September 1919 meeting of this Society as *Trox* sp. ("Proceedings" 4:331). Pemberton's record appears to be the only published record of a *Trox* from Hilo, except for a record of *T. scaber*, collected "above Hilo" by Perkins, in the Fauna Hawaiiensis (Sharp and Scott, 1908, Coleoptera Part 3:401). Also at hand is a specimen from Hilo, March 1961, C. R. Joyce and another taken from a black light trap at Hilo in June, 1972. Specimens are being submitted to the USDA Insect Identification Laboratory to determine if they are in fact *T. scaber*.¹

¹This identification subsequently confirmed; see Notes and Exhibitions for August (ed.).

In addition to the smaller species from Hilo, a larger *Trox*, *T. suberosus* Fabricius is established on Oahu, where it was first collected during January, 1970.

Species of the genus *Trox* are generally associated with dead animal matter. In addition to carrion, most often dry, they are frequently found in association with bird and animal nests, feeding on fur, hair, feathers, owl pellets, etc. They appear to be mostly scavengers, although a few have been reported to be predaceous on insects; for example, grasshopper eggs. One species, *T. procerus* (Harold), was purposely introduced here from India in 1966 to combat *Schistocerca vaga*, but was never recovered. Interestingly, *T. suberosus*, a species which is widespread in North, Central and South America, was once reported to be a predator on the eggs of *Schistocerca paranensis* Burmeister in Argentina. However, a second worker disputed this finding and held that the beetles were attracted to the locust egg beds by the presence of large numbers of dead adults which constituted their principal food (see Clausen, 1940, Entomophagous Insects, p. 581). It was also reported that the beetles eat the protective covering off the grasshopper eggs, causing them to decompose. It appears likely that this species is not normally predaceous. **J. W. Beardsley.**

Conoderus amplicollis (Gyllenhal): The Gulf wireworm, *Conoderus amplicollis*, was reported to be established in Hawaii at the March meeting of this Society, on the basis of two adult specimens collected in the Ewa area of Oahu during September and November, 1974. Since March about 40 additional specimens of this elaterid beetle have come to hand; 10 from pit traps in a cane field near Ewa, and the remainder from various survey light traps operated at Ewa Beach, Ewa, Waipahu, Honolulu International Airport, and Halawa Valley. So far, there have been no reports of damage attributable to this species. **J. W. Beardsley.**

New Insect Records from Hawaii Island: The following species, previously unreported from Hawaii Island, were found in light trap material from Hilo Airport collected during March and April, 1975:

Imma mylias Meyrick (Lepidoptera: Glyphipterigidae);

Platysenta illecta (Walker) (Lepidoptera: Noctuidae);

Plautia stali Scott (Hemiptera: Pentatomidae);

Selenophorus sp.¹ (Coleoptera: Carabidae);

Tachys luteus Andrews (Coleoptera: Carabidae);

Macrocentrus calacte Nixon (Hymenoptera: Braconidae).

J. W. Beardsley.

Xylosandrus compactus Eichhoff: The black twig borer, *Xylosandrus compactus*, was found causing moderate twig die-back on Hawaiian sandalwood, *Santalum freycinetianum* Gaud. The sandalwood trees were located on the Kaunala trail in the Pupukea Paumalu Forest Reserve at the 840 ft. elevation. Many emergence holes and several adult borers were observed in the twigs. **J. Fujii.**

Blepharomastix ebulealis Guenee: Larval activity of this moth was detected on *Clidemia hirta* along the Kaunala trail (Pupukea Paumalu Forest Reserve) on 22 April 1975. The larval leaf rolling was scattered

¹Subsequently identified as *S. striatopunctatus* Putzeys by Dr. G. E. Ball. See September Notes and Exhibitions (ed.).

throughout the trail; however, 95% of the rolled leaves were empty. **J. Fujii.**

Program: Dr. Minoru Tamashiro spoke on recent advances in research on subterranean termites in Hawaii.

JUNE

The 834th meeting of the Hawaiian Entomological Society was called to order by President Harris at 2:00 p.m., June 16, 1975, in the Seminar Room, National Marine Fisheries Service Building.

Members Present: Beardsley, Bianchi, Gagne, Hara, Harris, Ito, Joyce, Kunishi, Lauret, Look, Mau, Ohinata, Ota, Tamashiro, Tenorio (J. M.), Tsuda.

Visitors: Mr. Eric Pang and Mr. Tsong Hong Su, East-West Center grantee.

Membership Committee: Mr. Tsuda proposed the name of Mr. Eric Pang, a graduate student working under Dr. Tamashiro's direction, for membership in the Society. He was unanimously elected.

Common Names Committee: Dr. Mau presented the revised list of common names of Hawaiian insects which was recently completed by the committee. The members present voted unanimously to accept the revised list of common names with thanks to the committee for a job well done.

Announcement: Mr. Bianchi reported the death, on May 16, of Dr. Cyril E. Pemberton, honorary member of the Society and one of Hawaii's most distinguished scientists. Several of the members present reminisced about Dr. Pemberton and his work, particularly in the fields of fruit fly biology and biological control of pests.

NOTES AND EXHIBITIONS

Diomus sp.: Two adults of this coccinellid (new to Hawaii) were collected by G. Funasaki from grass at Hickam Air Force Base, Oahu in August, 1973. In May, 1974 four adults were collected from Bermuda grass at Aiea, Oahu. Since then numerous adults have been collected during detection surveys of Hickam AFB. With the discovery of this new coccinellid, there are now two unidentified species of *Diomus* in Hawaii. They are easily distinguished by the degree of pubescence on the elytra. The new *Diomus* is distinctly less pubescent than the other species which has been known here since 1932. No information is available on the host preference of this new coccinellid. Determination was made by Dr. R. D. Gordon, USDA Systematic Entomology Laboratory. **R. Mau.**

Eucelatoria sp. near **armigera**: Evaluation surveys conducted by Hawaii Department of Agriculture entomologist Kenneth Teramoto show that this tachinid parasite is definitely established on Oahu. Adults were reared from field collected *Melipotis indomita* larvae. Parasitism was light with no more than 27 *Eucelatoria* adults reared out of as many as 408 field collected larvae. The parasite was introduced from Oaxaca, Mexico in April, 1974 for control of *Melipotis indomita*. To date, more than 5,000 parasites have been liberated on Oahu, Kauai, and Hawaii. **R. Mau.**

Paratriphleps laevisculus Champion: Several adults of this immigrant anthocorid bug were collected from eggplant flowers at Waimanalo, Oahu

during May. This is the first field collection here of this insect, other than from light trap catches (see February Notes and Exhibitions). According to Wille (1951, *J. Econ. Ent.* 44(1):13-18), this bug is one of the most important predators of *Heliothis virescens* eggs and young larvae on cotton in Peru. **R. Mau.**

Erionota thrax Linnaeus: Light infestations of the banana skipper were detected at Kalamaulu and Kaunakakai, Molokai on March 27, 1975. Early and late instar larvae were present. Empty pupal skins were also found. This is the first report of the banana skipper on Molokai. **R. Mau.**

New Island Records for Lanai: Insect detection surveys were conducted on Lanai during April and May, 1975. The insects listed in Table 1 below have, to my knowledge, not been reported previously from Lanai. Many have probably been present there for years. Identifications were made by Dr. J. W. Beardsley and Hawaii Department of Agriculture entomologists. **R. Mau.**

Trigonotylus dohertyi (Distant)¹: Specimens believed to be this tropicopolitan mirid bug were found on Oahu at Hickam Air Force Base, on May 30, 1975. Numerous nymphs and adults were collected sweeping Bermuda grass (*Cynodon dactylon*). This species has not been reported previously from Hawaii. Carvalho (1956, *Insects of Micronesia* 7(1):72-73) recorded the distribution of this species as Central and South America, South Africa, South Asia (type locality: India), Philippines, Formosa, Australia, and Micronesia. Previously, two specimens of this bug were taken from light trap collections from Honolulu International Airport during June and August of 1974, indicating that the species has been present here for at least one year. *T. dohertyi* is superficially similar to a related endemic Hawaiian grass-feeding mirid, *Trigonotylus hawaiiensis* (Kirkaldy) which in past years has sometimes been common in lowland areas here. **J. W. Beardsley.**

Zygina penapacha (Beamer): Specimens of this immigrant cicadellid leafhopper, first found in Hawaii during February, 1974, were beaten from klu, *Acacia farnesiana*, by me at Hickam A.F.B., Oahu, on May 30, 1975. This is the first host record for this species in Hawaii as earlier specimens were all taken from light trap collections. **J. W. Beardsley.**

Coccinella septempunctata var. **brucki** Mulsant: On June 13, 1975 a single adult of this immigrant coccinellid beetle was collected by me in a Malaise trap near the Halemauu Trailhead, 8,000 ft., Haleakala, Maui. This is a new island record. **J. W. Beardsley.**

Eupithecia scoriodes (Meyrick): Numerous adults of this small, endemic geometrid moth, known only from Haleakala, Maui, were observed flying during daylight hours in bright sunlight, at Hosmer's Grove (6,600 ft), Haleakala National Park, on June 14, 1975. Six specimens also were collected in a Malaise trap operated during daylight hours near the Halemauu Trailhead at 8,000 ft. on June 13. This is the first report of an Hawaiian *Eupithecia* species flying during daylight hours. The other known species generally are active at night and frequently are collected at light. Although light traps were operated on the nights of June 12 and 13, in the

¹*Trigonotylus dohertyi* is a synonym of *T. doddi* (Distant); see Notes and Exhibitions for July (ed.).

TABLE 1. *New Insect Records For Lanai - April & May, 1975.*

<i>Insect Name</i>	<i>Order/Family</i>	<i>Location</i>	<i>Host</i>
<i>Conocephalus saltator</i> (Saussure)	Orthoptera: Tettigoniidae	Lanai City	Sweet Potato
<i>Paraleyrodes perseae</i> (Quaintance)	Homoptera: Aleyrodidae	Lanai City	Citrus
<i>Brevicoryne brassicae</i> (Linnaeus)	Homoptera: Aphididae	Lanai City	Cabbage, Broccoli
<i>Myzus persicae</i> (Sulzer)	Homoptera: Aphididae	Lanai City	Cabbage, Broccoli
<i>Rhopalosiphum maidis</i> (Fitch)	Homoptera: Aphididae	Lanai City	Corn
<i>Chrysomphalus aonidum</i> (Linnaeus)	Homoptera: Coccidae	Maunalei	Coconut
<i>Coccus viridis</i> Green	Homoptera: Coccidae	Lanai City	Citrus
<i>Ischnaspis longirostris</i> (Signoret)	Homoptera: Coccidae	Maunalei	Kiawe, Coconut
<i>Pinnaspis strachani</i> (Cooley)	Homoptera: Coccidae	Maunalei	Hibiscus
<i>Pulvinaria urbicola</i> Cockerell	Homoptera: Coccidae	Lanai City	Sweet Potato
<i>Pulvinaria psidii</i> Maskell	Homoptera: Coccidae	Lanai City	Guava
<i>Leptobyrsa decora</i> Drake	Homoptera: Tingidae	Maunalei	Lantana
<i>Antianthe expansa</i> (Germar)	Hemiptera: Membracidae	Lanai City	Pepper, Tomato, Eggplant
<i>Anacamptodes fragilaris</i> (Grossbeck)	Lepidoptera: Geometridae	Naha	Kiawe
<i>Bombotelia jocosatrix</i> Guenee	Lepidoptera: Noctuidae	Maunalei	Mango
<i>Cosymbia serrulata</i> (Packard)	Lepidoptera: Geometridae	Lopa	Kiawe Blossoms
<i>Omphisa anastomosalis</i> (Guenee)	Lepidoptera: Pyralidae	Lanai City	Sweet Potato
<i>Plutella xylostella</i> (Linnaeus)	Lepidoptera: Yponomeutidae	Lanai City	Broccoli, Cabbage
<i>Eucepes postfasciatus</i> (Fairmaire)	Coleoptera: Curculionidae	Lanai City	Sweet Potato
<i>Protaetia fusca</i> (Herbst)	Coleoptera: Scarabaeidae	Lanai City	Tomato
<i>Xylosandrus compactus</i> (Eichhoff)	Coleoptera: Scolytidae	Naha, Maunalei	Kiawe
<i>Eurytoma orchidearum</i> (Westwood)	Hymenoptera: Eurytomidae	Lanai City	Orchid
<i>Phytobia maculosa</i> (Malloch)	Diptera: Agromyzidae	Lanai City	Aster
<i>Polypogotarsonemus latus</i> (Banks)	Acarina: Prostigmata	Lanai City	<i>Bidens</i>

areas where *E. scoriodes* flight activity was observed, no specimens were found in the trap catches. Specimens of *E. scoriodes* are very rare in collections; however, the species appeared to be quite abundant at the time that these observations were made. **J. W. Beardsley.**

Megalotica holombra (Meyrick): Numerous adults of this large brown day-flying geometrid moth were observed at Hosmer's Grove, Haleakala National Park, on June 14. This endemic species, known only from East Maui, is quite rare in collections. This may be partly due to the fact that the moths are very difficult to net. They were observed flying about the tops of small mamani trees and other shrubs on the margin of a planting of *Eucalyptus*. However, at the slightest movement of the insect net they immediately flew upward out of reach. I was able to catch only two specimens in one and one-half hours. **J. W. Beardsley.**

Hodegia apatella Walsingham: This unusual flightless xylorectid moth was described in the Fauna Hawaiiensis on the basis of a single female specimen collected on Haleakala by R. C. L. Perkins. It was rediscovered by me in 1965 when 6 specimens were collected at altitudes of 7,000 to 10,000 ft. An additional specimen was collected at 9,200 ft. on June 13, 1975. On the basis of a male which I provided, Dr. Klaus Sattler at the British Museum has been able to demonstrate the close relationship of *H. apatella* to the endemic genus *Thyrocopa*, which has numerous fully winged species here. *H. apatella* has enlarged saltatorial hind legs and moves by jumping. **J. W. Beardsley.**

Heliothrips haemorrhoidalis (Bouche'): F. A. Bianchi reported that Wayne Gagne had observed this thrips seriously injuring, perhaps killing, seedlings of *Myrica faya* Ait. in a deeply shaded forest area near Volcano, Hawaii I., on May 18 of this year. *Myrica faya* is not a new host plant for *H. haemorrhoidalis* but the severity of the damage observed by Dr. Gagne may indicate a growing importance of the thrips as an enemy of the plant. **F. A. Bianchi.**

Program: Mr. Tim Wong, USDA Fruit Fly Laboratory, spoke about his work on field studies on a sex attractant of the lesser peach tree borer which were carried out on Washington Island, Wisconsin.

JULY

The 835th meeting of the Hawaiian Entomological Society was called to order by President Harris at 2:00 p.m., 14 July 1975, in the Seminar Room, National Marine Fisheries Service Building.

Members Present: Beardsley, Bianchi, Brennan, Gagne, Goff, Gressitt, Hara, Harris, Howarth, Ikeda, Joyce, Look, Ota, Samuelson, Steffan, Tsuda.

Visitor: Mr. Tsong Hong Su.

NOTES AND EXHIBITIONS

Delta curvata (Saussure): A specimen of a eumenid wasp, collected at Waiahole Valley, Oahu, in October, 1974 by Mr. R. Inouye (a student in general entomology at the University of Hawaii) was recently determined by Dr. A. S. Menke (USDA Insect Identification and Beneficial Insect Introduction Institute) as *Delta curvata* (Saussure). This combination is

evidently the currently accepted one for *Eumenes curvata* Saussure, as which I had tentatively identified this insect earlier (see January Notes and Exhibitions). To date, four specimens of this wasp, all females, have been taken on Oahu. In addition to the two specimens previously reported, two more were found in collections of general entomology students during May. One of these was collected on Manoa trail, April 30, 1975 (no collector specified), and the second at Kahana Valley, March 2, 1975 by R. Winters. These specimens suggest that the species is established on Oahu. The collection localities also suggest that this wasp may be found to frequent wet forested areas. **J. W. Beardsley.**

Evagetes sp.¹: This determination, also by Dr. A. S. Menke, was received for specimens of a small pompillid wasp, four of which were collected in pit traps in a sugarcane field at Ewa, Oahu during March, 1975, by Dr. A. K. Ota. This is a new insect record for Hawaii. Species of the widespread genus *Evagetes* are social parasites on other Pompilidae of the subfamily Pompilinae. According to Muesebeck et al (1951, Hymenoptera of North America; Synoptic Catalog. USDA Agricultural Monograph 2, p. 924) females of *Evagetes* seek freshly filled nests of their hosts, usually in sandy places, destroy the host egg, deposit their own on the stored prey, and then refill the burrow. **J. W. Beardsley.**

Barichneumon californicus Heinrich: Numerous specimens of an ichneumonid wasp, determined as *Barichneumon californicus* Heinrich by Dr. R. W. Carlson, USDA Insect Identification Laboratory, have been collected from light trap catches from the Ewa, Waipahu, Pearl City and Honolulu International Airport areas, during April and May of this year. This is a new insect record for Hawaii. The earliest record known of this species in the state is a female specimen collected by Robert Pang at Kailua, Oahu on Feb. 25, 1975. *B. californicus* was described in 1972 (Nat. Can. 98:1013-1014) and heretofore was known only from California. Its host relationships are unknown, although species of this group of Ichneumonidae (subfamily Ichneumoninae) are virtually all internal parasites of larval Lepidoptera. **J. W. Beardsley.**

Diadegma pattoni (Ashmead): This previously unreported ichneumonid wasp apparently has been established in Hawaii for at least two years. The oldest Hawaiian specimen seen by me was a female collected by Mr. Wayne Ibara, Upper Waihoi Valley, Maui, above 2,000 ft., during the summer of 1973. No additional specimens were seen until recently. During June, several specimens, taken in March and April, 1975, from various localities on Oahu, were found in collections of students in General Entomology at U.H. Manoa, and during April four specimens were recovered by me from light trap catches from Hickam AFB, Oahu. The species is widely distributed in North and Central America. Determination was made by Dr. R. W. Carlson, USDA Insect Identification Laboratory. The genus *Diadegma* is represented in the Hawaiian fauna by two other species, in addition to the present one. The host relationships of *D. pattoni* in Hawaii are unknown but in North America it has been reported from larvae of *Crambus teterrellus* (Zinck.) and *Loxostege similans* (Guenee) which are grass feeding Pyralidae, neither of which occurs here. **J. W. Beardsley.**

¹Subsequently identified as *Evagetes padrinus padrinus* (Viereck); see Notes and Exhibitions for September (ed.).

Trigonotylus doddi (Distant): Specimens of the immigrant mirid bug which was reported at the June meeting as *Trigonotylus dohertyi* (Distant) were recently identified by Dr. J. L. Herring of the USDA Insect Identification Laboratory as *T. doddi* (Distant). Dr. Herring indicated that *T. dohertyi* is considered to be a synonym of *T. doddi*. **J. W. Beardsley.**

Selenophorus sp.: Specimens were exhibited of a previously unreported immigrant carabid beetle which appears to be established on Oahu. This has been determined as a species of *Selenophorus* by Dr. T. L. Erwin, U. S. National Museum of Natural History. This is the second *Selenophorus* species to become established here within the past three years. Specimens have been sent to Dr. G. E. Ball, University of Alberta, Edmonton, Alberta, Canada, who is currently working on a revision of this very large American group of carabid beetles. To date, seven specimens of the new *Selenophorus* have been collected here. The oldest was taken in April, 1974 and all have been from light trap catches from Waipahu and Hickam AFB. **J. W. Beardsley.**

Abgrallaspis cyanophylli (Signoret): Specimens of this widespread armored scale insect, collected at Wailuku, Maui, June 10, 1975 on banana leaves, were submitted for identification by Mr. Nobu Miyahira. Although probably it has been present there for many years, this scale apparently has not been recorded previously from Maui. Determination was made by J. W. Beardsley. Although nearly all references to this species in Hawaiian literature are under the previously accepted name of *Hemiberlasia cyanophylli* (Signoret), the present combination of *Abgrallaspis cyanophylli* has now been generally accepted by scale insect taxonomists in Europe and North America. **J. W. Beardsley.**

Program: Dr. Brennan, Dr. Harris, and Mr. Ikeda reported on the meeting of the Pacific Branch of the Entomological Society of America, which was held in Portland, Oregon during June.

AUGUST

The 836th meeting of the Hawaiian Entomological Society was called to order by President Harris at 2:01 p.m., 11 August 1975, in the Seminar Room, National Marine Fisheries Services Building.

Members Present: Beardsley, Bess, Bianchi, Burkhart, Gagne, Gressitt, Hara, Harris, Howarth, Ito, Joyce, Lind, Look, Mau, Radovsky, Sakimura, Samuelson, Sugerman, Tenorio (J. M.), Tsuda.

Visitors: Dr. Richard Papp, Bishop Museum; Mr. M. Nadchatram, U.H.; Dr. Hampton Carson, U.H.; Mr. David L. Bishop, Moorpack College, and Mr. S. Sanidad, U.H.

Membership Committee: Mr. Tsuda presented the name of Mr. Simon Sanidad who was unanimously elected to membership.

NOTES AND EXHIBITIONS

Saissetia oleae (Olivier): On June 14, 1975 I found black scale, *Saissetia oleae* (Olivier), heavily infesting a small native shrub, *Raillardia menziesii* (Compositae) in a botanical planting at the Haleakala National Park Headquarters building, 7,000 ft., Maui. Earlier records of this scale from

Maui had been considered to be questionable, due to the confusion of two previously unrecognized species, *S. miranda* Cockerell and Parott and *S. neglecta* De Lotto with *S. oleae* ("Proceedings" 22:3, 1975). The present record confirms the presence of true *S. oleae* on Maui; it was previously confirmed as present on Hawaii. All confirmed records of this scale in the state are from elevations above 4,000 feet. **J. W. Beardsley.**

Pulvinaria urbicola Cockerell: During June, Dr. Ron Mau collected this soft scale insect on stems of Chile pepper, *Capsicum frutescens* L., at Kaunakakai, Molokai. This is a new island record. **J. W. Beardsley.**

Therioaphis maculata (Buckton): On May 30, 1975, during an insect detection survey of Hickam Air Force Base, in company with Messrs. Ron Mau, Ed Shiroma, Bob Kunishi, and Simon Sanidad, I found a small patch of bur clover, *Medicago denticulata*, which was heavily infested by an aphid of the genus *Therioaphis*. Specimens submitted to the U.S.D.A. Insect Identification Laboratory at Beltsville, Maryland were subsequently identified by Dr. M. B. Stoetzel, and confirmed by Miss Louise M. Russell, as *T. maculata* (Buckton), the spotted alfalfa aphid. In subsequent surveys additional light infestations on *Medicago lupulina* (black medic) and on white clover *Melilotis alba* have been found on Hickam AFB, but surveys in surrounding areas have so far been negative. However, a single alate female, collected in a pit trap in a sugarcane field at Ewa, Oahu during March of this year by Dr. Ota, had been previously identified by Miss Russell as *Therioaphis* sp. Miss Russell stated in a recent letter that she presumes this specimen is *T. maculata*, but the slide mount of the specimen was not good enough for her to be sure. This suggests that *T. maculata* is not confined to Hickam AFB. This is a new state record.

T. maculata, which is native to the Middle East, is a well known pest of alfalfa in the continental U.S., but it appears to have been brought under satisfactory biological control in most areas by introduced parasites. **J. W. Beardsley.**

Wahlgreniella nervata (Gillette): In 1966 (Proceedings 19:332) in a note on the aphid *Masonaphis azaleae* (Mason), I reported that Miss L. M. Russell had identified a second species of aphid which was present among specimens of *M. azaleae* submitted to her, as *Amphorophora* sp., possibly *nervata* (Gillette). At that time alates, which are necessary for positive identification, were not available in my material. On June 15, 1975, I collected both apterae and alates of an unknown aphid from *Vaccinium* sp. at 8,000 ft. elevation on the west rim of Haleakala Crater. These specimens were subsequently determined by Miss Russell as *Wahlgreniella nervata* (Gillette), the name currently in use for the species *nervata* which was formerly placed in *Amphorophora*. I have also collected apterae only of what probably is this same species from *Vaccinium*, 6,800 ft., Mauna Loa, Hawaii, 18 July 1973. This is another new aphid record for Hawaii. **J. W. Beardsley.**

Heteropsylla sp., possibly *mimosae* Crawford: During the insect survey of Hickam AFB, Oahu which was conducted on May 30, 1975, three female specimens of an unidentified psyllid were swept from foliage by J. W. Beardsley. The specimens were submitted to the USDA Insect Identification Laboratory at Beltsville and subsequently determined by Dr. M. B. Stoetzel

and confirmed by Miss Louise Russell, as "*Heteropsylla* sp. perhaps *mimosae* Crawford." This is a new state record. In response to my questions concerning this psyllid, Miss Russell replied, "*Heteropsylla mimosae* Crawford was described from *Mimosa* sp. from Texas. Several species of *Heteropsylla* have been described from the Southwest or Mexico. They are all small and difficult to identify. The male genitalia appear to be more distinctive than anything."

To date no additional specimens of this psyllid have been collected. It is thought that the three females may have been swept from either klu (*Acacia farnesiana*) or from *Desmanthus virgatus*. **J. W. Beardsley.**

Hygrotus medialis (Le Conte): Several specimens of an unidentified dytiscid water beetle were collected during September, 1974 at Lake Waiau, 13,000 ft. elevation, Mauna Kea, Hawaii, by Dr. John Maciolek of U. H. Department of Zoology. Two additional specimens were found by me in light trap material from Kohala, Hawaii, collected during March of this year. Specimens were identified as *Hygrotus medialis* (Le Conte), a widely distributed species from western North America and Mexico, by Dr. Paul J. Spangler of the U. S. National Museum (Natural History) in Washington, D. C. This is a new insect record for the state. **J. W. Beardsley.**

Trox scaber (L.): Specimens of this trogid beetle, from light trap collections at Hilo Airport, were determined by Dr. R. D. Gordon, U.S.D.A. Insect Identification Laboratory, Beltsville at *Trox scaber* (L.). The species was reported previously from the Hilo area in the Fauna Hawaiiensis, but confirmation of the identity of more recently collected specimens had been sought (see Notes and Exhibition for May). **J. W. Beardsley.**

Coptotermes formosanus Shiraki: Three blackbutt eucalyptus, *Eucalyptus pilularis*, were found dead on June 5, 1975. These five-year old plantings were on Kalepa mountain on Kauai. The recently killed trees were infested with *C. formosanus*, the apparent cause of the tree deaths. Nymphal alates were present as well as soldiers and workers. There also was an abundance of cerambycid larvae under the bark. Larvae were collected and attempts are being made to rear them to adults for identification. **J. Fujii.**

Xylosandrus compactus Eichhoff: A light to moderate infestation of the black twig borer, *X. compactus*, was observed attacking Koster's curse, *Clidemia hirta*, along the Poamoho trail on Oahu on June 10, 1975. In some isolated areas the infestation was heavy, with severe die-back of *Clidemia*. **J. Fujii.**

Blepharomastix ebulealis Guenee: Damage by larvae of this moth to *Clidemia hirta* was practically nil along the Poamoho trail on Oahu on June 10, 1975. **J. Fujii.**

Dactynotus sonchi (Geoffroy): Many apterous adults and immatures of a dark colored aphid were collected from common sowthistle, *Sonchus oleraceus*, at Hickam Air Force Base on May 30, 1975, by S. Sanidad and R. Mau. Aphids collected on June 20, 1975 were sent to the U. S. National Museum and subsequently identified by M. B. Stoetzel and confirmed by L. M. Russell as *Dactynotus sonchi*. This is a new state record.

This aphid is a cosmopolitan species and occurs in Europe, Morocco, Central Asia, Uganda, North and South America, and the Middle East. Synonyms include *Aphis sonchi* Geoff., *A. sonchi* L., and *Macrosiphum*

sonchi L. (Bodenheimer and Swirski, 1957. The Aphidoidea of the Middle East). *D. sonchi* and other species of this rather large genus (150 or more species) are generally found on the plant family Compositae. However, many other hosts are listed in the Foodplant Catalog of Aphids of the World (Patch, 1938, Maine Agricultural Experiment Station, Bul. 393). **R. Mau**

Pteromalus luzonensis Gahan: Several releases of this parasitic wasp were made on Kauai and on Maui during July, 1975. Releases were made at Kapahi, Kauai (1 release of 511 adults), at Kahului, Maui (3 releases totalling 650 adults), and at Lahaina, Maui (1 release of 540 adults). The wasp was introduced from Guam for control of the citrus swallowtail, *Papilio xuthus* L. The parasite apparently oviposits in the prepupae and pupae of *P. xuthus*. Approximately 100 to 150 adult wasps emerge from each swallowtail pupa under insectary conditions. *Pteromalus luzonensis* has been an effective control agent of *Papilio polytes* on Guam. **R. Mau.**

Program: Dr. J. Linsley Gressitt gave a slide-illustrated talk on the topography, flora and fauna of areas around the Wau Ecology Institute in New Guinea, and discussed some of the current research activities of the Institute.

SEPTEMBER

The 837th meeting of the Hawaiian Entomological Society was called to order by President Harris at 2:02 p.m., 8 September 1975, in the Seminar Room, National Marine Fisheries Services Building.

Members Present: Beardsley, Bess, Gagne, Gressitt, Hardy, Harris, Howarth, Joyce, Kajiwara, Montgomery, Ota, Radovsky, Samuelson, Steffan, Sugerman, Tenorio (J. M.), Tenorio (J. A.).

Visitor: Mr. Lawrence Pinter, Univ. Hawaii.

Unfinished Business: The Secretary read a letter to President Harris from Dr. Paul A. Opler, Office of Endangered Species and International Activities, U. S. Department of Interior. Dr. Opler stated that information received by his office was unanimous in supporting the position that *Vaga blackburni* is neither endangered or threatened.

Announcements: Dr. Radovsky announced that Dr. J. Linsley Gressitt had received the Herbert E. Gregory Medal for distinguished research in the Pacific and contributions to the development of institutions and organizations supporting Pacific Research. The medal was awarded at the 13th Pacific Science Congress in Vancouver in August 1975. Dr. Gressitt is the fourth person to receive the award and the first on the Museum staff.

NOTES AND EXHIBITIONS

Selenophorus striatopunctatus Putzeys: Specimens of a previously unidentified species of the carabid genus *Selenophorus*, which was first reported to be established on Oahu at the March 1974 meeting, have now been determined by Dr. George E. Ball, University of Alberta, Canada, as *S. striatopunctatus* Putzeys. Dr. Ball wrote that *S. striatopunctatus* is widely distributed in Central America, southern U. S., and the West Indies. He suggested that, judging from the form of mandibles, species of this genus are probably vegetarian, possibly seed-eaters.

There appear to be two *Selenophorus* species now established on Oahu, and *S. striatopunctatus* has also been taken at Hilo, Hawaii. *S. striatopunctatus* is shiny metallic blue on the dorsal surface, while the second species, which Dr. Ball as yet has been unable to identify, is black. While *S. striatopunctatus* appears to be plentiful in lowland areas of Oahu, only seven specimens of the second species have as yet been collected, all from the Ewa-Pearl Harbor area. **J. W. Beardsley.**

Evagetes padrinus padrinus (Viereck): At the July 14, 1975 meeting I reported the discovery of a new pompilid wasp, then identified only as *Evagetes* sp., on Oahu. Specimens have now been identified as *E. padrinus padrinus* by Professor Howard E. Evans, Colorado State University, Fort Collins. This species is widespread in the western continental U. S. and is a kleptoparasite of other Pompilidae. **J. W. Beardsley.**

Torymid wasps from fruits of Chinese banyan: In May 1971 I reported the discovery of a small unidentified torymid wasp which I reared from fruit of *Ficus retusa* on Oahu. During July of this year, Mr. George Kitaguchi of the State Department of Health, Vector Control Branch, brought in for identification numerous specimens of both sexes of another species of Torymidae which were associated with the fruit of a large Chinese banyan tree at the Governor's residence (Washington Place) where they were causing a nuisance problem. I recognized this species as one which I had first found in light trap material from Honolulu International Airport during January, 1974. Before Mr. Kitaguchi's collection I had seen only two female specimens, both from light traps, and had not attempted to have them identified. Examination of *Ficus retusa* fruit from trees on the U. H. campus showed them to be heavily infested with the same wasp.

During July I submitted specimens of both the torymid species from *Ficus retusa* to the USDA Systematic Entomology Laboratory for determination. Recently I received a letter from Dr. Gordon Gordh, Chalcidoidea specialist for the USDA, reporting on this material. He determined the species first reported in 1971 (with metallic green females, and brachypterous larviform males) as *Otitesella* sp. nr. *ako* Ishii. Dr. Gordh was unable to place the second, more recently discovered torymid, but stated that it fits best into the tribe Sycophilini Joseph. Both of these insects are presumed to have originated in the Oriental or Australasian Zoogeographic areas. The *Otitesella* is probably parasitic in its larval stages on the caprifig of *Ficus retusa*, *Euprestina verticillata* (Waterstoy), but the relatively large size of the second species suggests that it is not parasitic, or not entirely so.

The presence of these two torymid wasps in Hawaii considerably enriches the fauna of Hawaiian fig insects. Prior to their discovery only three species of purposely introduced primary caprifigiers (family Agaonidae) were known to be established. *E. verticillata* was introduced from the Philippines in 1938. Prior to that time *F. retusa* did not produce seed here, and the introduction was made so that this tree could be utilized in reforestation projects. Also successfully introduced were *Pleistodontes froggatti* Mayer which caprifigies the Morton Bay fig, *Ficus macrophylla*, and *P. imperialis* Saunders, which caprifigies *Ficus rubiginosus*, the Port Jackson fig. Both were introduced from Australia, in 1921 and 1922, respectively. In Hawaii other *Ficus* species do not produce seed as their caprifigiers are not present here.

In areas where *Ficus* species are native, species of Torymidae are frequently associated with the fruit. Many of these develop as parasites of the caprifig. Often several species of torymids may infest fruit of a single *Ficus* species. Apparently these wasps, like the agaonid caprifig, are highly host specific.

Of the two species of fig-infesting torymids present here, the *Oritesella* has flightless larviform males with wings reduced to tiny vestiges, and very large mandibles. These males apparently do not normally leave the fruit. Possibly the mandibles are used to bite open female-containing galls prior to mating. Males of the second, larger, pale tan colored species are fully winged, and mating is presumed to take place after the wasps leave the fruit. **J. W. Beardsley.**

Semaranga dorsocentralis Becker: A single specimen of this chloropid fly was taken in a light trap collection in Honolulu, Hawaii on May 19, 1969. It is a new record for Hawaii. This oriental species was originally described from Java and India with the nearest record to Hawaii being the Philippines¹. Determination was made by Dr. C. W. Sabrosky of the USDA Systematic Entomology Laboratory. **C. R. Joyce.**

Phoracantha semipunctata Fabricius: On 5 June 1975, extensive *P. semipunctata* larval activity was observed under the bark of blackbutt eucalyptus, *Eucalyptus pilularis*, recently killed by the Formosan subterranean termite, *Coptotermes formosanus*. The dead trees were located on Kalepa Mountain on Kauai. Five larvae were brought to Honolulu, and only one adult emerged during the week of 11 August 1975. The adult was identified by Dr. G. A. Samuelson. This cerambycid was previously recorded on the same host near Puu Ka-pele on Kauai on 21 February 1968 by C. J. Davis. **J. Fujii.**

Blepharomastix ebulealis Guenee: A single leaf-roll on *Clidemia hirta* by a larva of *B. ebulealis* was observed on 10 July 1975 at the north end of the Honouliuli Forst Reserve, Waikele Gulch. The rolled leaf was opened; however, the larva was not present. This larval activity indicates that *B. ebulealis* is apparently present on the Waianae Range. *Clidemia* is very dense in certain areas of Waikele Gulch and appears to be spreading. **J. Fujii.**

Saicella sp.: A male and a female of an undescribed species of this endemic thread-legged bug genus were collected by William Mull at Puu Makaala, Hawaii I., 1130m, 10 August 1975, by beating epiphytic *Astelia* (Liliaceae). The specimens were brought alive to his laboratory in Volcano where he photographed them. The female subsequently laid 9 eggs which he is making an effort to rear, and she fed readily on live Collembola. This is the first report of this genus from Hawaii I. Two other species are known, one each from Maui and Kauai Is. They all seem to be very cryptic and rare. A colored slide of *Saicella* sp., taken by Mr. Mull, was shown. **W. Gagne.**

Hodegia apatela Walsingham: Photographs taken by William Mull of a live specimen of this flightless gelechiid moth from Haleakala National Park, 2740m collected by B. Gagne and myself on 5 July 1975, were exhibited. This specimen was later mounted, spread and photographed by

¹Six additional specimens of this species (Det. D. E. Hardy) were collected from light trap catches from Barber's Point Naval Air Station, Oahu, during December, 1975, by J. W. Beardsley (ed.).

Mr. Mull. The photograph showed its apically acute but apparently non-functional fore- and hind-wings. **W. C. Gagne.**

Program: Dr. Wally Steffan gave an overview of topical stamp collecting, emphasizing insect stamps issued by various countries.

OCTOBER

The 838th meeting of the Hawaiian Entomological Society was called to order by President-elect J. W. Beardsley at 2:01 p.m., 6 October 1975, in the Seminar Room, National Marine Fisheries Service Building.

Members Present: Beardsley, Brennan, Chang, F., Chang, V., Gagne, Hara, Hardy, Howarth, Ito, Joyce, Look, Mau, Ota, Pang, Steffan, Tenorio (J. M.), Tsuda.

Visitors: Marian Chun, Robin Rice, Tsong Hong Su, Sue Campbell, Jimmy Drain, Parry Donnalley, John Takara, Patrick Jules, Tom Mark, Lawrence Pinter (all University of Hawaii graduate students).

Membership Committee: Mr. Tsuda proposed for membership Mr. Tsong Hong Su, graduate student at UH and Mr. Rafael Ingles, Research Associate, Agric. Expt. Station, Puerto Rico. These gentlemen were unanimously elected to membership.

NOTES AND EXHIBITIONS

Hemerobius pacificus Banks: Numerous specimens of the immigrant brown lacewing, *Hemerobius pacificus* Banks, were taken at various localities within Haleakala National Park, Maui, during July and August 1975 by R. Burkhart and J. W. Beardsley. This is a new island record, as *H. pacificus* previously was known in the state only from the island of Hawaii. In Hawaii, this species appears to be confined to higher elevations. The Haleakala specimens were all taken at elevations above 5,500 ft. **J. W. Beardsley.**

Mesovelia amoena Uhler: Several specimens of this immigrant mesoveliid water bug were taken from light trap material collected at the U. H. Waiakea Experimental Farm near Hilo, Hawaii during September, 1975. This is a new island record for *M. amoena*, which was previously reported from Kauai and Oahu (Gagne and Howarth, 1975, Pacific Insects 16: 408-412). **J. W. Beardsley.**

Cligenes marianensis Usinger: Numerous specimens of this immigrant lygaeid bug were recovered from light trap material taken at the U. H. Waiakea Farm, near Hilo, during September. This is a new island record. **J. W. Beardsley.**

Tachys ceylanicus (Nietner) and **Tachys luteus** Andrews: Specimens of these two small immigrant carabid beetles also were taken from light trap material at the U. H. Waiakea Farm during September. These are new island records. **J. W. Beardsley.**

Rhyncogonus sp., probably **fuscus** Perkins: Mr. Robin C. A. Rice, graduate student at the University of Hawaii, has discovered that adults of many of the endemic Hawaiian species of *Rhyncogonus* are nocturnal. These spectacular weevils have been a popular group among collectors, yet they are only rarely collected. On the evening of 2 October 1975 Messrs.

Rice, G. Nishida, and myself surveyed the vegetation along a section of the paved road to Mt. Kaala, Wailua, Oahu, at ca 600 m elevation for *Rhyncogonus*. In approximately 2 hours time we collected a total of 61 adults including several mating pairs on the foliage and stems of several plant species. Feeding and characteristic feeding injury were observed most commonly on *Acacia koa* phyllodes and *Scaevola Guadichaudiana* leaves, and less commonly on leaves of *Dodonaea viscosa* and *Psidium cattleianum*. The *Rhyncogonus* species is unrepresented in the collections at the Bishop Museum or the University of Hawaii, but from the descriptions and locality it is probably *R. fuscus* Perkins. **F. G. Howarth.**

Aphis nerii Boyer de Fonscolombe: Heavy infestations were discovered on an oleander hedge at Kihei, Maui on August 29, 1975 by J. Ah Sam, D. Tsuda, and me. This is the first record of the aphid from Maui. The oleander aphid had previously been recorded from Kauai, Oahu and Hawaii. Larvae of three coccinellids, *Coelorphora inaequalis*, *Coelophora pupillata*, and *Curinus coeruleus* were observed among the aphids. In addition, a few of the aphids were mummified indicating parasitism by possibly *Lysiphlebius* (= *Aphidius*) *testaceipes* (Cresson). **R. Mau.**

Deilephila nerii (Linnaeus): A single adult was caught by a resident at Kihei, Maui on August 5, 1975. On August 29, 1975 two late instar larvae were collected from oleander by D. Tsuda and myself also at Kihei. These are the first records of the moth from Maui. A single early instar larva was collected from oleander foliage at Lanai City, Lanai on September 17, 1975. While no other larvae were found during the insect detection survey, it is assumed that the sphingid is established on the island since old larval feeding damage was observed. This is the first record from Lanai. The insect is now known to be established on Oahu (September 1974), Kauai (February 1975), Maui, and Lanai. **R. Mau.**

Oidaematophorus sp.: Conspicuous damage on Hamakua pamakani, *Ageratina riparia*, was observed at Volcano, Hawaii on August 21, 1975. Many larvae of this purposely introduced plume moth were observed on the pamakani leaves in sheltered locations. During the past several months the insect has been found to be established at several locations at Kona and Ka'u, Hawaii. **R. Mau.**

Keiferia lycopersicella (Walsingham): Trace larval infestations were noted on cherry tomato at Lanai City, Lanai on September 16, 1975. No more than one or two larvae were found on each plant. This apparently is the first record for Lanai. The pinworm, now known from all major islands, has become a major pest of tomato during recent years. It is not uncommon for commercial farmers to suffer more than 40 per cent fruit loss due to direct pinworm damage. Larvae were identified using the "Illustrated Key to the Identification of Lepidopterous Larvae Attacking Tomatoes in Mexico and the United States, Excluding Alaska." (Okumura, G. T., National Pest Control Operator News, July 1974). **R. Mau.**

Theretra nessus (Drury): Numerous eggs and young larvae of this immigrant sphingid were discovered on *Dioscorea* spp. in community gardens at Lanai City, Lanai on September 16, 1975. Eggs were deposited on both leaf surfaces, but the larvae were generally found on the under surface. The sphingid was discovered in Hawaii at Campbell Industrial

Park, Oahu in August 1974 and has since been collected from Kauai (Kokee and Kaumakani, November 1974), Maui (Waikapu, March 1975), Hawaii (Papaikou and Kona, July 1975). This is the first record for Lanai. Larvae are light green or orange brown and characteristically have two silvery white eyespots on the first abdominal segment. Pupae are distinctly different from other sphingids present in Hawaii. **R. Mau.**

Procecidochares alani Steyskal: Surveys at Round Top, Tantalus, and Nuuanu, Oahu indicate that this introduced tephritid gall fly is firmly established on Hamakua pamakani, *Ageratina riparia*, on Oahu. The fly has already dispersed and become established at least two miles from the release sites. Galls were detected in the Nuuanu Tunnel area and at all roadside areas surveyed at Tantalus and Round Top. The parasite *Eurytoma tephritidis* Fullaway was found parasitizing galls in the Nuuanu, Tantalus, and Round Top areas. Parasitization rates are not yet available. *E. tephritidis* is an immigrant parasite which has also been recorded from the Maui pamakani gall fly, *Procecidochares utilis* Stone. **R. Mau.**

New Island Records for Lanai: Insect detection surveys were conducted at Lanai City on September 16 and 17, 1975. The insects listed in Table 1 below, to my knowledge, have not been recorded previously from Lanai. Many have been there for years. Identifications were made by Hawaii Department of Agriculture staff. **R. Mau.**

Therioaphis maculata (Buckton): Moderate infestations of nymphs and adults of the spotted alfalfa aphid were discovered on black medic, *Medicago lupulina*, and on bur clover, *Medicago denticulata*, at Hickam AFB. Three to eight aphids were found on nearly all bur clover plants. Most black medic plants were not infested. No infestations were found in alfalfa at Mililani, Oahu and on Kauai. The State Entomologist, Harry Nakao, is expecting a shipment of parasites from California to combat this recently discovered pest. **R. Mau.**

Program: Dr. Barry Brennan, University of Hawaii, spoke on the influence of physiological parameters on production of and response to *Nezara viridula* sex pheromones.

NOVEMBER

The 839th meeting of the Hawaiian Entomological Society was called to order by President Harris at 2:00 p.m., 10 November 1975, in the Seminar Room, National Marine Fisheries Service Building.

Members Present: Beardsley, Bess, Bianchi, Gagne, Hardy, Harris, Higa, Howarth, Ito, Joyce, Look, Samuelson, Steffan, Su, Tenorio (J. A.), Tenorio (J. M.).

Visitors: Ms. Sue Campbell, Ms. Parry Donnalley, Mr. James Drain, Mr. Jamie Neeley, Mr. Gordon Nishida (Bishop Mus.), Mr. Lawrence Pinter and Mr. Robin Rice.

Membership Committee: Dr. JoAnn Tenorio placed the following names in nomination: Mr. Gordon Nishida (Bishop Museum), Dr. Richard Papp (Bishop Museum), and Ms. Susan Campbell (Univ. of Hawaii). These persons were unanimously elected to membership in the Society.

TABLE I. *New Insect Records for Lanai - September 1975.*

INSECT NAME	ORDER/FAMILY	HOST
<i>Coccinella septempunctata</i> var. <i>brucki</i> Mulsant	Coleoptera: Coccinellidae	Unknown
<i>Hippodamia convergens</i> Guerin	Coleoptera: Coccinellidae	Unknown
<i>Hyperaspis jocosa</i> (Mulsant)	Coleoptera: Coccinellidae	<i>Orthezia insignis</i>
<i>Hyperaspis silvestrii</i> Weise	Coleoptera: Coccinellidae	Unknown
<i>Nephus bilucernarius</i> (Mulsant)	Coleoptera: Coccinellidae	Unknown
<i>Orcus chalybeus</i> (Boisduval)	Coleoptera: Coccinellidae	Unknown
<i>Curinus coeruleus</i> Mulsant	Coleoptera: Coccinellidae	Unknown
<i>Telsimia nitida</i> Chapin	Coleoptera: Coccinellidae	Unknown
<i>Aphis gossypii</i> Glover	Homoptera: Aphididae	Squash
<i>Cerataphis orchidearum</i> (Westwood)	Homoptera: Aphididae	Cattelya orchids
<i>Orthezia insignis</i> Browne	Homoptera: Ortheziidae	<i>Coleus</i>
<i>Selenothrips rubrocinctus</i> (Giard)	Thysanoptera: Thripidae	Croton
<i>Thrips hawaiiensis</i> (Morgan)	Thysanoptera: Thripidae	Bean flower
<i>Anthonomus eugenii</i> Cano	Coleoptera: Curculionidae	Chili pepper
<i>Cylas formicarius</i> <i>elegantulus</i> (Summers)	Coleoptera: Curculionidae	Sweet potato
<i>Octotoma scabripennis</i> Guerin	Coleoptera: Hispididae	<i>Lantana camara</i>
<i>Hellula rogatalis</i> (Hulst)	Lepidoptera: Pyralidae	Chinese cabbage

NOTES AND EXHIBITIONS

Allacta similis Saussure: On October 13th of this year this small cockroach was quite abundant near the camp site of Kipuka Nene, Hawaii National Park, on the Big Island. A few adults and large numbers of immature stages and oothecae were collected by beating the loose bark of Ohia lehua trees and the dry flower heads of a tall grass, *Andropogon* sp. **Fred A. Bianchi.**

Rhinia apicalis (Wied.): Members of the staff of the Hawaii National Park report that this calliphorid fly has become a frequent nuisance lately at the Visitors' Center on Kilauea Volcano. Usually during the middle hours of warm days, large numbers of the fly enter the building and accumulate on the inside of the windows, dirtying the panes, annoying people and demanding extra labor to maintain the building in attractive condition. Other fly spp. are also found on the windows, but *R. apicalis* far more abundant than all the other together. **Fred A. Bianchi.**

Xyleborus simillimus Perkins: This is one of two species of ambrosia beetles found to be associated with ohia trees, *Metrosideros collina polymorpha*, on the island of Hawaii. Specimens were reared or collected from stems of the host in the Saddle Area at 600-700 m and 1270 m (VII, VIII.1972), above Kona in the Kahaluu Forest Reserve at 850 m (X.1973) and Kipahoe at 640 m (I.1975). The identity of this species was not confirmed until I compared our material with the holotype in the British Museum (Natural History) in 1974. Little or nothing has been published on this species since its description in *Fauna Hawaiiensis* in 1900. The type locality is stated as "Hawaii, above Hilo (1800 feet)." This locality, then, is likely a place where ohia is a predominant plant and may possibly be near one of our study areas at 600-700 m in the Saddle where this ambrosia beetle was locally abundant in dead trees. There *X. simillimus* commonly occurred in association with another ambrosia beetle, *X. saxeseni* (Ratzburg), with entrances to galleries of both species being interspersed on tree trunks. Gallery entrances of *X. simillimus* are distinctly larger than those of *X. saxeseni*. Galleries of *Plagithmysus bilineatus* Sharp, a cerambycid, were usually noted in these trees as well. In the Kahaluu Forest Reserve *X. simillimus* and *Plagithmysus bilineatus* were noted in living but declining ohia trees. *Xyleborus simillimus* appears to be a monoisular endemic and forms a complex with two or three other species. The association of *X. simillimus* with ohia is a new host record and apparently the first record, with *X. saxeseni*, of any Scolytidae on ohia. **G. A. Samuelson.**

Xyleborus saxeseni (Ratzeburg): This is a widespread species throughout the Northern Hemisphere recorded from many kinds of trees. In the State of Hawaii this species was first reported by E. J. Ford (1955, Proc. Hawaiian Ent. Soc. 15(3): 388), citing specimens reared from dying branches of *Acacia koa* and specimens taken at light on Oahu. This species name is also a senior synonym of one for an Hawaiian species described by Blackburn (to be synonymized later). The association of this species with ohia, as with *X. simillimus* Perkins is a new host record. Unlike *X. simillimus*, this species has also been collected from ohia outside areas of conspicuous ohia forest dieback. Fire-damaged ohia below Byron Ledge Trail, near the floor of Kilauea Caldera, had infestations of this scolytid (VII.1972) in more or less

severely burned trees with charred stems and completely burned foliage. Nonetheless, some of the trees recovered to the extent of producing aerial roots and developing signs of new leaf flushes, as observed some 10 months later. In the Saddle area, *X. saxeseni* appeared to be most abundant at 600-700 m (VII.1972) in company with *X. simillimus*. **G. A. Samuelson.**

Program: Dr. D. Elmo Hardy presented a slide show and talk on his recent trip to and entomological work in Indonesia.

DECEMBER

The 840th meeting (Seventh Annual Dinner Meeting) of the Hawaiian Entomological Society was held at China House, 1349 Kapiolani Boulevard, on 12 December 1975 at 7:30 p.m. Mr. Tom Lauret served as Master of Ceremonies for the occasion, which included a 7-course Chinese dinner and gifts for the ladies.

Members Present (and Wives): Beardsley (Marilyn), Bess (Ozeal), Bianchi, Brennan, Chang (Cheryl), Goff (Dianne), Hardy (Agnes), Harris (B. J.), Howarth (Nancy), Kajiwara (Edna), Joyce (Dorothy), LaPlante, Lauret (Leta), Look (Helen), Mau (Penny), Ohinata, Ota (Ruth), Shiroma (Jane), Steffan (Sylvia), Sugerman (Joslyn), Tanada, Tsuda (Cassy).

Visitors: Dr. Brennan (Chata), Mr. L. Pinter, Mr. R. Rice.

The regular order of business was suspended.

President Harris announced that the elected officers for 1976 are:

- President Dr. J. W. Beardsley
- President-elect Dr. Frank J. Radovsky
- Secretary Dr. JoAnn Tenorio
- Treasurer Dr. Franklin Chang
- Advisor Dr. D. E. Hardy
- Advisor (past President) Dr. Ernest Harris

Presidential Address: The outgoing president, Dr. Harris, gave as his presidential address a talk entitled "The Threat of the Mediterranean Fruit Fly to American Agriculture."

Cyril Eugene Pemberton, 1886-1975: A Biographical Sketch

FRED A. BIANCHI

Cyril Pemberton, "Pem," as he was known to his older friends, died at his home on the seaward slope of Diamond Head on the afternoon of May 16, 1975, at age 89. His passing affected not only a large circle of friends but the entire scientific community of the State, who looked upon Pemberton as a last link with the era that saw the biological sciences attain their majority in Hawaii. Pemberton was an Entomologist by training and preference, but through his prolific writings and his actual participation, he strongly influenced developments in the related fields of Forestry, Agriculture and Zoology. As a notably tactful and diplomatic member of various international organizations, he also extended his influence beyond the borders of our State and helped to establish and maintain Hawaii as a leader in the scientific activity of the whole Pacific basin.

Pemberton's parents were William and Elizabeth (Hampton) Pemberton. They had migrated from Canton, Missouri, about 1883, and were living at the time of Cyril's birth in a small orange ranch situated in what is now the junction of Berendo and Pico Streets, in Los Angeles, California. Cyril's older brother, "Bill," and his younger sister, Mary, were also born on that ranch, and until 1899 all three children attended Pico Heights Grammar School. Cyril's recollections of these early years were naturally meager, but they told of a happy childhood in a dry environment which made a lasting impression on him and which he always preferred to the humid conditions of San Francisco, to which the family moved in 1899.

In San Francisco, Cyril's father became partner and Treasurer in a brick manufacturing business, and soon built a large house for his family at Twin-Peaks, which was at the time one of the best residential areas of the city. The house has long passed to other owners but it still stands on "Pemberton Place," a street which was named after the family.

Cyril remembered the San Francisco days more distinctly than the time in Los Angeles, and he often recalled with amusement a considerable incongruity of which he had been aware between his own and his brother's behavior and his family's respectability. He refused to favor me with details, but he told me several times that he and Bill had belonged to a "very tough gang" in San Francisco and had barely escaped serious trouble with the Police on one or two occasions. Probably Cyril's memory exaggerated the importance of the gang's adventures, as members of the "gang" in later years became some of San Francisco's most prosperous and respected citizens and reunions were a source of pride.

He attended James Lick grammar school, and graduated from Mission High School in April of 1906, the month of the tragic earthquake and fire that nearly leveled the city of San Francisco. In the fall of the same year, Pemberton matriculated in Stanford University with the class of 1910. At Stanford Cyril was first interested in Forestry and Botany but later switched from Botany to Entomology. He devoted himself energetically to the study of Entomology and tightened the self-discipline which became one of the hallmarks of his personality.

Entomology was being taught at the time in Stanford by two superb teachers, Vernon Kellog and Rennie W. Doane. Pemberton obtained a Bachelor of Science degree in 1910, and later returned for a short post-graduate stretch during which he worked as a laboratory assistant and wrote the first three of the many scientific papers he was to produce in the course of his long career. These papers were, respectively, on the stridulation of the shield-backed grasshoppers of the genera *Neduba* and *Aglaothorax*, on the sound-making of Diptera and Hymenoptera, and on the biology of the California christmas-berry tingid. They were short but workmanlike presentations which clearly evidenced the author's unusual ability to observe and interpret natural phenomena, and they won for him the distinction of membership in Sigma Xi, the national honorary fraternity of biological students. He had been elected earlier to Kappa Alpha, the social fraternity in whose house he resided while in Stanford.

It is interesting that his first three papers already showed traits which were to mark Pemberton's entire career. These were complete dedication to what he was wont to call "useful science," studies of direct and immediate interest to society, and a manner of presentation which, although impeccably accurate and detailed, could not fail to clarify the subject to any intelligent layman. In conversations with me, he often recognized a strong personal bias towards applied science and stated that he could never have found fulfillment in the pursuit of esoteric studies.

This bias naturally inhibited Pemberton's development as a cloistered taxonomist on the one hand, and as a free-roaming "naturalist" on the other; but it must be emphasized in his honor that he never underestimated, in word or deed, the need and usefulness of scientists with motivations different from his own. He was particularly emphatic in his appreciation of taxonomists and always supported taxonomic work which originated in his sphere of action or influence. One of many taxonomic projects which he helped promote and sustain, often in unfavorable circumstances, was the great collection of Coleoptera which Fred C. Hadden gathered in the Philippine Islands from 1930 to 1932, while doing other work for the Hawaiian Sugar Planters' Association. This collection provided too large for the curatorial facilities available in Hawaii at the time and was given to the California Academy of Science. A better known project which also owed much to Pemberton's benevolent influence was E. C. Zimmerman's monumental series, *Insects of Hawaii*. Indeed, it is almost certain that the beginning volumes of this series would not have been published when they were without Pemberton's advocacy. It was he who prevailed on the H.S.P.A. to pay a large share of the cost of publication and to permit much of the preparatory research of the project to be done while Zimmerman was an employee of the Planters' Experiment Station. Still another project aided and abetted by Pemberton was the development of John W. Beardsley into one of the world's important authorities on the Coccoidea. Much of Beardsley's early work on this group was also done while he was employed by the H.S.P.A., as were much of R. H. Van Zwalenburg's work on the Elateridae; and practically all my studies on the Thysanoptera.

The year 1911 was a very busy one for Pemberton. He left Stanford in January, and took the U. S. Civil Service Examinations in Entomology at

San Francisco on April 12. In June he qualified as an Agent and Expert of the U. S. Bureau of Entomology. During the same month he was married and established residence at Lindsay, California.

At Lindsay, in the San Joaquin Valley, Pemberton worked with J. H. Horton on Citrus fruit investigations. Although he did not later recall this period with enthusiasm, the work earned him promotion to Scientific Assistant in 1912 and resulted in the publication of U.S.D.A. Bulletin No. 256, *Katydid Injurious to Oranges in California*, for which Horton appeared as Senior Author and Pemberton provided the illustrations.

For some reason, this bulletin did not appear in print until 1915, long after the Junior Author had left Lindsay and come to Hawaii. His arrival in Honolulu had occurred on March 21, 1913, and had been preceded by about one month which he had spent at the Bureau of Entomology in Washington, D. C. During this time he attended the inauguration of President Wilson.

The Chief of the Bureau offered him two positions, one in Hawaii and the other in Mexico. The Chief recommended Hawaii because of the general unrest in Mexico resulting from the activities of Pauncho Villa. His decision to accept the Hawaiian position proved to be a most fortunate choice for the development of entomology, and science in general, in Hawaii and throughout the Pacific Basin.

Pemberton brought his wife to Honolulu on the S. S. Sonoma, and at first the couple lived in a house on Kalia Road, in Waikiki, but soon moved to Emerson Street, where a daughter, Virginia, was born to them a few months later. Hawaii was then still under a Territorial Government, and Honolulu was only a small community, where everyone knew everyone else. The Pembertons' enjoyed the company of many interesting residents and visitors during that time. One of these was August Busck, the Lepidopterist, a European of great charm whom Pemberton had probably met during his short stay in Washington, and who visited Hawaii late in 1913. Another was the well known novelist and somewhat raucous personality, Jack London, who was the Pembertons' neighbor on Kalia Road; and in a class by himself was Hawaii's legendary swimming champion, Duke Kahanamoku, with whom Pemberton often met at the beach to enjoy swimming and surfing. The habit of a strenuous daily swim was established by Cyril at this time, and he practiced it religiously until a year or so before his death.

The transfer to Hawaii was always acknowledged by Pemberton as a fortunate vicissitude that brought him horizons and opportunities of accomplishment he would never have known if he had remained in California or gone to Mexico. Although our islands were only entering the mainstream of American technological development when he came, agriculture had already gained great impetus and was coming to depend more and more on the sciences that could help its progress. Entomology had proven its vital role in this respect quite early, and in consequence Honolulu had become, as it still is, a Mecca for visiting practitioners of the science and a favored base for the lucky ones who could obtain employment here. As a result of this attraction, entomological activity was greater in Honolulu, both on the amateur and the professional level, than in any other community of its size in the U.S.A., and this surprising fact was reflected in the vitality of the Hawaiian Entomological Society.

The Society was organized in 1904. Its first meeting was held on December 15 of that year, and not a single monthly meeting has been skipped since. The record shows that Pemberton first visited the Society on April 3, 1913, that he was proposed for membership by E. A. Back, and that he was elected a member at the following monthly session. From that time, he never willingly missed a meeting that did not interfere with other duties, and he became an active and enthusiastic participant in all the business of the Society. He first served as an officer, substituting for J. C. Bridwell as Secretary-Treasurer from June to December of 1914. Later he served many years in committees and as Advisor and Librarian, and during three widely spaced terms, 1918, 1933 and 1950, he served as President. In 1918 he was unable to deliver the usual Presidential Address at the last meeting because, with World War I going on, he had enlisted in the U. S. Army, but in 1933 he spoke on "Some Future Work for the Entomologist in Hawaii," and in 1950 on "The Hawaiian Entomological Society as a Community Asset." In these two lectures, both in impersonal and unpretentious style, Pemberton gave us a round-about but unmistakable exposition of the philosophy which underpinned his professional life and made him happy to be an entomologist.

Pemberton was first brought to Hawaii by the Bureau of Entomology to work with Dr. E. A. Back, who had come in 1912 to study the twin problems of the Mediterranean fruit fly (*Ceratitidis capitata*) and the Melon fly (*Dacus cucurbitae*) and to develop quarantine procedures that might prevent the importation of the flies to the Mainland. Although Back was a rather serious and reserved individual, the two men soon established a working relationship that was often to be recalled by Pemberton as very satisfactory and that proved very fruitful. Between 1912 and 1918, it resulted in the issue of a series of articles which thoroughly covered the biology and ecology of the Mediterranean fruit fly and the melon fly, and which were eventually recapitulated as U.S.D.A. Bulletin No. 491 (The Melon fly in Hawaii, June 1917) and U.S.D.A. Bulletin No. 536 (The Mediterranean Fruit Fly in Hawaii, January 1918).

In these publications Pemberton always appeared by regulation as the junior author; but from conversations on the question in later years I gained the impression that some of the articles had been more the result of his own work than the Chief's. It was a fact, in any case, that most of the rough field work of the program fell in Pemberton's share, and he always remembered his personal experiences in this connection with pleasure. Roads were generally quite primitive in those early days of the century, and fruit farmers were generally unsophisticated people for whom English, if they spoke it at all, was not an easy language; but Pemberton overcame the first difficulty by becoming an expert motorcycle rider; and the second by courting the farmers' friendship and learning pidgin English, to which he was able to surmount amusing fluency years after the need for it had disappeared from his life and from our islands.

With the return of Dr. Back to the Mainland at the end of 1915, Pemberton was promoted to Entomological Assistant and was given Back's job as Chief of the Federal Entomological Station, which then had headquarters with the Territorial Board of Agriculture and Forestry, at the

corner of King and Keeaumoku Streets. In his new post, Pemberton's principal collaborator was the Federal Fruit fly Quarantine Inspector, H. F. Willard, a man for whom Pemberton always expressed high regard and affection. The two friends continued the series that had begun with Dr. Back, but they shifted the emphasis of the program from studies on the flies themselves to a very close scrutiny of their parasites.

This scrutiny involved very careful and laborious rearing of thousands of fly parasites under controlled conditions, and the no less laborious dissection of thousands of parasitized fly larvae. The results were published, with Pemberton now appearing as senior author, in four articles, of which the last (A Contribution to the Biology of Fruit Fly Parasites in Hawaii; Journal of Agricultural Research, Vol. 15, No. 8, Nov. 1918) is comprehensive of the others. From these results it became evident that of four parasitic species which had been introduced to combat fruit flies in Hawaii, *Opius humilis* was potentially more efficacious than the other three taken together. These others (*Diachasma tryoni*, *D. fullawayi* and *Tetrastichus giffardianus*) generally cannibalized *Opius*, with the consequence that the total parasitism from all four species was reduced in the field to that which might have been obtained from one single mediocre introduction.

This finding was startling and left an obvious mark in Pemberton's thinking. I heard him state more than once that the kind of study which he and Willard had carried out should always precede, rather than follow, the introduction of foreign parasites to a new home; and I always found him inclined to encourage biological control entomologists to spend a larger proportion of their time and effort in the countries from which parasites might come rather than in the countries to which they might be sent.

It follows from this attitude that Pemberton would have wanted the Hawaiian Sugar Planters or the Government of Hawaii to establish one or more field stations for the study of parasites and biological control somewhere in the Orient, from which he assumed that most of Hawaii's future pests and their natural enemies would come. He discussed the possibility of such stations several times with other colleagues and myself, but I do not know whether he ever carried the suggestion to higher levels.

Pemberton's outstanding work would probably have taken him much higher in government service, but the break-up of his first marriage some time in 1917 apparently changed the course of his life. With the entrance of the United States into World War I, he went on leave from his position in the Bureau of Entomology and enlisted in the U. S. Army. The record shows that he enlisted in Company L, Second Hawaiian Infantry Battalion, on July 30, 1918, and that he was discharged as First Sergeant on February 2, 1919. In the interim he was stationed continuously at Schofield Barracks, on Oahu, and in later years he seldom failed to recall laughingly that his entire military service had been in the field of Forestry, and that most of the large trees which now embellish the Schofield grounds and Wahiawa had been planted by Filipino soldiers of his company and under his supervision.

This involuntary contact with Forestry may have been fateful for Pemberton, as it probably brought him to the attention of Dr. Harold L.

Lyon, who was then in the process of organizing a new Department of Botany and Forestry at the Experiment Station of the Hawaiian Sugar Planters' Association. Lyon, a notably forceful, influential and far-sighted personality, was always a strong patron of Pemberton's career in the years that followed, and probably foresaw early the use that could be made of the vigorous young man by combining in him the functions of an exploring entomologist and an exploring botanist, who would in the future bring to Hawaii dozens of beneficial insects and hundreds of new plants. I strongly suspect that it was he who prompted the employment of Pemberton by the H.S.P.A.

In any case, Pemberton was offered a job at the Experiment Station, H.S.P.A. while he was still at Schofield, and he was employed as Assistant Entomologist on February 2, 1919, the very day of his discharge from the Army.

During the first months of his new post, Pemberton spent much time on the outer islands and acquainted himself with the entomological problems of the sugar industry, specially with the problem of the sugarcane leafhopper, *Perkinsiella saccharicida*, which was not yet under full control and was of the greatest concern to the plantations. His investigation of this problem was carried out mostly at the very wet Mountain View section of Olaa Plantation and helped greatly to clarify the interrelationships of the leafhopper and the enemies of it which had become established in Hawaii up to then. His observations clearly showed that these parasites were bound to fail in the wetter areas of the plantations, and explained why this was so. They made up Pemberton's first important contribution to the Hawaiian Planter's Records, the house organ of the Hawaiian sugar industry, and were published as No. 4, Vol. 21, Leafhopper Investigations in Hawaii, October 1919.

One tangible consequence of these investigations was a firm decision by the H.S.P.A. to renew attempts to establish the leafhopper predator, *Cyrtorhinus mundulus* (now known to taxonomists as *Tytthus mundulus* (Breddin)) in their plantations. This mirid bug had been studied by Frederick Muir in Australia and was believed to be of promise for Hawaii, but Muir had found it impossible to bring more than a small and tired shipment of the bug from that distant land in the early part of 1920, and that shipment had been released only at Ewa Plantation near Honolulu. Whether the bug actually was established at Ewa from Muir's original shipment has become, with the passage of time, a moot question; but regardless of the answer, Pemberton's first foreign assignment from the H.S.P.A. was to obtain further shipments of *Cyrtorhinus*, so that it could be distributed to other plantations.

As *Cyrtorhinus* was common in Fiji as well as Australia and it could be sent more easily and safely from there, Pemberton embarked for Fiji on the S. S. Niagara on July 28, 1920. In Fiji he stationed himself at Nausori and from there, in the course of three months, made several shipments of the material from which *Cyrtorhinus* was firmly established on all our islands and within a remarkably short time reduced the leafhopper populations to insignificance.

This was an outstanding triumph for biological control; but Pemberton and the other entomologists concerned with it were always to regret that *Cyrtorhinus* had not been the first of the many enemies of the leafhopper that were brought to Hawaii, for they came to believe that *Cyrtorhinus* alone would have solved the problem, without need of other enemies. Unfortunately, a study of the habits and potential of the mirid was not carried out until early in 1919, during the last of Dr. Muir's visits to Australia. Had they been understood in 1903-1905, at the beginning of the campaign against *Perkinsiella*, the sugar industry would have been saved heavy losses and many years of worry.

Having accomplished the task in Fiji, Pemberton left Suva on the S. S. Atua on November 25, 1920, and debarked in Sydney, Australia, on December 9. On this, his first expedition for the H.S.P.A., he was to be away from Honolulu one year and four months. He thoroughly enjoyed this trip to Fiji and Australia, and during it made many lasting friendships. The official objectives of the sojourn in Australia were to search for natural enemies of wireworms, particularly *Conoderus exsul* (Sharp) and *Simodactylus cinnamomeus* (Boisd.), to search for enemies of the Australian fern weevil, *Syagrius fulvitaris* Pascoe, and to procure planting material of as many species of the genus *Ficus* as might be available. In the first objective Pemberton failed completely, as F. X. Williams was to fail later while searching in South America; but the failure proved immaterial, for wireworms, which during some years had been abundant and harmful to sugarcane along the Hamakua Coast of the Big Island, eventually became scarce and unimportant on all the islands of our group. The second objective was attained even beyond Pemberton's optimistic expectations, for he quickly found that the fern weevil was kept in check in the forests of New South Wales by a larval parasite which turned out to be new to science and was described in Hawaii by David Fullaway as *Ischiogonus syagrii*. This parasite, a braconid which is now known as *Doryctes syagrii*, was easily established in Hawaii from two Australian shipments, and improved the fern weevil situation considerably. Pemberton discussed these matters in a well illustrated article, The Fern Weevil Parasite, Hawn. Planters' Record, Vol. 5, No. 5, 1921. He was always emphatically in favor of saving our tree ferns by the introduction of more enemies of the weevil, which he believed can be found.

The third objective of Pemberton's work in Queensland and New South Wales probably bore more weight in the decision to commit him to the expedition than the first two, as it was undoubtedly suggested and supported by Dr. Lyon's powerful interest. As Lyon proclaimed in several writings, he was firmly convinced that the native forests of Hawaii, beautiful and interesting as they may seem, are decadent forest, doomed to disappear before long and to leave the watersheds of the islands unprotected and useless. He sought, therefore, to renovate or replace the present forests with foreign trees that could prosper in our conditions, and he favored among such trees the widespread genus *Ficus*, members of which grow rapidly and often germinate from seeds deposited by birds in aerial situations.

Pemberton accepted the commission to provide planting material of as many *Ficus* spp. as he could find in Australia and he fulfilled the

commission with notable success. He sent large quantities of fertile seed from a number of species peculiar to the forests of New South Wales, and he also succeeded in getting to Hawaii the pollinating insects of two more or less cosmopolitan species of which there were already some large specimens on Oahu. These two species were the Moreton Bay Fig, *Ficus macrophylla*, and the Port Jackson Fig, *Ficus rubiginosa*. A detailed and well illustrated account of the biology of the pollinator of the former species was published by Pemberton under the title, The Fig Wasp In Its Relation To The Development Of Fertile Seed In The Moreton Bay Fig, in the Hawaiian Planters' Record, 24(6):297-319, June 1921.

The Australian assignment completed, Pemberton returned directly to Honolulu, arriving on March 5, 1922, on the S. S. Niagara. He had been gone one year and four months, and after such a long absence no pressure would have been put on him to leave headquarters soon, but he apparently found no reason to remain and within a few weeks reported for duty on the island of Hawaii. On April 26, 1922, he arrived at Honokaa Sugar Company and began a period of residence in the boarding house of that plantation which was to last until December 20, 1924, more than two and a half years.

Pemberton's specifically assigned task was now to study the relationship of rats to sugarcane and to improve their control in cane fields if possible. The special considerations which prompted his being picked for this task, which was outside the realm of his training and, at first, of his interest, had to do with the wishes of Pierre Naquin, who was then and for many years late the Manager of Honokaa Plantation. Naquin, a somewhat eccentric but wide-visioned Manager, wanted Pemberton permanently located on the Hamakua Coast, which during the 1920's was suffering much more seriously than it has since from a number of problems both related and unrelated to rats. Pemberton, on the other hand, was pleased with the chance to study these problems, to spend most of his time in field work, and to quicken his relations with the plantations of the Big Island and their personnel. That he did an exceptionally thorough job in this last regard, I was personally able to verify ten years later, when I first made a tour of the Big Island plantations and met people everywhere who had been impressed with his diligence and his personality.

Although the rat problem may have been used by Naquin as a pretext to procure Pemberton's help in other directions, it was nevertheless a problem of vital importance to the plantations of Hamakua and to the people who labored on them. Rats have always done serious damage to sugarcane, and more importantly, in the 20's they were still carrying in the Hamakua district the bacillus of the dreadful Bubonic plague, which had practically disappeared from the rest of the Territory. In fact, eleven deaths from plague occurred on the Hamakua Coast during Pemberton's first year there, six of them on Honokaa Plantation itself. Incited by this situation, Pemberton threw all his energies into rat work and soon became aware of the intricacies and ramifications of the problem and the difficulties its solution presents. In keeping with his usual practice, he did not fail to record all his observations carefully and to offer them periodically as progress reports, which were eventually incorporated into Entomological Series Bulletin No. 17, of the Experiment Station, H.S.P.A.

This bulletin was entitled, The Field Rat In Hawaii And Its Control. It was the first over-all presentation of the subject to the sugar planters and had considerable impact upon them. It resulted in the intensification of rat control programs on some of the plantations and in the adoption by most of them of baits and procedures which had been found efficacious at Honokaa.

The use of these baits no doubt improved the rat situation locally and temporarily on some plantations, but they soon came to realize that the effectiveness of the baits in Honokaa had depended upon their being used in very large quantities and with repeated applications that could not be managed without abundant manpower. As the cost and scarcity of manpower increased in the Territory, the popularity of the baits declined, and eventually they were replaced in cane fields by poisoned rolled-oats exposed in protective dispensers according to what is called "the pre-bait method." This is probably the most efficient and economic method of combating rats available today and is based on the fact that the number of rats which come to feed at a new source of food increases progressively during several days; and more rats can be killed, therefore, by poisoning the food on the fifth or sixth day of exposure than from the first.

Ironically, the behavior characteristic upon which the pre-bait method is dependent was noted and commented on by Pemberton at Honokaa, but it was not he who developed the method. The method was developed some years later by Ralph E. Doty, who gained world acclaim for it but quite candidly admitted that it was based on Pemberton's suggestion. Pemberton on this occasion "missed the boat" that would have added even more laurels to his crown of achievements. But I am sure he did not mind the loss, as he told me more than once that rat control had never been his favorite game, and that after nearly three years of being concerned with it at Honokaa he had been glad to leave it behind.

Besides rats, other organisms were more abundant and injurious on the Big Island in the 1920's than they are now. Of these, Pemberton found time and energy to study mites, wireworms and centipedes which injured the root systems of sugarcane; armyworms and cutworms which had defoliated entire pastures and cane fields in a spectacular manner every Spring since the days of the Missionaries; and the sugarcane beetle borer, *Rhabdoscelus obscurus*, which was, and still is, second in importance only to rats as a pest of sugarcane.

The reports which Pemberton submitted on these studies were published as articles in the Hawaiian Planters' Record and are listed in the bibliography which accompanies this sketch. The most important one, and the only one with possible current application, is entitled, A Study of the Cane Borer, *R. obscura*, and its Parasite, *C. sphenophori*, at Paauhau Sugar Plantation. This was the first statistical presentation of the subject and it proved that the failure of the tachinid parasite *Lixophaga sphenophori* (then placed in the genus *Ceromasia*) to control *Rhabdoscelus* is due to the fact that the fly cannot penetrate dense mats of trash and old cane which accumulate in older fields and provide ideal conditions for the breeding of large beetle populations. It followed from this proof that short-cropping would certainly ameliorate the borer problem, and Pemberton strongly

recommended the practice of short-cropping to the plantations. However, although short-cropping would also reduce the rat problem, it was not considered compatible with the over-all policies of the Hawaiian sugar industry; and Pemberton's recommendation was not accepted.

Another interesting article from these Honokaa days concerns Pemberton's work with the Chilopod, *Mecistocephalus maxillaris* (Gervais). This soil-inhabiting centipede was still quite common in the islands in 1930, and can still be found today by hard digging; but during the 20's it was a very abundant organism in many cane fields, notably so in the Hamakua and the Kohala districts, where it was generally suspected that it injured sugarcane roots and was at least partly responsible for the poor quality of root systems in those districts. During the final months of Pemberton's residence in Honokaa, he verified the suspicion with a long series of observations and experiments; and furthermore, he showed that the centipede could be easily eliminated with a slight sprinkling of paradichlorobenzene flakes on the surface of the ground. This measure provided a very simple solution for the problem; and it always amused Pemberton to explain that it had been suggested to him by the practice of certain Chinese farmers he had known on Oahu, who always planted moth balls along with their corn seed and always obtained better germination than their less enterprising neighbors. The moth balls, however, probably consisted of camphor rather than P.D.B.

Pemberton had been promoted in 1923, and when he finally returned to Honolulu on December 20, 1924, he bore the title of Associate Entomologist. The men above him in the hierarchy of the department were then Frederick Muir and Otto Swezey, and the Director of the Station was Hamilton P. Agee. With these three enthusiastic adherents of biological control in charge, foreign exploration was the order of the day, and Pemberton was permitted only a few weeks in the relative relaxation of headquarters before being sent out again. On February 13, 1925, he boarded the S. S. President Taft and began the longest and most strenuous of his expeditions.

This expedition began with a stay of about thirteen months at the College of Agriculture of the Philippines, in Los Banos, not far from Manila. F. X. Williams had already spent time there in 1920 studying the biologies of a larrid wasp, *Larra luzonensis* Rohwer, which is parasitic on the mole cricket, *Gryllotalpa africana* (Palisot de Beauvois), and of a small weevil and a small moth which destroy, respectively, the bulb and the spindle of the very noxious nut-grass, *Cyperus rotundus*. It was now Pemberton's task to get these three beneficial insects to Hawaii; and in this he was quite successful, not however, without a great deal of physical exertion which was required to find enough crickets and wasps for the initiation of his breeding program. From the material he sent, the three parasites were soon firmly established in all the islands of Hawaii; and it was not long before *Gryllotalpa* was under excellent biological control. Unfortunately, this was not the case with the nut-grass, however, as it still remains a bothersome weed on most agricultural areas. At first it did seem that the small moth, *Bactra truculenta*, might provide effective control, but in later years it has turned out that the eggs of the moth are heavily parasitized by

Trichogramma minutum and the populations of the moth are made too small to be useful.

Informed from Hawaii that *Larra*, *Bactra* and *Athesapeuta* (the weevil) were being bred and released in their new home, Pemberton turned his attention to two other projects of the Philippine assignment. Fortunately they could both be attended to at the same time in the tropical forests of Mt. Makiling, not far from the quarters provided for him at the School of Agriculture. The ten months he dedicated to them brought Pemberton his first experience of the difficulties and dangers which surround exploration of any kind in deep tropical forests, and they remained deeply impressed in his memory. The most serious trouble he met was Malaria, which he probably contracted late in his stay at Los Banos but which bothered him sporadically many months later.

One of the projects on Mt. Makiling was to study the ecology of the forest itself and to procure good quantities of seed from whatever trees Pemberton might find of possible use in the forests of Hawaii. Dr. Lyon, of course, had instigated this enterprise and was later to express great satisfaction with Pemberton's results. Pemberton not only provided him with large shipments of seeds of many kinds but also sent him a profusion of careful notes and excellent photographs which Lyon used in the promotion of his reforestation schemes. Some of the photographs were published in the Hawaiian Planters' Record, and once when I enquired of Cyril when he had found time to study photography he wryly told me that he had never studied the art and that he knew and applied only one of its rules: "Use always a tripod, with the smallest aperture and the longest exposure time the conditions will permit."

The entomological aspect of the work in the forest involved the dissection of palms and large grasses of all kinds, to search them for enemies of weevils related to *Rhabdoscelus obscurus*, the pest of sugarcane in Hawaii. There are several such weevils in the Philippine Islands and one, *R. lineaticollis* (Heller), is quite close to the Hawaiian pest in habits and appearance. There are also many enemies of the weevils, and Pemberton gathered enough of them to make ten shipments of material from Mt. Makiling, including predatory mirids, anthocorids, histerids and hydrophilids, and one fly of the family Leptidae. All reached Hawaii in viable condition and all were released in various sugarcane or forest environments, the Leptid fly with particularly optimistic expectations; but apparently Hawaiian conditions did not suit any of the species and none became established.

On March 12, 1926, Pemberton left Manila on the German ship "Fulda." He was on the way to Java, and his first stop was Singapore, where he was impressed by the elegance of the historic Hotel Raffles but could not fully enjoy its amenities, for he arrived there "sick as a dog," in his own words, with Malaria. Still weak and dizzy with the disease, he sailed from Singapore three days later on the S. S. Plancius and reached the port of Batavia on March 23, and on the same day motored to Buitenzorg, Indonesia.

In Buitenzorg he found memorably good accommodation in the Hotel Belleview, and a warm welcome from the staff of the Instituut voor

Plantenziekten, whose hospitality had become proverbial among traveling scientists of those days. The institute provided him with ample space and facilities during the following four months, and in this period he explored a large portion of Java and investigated in detail the enemies of *Rhabdoscelus leprosus* which lives in the boles and leaf stalks of *Arenga saccharifera* the East Indian sugar palm. Practically the same complex of predators previously studied in the Philippines was found in the sugar palms, but Pemberton soon determined that *R. leprosus* is kept under control by a white fungus he had never seen. The fungus was sent to Hawaii, where pathologists of the H.S.P.A. propagated it on *Rhabdoscelus obscurus* and several other noxious insects but were never able to recover it in the field. Presumably, the conditions of Hawaii are not propitious to its establishment.

With Java explored, Pemberton reluctantly left the order and comfort of Buitenzorg on July 7, 1926, and after seventeen days on a small coastal steamer reached the small town of Menado, on the northern tip of the island of Celebes. With only a few days interruption, he remained here until October 17, and from here he explored the small forest of Tateli, which is on the coastal plain of the island, and the more distant forests and sago palm swamps around Lake Tondano, at an elevation of 2,250 feet.

At least one species of *Rhabdoscelus* closely related to the Hawaiian form was found in each of the two regions, but these species seemed to be controlled by a complex of predators very similar or identical to the Philippine complex and by a fungus very similar to the one found in Java. Pemberton did not bother with further remittances of the predators, but he did send the fungus to Hawaii, where it was propagated in the laboratory and released in several fields, but, like the Javanese form, was never recovered.

A find of this period which impressed Pemberton and which he often mentioned later was that of a large braconid wasp he discovered in the Tateli Forest. Unfortunately, no one else has reported this insect and it bears no name, but Pemberton found it parasitizing large larvae and pupae of *Rhabdoscelus* in palm trees. With such habits, the wasp might have proven a useful complement to the single larval parasite which provides insufficient control of the sugarcane borer in Hawaii, but it turned out to be quite difficult to find in the forest, and Pemberton was unable to make a live shipment of it. It is known only from a half dozen pinned specimens which remain in the insect collection of the H.S.P.A.

During a short interlude in the stay at Menado, Pemberton visited the small islands of Tagoland, Siao, Sangir and Talauer, which run about 200 miles north-by-east towards Mindanao, in the Philippines. The entire chain turned out to be planted with coconut palms which bore no beetle borers; but on Tangir Island Pemberton ran into a horrendous infestation of a scale insect, *Aspidiotus destructor* Signoret, which seriously threatened the survival of the copra industry of the island and gave Pemberton a chance to repay in part the kindness which had been shown him everywhere by the Dutch and the Malays. This he did by determining that none of the enemies of *Aspidiotus* was to be found on Tangir, and by arranging later to have some of its efficient enemies introduced from Java by Dr. Leefmans, of the

Dutch Entomological Service. The incident, in retrospect, always pleased Pemberton. It provided concrete support for his view that the travels and explorations of Entomologists can and often do bring returns unforeseen in their original perspective.

When he judged the northern end of Celebes to offer nothing more of interest, Pemberton moved from Menado to Macassar, a larger town on the extreme S.W. coast of the island. The area turned out to be too intensively cultivated to hold any species of *Rhabdoscelus*; but termites of many kinds were extremely abundant in a small forest reserve near the town, and Pemberton continued here a search for parasites of termites which he had already begun at the southern end of the island. He soon found a fly larva in the intestinal cavity and a nematode in the buccal cavity of a species of *Termes*, and he shipped the nematode to Hawaii, but the species was not able to survive in any of the termites which plague these islands.

Delayed beyond his liking at Macassar, Pemberton was at last able to arrange transport on a small Japanese freighter, the Ganges Maru, which landed him at Sandakan, British North Borneo, on November 22, 1926. All of Borneo, and particularly North Borneo, was still in an undisturbed natural state at this time, and it would have been difficult for Cyril alone to overcome the difficulties of language, subsistence, transport and guidance which the natural state entails. It was fortunate therefore, that he was met at Sandakan by H. G. Keith, Acting Conservator of Forests, a man Pemberton liked at once and whom he often remembered in later years as a most efficient and congenial guide and companion.

Mostly in the company of this new friend, Pemberton now explored the east and west coasts of North Borneo, and the small islands of Jambongan and Labuan, which lie N.E. and E. of North Borneo, respectively. The exploration was extremely interesting and brought Cyril in contact with primitive peoples and with plants and animals that he had never seen before, but it did nothing to advance the purpose of his efforts. A beetle related to the Hawaiian *Rhabdoscelus* was found attacking Sago Palms in the Sandakan swamps, but it was controlled by the same predators that Pemberton had been observing since the Philippines and was no longer interested in. Termite inhabiting nematodes were also present in Sandakan and Pemberton actually carried a lot of them on his return trip, but they, like the nemas previously sent from Menado, failed to demonstrate any interest in the termites of our islands.

With about two months in Borneo, Pemberton completed searching the geographical area that had been chosen for the expedition and brought it to a close. He left Sandakan on February 1, on the Australian ship "Tanda," and after a five day stop in Manila he reached Honolulu on March 3, 1927. His arduous labors of more than two years had resulted early in the elimination of the mole cricket from the agricultural fields of the Territory, and that was a worthwhile accomplishment, but they had in no way helped to reduce the losses which the borer continued to inflict upon our sugar plantations. That reduction remained as a challenge and objective for future explorations. As Pemberton himself pointed out in his account of the expedition (The Hawaiian Planters' Record 30(3):217-230, July 1927), the only way in which it may have advanced the attainment of that objective was

by adding support to the theory that the original home of the genus *Rhabdoscelus* lies in the Austro-Malayan rather than the Indo-Malayan region, and therefore effective parasites of the genus are more likely to be found farther towards New Guinea than in the islands Pemberton had just searched.

On his return to Honolulu, Pemberton resumed residence at the Pleasanton Hotel, a family type hostel which provided comfortable quarters within easy walking distance of the H.S.P.A. laboratories. The following year and a half was a period of relative inactivity for him; but the record shows that he presented a long and interesting account of his just-completed travels at the March 1927 meeting of the Hawaiian Entomological Society, and that in the months that followed he either worked on or published short but informative papers on the biology of *Tarsonemus spinipes*, the sugarcane rust mite, on certain Thysanura which he had found preying on termites in Borneo, and on the status of the fern weevil prevalent at the time at Kilauea, on the Big Island. During the months of June, July, August and September he visited the Mainland; but he returned to Honolulu early in October and was present at the last three monthly meetings of the Hawaiian Entomological Society.

At the beginning of 1928, Pemberton's title at the H.S.P.A. was changed to Chief Entomologist. The change implied recognition of his value to the industry and brought him a considerable raise in salary, but it did not in effect change his status or his work. He and Otto H. Swezey, for whom Cyril fully shared the affection and high respect of all his colleagues, had been sharing guidance of the Entomology Department in fact for some time, and now continued to share the office and the title until Dr. Swezey's retirement in 1933. The relations of these two men always held up to us a shining example of what relations should be between scientists working together.

In April of 1928, Dr. E. W. Brandes, of the United States Department of Agriculture, and Dr. J. Jeswiet, representing the Dutch Government, stopped in Honolulu on their way to New Guinea. They had been commissioned by the U.S.D.A. to search that island for new species and varieties of sugarcane, to be used in Department's continuous program of genetic improvement. Dr. Brandes was to lead the expedition, and Pemberton joined it by pre-arrangement in Honolulu, from where the three men and Dr. Brandes's wife sailed on the S. S. Ventura, on April 18.

For Pemberton the expedition was to have two stages: During the first he was to travel with the other men, and during the second he was to be alone. The first stage was amply covered at its completion in various accounts published by Dr. Brandes and Dr. Jeswiet, and by Pemberton himself. It involved unprecedented incursions on foot or by airplane, canoes or small ships into the headlands of the Fly and Sepik rivers, where completely uncivilized cannibals still lived and had never been visited by white men. It was an unforgettable adventure for each of the participants, and it added significantly to the geographical, and botanical and anthropological records of New Guinea. It was also very successful in its main objective of obtaining new blood lines of sugarcane, including a species, *Saccharum robustum*, which turned out to be new to science in spite of its wide distribution on the island. From the exclusive viewpoint of Entomology, however, Pemberton's

participation in the Brandes expedition was not fruitful at all, as it probably was not intended to be. Pemberton helped with the finding, cutting and packing of the new canes, and necessarily moved along from place to place with the other men, so that he never had time to examine with any care the rich insect fauna through which the group moved. He hardly had time, he told me later, to look at insects, let alone to study them.

The second stage of the trip was very different. As soon as the other men had left Port Moresby on the start of their homeward journey, he went by himself to Koitaki, an upland administrative post about 40 miles from the coast, where the New Guinea government was to provide him with help. He arrived in Koitaki on September 12, 1928, and left early in February of the following year. In the interval he studied sugarcane insects, which are extremely abundant in New Guinea, and spent many days exploring the surrounding forests. He did not, at this time, send any insects to Hawaii; but he did send large quantities of tree seeds and many notes and photographs of the forest to Dr. Lyon.

On February 8, 1929, Pemberton ended his stay in New Guinea and embarked on the S. S. Marsina with the town of Rabaul, in New Britain as his destination. He debarked in Rabaul after a voyage of three days and immediately made his way to the settlement of Wunawatung, forty miles from Rabaul, on the eastward coast of the same peninsula. Here he continued to investigate forest conditions, sending Dr. Lyon more notes and photographs and several more shipments of seeds, in this case the seeds of various *Ficus*, the genus of particular interest to Lyon. In addition, he sent to the geneticists of the H.S.P.A. one new variety of sugarcane; and to the entomologists, two lots of a cannibalistic mosquito, *Toxorhynchites inornatus* (Walker), which reproduced in the laboratory for awhile but failed to become established.

With the work in New Britain terminated, Pemberton left Rabaul on June 21 and went to Australia, where he spent a few days before embarking in Sidney on the S. S. Sierra, on which he arrived in Honolulu on August 30, 1929. On this expedition, he had been away from headquarters one year and three months.

Less than one year later, on July 8, 1930, he left Honolulu again; this time on the S. S. President Monroe, on which he travelled to Singapore and Kuala Lumpur, in the Federated Malay States. He reached Kuala Lumpur on August 6, and after making arrangements with the proper government authorities he moved twenty miles inland to Serdang, where he was allowed to occupy a small grass shack located on the very edge of a forest which in those days was still a virgin jungle. He lived in this shack from August 12 to the end of February of the following year, and in the course of this stay he continued the forest work for Dr. Lyon but paid more attention to the entomological objective of his visit to Malaya. This was to find and if possible to introduce to Hawaii parasites of the Chinese Grasshopper, *Oxya chinensis* (Thun.), a large and voracious insect which had entered Hawaii many years before but had lately attained considerable importance as a defoliator of sugarcane.

Pemberton was brilliantly successful in the attainment of this objective, and in retrospect his success always seemed to bring him more satisfaction

than any other of his professional accomplishments. And his satisfaction was just, for his success was due to an imaginative way in which he had scattered *Oxya* adults in wire-bottomed cages and caused them to leave known concentrations of eggs in various environments where Pemberton only hoped parasites might be found but had never actually seen them. When the egg masses were dug up, a few days after the cages had been moved to other locations, they produced two species of parasites which were new to science. The two species were described by as *Scelio serdangensis* and *S. pembertonii*.

Once Pemberton's cleverness had turned them up, neither of the two species proved difficult to breed or to transport; and before long *Scelio pembertonii* became firmly established in Hawaii, with the result that its host is now under excellent biological control. Pemberton published a nicely illustrated account of the biology and history of the two *Scelios* in the Proceedings of the Hawaiian Entomological Society, 8(2):253-264, Nov. 1933.

Another of Pemberton's discoveries in Malaya was the encyrtid *Anagyrus saccharicola* Timberlake, a parasite of the pink mealybug of sugarcane, *Saccharicoccus sacchari* (Cockerell). For some reason, Pemberton himself did not send this little wasp to Hawaii, but it was later established in our cane fields from material sent from the Philippines by Fred C. Hadden. The wasp did not eliminate the mealy bug but it did greatly reduce the size and incidence of the populations, which before 1930 constituted a serious annoyance, if not a major problem for sugarcane growers.

Pemberton returned to Honolulu on the S. S. President Madison, which docked on May 31, 1933. His Malayan sojourn had lasted about nine months and may have seemed to others a short and mild adventure when compared to his previous expeditions. Cyril, however, never forgot Serdang and often recalled, more or less humorously, the severe discomforts of the grass shack and the immense inefficiency of the Chinese servant and cook with whom he shared the shack for a time. More seriously, he was also wont to talk of the dangers inherent in the location of the shack and the places where his work was done. Snakes and tigers of aggressive nature were common all around, and Pemberton, who had not foreseen these dangers and had never owned a gun, was required by government officials to arm himself before they would permit him to live and work alone. He did buy a gun, a tremendously cumbersome 45 caliber pistol which he eventually brought home and kept in a drawer of his desk at the Experiment Station until his retirement. Cyril did see the spoor of tigers near his shack in Serdang more than once, and was actually struck on the calf by a snake on one occasion, when the reptile slithered away before Pemberton could separate the 45 from the rest of his kit. If this snake was poisonous, what saved Pemberton was not the gun, but his invariable habit of wearing puteses or wrapping his legs in heavy canvas or cloth whenever he was to venture into rough terrain. This was a safety measure which he strongly recommended.

Following the Malayan expedition, Pemberton spent several months in Honolulu, his main concern and activity revolving around the problem of

Anomala orientalis (Waterhouse) at the Ewa and Oahu sugarcane plantations. This beetle had been a serious pest for a few years following its discovery in 1908, but it had practically disappeared from the fields soon after the introduction of a parasitic wasp from the Philippines in 1916. Around 1928, however, a recrudescence of damage became evident, especially in the upper fields of Oahu Sugar Co., which showed serious losses for the crops of 1930 and 1931. Entomologists in touch with the problem were unanimous in the conviction that the trouble was transient and due only to a temporary imbalance between *Anomala* and its parasite; but this view was not accepted by the influential managers of the plantations concerned, and for a time Pemberton and his department were forced to humor their skepticism with a considerable amount of redundant activity. One phase of this activity involved the hiring of the present writer to help in a laborious study of the inter-relationships of *Anomala* and its parasite at Oahu Sugar Co., and later to search Central America for other possible enemies of the beetle. Another phase was the introduction of the toad, *Bufo marinus* (Linne), from Puerto Rico.

The introduction of the toad was neither premeditated nor immediately consequent upon the *Anomala* scare; but it was directly due to apprehension which the scare had aroused in certain high executive officials of the Hawaiian sugar industry. Pemberton arranged for the transport of three lots, and himself escorted the fourth lot of toads with which the introduction was consummated, and his name has naturally become associated with the establishment of the toad in Hawaii and its spread to most of the Pacific islands and territories. In public, Pemberton never rejected the association; but in private conversation I heard him make the statement more than once that he had been ordered to bring the toad to Hawaii by one of the executives who, as Pemberton put it, "was one of my bosses."

The order was given to Pemberton personally and directly in a sugarcane field in Puerto Rico during February 1932. At the time, Pemberton and his "bosses" were part of Hawaii's delegation to the Fourth Congress of the International Society of Sugarcane Technologists, and they were being subjected to a laudatory, and probably inaccurate, spiel on the impact that the earlier introduction of *Bufo marinus* had had on the noxious insects of Puerto Rican cane fields, including beetles with habits similar to those of *Anomala orientalis*. The spiel impressed Pemberton's superiors very strongly. It did not have quite the same impact on Pemberton, who was by nature skeptical and quite resistant to spiels of all kinds, but it did impress him enough to weaken objections he might have adduced in other circumstances against his superior's peremptory demand. The result of his acquiescence was that *Bufo marinus* was brought to Hawaii, that its introduction received an inordinate amount of publicity, and that in consequence of the publicity, more than any other factor, the toad was spread to a new range that must cover nearly one half of the world's area. No consequences of undesirable nature have been proven in the vast new range of the toad; and on the other hand, in Hawaii it is generally believed that *Bufo* was instrumental in greatly reducing the abundance of the centipede, *Scolopendra subspinipes* Leach, which up to 1934 or 1935 constituted a serious annoyance in many residential areas of the Territory.

Ironically, *Bufo* was always relatively scarce in sugarcane fields and cannot have significantly affected their insect fauna, specially the heavy population of *Anomala orientalis* which motivated its introduction. These populations had begun to subside even before the toad was brought, and they have not reappeared since that time.

At the end of 1933 Dr. Swezey retired from the office and Pemberton assumed sole responsibility for the direction of the Department. His title was changed at this time to Executive Entomologist (years later it was changed again to Principal Entomologist), and he entered what might be called the executive period of his career. During this period he still travelled frequently, but he no longer engaged in lengthy entomological explorations. His activity now centered in the chores of the Experiment Station, in the preparation of numerous reports and scientific papers, and in duties connected with organizations of which he was a member.

These organizations were many, and Pemberton was almost religious in the fulfillment of any commitment to them; but he seemed to derive particular pleasure from duties related to the Hawaii Board of Agriculture and Forestry, of which he was a Commissioner from 1943 through 1959, the Association of Hawaiian Sugar Technologists, of which he was President in 1937, The International Society of Sugarcane Technologists, of which he was a Charter Member, the Conservation Council for Hawaii, of which he was President in 1961, the Pacific Science Association, of which he was a member from 1947 through 1965, and which he served as Honorary Vice-President in 1959, and the Pacific Science Board, in which he served as Chairman of the Invertebrate Consultants Committee from 1949 to 1954. His attendance at all sessions of these bodies was punctilious, and his reports and addresses to them were always models of what such presentations should be. His two Presidential Addresses to the Hawaiian Entomological Society (1933 and 1950), his Presidential Address to the Hawaiian Academy of Science (1941), and his Presidential Address to the Sigma Xi Club of Hawaii (1946) are evidence of the care and effort which he spent on his commitments; and even more so is his Chairman's Report for 1949-1954 to the Invertebrate Consultants Committee for the Pacific. This report constitutes, in fact, a valuable book of reference to the outburst of biological research which followed the long blank years of the Japanese occupation of the Pacific and the war against them.

On the first trip of his executive period, Pemberton attended a Congress of the International Society of Sugarcane Technologists in Australia, and he was away from Hawaii from July 29 to October 28, 1935. On the following month he gave up his long bachelorhood and married Mildred Yokum Lucas, a charming lady who had been for some time Assistant Librarian at the H.S.P.A. Experiment Station. The couple lived quietly for awhile in Makiki Heights, and Cyril did not travel again until 1937.

On January 6 of that year, Cyril and his wife left Honolulu on the S. S. Aorangi, in the company of Colin Lennox and Mrs. Lennox. Lennox was at the time one of the geneticists of the H.S.P.A., and the avowed purpose of the expedition was to procure new varieties of sugarcane for Hawaii. The two couples traveled together and spent six months in Australia, New Guinea, New Britain and New Ireland, returning to Honolulu on June 6,

1937. They did indeed find new varieties and made several shipments of them to Hawaii; but with two ladies on the staff, this expedition cannot have been one of Pemberton's most strenuous adventures, although it did remain impressed on his memory through the wreck of a small boat on which the Lennoxes and the Pembertons had taken passage from New Ireland to the small island of Lavongai. A sudden storm broke the boat against a reef some distance from Lavongai, and the expedition might have come to a fatal end if natives had not braved the surf and the dangerous reef to help the explorers negotiate the last few hundred yards of the trip. The experience, as might be expected, made a lasting impression on all concerned, especially the ladies.

In February of 1938 the Pembertons had a daughter, Mary, born in Honolulu; and later in the same year Cyril travelled again, this time to attend the Sixth Congress of the I.S.C.T. in New Orleans from October 20 to November 7.

Following this congress, Pemberton did not travel again until 1947; but in the interim he suffered an experience more painful than any that ever befell him in a foreign land. The family, which had come to include his widowed and aged father, was living at this time on Keeaumoku Street, not far from Pemberton's office, in a house surrounded by several large trees which Cyril tended with great care. On September 10, 1945, while gathering avocados in one of the trees, he slipped to the ground and broke his pelvis and one heel. The accident hospitalized him for about a month, but he suffered serious pain many more months, and his heel was never again as useful as it had been.

Two years after the accident, a group of men from the H.S.P.A. spent a few days on Guam clearing for shipment to Hawaii a number of sugarcane varieties which had been obtained by a previous expedition in Formosa. The group included Dr. Lyon, by now Director of the Experiment Station, Dr. A. H. Mangelsdorff, Principal Geneticist, Dr. J. P. Martin, Principal Pathologist, and Pemberton, who went along as the entomologist of the enterprise. The trip was made by air in both directions and lasted from October 2 to October 13, 1947. It provided Cyril with his last opportunity to travel on a working assignment from the H.S.P.A., although he attended the 7th Congress of the Pacific Science Association in New Zealand 1949, and the 8th Congress of the same organization in Manila in 1953, while still bearing the title of Principal Entomologist.

In 1951 Pemberton reached the age of 65, the statutory age of retirement from the H.S.P.A., but in unprecedented departure from ordinary procedure, his term of service was prolonged two years. Officially, then, his retirement came at the end of 1953, but even after that he retained a desk at the Experiment Station until about 1966.

Throughout his years in Honolulu, Pemberton maintained a close relationship with the University of Hawaii. As a member of the affiliate graduate faculty from 1931 on, he gave unselfishly of his time and talents to deliver lectures and lead seminars on subjects relating to entomology and sugarcane culture. In appreciation of these faithful services, and in recognition of his many contributions to the advancement of science in the

Pacific, he was awarded an honorary Doctor of Sciences degree by the University in June, 1951. In 1954, following his retirement, he was elected an honorary member of the Hawaiian Entomological Society, and in April 1960, a life member of the Hawaiian Botanical Society.

Other organizations in which he was active included the American Association for the Advancement of Science, which he joined in 1922. Later he became a life member and fellow of this organization. He was also a charter member of the Bishop Museum Association. During World War II he organized defense volunteers for the Central Pacific area within the Businessmen's Military Training Corps.

Until about 1966, Cyril could be found at his desk almost any day of the week, and his participation in the activities of the many organizations to which he belonged did not slacken. If anything, the tempo of his participation increased, and he worked on more committees and attended more sessions. In November 1957, he took his wife and daughter to the 9th Congress of the Pacific Science Association, held in Bangkok. The United States Department of State designated him as an official delegate of the USA to that Congress. In February 1959, he participated in a meeting of the Pacific Science Association Technical Advisory Committee on Rhinoceros Beetle Control held in Suva, Fiji; and finally, between August 22 and September 4 of 1966, he attended the 11th Pacific Science Congress in Tokyo. At this Congress he and Mrs. Pemberton were treated as Honored Guests, and his long and faithful services were fittingly recognized with the award of an Honorary Life Fellowship in the Pacific Science Association. While attending the congress he and Mrs. Pemberton received an additional honor, an audience with Emperor Hirohito.

He was also honored with a Life Membership at the 13th Congress of the I.S.S.C.T., which was held in South Africa in March 1968; but this honor came to him in absentia, for by this time he was 82 years old, and his sight and hearing had weakened to a point where he no longer cared to travel or to be among large crowds. He still attended the relatively intimate meetings of the Hawaiian Entomological Society, however, and the record shows that his last appearance with these colleagues was at the fifth annual dinner meeting of the Society which was held December 12, 1973.

During his last few years, Cyril seldom left his home, although he was by no means incapacitated and continued to do most of his own gardening and to enjoy a daily swim in the ocean, a short walk from the garden. These activities gave vent to his unusual energy and he might have enjoyed them many more years, but early in November of 1972 he fell and broke an ankle, and a few days later he suffered a mild cerebral stroke. Although he recovered from these blows, their consequences limited his independence and prepared him for the end of his life. When the end came he was ready.



CYRIL EUGENE PEMBERTON
From a photograph taken December 11, 1967.

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Compiled by F. A. Bianchi

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NAME CHANGES AND CORRECTIONS NOTED IN NOTES AND EXHIBITIONS SECTION

Previous Name	Changed to	Page
<i>Hemiberlesia cyanophylli</i> (Signoret)	Abgrallaspis cyanophylli (Signoret)	404

NEW IMMIGRANT RECORDS FOR THE YEAR 1975

The following species were reported in the Hawaiian Islands for the first time during 1975, or earlier, on the dates recorded in the text. Species marked with an asterisk were reported previously but were incompletely or incorrectly identified. Those marked with a dagger are considered to be doubtfully established as these records are based on single collections (ed.).

CHANCE IMMIGRANTS

	Page
Balclutha rufofasciata (Merino) (Cicadellidae)	389
Meristhus sp. (Elateridae)	390
Delta curvata (Saussure) (Vespidae)	390
Imma mylias Meyrick (Glyphipterigidae)	391
Mesovelia amoana (Uhler) (Mesoveliidae)	392
Paratriphleps laevisculus Champion (Anthocoridae)	392
Cardiasthethus sp. (Anthocoridae)	392
Conoderus eveillardii (Le Guillou) (Elateridae)	392
Conoderus amplicollis (Gyllenhal) (Elateridae)	393
Neschoengastia sp. (Trombiculidae)	396
Toritrombicula sp. (Trombiculidae)	396
Diomus sp. (Coccinellidae)	399
Trigonotylus doddi (Distant) (Miridae)	400
Evagetes padrinus padrinus (Viereck) (Pompillidae)	403
Barichneumon californicus Heinrich (Ichneumonidae)	403
Diadegma pattoni (Ashmead) (Ichneumonidae)	403
Selenophorus sp. (Carabidae)	404
Therioaphis maculata (Buckton) (Aphididae)	405
* Whalgreniella nervata (Gillette) (Aphididae)	405
Heteropsylla sp., possibly <i>mimosae</i> Crawford (Psyllidae)	405
Hygrotus medialis (Le Conte) (Dytiscidae)	406
Dactynotus sonchi (Geoffroy) (Aphididae)	406
* Selenophorus striatopunctatus Putzeys (Carabidae)	407
Otitesella sp. near <i>ako</i> Ishii (Torymidae)	408
Unidentified genus and species (Torymidae)	408
Semarangia dorsocentralis Becker (Chloropidae)	409
Allothrips brasiliensis Hood (Phlaeothripidae)	499
Nesothrips brevicollis (Bagnall) (Phlaeothripidae)	508

BENEFICIAL INSECTS PURPOSELY INTRODUCED

	Page
Eucelatoria sp. near <i>armigera</i> (Tachinidae)	399

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