

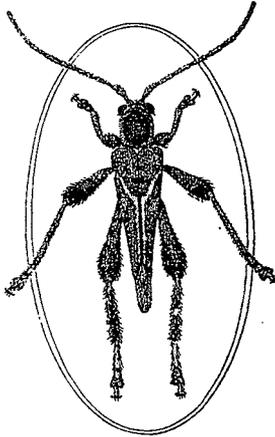
PROCEEDINGS

OF THE

Hawaiian Entomological Society

I

PART 2



HONOLULU, DECEMBER, 1st, 1906

PRICE, 50 Cents

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OF THE
Hawaiian Entomological Society

JANUARY 4th, 1906.

The twelfth regular, and first annual, meeting of the Society was presided over by Mr. Craw.

Mr. Kotinsky read his reports as Secretary-Treasurer. During the eleven meetings held by the Society in the course of its first year, there was an average attendance of seven and one-half. There was a balance of sixty-seven dollars and eighteen cents (\$67.18), plus an accrued interest of two dollars and eighty-two cents, (\$2.82), making a total of seventy dollars (\$70.00).

NOTES AND EXHIBITIONS.

MR. O. H. SWEZEY exhibited a specimen of *Rhyparobia maderae* (Fabricius), a large cockroach new to the Hawaiian Islands, and read the following notes:

An adult specimen of this large roach was taken on the evening of December 3d, 1905, at Pahala, Hawaii. It was in the house of the manager of the plantation, and was captured as it ran across the sitting room floor.

The species is not mentioned in the "Orthoptera," of the "Fauna Hawaiiensis" (1899), nor have I found any other Hawaiian record.

It is a native of Madeira and the west coast of Africa, and was described by Fabricius as *Blatta maderae*, in 1781. In 1838, Burmeister placed it in the genus *Panchlora*, and in 1892, Krauss created the genus *Rhyparobia* and assigned this species to it. By Kirby's "Catalogue of Orthoptera" (1904), there are eight species of *Rhyparobia*, all African.

R. maderae has become cosmopolitan, being carried by commerce. It has been reported from the Madeira and Canary Islands; Senegal, Africa; Cuba; Hayti; Brazil; Java; Philippines; and Great Britain. It is rare in the latter country, an occasional

specimen being taken at the docks in London, and at Covent Garden Market. (Burr, "British Orthoptera," p. 27, 1897). At a meeting of the South London Entomological and Natural History Society, Mr. W. J. Lucas exhibited specimens among some "recent uninvited visitors to Kew Gardens, from the Belgian Congo." (Entomologist, XXXII, p. 43, 1899.)

I find no records of the occurrence of this species in the United States; but J. B. Smith, in his Catalogue of New Jersey Insects (1899), mentions two related species, *Panchlora viridis* Burm., and *P. exoleta* Burm. as "found occasionally in cities and towns imported with tropical fruits." Another near relative, *Leucophoea surinamensis* (Fabr.), has been reported from New Orleans, eating palms and ferns in a green-house; and from Puerta Gorda in the extreme south of Florida (Insect Life, V, pp. 201, 268, 1892).

Mr. Kotinsky stated that Mr. A. N. Caudell, Orthopterist of the U. S. National Museum at Washington, had determined the pink-winged Tryxalid to be a species of *Atractomorpha**

FEBRUARY 8th, 1906.

The thirteenth regular meeting of the Society was presided over by Mr. Perkins, who appointed Mr. Kirkaldy as Vice President for the current year.

NOTES AND EXHIBITIONS.

MR. KOTINSKY exhibited specimens of *Samia cecropia* bred from pupae imported from the United States and intercepted by Mr. Craw, also specimens of the Coccid *Saissetia nigra* on fig.

The following Presidential address for 1905, was delivered by Mr. R. C. L. PERKINS:

The Insects of Tantalus

As a subject for the Annual Presidential Address I have chosen to give an account of the endemic insects, that are found on that part of the Honolulu mountains known as Tantalus and

* Since identified as *A. crenaticeps* Blanch. by Mr. Swezey and confirmed by Mr. L. Bruner. This species is found in Australia and New Guinea, and has been accidentally introduced into the Hawaiian Isles.

its adjacent slopes. The subject will necessitate my giving long lists of scientific names, and is consequently not an attractive one to listen to, but I think the account will be found of considerable practical value to members who are interested in the native Hawaiian fauna, as, indeed, it would be to any transient entomologist having a few days or weeks to spare in entomological work. I may say that Tantalus is a rich locality, much richer than many other parts of this island, which would appear more attractive and productive on account of their far finer and more extensive forest. It is too, very accessible up to 1500 feet elevation, either by riding, driving or walking, and the actual summit can be reached in an hour and a half on foot from Honolulu itself. By "Tantalus" in this paper I mean the peak itself and all its slopes, *i. e.*, all the ridges that lead up from the plains to its base, as well as the steep side running down into the Pauoa valley and similarly the steep side bordering Manoa, but these two valleys themselves are not included. The main range lying behind Tantalus is entirely excluded. It is much wetter and more windswept than the latter and has, as is usual under these conditions, a scantier fauna, though some of its species are peculiar, while the Tantalus region has many that are not found on the highest mountains. For instance I may cite the six fine species of Longicorns belonging to the genera *Callithmysus*, *Plagithmysus*, and *Clytarlus*, which are entirely absent from the higher elevations, not being found at an elevation greater than that of the summit of Tantalus, and more usually some hundreds of feet lower still.

No doubt in 1892 when I first spent a day in collecting on Tantalus, it was decidedly a better collecting ground than today, the changes that have taken place since that time being very great. It was not, however, until 1900 that I did any systematic collecting in this locality, and in the past five years again I notice many changes all tending to its impoverishment as a collecting ground. Still at present these are not so great as to lead one to suppose that any species have been exterminated, and in fact it is extremely unlikely that such has been the case, since I ceased collecting in 1902. A recent visit leaves no doubt in my mind on this point, but it would not be at all surprising to find, now the locality is comparatively thickly inhabited, that in a few years the native fauna will considerably decrease.

Before taking the orders of Insects seriatim and listing the species found on Tantalus, it is proper to say that, excepting the Aculeate Hymenoptera and in a rather less degree the beetles, no serious attempt has been made by me to acquire a complete collection of insects frequenting the locality. Practically my whole collection thence was obtained incidentally to special researches on the variation of certain species of Coleoptera and other insects and on the habits and foodplants, etc., of these.

I will first take the species of Macrolepidoptera, that is to say, the butterflies and moths, excepting the Tortricina, Tineina and the Pterophoridae, which three groups I cannot at present name. The species here listed are such as I have myself met with on the slopes of Tantalus, but I believe that nearly all the species of Macrolepidoptera known on Oahu might be found there, either regularly or as stragglers, since the larger moths are not usually much localized in their range on the island they inhabit. Most of my work on the Lepidoptera of Oahu has been done in the mountains behind Waialua and to a less degree in the Waianae Mountains.

Of the stout-bodied night flying moths of the family Noctuidae, I can report very few, but others are certainly to be found. *Leucania euclidias*, a species remarkable for its variation in colour, is of course found, as in all other mountain localities throughout the islands, and is well worth examining in numbers for the more beautiful and unusual varieties. *Leucania amblycasis* is found as far down as the plains and could no doubt be taken in numbers on the flowers of the Ohia at night, as in other parts of the islands. It is hardly distinguishable from the moth of the "army-worm" (*L. unipuncta*). Once I saw it in countless thousands on those flowers, but mistaking it for the common pest I took only a few examples. *Agrotis dislocata* and *A. crinigera*, the produce of two of our commoner cut-worms, are naturally present, and I obtained one handsome specimen of the more recently described *A. hephaestea*. *Hypenodes altivolans* is common and worth examining for its remarkable variations in colour; it comes to light and sugar, just as the very similar *H. costaeirigalis* does in England. No other Hawaiian Noctuids visit sugared trees. *Nesamiptis obsoleta*, an extraordinarily variable species, abounds, *Cosmophila noctivolans*, also variable, is worth collecting in series, with the allied but not endemic

C. sabulifera, a highly variable form. The caterpillars feed on Hibiscus, and are sometimes very abundant on the 'Hau' trees.

The unique *Plusia pterylotis*, a remarkable species of this beautiful genus, was obtained on Tantalus (where a second very worn specimen was seen) and might no doubt be collected in numbers. Of the Hydrimenidae the considerable genus *Eucymatoge* has so far yielded only *E. monticolans*, which is often seen resting with expanded wings on the trunks or branches of trees. It is so highly variable in colour, as to be worth collecting, for some of the forms are so different in appearance, as to appear quite distinct species. No doubt other species of *Eucymatoge* occur, e. g., the rather curiously shaped *E. staurophragma*, which elsewhere is found amongst Ieie (*Freycinetia*).

The Selidosemidae are well represented on Tantalus, the extensive genus *Scotorythra* having many species. *S. caryopsis*, remarkable for the great sexual distinctions, is very common, and exhibits several noteworthy varieties. *S. hecataea* and *homotrias* are larger and much less common, but allied to the preceding. A single male, taken a year or two ago appears to belong to an undescribed species, and may be allied to *S. demetrius* of Hawaii. Other species that are found are *S. dissotis*, *S. metacrossa*, *S. triscia*, *S. nephelosticta* var. *cocytias*, together with some that have taken to feeding on introduced plants (e. g. guava), *S. diceraunia*, *S. brachytarsa*, and *S. vara*. Many of these species yield extraordinary variations in colour. The larger *S. euryphaea* is less common. The two commonest koa-feeding species are *S. caryopsis* and *S. rara*. The two finest species of the family, however, are the great *Acrodrepanis megalophylla* and the very pretty *Nesochlide epixantha*, the latter being common in the male sex, but the females rarely seen. I have only twice seen the latter at large and curiously enough both of these on the wing in the daytime, one of them only the other day on Tantalus, the other in the mountains behind Waialua. Whereas the male is readily attracted by flowers of the Ohia and to light, the female apparently comes to neither of these attractions. *Sisyrophyta gomphias*, remarkable for the curious secondary sexual characters of the male, is common, even in the forest of introduced trees planted by the Government. The caterpillar of the handsome Sphingid *Deilephila calida* is ofund feeding on various trees, "ohia," "koa," *Bobea elatior* and

others, being polyphagous. The moth itself occasionally is seen on lantana flowers.

The two butterflies, *Vanessa tammeamea* and *Lycaena blackburni* are common, as also their caterpillars, the former on *Pipturus*, the latter on "koa," and on *Dodonaea viscosa*, as well as on introduced pod-bearing trees—the monkey-pod tree and others.

In the Pyralidina at least two species of *Talis* are found, one of them only on the low dry slopes, and the conspicuous green *Margaronia exaula* flies wildly by day or night in ferny places. Its larva equally conspicuous in colour is found on the native *Euphorbia* trees and likewise attacks introduced species. Of the important genus *Omiodes*, *blackburni*, *epicentra*, *accepta*, *continuatilis*, *demaratalis*, *monogona* and *localis* all occur below the native forest as well as (at least most of them) in it. *O. euryprora* was once taken. Most of the species are to some extent of economic importance, and no doubt rarer species are to be found, such as *antidoxa*, *monogramma*, etc.

The genus *Phlyctaenia* yields five species; others no doubt only want looking for. *P. synastra* is a very pretty species, and the other four are *P. monticolans*, *nigrescens*, *stellata* and *despecta*, the latter being extremely common. *Pyrausta constricta* is not common but varies much in colour, and *Mecyna aurora* is taken in single specimens occasionally.

The species of the genus *Mestolobes* are very interesting, and as none have been bred, their habits should be studied. *M. xanthoscia*, *semiochrea*, *abnormis*, *autodoxa* and *antichora* all occur here, frequently visiting the Ohia flowers, while the abundant and ubiquitous *M. minuscula* ranges down to the plains. Of the allied genus *Orthomecyna*, only *crossias* has been taken, but no doubt other species are to be found, as is also the case in the big genus *Scoparia*. Of the latter only *S. balanopis*, *mesoleuca*, *catactis*, *ianthes*, *bucolica*, *hawaiiensis*, *melanopis*, *meristis* and *halmaea* have occurred, but it must be said that no special collecting of *Scoparia* has been attempted on Tantalus. The microlepidoptera cannot be dealt with at present, but at certain seasons the Tineina are very numerous represented.

HYMENOPTERA.

The Aculeate Hymenoptera of the lowest slopes of Tantalus have as yet been little studied, the forest-frequenting forms have

been more assiduously collected, and of the latter class probably not many additions are to be expected.

Of the Fossores *Nesomimesa antennata*, preying on daddy-long-legs of the subfam. Limnobiinae, is very common, and was collected nearly a century ago by the early explorers. A species of *Deinomimesa* should occur, since on the other islands the two genera are found together. *Crabro tumidoventris*, *monticola*, *unicolor*, and *notostictus* are all present, and the three latter are more noticeable amongst the guava scrub of the lower ridges. The very rare and singular *Crabro abnormis* should be looked for. I have found it at elevations of about 1500 feet elsewhere, but not on Tantalus, though Blackburn's type was taken hard by.

Nesocrabro stygius flies on the higher ridges, that are covered with "Ieie," and preys on the metallic green flies of the genus *Dyscritomyia* and *Prosthechaeta*.

Fourteen species of *Odynerus* have been found, including four of the rarest species. Three of these, *O. leiodemus*, *eucharis*, and *homoeophanes* are red and black species, and fly in company with three similarly coloured but common species—*O. pseudochromus*, *O. pseudochromoides*, and *O. oahuensis*. I always keep a special lookout for these rare species and usually take a specimen of one or more of them on each of my visits to Tantalus. The other choice species is *O. illudens*, a black species, which exactly resembles *O. montanus* and other common species superficially, and flies with these. *O. unicus*, *rudolphi*, *montanus*, and *nigripennis* are generally distributed, whilst *threnodes*, *oblitus*, and *dubiosus* are more abundant on the lowest slopes and plains.

The bees of the genus *Nesoprotopis* are *facilis*, *difficilis*, *anthracina*, *koae*, *fuscipennis*, the parasitic *volatilis*, and the rare and remarkable *anomala*. The latter, one of the finest and most interesting of the native bees, I have taken in the forest of introduced trees, and once I saw it on Tantalus itself. It is a very desirable insect. The single native ant *Ponera perkinsi*, is found in shady or damp places and is common. Its communities consist rarely of more than a dozen individuals.

The parasitic Hymenoptera are very imperfectly known. There are two species of *Scleroderma*, and three of *Sierola* at least, amongst the Bethyridae. They are no doubt parasitic on *Cis* and possibly other small beetles, and they may frequently be bred from deadwood infested by these.

A *Pseudogonatopus* is parasitic on small Delphacids and apparently does not differ specifically from the somewhat variable species found on the other islands. *Echthrodolphax fairchildii* is also commonly parasitic on two or three species of the same leaf-hoppers. One or two species of Cynipids have been taken, probably species of *Aglaotoma*, and most likely parasitic on the larvae of the small flies of the genus *Drosophila*, in company with which I have elsewhere noticed them. A Diapriid is also probably a parasite on some Dipterous insect. In the Chalcid group we may note species of the genera *Toxeuma* and *Neolelaps*, and several of *Eupelmus*. The latter are interesting from their diversity of habits, some being parasites of Coleopterous larvae, some of Chrysopides, and some of Orthopterous eggs. *Anastatus koebelei* is a common parasite in Locustid eggs, and of two other Eupelmines (one forming the rather remarkable genus *Solindenia*) the hosts are not known. An *Astichus*, and four or five other Eulophids of various groups, occur. *Polynema reduvioli* is often seen on the wing, and two other mymarids, one of which is parasitic in leaf-hopper's eggs, have also been taken.

The Ichneumons known in the locality are very few, *Evania sericea*, a cockroach parasite, has not yet been found in other countries. *Echthromorpha maculipennis* and *Pimpla hawaiiensis*, the Ophionines *Enicospilus mauicola*, *kaalae*, *dispilus*, *molokaiensis* and *dimidiatus* are all parasites of various species of Lepidoptera, *Omiodes*, *Agrotis*, *Vanessa*, and *Scotorythra* being attacked by them. One or two species of *Limnerium* are common parasites of various Pyralids and one or more species of *Atrometus* may also be found.

The two common Braconids parasitic on Longicorns of all kinds, and *Chelonus blackburni* and *Phanerotoma*, though described from the islands, are certainly all introduced, but the little apterous *Ecphylopsis* is, no doubt, endemic.

COLEOPTERA.

The native beetles of Tantalus have been a good deal collected and many species are to be found in the forest. Some of these are only found on or about this locality, or at least are much more abundant here than elsewhere. This seems to me to be partly due to the fact that the rainfall being largely precipitated

on the mountains a mile or two behind Tantalus, the climate becomes more agreeable to the Hawaiian beetles on this mountain, for it is noteworthy that in most localities with excessive precipitation the Coleopterous fauna is scanty.

The native Longicorns are not very numerous consisting of our single species of *Parandra*, *Aegosoma reflexum*, the small *Clytarlus fragilis* of the Koa, and several *Plagithmysus*. *P. solitarius* is on *Eugenia sandwichensis* and is not rare. More rarely it breeds in *Metrosiderus*. On one occasion I took eighty larvae in a small piece of wood of the "Ohia-ha," but all save two were destroyed by Braconid parasites, and the elevation being only about 1200 feet ants also were attacking the beetles. *P. pulverulentus* and *cristatus* are common on unhealthy Koa trees and as these unhealthy trees, owing to the settlement on the mountain, are now abundant, the beetles must be extremely so. *Callithmysus koebelei* in shady places on *Pipturus*, and *C. microgaster* on *Bobea* are always worth looking for. I have taken *microgaster* in May, June and November, *koebelei* chiefly in the latter month. The larvae of *microgaster* I have taken in numbers, but the beetles rarely and singly. Of the weevils the fine Otiorhynchine, *Rhyncogonus blackburni* is found sparsely on all sorts of trees, but its life history is altogether unknown. The hitherto unique *R. koebelei* was found near by, and should be rediscovered. The Cryptorhynchines are represented by *Acalles duplex* and at least three or four other species, all but the one named being most difficult to collect. I have cut some of them out of very hard and dry dead twigs and branches of different forest trees. *Dryophthorus* is well represented by *squalidus*, *distinguendus*, *gravidus*, *crassus*, *declivis*, *modestus*, *oahuensis*, *insignis* and *insignoides*; *pusillus*, the distinctness of which from *modestus* seems to me doubtful, might be rediscovered in tree-ferns, where it was found by Blackburn. The *Dryophthorus* are gregarious and it is quite usual to find from two to half a dozen species in a single flock. *Pentarthrum prolixum* is abundant on tree-ferns, and *obscurum* and *blackburni* are both to be found, the latter at very low elevations or even on the plains. *Orothreptes callithrix*, originally described from Kona, Hawaii, is not rare at 1500 feet and *Deinocossonus* is taken singly and infrequently. *Pseudolus* (two species) and *Phloeophagosoma* are in decaying Kukui, Cactus, and other soft woods, while an undescribed *Nesotocus* is very rare.

Oodemas yields three species of these brassy weevils and *Anotheorus montanus* feeds in dead wood of various trees, *Acacia*, *Aleurites*, and *Pisonia*.

The interesting *Heteramphus filicum* is found in stems of tree ferns, and no doubt the other species can be obtained on the steep sides of Manoa. Three or four species of *Xyleborus* burrow in sickly or dead trees, and probably others remain to be discovered.

In *Proterhinus*, Tantalus is very rich and it is unlikely that much, if anything, new will be obtained in this line, though it should be said that one or two are yet undescribed. Some of the species are excessively difficult to obtain, especially those that burrow in the hardest tree trunks and have to be cut out. Others are extremely abundant. Some species attack many trees even introduced ones, but others are absolutely attached to a single kind. *Proterhinus ruficornis* is local, *squamicollis* rare; *obscuricolor*, *subplanatus*, *angularis* and *archaeus* are all on *Straussia*; *simplex*, *obscurus* and *vestitus* on various trees, being polyphagous; *oscillans* and *vicinus* on Koa; *pusillus* on *Pelea*; *dispar* on *Wikstroemia*; *blackburni* on various trees and ferns; *deceptor* on Hau and some other trees; *longulus* on tree ferns; *oahuensis* in hard tree trunks; *oxygonias* and one or two others as yet imperfectly known. Blackburn's *P. paradoxus* and *P. oahuensis* are the rarest and most desirable species, the former not having been found since it was first collected. Two endemic Tenebrionids *Cistela crassicornis* and *apicalis* occur very rarely, and *Labetis*, a peculiar genus, two species of which were taken on Oahu by Blackburn, should turn up.

Many native Cioidae are to be found, most of them feeding on microscopic fungi in dead wood, but a few prefer the large woody growths on various trees. *Cis alienus* and *pacificus*, especially the latter, may not be really native, but the endemic species are *cognatissimus*, *tabidus*, *bicolor*, *insularis*, *porcatus*, *setarius*, *calidus*, *signatus*, *roridus*, *evanescens*, and *laeticulus*; of these *calidus*, *insularis* and *roridus* are the least numerous, but none are very rare. Two or three species of *apterocis* are found, *ephistemoides* being one of the commonest of beetles.

Anobiids are not well represented, only one or two species of *Mirosternus* and the same of *Xyletobius* and *Holcobius* being found. Their headquarters in Oahu is the Waialua end of

the range and they become scarcer and scarcer, as one comes towards Honolulu, and in no part of this island does one meet with them in the great numbers one finds on the uplands of Hawaii near Kilauea. *Holcobioides glabricollis* is the most interesting species and is not rare on Koa trees. Elateridae are represented by the two endemic genera *Eopenthes* and *Itodacnus*, two species of the latter, and not less than six or eight of the former. Tantalus is probably the best known locality for these beetles, which in most places are rare or altogether absent. They are only found during the summer months, and the larvae feed in decaying wood. The beetles are often found feeding in the flowers of the Ohia, in fact are the only Coleopterous insects that visit flowers for the sake of the sweet contents of these.

About four *Eucnemidae* of the genus *Fornax* are known. The larvae are common, but unless collecting systematically one rarely comes across the mature insects.

There is a single species of the native genus *Labrocerus*, and it is not at all common and is usually found in company with the Anobiid *Xyletobius*, which it somewhat closely resembles in superficial appearance.

The Cucujids *Brontolaemus elegans* and *Laemophloeus aeneus* are both found, the former commonly, the latter very rarely. Information as to their life-history is needed, as they seem to have some connection with the various Longicorn beetles and their burrows.

The Colydiid, *Antilissus aper* is generally found under bark of *Straussia* with the two Staphylinids *Glyptoma blackburni* and *Lispinodes explicandus*.

The Nitidulidae have two or three species of *Goniorhynchus* and no less than fourteen of *Brachypeplus*. *B. tinctus* and *vestitus* on flowers; *discedens*, *parallelus* and *omaloides* on *Freyinetia*; *robustus* on Lobeliaceous plants; *guttatus* on decayed and exuding Koa; *reitteri* on banana; *infimus* on *Pisonia*; *aper* on various trees, but not very common; *explanatus*, *impressus*, and *inaequalis* on several trees and climbing plants; *brevis* and a species not yet described under rubbish on the ground in shady places. The Histeridae yield two species at least of *Aeletes* and one or two smaller beetles, probably *Acritus* and *Bacanius*.

The Staphylinidae have hardly been worked at on Oahu since Blackburn's time, who took many species. One or two

very minute *Oligota*, one or two *Myllaena* all rare, and an occasional *Diestota* are all I have noted. *Glyptoma blackburni* and the much rarer *Lispinodes* I have already mentioned under Colydiidae. The Staphylinidae of Oahu require a very special study extending over several years to get together a fairly good collection.

The Carabidae are well represented by one or two extremely common and some very scarce species. *Chalcomenus corruscus* may be found running in the day time on bare ground or at the bottom of gulches. It is interesting as being the first known Hawaiian Carabid. It was described in 1834 or half a century before any other species. *Colpocaccus tantalus* is very common in many situations and fifty or a hundred individuals are sometimes found in a single batch. *Mesothriscus muscicola* is not rare and *M. prognathus* probably came from the same locality. *Metromenus* has the following species; *palmae* common on *Freycinctia*; *mutabilis* in stems of tree ferns; *epicurus* abundant and very variable in colour and structure; *fraternus* rare, *fossipennis* local, *fugitivus* not rare; *protervus* very rare; *cuneipennis* rather common.

M. cuneipennis and *fugitivus* are true ground species, while the others named are found in various situations. There are also three or four other species, which have not been accurately determined at present. *Thriscothorax brevis* is not rare and is always found on the ground, and *Metrothorax simiolus* is sometimes with it, but more often found in cavities of tree ferns or rotting wood. *Bembidium teres* runs on the ground in gulches or damp places, as also does *B. pacificum*. Though abundant elsewhere in the islands, neither is common on Tantalus. Probably many other Oahuan Carabidae remain to be found in this locality and the unique *Deropristus blaptoides*, the finest of all Hawaiian Carabidae, should be looked for under stones, and the green metallic species of *Derobrosus* and *Brosconymus* in cavities in the higher branches of Koa trees.

HEMIPTERA HOMOPTERA.

Three or four species of Psyllidae are found, causing gall-like growths on the leaves of *Pelea* and *Metrosideros*. Those with pigmented wings are always rare or local species. There are some four species of Jassidae, but the Fulgorids are better repre-

sented with at least eight species of Delphacidae, four or five *Oliarus*, and a common *Iolania*. Compared with the orders already dealt with, however, the Rhynchota are very commonplace and poorly represented.

HETEROPTERA.

Lasiochilus denigratus is, so far as I remember, not abundant, and is probably the only truly endemic Anthocorid on Tantalus. *Orthotylus* of the Capsidae yields five or six species, and there are probably more. The one described *Kamehameha* is scarce but there is a second species or very distinct variety of this. *Koanoa* is sometimes common. *Nesidiorchestes* is abundant, but tedious to collect in numbers. *Pseudoclerada morai* is not common but is nearly always obtainable. *Oronomiris* is abundant on grass at all elevations. *Acanthia oahuensis* is found amongst wet leaves and on bare ground while some species of *Ploiariodes* are common and there is a *Nesidiorchestes*. Of *Reduviolus*, *blackburni*, *subrufus*, *rubritinctus* and *lusciosus*, the latter as defined in the Fauna Hawaiiensis, embracing at least three distinct species from Tantalus. A *Sephora*, probably *calvus*, is terrestrial and three or four *Nysius* are more or less common. Three species of *Metrarga* occur together, *M. nuda* is commonest and is both arboreal and terrestrial, *contracta* and *villosa* are generally, if not always, terrestrial, amongst decaying vegetation. I once took all three species on one day, on a certain ridge. *Oechalia grisea* is periodically abundant, *Coleotichus* less common, but not rare, and frequents ferns and Koa trees.

DIPTERA.

The Diptera have been studied least of all Hawaiian insects and no doubt many new species can be taken on Tantalus, or in any other mountain locality. The rather fine Sarcophagid flies of the genus *Prostethochaeta* and *Dyscritomyia* occur but only one or two species of either. Somewhat resembling flesh-flies of the genus *Lucilia*, they are by far the finest Hawaiian Diptera, but in other countries would attract little attention. The small flightless Dolichopodid of the genus *Emperoptera* is locally common. Of *Pipunculus* there are at least three species, parasitic on leafhoppers. The species of *Drosophila*, of which several are known breeding in banana stems, *Pisomia* and other trees, and the

various species of *Caenosia* are well worth collecting, as there must be many new species of these. Other still smaller and more obscure Acalypterate muscids are numerous. They should be collected in large numbers, as most of the individuals preserve badly.

ORTHOPTERA.

The little native cockroach *Phyllodromia obtusata* is extremely common, but the two very distinct species of *Brachymetopa* in the Locustidae are much more interesting. *B. blackburni* is dimorphic, having a brownish or testaceous form with black face, and a bright green form. The males are usually of the testaceous form, the females green, but occasionally a brown female or green male is found. Some of the green examples have the face largely brownish, and thus resemble *B. unica* superficially, but there are no true intermediate forms between the two phases of *blackburni*. *B. unica* is a rare species, known only as a green form, but a yellowish or brown one will probably be discovered if a number of specimens be collected. It is a most distinct species.

In the Gryllidae *Paratrigonidium* yields several species, *saltator* on *Freycinetia*, *subroseum* only on Ohia, *pacificum* terrestrial, and at least two other species, probably *varians* and *debile*. *Prognathogryllus stridulans* is the species called *Nesogryllus stridulans* in the Fauna Hawaiiensis, the curious sexual characters being formerly unknown. *Leptogryllus nigrolineatus* is found at the base of leaves of *Freycinetia*, and *fusconotatus* in exactly similar situations.

NEUROPTERA.

The Neuroptera are not well known at present; the Heme-
robiids *Megalomus hospes* and *Nesomicromus vagus* are common and one other species, probably *subochraceus*. *Anomalochrysa deceptor*, *biseriata*, *proteus*, and *cognata* have been taken, and there are certainly others.

Stray specimens of the dragon-fly *Sympetrum blackburni* are occasionally seen, and of the great *Anax strenuus*, and the following Agrionines *A. xanthomelas*, *hawaiiense?*, *nigro-hamatum*, *deceptor*, and *oceanicum*. All these are stragglers from neighboring waters, but I noticed three of the five in one spot the other day. *A. asteliae*, *A. koelense*, and *A. oahuense* all breed at

the bases of leaves of *Freycinetia* and other plants, the larvae being arboreal and not living in water, and they occur regularly on Tantalus, *koelense* being very common. *Psocidae* are very common and several native species are present, but many recently introduced forms have now occupied this mountain, and the native ones are more agreeably studied in more remote localities.

The above lists though no doubt very imperfect, are sufficiently extensive to show that a fine field for work is close at hand for those who have any ambition to study the peculiar fauna of Hawaii. The best localities are within an hour and a half's walk of our meeting place here. I would rather advise the thorough study of some of the more interesting of the insects already known, than the usual hunt after new species, the acquisition of which will probably be of comparatively little importance. To know the life-history of *Rhyncogonus blackburni* and why it remains so comparatively weak in individuals; or to fully ascertain the life-history of some of the Carabids, and why again some are so common, others so extremely rare; what furnishes food for the larvae of such common species as *Metromenus epicurus* or *Colpocaccus tantalus* would be far more interesting than the discovery of half a dozen new *Proterhinus*, which would surely differ but little from species already known. However, looked at even from the view of acquiring *new species* he would be a bold man, who would say that there are not many such to be obtained on Mount Tantalus.

MARCH 1st, 1906.

The fourteenth meeting was presided over by Mr. Kirkaldy.

NOTES AND EXHIBITIONS.

Dr. Cobb, in examining sugar-cane affected with the "iliau" disease, had observed a Lepidopterous larva in numbers constantly present where the disease existed. The latter being saprophytic he was inclined to suspect that some relation existed between these caterpillars and the disease. At the Hutchison Plantation he had observed another sugar-cane disease associated with Lepidopterous Larvae. On one plantation on Hawaii he had observed earwigs in the cane in great abundance, while in Hilo

he had observed *Xiphidium varipenne* in considerable numbers, having counted as many as thirty or forty on the ceiling of his room.

Mr. Swezey stated that since writing on *X. varipenne*, he had observed this species partaking of more vegetable food than he had formerly supposed. He had seen it eating the flowers of *Lantana* quite extensively, showing a decided taste for the immature stamens; he had also seen it devouring the flowers of the wild *Canna*, as well as a sugar-cane leaf, at the Experiment Station.

PAPERS.

The Chairman read a paper by MR. R. C. L. PERKINS, entitled: "A New Method of Relaxing and Cleaning Specimens," and exhibited examples.

Anyone who has had an extensive experience in relaxing and mounting dried specimens of insects, must have come across specimens so difficult to deal with, after the usual methods of relaxing have been tried on them, as to be almost impossible to mount in proper style. Anyone of ordinary powers of observation must have noticed that relaxation is greatly facilitated by the use of naphthaline in the relaxing jar. Further, it is obvious that that most valuable, in fact indispensable, preservative of insects, carbolic acid, tends to make specimens more difficult to relax, by inducing a wire-like condition of the limbs.

At various times Dr. Sharp and myself came across specimens, amongst my Hawaiian collections, in this condition, and we were forced to be content to simply pin up such specimens without expanding the limbs, antennae, etc. Lately I discovered a misplaced box of Tantalus beetles, collected in 1902 and not seen since, all of which had become covered with a dense growth of mould, and were in an apparently hopeless condition. Wishing to clean them, at least sufficiently for a determination of the species, I tried various methods without any great results, till I finally hit upon the following method. In a tumbler of nearly boiling water place a piece of soap as large as a large pea, and a small spoonful of pure naphthaline, stir till the soap is sufficiently dissolved to make the water at least milky. While the water is still very hot—too hot for one to keep one's hand on the glass—put in the mouldy or stubborn beetles and cover the top of the

glass. The time required for relaxation varies with the nature of the beetle and its condition.

A *Rhyncogonus blackburni*, which after a day or two in the usual relaxing jar it was impossible to mount properly, was in perfect condition for mounting in thirty minutes. This was a 1902 specimen.

A large Cossonid *Nesotocus munroi*, a species which is most apt to assume a most wiry condition, and was one of the worst samples of this condition I have ever seen, was mounted after one hour's immersion, but less easily than the *Rhyncogonus*. This specimen, however, was nine or ten years old, had been collected in alcohol, then simply pinned with all the legs folded up, and entangled; and subjected to the fumes of carbolic in a store box for at least eight years. As to the mouldy specimens the treatment was first given to some moderate-sized Carabids. Every particle of mould brushed off with ease, and relaxation was complete in thirty minutes. I then tried smaller species, *Bembidium*, with similar results. The surface of the Carabidae being smooth, I then took mouldy specimens of the little beetle *Antilissus aper*, a species very easily injured. The results were similar, the mould was removed in spite of the rough surface, the sculpture and setae showing again in the most perfect manner. The most obstinate and dirty specimens of *Dryophthorus* and *Oodemus* were cleaned to a degree that exhibited the clothing or sculpture in a way never seen in specimens taken at large. I exhibit one or two species of beetles relaxed and cleaned by the above method, not as samples of absolutely accurate mounting, but as showing what can be done with apparently hopeless specimens.

MR. O. H. SWEZEY read "Life History Notes and Observations on Three Common Moths," and exhibited specimens.

(1) *Plusia chalcites*, Esp.

This common moth of the Hawaiian Islands, occurs also in other Pacific Islands, Australia, Southern Asia, Africa, and Southern Europe.

Life History.—The eggs are white, about one-half mm. in diameter, flattened, height about half the diameter, entire surface covered with concavities like those on a thimble arranged in

regular rows radiating from the apex. They are deposited singly on the under surface of leaves. I observed a female ovipositing, one evening just before it was too dark to see the eggs. She was fluttering around some bean vines, and would occasionally alight but an instant on the edge of a leaf, bending her abdomen beneath to place the egg on the under surface; then she would fly about a few moments and go to another leaf. I watched her several minutes, and she oviposited at the rate of about two eggs per minute.

Some of the eggs hatched in six days. The freshly hatched larvae are 2 mm. long, green with black hairs situated in small black tubercles. At first they ate small patches of the substance of the leaf, leaving the opposite epidermis; but when five days old they ate small holes entirely thru the leaf. Larger caterpillars ate larger holes, and ate the leaves from the margin as well.

There is very little change in the larva at the successive molts, except in size. The full-grown larva is about 36 mm. long; bright green, with a white line just above the line of spiracles, and several faint, crinkly, white lines down the back, often a black spiracular line; tubercles mostly white, except a row just above the spiracles which are black and larger than the others. (Usually all tubercles were black previous to the last molt). Feet often black; head green, with black dots where the hairs are situated, and a black line on lateral margins; mandibles blackish on tip and edges. The prolegs are situated on segments 9, 10 and 13, and the caterpillar crawls by a looping motion; when at rest, its back is humped up.

A caterpillar in breeding cage obtained its growth and ready to pupate in twenty-three days. The pupa is pale green with a broad brown streak on the back, darker on the margins of the segments, the whole pupa turning brownish a little before the adult emerges; wing and leg-cases extend just a little beyond the posterior margin of the fourth abdominal segment; cremaster short, with several tiny brown hooks attaching the pupa to the slight white silken cocoon, which is made between leaves fastened together, or in the fold of a single leaf; length of pupa 19 mm., width 4.5 mm. The pupal period is eight to eleven days.

Food plants.—Caterpillars of this species are quite general feeders. I have found them feeding upon the following plants:

Adenostemma viscosum, *Ageratum conyzoides*, bean, beet, cabbage, *Canna*, cockle burr, *Coleus*, cotton, *Datura*, *Euxolus*, *Ipomoea*, *Pelargonium*, potato (both Irish and sweet), *Setaria verticillata*, *Sonchus*, sunflower, tomato, wild yam, and a few other undetermined wild plants.

(2) *Spodoptera exigua* (Hübner).

This moth was first recorded from the Hawaiian Islands by Butler (1880) who described it as *Caradrina venosa*. His description was from specimens collected near Honolulu, by Blackburn, who said it was "rare." "Macrolepidoptera," of the Fauna Hawaiiensis, gives Kona, Hawaii, and Lahaina, Maui, as places where it had been collected.

It is a widely distributed moth, being recorded from Great Britain, Southern Europe, Africa, Southern Asia, China, Japan, Australia, Hawaiian Islands, and Western United States. In the latter country it has been reported from Oregon, California, Colorado and New Mexico, where it is known as the Beet Army Worm (*Caradrina (Laphygma) exigua* Hbn.)

A very complete account of its depredations, habits, life history, etc., together with figures, is given in Bul. U. S. Div. Ent. 33 n. s., pp. 37-46, 1902.

It is not nearly so common on these Islands as *Spodoptera mauritia*. I have found it on only two occasions. The first was at Pahala, Hawaii, Dec. 5, 1905. A large number of larvae of all sizes were found feeding on Castor Oil plants (*Ricinus communis*), in a small gulch in a sugar cane field of the plantation of the Hawaiian Agricultural Co. Several egg clusters were also found, which on hatching proved to be this same species.

The egg clusters were on the upper surface of a leaf. In one cluster, 40 eggs were counted. They were spherical, in regular rows, one layer deep, and the cluster densely covered with greyish hairs from the body of the moth.

One cluster of 100 was found which had just hatched. The larvae were two mm. long, green with black heads, and finely pubescent, each hair in a tiny black tubercle.

While young they fed gregariously on the upper surface of a leaf along a vein where the leaf was somewhat depressed, and they ate only the green substance of the leaf, leaving the lower epidermis. They were covered by a slight web. As they increase in size they become more separated, often feeding

singly, but protected by a web, tho not always. Finally, when about full grown, they were found without the protecting web; and they ate the leaf entirely, making ragged holes, not leaving the lower epidermis.

The ground color of the upper surface of a larva 12 mm. long is black, with fine longitudinal, crinkly, much interrupted lines of yellowish; there are three nearly complete yellow lines on dorsal side, the middle one forking on the head; a broad yellowish line just below the level of the spiracles; there is a row of white dots on each side, one dot behind and a little above each abdominal spiracle; under side paler than upper.

A larva somewhat larger had the same markings except that the yellowish lines have become greenish. As they become older there is quite a variation in the degree of coloration, often the green predominates, and an occasional specimen is almost entirely black, but all have a black line on the level of the spiracles; the mid-dorsal pale line is nearly obliterated; spiracles are brownish, with black borders. Some of the larger caterpillars were collected to rear to maturity, which determined the species.

On Dec. 30, 1905, a cluster of eggs was found on *Euxolus* sp. (one of the Amarantaceae) in a weed patch in Honolulu. These eggs hatched Jan. 1, 1906, and were fed until full grown upon leaves of *Euxolus*. Four larva were full grown and ready to pupate, in sixteen days; length 25 mm. They entered the ground to pupate.

The pupa is 12 mm. long; medium brown, with some greenish on wing and leg-cases; smooth, except a punctate band on anterior margin of segments 4, 5, 6, 7 of abdomen; abdominal spiracles black, very slightly raised; cremaster two sharp-pointed spines.

The pupal period was twelve to seventeen days.

I have not found this species feeding on any other plant than *Ricinus*, and *Euxolus*; but Meyrick gives *Plantago* as its food plant; and in Western United States it is considered a pest on the sugar beet, tho it is quite a general feeder, having been reported on table beets, lambsquarters, pigweed, saltbush, Russian thistle (all closely related plants) and when numerous feed also on corn, potato, pea, onion, wild sunflower, leaves of apple, mallow, *Nicotina glauca*, *Cleome*, and wild grasses.

(3) *Spodoptera mauritia* Bois.

This moth occurs commonly in these islands, in fact at one time was a serious pest. Mr. Perkins says that their numbers were greatly reduced after the introduction of the Mynah birds, these birds feeding largely upon the caterpillars. The species occurs also in Mauritius, West Africa, Southern Asia, and throught Oriental and Australian regions.

The caterpillars feed upon grasses, and I have found them on young sweet corn and peas, also on a sedge (*Cyperus rotundus*), commonly called "bulb grass" or "nut grass," which is a troublesome weed in lawns and gardens. At the Experiment Station of the Hawaiian Sugar Planter's Association, they were found feeding on very young sugar cane seedlings during January and February, 1906. They were first discovered on January 3d, when a few of the tiny green larvae were found on very small cane seedlings in propogating boxes. A few of these larvae were found each day for several days thereafter; on one day (Jan. 10), twenty-five were found. Although very small, the cane plants were also very small (one to two inches in height), and if a larva had fed for two or three days upon a plant before discovery, the plant was nearly destroyed; so that quite a little trouble and some loss was caused by these caterpillars during the months mentioned. Usually not more than one caterpillar would be found on a plant, but occasionally as many as four were found. Being green, and so small, they were most easily detected by first seeing the partially dead leaf where they had eaten, as they began near the apex of the leaf and continued downwards, eating the mesophyll and leaving the opposite epidermis. On being disturbed they dropped to the ground by a fine silken fiber, and curled up. Several of the caterpillars were reared to maturity.

Life History.—The eggs of this moth are spherical, vertically striated, and laid in clusters on the surface of some object. They are usually in one layer and in regular rows, and covered by a few hairs from the body of the moth; 100 to 300 eggs per cluster. I have found them on leaves of banana and oleander at a distance of five feet from the ground. At the H. S. P. A. Experiment Station a large number of egg clusters have been observed on the outside of the insectaries, one as high as ten feet from the ground. A hatched cluster was found in a shed where the boxes of cane

seedlings before mentioned were placed at nighttimes. It was in such a position that the young larvae might drop onto the cane seedlings below, as it is their habit on hatching to drop to the ground by a silken thread. This probably accounts for the cane seedlings having been infested, as the small caterpillars were scattered quite generally amongst the propagating boxes; whereas, if a cluster of eggs had been deposited on any one box, the larvae would not for some time have been likely to get to other boxes, but would all have attacked the cane plants in that one box.

When larvae are a few days old, they consume the entire substance of the leaf, not leaving the epidermis as they did at first. They obtained their growth in about twenty-one days, and were about 35 mm. long. From being green at first, in successive molts, they became darker, often almost entirely black. They entered the ground to pupate. The pupa is similar to that of *S. exigua*, but slightly larger, and the spiracles a little more raised. The pupal period is eleven to fourteen days.

Dyar has described all of the preparatory stages of this moth (Can. Ent. XXVI, p. 65, 1894) under the name *Laphygma flavimaculata*. A correction of the name is made in Can. Ent. XXXII, p. 156, 1900. This is a very complete description, but the spiracles of the caterpillar are black, instead of white as he describes them. He has evidently mistaken for spiracles a row of white dots behind and a little above the spiracles on segments 5 to 12.

MR. F. W. TERRY discussed the "Increase of the Antennal Segments in the Forficulids *Chelisoche morio* (Fabricius) and *Forficula auricularia* Linnaeus," and exhibited specimens.

Whilst studying the life-history of *Chelisoche morio**, I made some observations on the numerical increase of the antennal segments. It was found that there was a definite increment at each ecdysis, the extra segments always appearing to arise from subdivisions of the third segment. Since the publication of these observations, my attention has been called to a paper by Meinert† on the life-history of *Forficula auricularia*. This author appears somewhat vague in his observations; he states

* Bull. Hawaiian Plant. Ent. 165-6 1905.

† Naturh. Tidsskr. (3) II, 427-82 Pl. IX (1864).

that the larva upon emergence from the egg has "six or eight" antennal segments, this number being increased by two at each moult, and that the adult possesses fourteen segments. As regards the number of moults, he is also uncertain, stating that there are "three or four." Now, although possible, it is improbable that the number of ecdyses should normally vary in these two types. We know that the number of moults in *Chelisoches* is four, and that the increase of the antennal segments at each successive moult is as follows: four (1st moult), four (2d moult), three (3d moult), one (4th moult). Assuming that there are four ecdyses in *Forficula*, and that the somewhat fragmentary data of Meinert are correct, we obtain the following comparison:

NUMBER OF ANTENNAL SEGMENTS.

	1st instar	2nd instar	3rd instar	4th instar	5th instar
<i>Chelisoches</i>	8	12	16	19	20
<i>Forficula</i>	6	8	10	12	14

Whether the above problematic increase is correct for *Forficula auricularia* requires to be verified, and it will be of interest if some entomologist having access to this common species will investigate this question.

MR. J. KOTINSKY read notes on a "**Hymenopterous Parasite of an Orthopterous Egg**," and exhibited specimens.

Last October I collected up Nuuanu Valley a leaf which contained an Orthopterous egg from which in November issued *Anastatus koebelei* Ashmead, as determined by Mr. Perkins. This month I received a collection of eggs that seem to be a similar, if not the same, species, from Hilo, Hawaii, on coffee leaves, collected by Bro. Matthias Newell. From these I bred a large number of a small black Chalcidoid parasite, which, judging from its size, seems to be secondary.

The host has since been partially reared and found to be *Elimaea appendiculata*, which Mr. Perkins states, habitually oviposits in young shoots of trees like the Avocado Pear.

In the discussion on the above four papers, Mr. Kotinsky had observed *Plusia chalcites* ovipositing on violets on Tantalus; while Mr. Giffard had seen it ovipositing on *Salvia* at the same place. Referring to Mr. Terry's notes, Mr. Kotinsky observed that in *Dactylopius* there is frequently a variation in the number of antennal segments, one species having either seven or eight, and it has been noted that the additional segment is usually formed by the division of the third.

APRIL 5th, 1906.

The fifteenth regular meeting was presided over by Mr. Kirkaldy.

Member elected: Mr. W. E. Chambers.

Amendment to Constitution: After due notice given at the previous meeting, Mr. Kirkaldy moved that Article VI of the Constitution be amended to read "The annual meeting for the election of officers shall be the regular meeting for the month of December," instead of "January," as it reads at present. The motion was seconded by Mr. Van Dine and carried.

NOTES AND EXHIBITION OF SPECIMENS.

Mr. Kotinsky exhibited thirty-two specimens of *Dacus cucurbitae* bred from a tomato, collected in the city; this was the first record of this pest on tomatoes, although it has been previously spoken of as occurring on this fruit. He had ascertained from Mr. Maxwell-Lefroy, Government Entomologist of India, that the fly occurs in India and is there kept in check by parasites. Mr. Weinrich said that tomatoes and melons were being attacked at Sisal by this fly. Mr. Van Dine stated that over-irrigation makes the plants subject to attack by this fly more succulent and therefore, more vulnerable; artificial pollination and immediate covering of the fertilized flowers are means resorted to on these Islands for securing cucurbitaceous fruit.

- 10 (5) Intermediate tibiae with a distinct calcar.
- 11 (28) Thorax or abdomen or both with red markings.
- 12 (13) Basal abdominal segment entirely red above, or at most a little infuscate, second also largely red as also the tegulae.
Odynerus frater.
- 13 (12) Basal abdominal segment black with a red hind-margin.
- 14 (15) Prothorax and mesopleura without red spots (female).
O. paludicola.
- 15 (14) Prothorax and mesopleura marked with red.
- 16 (21) Second ventral segment very strongly and abruptly raised behind the transverse sulcature to a height much greater than that of the basal part of the segment.
- 17 (20) Red colour of pronotum extended back along its margin to reach the tegulae.
- 18 (19) Second ventral segment very strongly raised from the costae; clypeus of male red at base; mesonotum of female more finely and irregularly punctured.
O. leiodemas.
- 19 (18) Second ventral segment still more strongly raised from the sulcature; clypeus of the male not red at the base; mesonotum of female more strongly and evenly punctured.
O. pseudochromoides, sp. nov.
- 20 (17) Red markings of pronotum not extended back along the margin to touch the tegulae.
O. pseudochromus.
- 21 (16) Second ventral segment not very greatly and abruptly raised behind the costae; at most it is raised to a height about equal to the basal part of the segment in front of the costae.
- 22 (23) Mesonotum with irregular puncturation, consisting of sparse larger punctures (which are themselves not at all coarse) and finer interstitial punctures; wings shining fuscous.
O. paranaias, sp. nov.
- 23 (22) Mesonotum with very dense and uniform puncturation, or if the punctures are not so dense they are deep and coarse. Wings to a large extent subhyaline.
- 24 (27) Propodeum rugose or rugosely punctate.
- 25 (26) Mesonotum with red lines.
O. homoeophanes.
- 26 (25) Mesonotum black.
O. eucharis.
- 27 (24) Propodeum smooth, with some shallow punctures.
O. oahuensis.
- 28 (11) Thorax and abdomen without red markings, rarely with the apical margins of one or more abdominal segments very narrowly and indistinctly testaceous.
- 29 (44) One or more entire yellow or whitish bands on the abdomen (thorax also often with yellow markings).
- 30 (31) Mandibles in both sexes entirely or almost entirely red (male with the clypeus very deeply emarginate at the apex, that of the female distinctly but less deeply).
O. xerophilus.
- 31 (30) Mandibles at most red or piceous on the apical half; generally for the most part black.

- 32 (35) Second ventral segment behind the costae with a distinct impression, which is wide and shallow, or of moderate width and depth and of triangular shape (clypeus of male deeply or rather deeply emarginate).
- 33 (34) Male with the scape entirely yellow in front; female with a yellow spot on each side of the propodeum near the insertion of the abdomen. *O. nautarum.*
- 34 (33) Male with the scape black, female with the propodeum without yellow markings. *O. erro, var.*
- 35 (32) Second ventral segment behind the costae generally flattened but without a triangular depression; when there is a depression it is very narrow, linear or sublinear (clypeus of male never deeply emarginate, but sometimes an apical impression gives it the appearance of having a deeper emargination than really exists).
- 36 (37) Second ventral segment of abdomen abruptly, but not greatly raised from the apices of the costae, depression feeble and linear for the most part; wings shining fuscous without blue iridescence. *O. waianaeanus.*
- 37 (36) Second ventral segment flattish or slightly convex behind the costae, never abruptly raised from their apices, wings frequently with blue iridescence.
- 38 (39) Costae of second ventral segment very short, shorter than the tumid basal part of the segment anterior to them. *O. acoelogaster.*
- 39 (38) Costae of second ventral segment not very short, the middle ones generally long and not shorter than the basal division of the segment.
- 40 (41) Wings shining fuscous, without distinct blue iridescence, clypeus and thorax entirely black (female unknown). *O. acyanus.*
- 41 (40) Wings dark, with more or less evident blue or steely iridescence clypeus of male nearly always and thorax often yellow-marked.
- 42 (43) Maxillary palpi of female very long and fringed with long hairs; male with the front of head rather remotely punctured, maxillary palpi more developed. *Pseudopterocheilus relictus.*
- 43 (42) Maxillary palpi of female normal; head closely punctate in front in the male and the palpi less developed. *Odynerus lithophilus.*
- 44 (29) Abdomen not yellow-banded, rarely with the margins of some of the segments faintly and inconspicuously testaceous; thorax not yellow-marked.
- 45 (54) Wings dark, with distinct blue or purple iridescence.
- 46 (51) Propodeum rugose or rugosely punctured; second ventral segment with a wide shallow depression, and all the costae well developed.

- 47 (48) Second dorsal segment hardly visibly punctured. *O. iopteryx*.
- 48 (47) Second segment with shallow, but conspicuous, puncturation.
- 49 (50) Mesonotum very dull, scutellum with sparse and very feeble punctures. *O. illudens*.
- 50 (49) Mesonotum not extremely dull, scutellum very distinctly, generally rather deeply, though remotely, punctured. *O. montanus*.
- 51 (46) Propodeum smooth or only with feeble impressions or punctures; costae of second ventral segment sometimes more or less effaced or indistinct, at least the middle ones.
- 52 (53) Mesonotum subrugosely punctured, the punctures of two sizes but the smaller ones conspicuous; second segment beneath with a conspicuous triangular depression. *O. erro*.
- 53 (52) Mesonotum with fine sparse puncturation; second ventral segment with a narrow and shallow depression, the costae usually more or less effaced at least in the middle of the series. *O. unicus*.
- 54 (45) Wings shining fuscous without blue or steely iridescence.
- 55 (56) Large species (about 10 mm. to apex of second abdominal segment,) mesonotum subrugosely punctate, the smaller punctures being unusually developed in size as compared with the larger, the latter fine and the whole tending to run into one another. *O. paranaia*.
- 56 (55) Small species, less than the above in length; mesonotum without the sculpture described above.
- 57 (58) Second dorsal segment in dorsal aspect raised into a conico-tuberculate form at about one-fourth of its length from the base. *O. pterophaennes*.
- 58 (57) Second dorsal segment only convex, not conico-tuberculate.
- 59 (60) Depression of second ventral segment wider and shallower; female with the scutellum much more feebly punctured than the mesonotum. *O. dubiosus*.
- 60 (59) Depression of second ventral segment narrower and deeper; female with the punctures of the scutellum not much finer and feebler than those of the mesonotum. *O. threnodes*.

(ii) SYNOPSIS OF ODYNERUS OF MAUI, MOLOKAI AND LANAI.

- 1 (2) Post-scutellum with a distinct raised serrulate or spinulose ridge dividing the dorsal and posterior surfaces; second discoidal cell about twice as high at the apex as the third is at the base. *O. nigripennis*, Holmgr.
- 2 (1) Post-scutellum without such a ridge; second discoidal cell generally much less than twice as high at the apex as the third is at the base.
- 3 (30) Abdomen with red-markings, sometimes only the hind margin of the basal segment with a red band, entire or broken; if the abdomen has no red markings, then the mesopleura have a red spot.

- 4 (5) First and second abdominal segments for the most part red, second sometimes black or fuscous at base and apex but red on the disc. *O. fraier*, D. T.
- 5 (4) First and second abdominal segments not for the most part red, if the first is red then the second is always black on the disc.
- 6 (7) Second ventral segment extremely strongly and abruptly raised behind the transverse sulcature to a height much greater than that of the basal part of the segment, the sulcature smooth and without costae. *O. homoeogaster*, P.
- 7 (6) Second ventral segment not very greatly raised, if moderately raised then the costae are present and the sulcature is not smooth and shining.
- 8 (13) Clypeus of the male extremely strongly emarginate, the emargination hardly less than semi-circular or even stronger; female with the clypeus strongly and distinctly emarginate, but sometimes much less deeply than that of the male.
- 9 (12) Basal abdominal segment for the most part red; second ventral segment with a shallow, or very shallow and vague, depression beyond the costae.
- 10 (11) Smaller, length to apex of second abdominal segment less than nine mm.; no median yellow frontal spot; punctures of basal abdominal segment effaced over almost the whole surface. *O. monas*, sp. nov.
- 11 (10) Larger, length to apex of second segment not less than nine mm. head with a median yellow spot; puncturation of basal abdominal segment shallow, but conspicuous. *O. cephalostictus*, P.
- 12 (9) Basal abdominal segment with a red apical band dilated at the sides; second ventral segment with a deep and distinct depression. *O. naiadum*, P.
- 13 (8) Male clypeus not extremely deeply emarginate; in the female the true emargination slight, or the apex is truncate.
- 14 (15) Clypeus distinctly red-marked on the basal half; (pronotum and apical margin of first abdominal segment always red-marked, second segment entirely black and the mandibles mostly dark. *O. tempe*, sp. nov.
- 15 (14) Clypeus not marked with red on the basal part; (pronotum in some species entirely black, second segment in many species red-marked, mandibles sometimes red).
- 16 (27) Prothorax with red-markings.
- 17 (22) Propodeum always red or red-marked.
- 18 (21) Apical margin of the second abdominal segment red.
- 19 (20) Basal abdominal segment with an apical red band strongly dilated at the sides; mesothorax somewhat finely and irregularly punctured. *O. dryas*, P.
- 20 (19) Basal segment nearly entirely red; mesothoracic punctures coarse. *O. potamophilus*, P.

- 21 (18) Apical margin of second segment not red.
 21a(21b) Basal abdominal segment nearly entirely red. *O. microdemas* P.
 21b(21a) Basal abdominal segment with an apical red band, sometimes interrupted. *O. monobius* var.
- 22 (17) Propodeum black.
 23 (24) Propodeum rugose. *O. erythrostacktes* P.
 24 (23) Propodeum smooth or punctured.
 25 (26) Propodeum smooth, impunctate or nearly so. *O. montivagus* P.
 26 (25) Propodeum densely punctured in the concavity. *O. monobius* P.
- 27 (16) Prothorax not red-marked.
 28 (29) Second abdominal segment with a red apical band. *O. sandwichensis*, de S. (*O. rubritinctus*, Sm)
 29 (28) Second segment without a red apical band. *O. petrobius*, P.
 30 (3) Abdomen without red markings, and the *mesopleura* without a red spot beneath the tegulae.
 31 (40) Costae of second ventral segment of abdomen largely effaced and indistinct, or altogether wanting, the transverse sulcature often smooth and shining, the abdomen never with two yellow bands.
 32 (33) A median red frontal spot on the face, and the prothorax always red-marked, second segment of abdomen above simple, not at all strongly convex or raised from the base, beneath greatly and abruptly raised behind the sulcature. *O. deinogaster*, P.
- 33 (32) No red frontal spot on face, the prothorax at most indistinctly reddish along the hind margin, second segment above always more or less strongly raised from the base or strongly convex in profile; beneath of various forms.
 34 (37) Second ventral segment raised from the sulcature to a height very much greater than that of its basal portion.
 35 (36) Propodeum smooth, shining; apex of clypeus red. *O. purpurifer*, P.
- 36 (35) Propodeum not smooth and shining, but punctate or subrugose apex of clypeus not red. *O. instabilis*, P.
 37 (34) Second ventral segment of abdomen (seen in profile) raised behind the sulcature only to about the height of its basal portion or a little higher.
 38 (39) Second ventral segment with a rather wide depression behind the sulcature. *O. ecostatus*, P.
 39 (38) Second ventral segment with a narrow depression. *O. laevisulcatus*, P.
- 40 (31) Transverse sulcature of second ventral segment with distinct costae, never smooth and shining; if the costae are more or less obsolete the abdomen has two yellow bands.
 41 (42) A median frontal spot and the tegulae always, other markings sometimes red. *O. camelinus*, P.

- 42 (41) Frontal spot and tegulae not red.
- 43 (46) Apical margins of two basal abdominal segments yellow or whitish *and* either the clypeus is only lightly emarginate, or if rather strongly then the second segment of the abdomen is somewhat strongly and abruptly raised from the base; in the male at least into a conical tuberculate form.
- 44 (45) Second segment of abdomen above simple, beneath not abruptly raised from the apices of the costae.
O. nubicola, P.
- 45 (44) Second segment above raised from the base; beneath abruptly elevated from the apices of the costae.
O. nivicola, P.
- 46 (43) Abdomen often black or with one yellow band, if with two bands then the clypeus is deeply or very deeply emarginate and the second dorsal segment of the abdomen is simply convex, never abruptly raised from the base into a sub-tuberculate conical form.
- 47 (52) Second ventral segment flat or nearly so behind the costae and without any depression, the basal part tumid and either the costae are extremely short compared with the basal part, or the apex of the clypeus and mandibles are both red.
- 48 (49) Apex of clypeus and mandibles both red.
O. eupteryx, P.
- 49 (48) Apex of clypeus not red.
- 50 (51) Propodeum shining.
O. brevicostatus, P.*
- 51 (50) Propodeum dull (middle tibiae without a calcar).
Nesodynerus paractias, sp. nov.
- 52 (47) Second ventral segment in most species with a more or less distinct depression behind the costae, which are never excessively short, nor is the basal part very largely developed and tumid, nor is the apex of the clypeus ever red.
- 53 (70) Males; antennae thirteen-jointed, terminal joints modified into a hook.
- 54 (61) Apex of clypeus rather deeply or very deeply emarginate, in the first case yellow or yellow-spotted.
- 55 (56) Mesothoracic puncturation nearly or entirely effaced.
O. sociabilis, P.
- 56 (55) Mesothoracic punctures always distinct, if shallow.
- 57 (60) Clypeus extremely deeply emarginate, the emargination not less than a semi-circle.
- 58 (59) Mandibles red.
O. molokaiensis, P.
- 59 (58) Mandibles dark.
O. smithii, D. T.
- 60 (57) Emargination of apex of clypeus less than a semi-circle (head above the antennae with somewhat remote puncturation).
O. insulicola, Bl.

* It is very probable that *O. brevicostatus* and possible that *O. eupteryx* belong to the genus *Nesodynerus*, the unique types of these species in the British Museum not having been examined for the essential generic character.

- 61 (54) Clypeus generally more or less impressed at the apex but the true emargination not deep.
- 62 (63) Mandibles for the most part red; propodeum with dull surface and hardly visible sculpture. *O. aprepes*, sp. nov.
- 63 (62) Mandibles generally for the most part black; propodeum with some coarse shallow punctures or rugose.
- 64 (67) Head above the antennae densely, mesothorax strongly and closely, punctured.
- 65 (66) Second ventral segment of abdomen with no depression behind the costae or with only faint traces of one. *O. lanaiensis*, P.
- 66 (65) Second ventral segment with a shallow but distinct depression (second dorsal segment quite strongly subtuberculately raised from the base). *O. konanus*, P.
- 67 (64) Head above the antennae more or less remotely or sparsely punctured, mesothorax not strongly punctured.
- 68 (69) Clypeus wide, seen from in front not much produced; face with a median yellow spot. *Pseudopterocheilus congruus*, Sm.
- 69 (68) Clypeus long and narrow much produced; no yellow frontal spot. *Chelodynerus chelififer*, P.
- 70 (53) Females; antennae twelve-jointed, simple at the apex.
- 71 (72) Mandibles extremely long and narrow with the teeth more or less obsolete; a distinct and rather long cheek between the eye and mandibles. *C. chelififer*, P.
- 72 (71) Mandibles normal; no distinct cheeks.
- 73 (74) Maxillary palpi extremely long and regularly fringed with long hairs. *P. congruus*, Sm.
- 74 (75) Maxillary palpi normal.
- 75 (76) Mesothorax with fine sparse punctures, sometimes almost effaced, the surface very dull with extremely dense minute interstitial punctures very distinct. *O. sociabilis*, P.
- 76 (75) Mesothorax always distinctly, sometimes strongly or densely punctured, the surface between the punctures in some species more or less shining, the minute interstitial punctures in some indistinct or nearly effaced.
- 77 (78) Mandibles nearly entirely red. *O. molokaiensis*, P.
- 78 (77) Mandibles wholly or for the most part black.
- 79 (84) Mesothorax closely and often strongly punctured.
- 80 (83) Apex of clypeus truncate or very slightly emarginate, basal abdominal segments not pale along the apical margins.
- 81 (82) Depression of second ventral segment of abdomen shallow but quite distinct. *O. konanus*, P.
- 82 (81) Depression of second ventral segment scarcely or not at all perceptible. *O. lanaiensis*, P.
- 83 (80) Apex of clypeus very distinctly emarginate, the true emargination not very feeble; abdomen generally with the apical margin of the basal or two basal abdominal segments pale. *O. smithii*, D. T.
- 84 (79) Mesothorax somewhat remotely and not strongly punctured. *O. insulicola*, Bl.

(iii) SYNOPSIS OF KAUAI ODYNERUS.

- 1 (6) Dorsal and posterior faces of the post-scutellum separated by a fine spinulose or serrulate ridge or raised line.
- 2 (3) Abdomen entirely black, or very rarely with the apical margin of the basal segment yellow. *Odynerus nigripennis.*
- 3 (2) Abdomen with two distinct yellow or whitish bands.
- 4 (5) Basal abdominal segment completely rounded off at the meeting of its dorsal and anterior surfaces. *O. radula.*
- 5 (4) Basal abdominal segment slightly depressed on its dorsal surface, so that this forms with the anterior surface a rather distinct edge, where they meet. *O. localis.*
- 6 (1) Dorsal and posterior faces of the post-scutellum not separated by a distinct raised line.
- 7 (10) Thorax and abdomen with red markings.
- 8 (9) Pronotum with a fine transverse red line, entire or broken. *O. soror.*
- 9 (8) Pronotum without a red line. *O. blackburni.*
- 10 (7) Thorax and abdomen without red markings.
- 11 (12) Abdomen with the bands orange or deep yellow. *O. xaniorhoes.*
- 12 (11) Abdomen with pale yellow or whitish bands.
- 13 (14) Second ventral segment very strongly and abruptly raised behind the sulcature, to a height much exceeding that of the basal part of the segment (the costae more or less obliterated, and no depression behind the sulcature). *O. minus.*
- 14 (13) Second ventral segment not so raised (only in a few species attaining a height about equal to that of its basal portion).
- 15 (18) Costae very short, shorter than the tumid basal portion of the segment; or nearly or quite obsolete, the sulcature being smooth; the depression absent or very faint and linear.
- 16 (17) Sulcature mostly smooth, the costae nearly absent, generally visible as traces only along the basal margin of the sulcature. *O. nesiotis.*
- 17 (16) Costae short, but strong; basal part of segment large and tumid. *O. vittativentris.*
- 18 (15) Costae of second ventral segment not very short, the middle ones generally long and not shorter than the basal portion of the segment, or with a distinct large or largish depression behind the costae.
- 19 (62) Second ventral segment flat behind the costae, no distinct depression.
- 20 (21) Second dorsal segment very abruptly and strongly raised from the base into a conical tuberculate form (middle tibiae without a calcar). *Nesodynerus conifer.*
- 21 (20) Second dorsal segment not so raised.

- 22 (25) Male with the clypeus whitish or yellow; basal abdominal segment not extremely coarsely punctured about the base of its dorsal surface in either sex.
- 23 (24) Middle tibiae without a calcar; propodeum with the posterior concavity only finely rugulose. *N. dilatipes.*
- 24 (23) Middle tibiae with a calcar; propodeum with the concavity rugose. *O. kirbyi.*
- 25 (22) Male with the clypeus black; basal abdominal segment in both sexes extremely coarsely punctate at base. *O. kauaiensis.*
- 26 (19) Second ventral segment with a distinct depression behind the costae.
- 27 (28) Basal abdominal segment almost evenly curved from the petiole to the hind margin, when seen in profile; being not at all abrupt in front. *O. eludens.*
- 28 (27) Basal abdominal segment abrupt in front, having a distinct dorsal and anterior face, though the angle, where they meet, is rounded off.
- 29 (30) Second dorsal segment, seen in profile, with the highest point, to which it is raised, situated near the middle of the length of the segment. *O. homochromus.*
- 30 (29) Second dorsal segment with the highest point far before the middle of its length.
- 31 (32) Mesonotum with the minute interstitial puncturation distinct; propodeum rugose. *O. caenosus.*
- 32 (31) Mesonotum with the minute interstitial puncturation hardly noticeable; propodeum smooth but with shallow punctures. *O. leucozonias.*

(iv) DESCRIPTION OF SPECIES.

Odynerus homoeophanes.

Black, with dull, red markings. A median frontal spot and one on the posterior margin of the eyes, a line in the emargination of the latter, markings on the pronotum, mesonotum, scutellum, post-scutellum, mesopleura and sometimes on the propodeum, the posterior margins of from three to five abdominal segments, as well as the clypeus, a line on the scape of the antennae and the front tibiae (more or less) in the male, dull red. Apex of clypeus in the male slightly emarginate, truncate or almost so in the female. Head and face very densely punctured. Mesonotum very densely, rugosely punctate, with discal red lines which are usually connected with those of the posterior three-fourths of the lateral margin; scutellum and post-scutellum very densely punctured, the propodeum rugose. Basal abdominal segment dull, densely punctured, the second also dull and punctured all over though more coarsely and densely towards the apex, the red band dilated at the sides; beneath, the costae are long and well defined and the segment is widely flattened or faintly depressed beyond the apices of the costae. Wings hyaline, not iridescent, infusate basally and along the costa. Length 9.5-13 mm.*

* The measurements are taken from the front of the head to the apex of the second abdominal segment.

Hab. Mountains of Oahu, widely distributed, but not abundant.

Odynerus eucharis.

Very like *O. homoeophanes* but of smaller average size, the wings are less infuscate, the clypeus of the male is only spotted with red, that of the female resembling it or being wholly black, there is no red line in the emargination of the eyes, and the mesonotum is without the red discal and marginal lines. The puncturation of the mesonotum though very dense is distinct, being less rugose, that of the second abdominal segment fine and not close, except on the apical red band; its impression behind the costae is more punctate, but more shining. Length 7.5-10 mm.

Hab. Mountains of Oahu, widely distributed but not abundant.

***Odynerus pseudochromoides* sp. nov.**

So like *O. pseudochromus* that it is only necessary to point out the distinguishing characters. The red prothoracic markings are continued backwards to reach the tegulae, the costae of the second ventral segment are moderately distinct and the surface between them is shining. In the female the mesothorax is also usually more shining. Length 7-10 mm.

Hab. Mountains of Oahu, common and generally distributed.

Odynerus paludicola.

Female: black with a red median frontal spot, a small spot on each side of the thorax touching the tegulae and the hind margin of the first abdominal segment red. Clypeus finely, head in front coarsely and closely punctured. Mesonotum shining, somewhat irregularly punctured, the minute punctures between the large ones easily seen with a powerful lens, but not dense; propodeum smooth and shining with large feeble punctures which become dense and more distinct in the concavity. Basal abdominal segment with shallow, even puncturation; second rather strongly convexly raised from the base; beneath, greatly raised above the costae, the latter fine but mostly distinct, the depression very narrow, the segment prominent on either side of it. Wings shining fuscous, without blue iridescence. Length 9 mm.

Hab. Oahu mountains 2000 ft.; not common.

***Odynerus paranaias* sp. nov.**

Black, with shining fuscous wings, without the iridescence, the male with a red dot behind each eye, and the pronotum, mesopleura, and post-scutellum with red markings, as well as a red apical band on the first and traces of one at the sides of the second abdominal segment. Clypeus of male very deeply emarginate, of the female strongly and dentately, its sculpture consisting of fine and excessively minute punctures

mixed. Front densely punctured. Mesonotum with sparse irregular larger (but not coarse) punctures and distinct, very minute, but not dense, interstitial ones; propodeum with more or less evident puncturation, the punctures being coarse, feebly impressed and mostly obsolete. Basal abdominal segment with shallow and not close puncturation, second strongly convexly raised from the base in the male, less so in the female, but still strongly convex in profile; beneath, with the costae well developed, the depression wide, quite deep and distinct. Length, 9-11 mm.

Hab. Waianae, Oahu; near the coast.

Odynerus lithophilus.

Black, the two basal abdominal segments with a pale yellow apical band; the female usually in addition has yellow markings on the tegulae and post-scutellum, a small medio-frontal and post-ocular spot; the male may have all or some of the following yellow marks; the clypeus, a spot on the mandibles, a line on the antennae, a median frontal spot and one behind each eye, all the tibiae to a large extent, coxal and femoral spots, the base of some of the tarsi, spots on the pronotum, tegulae, scutellum and post-scutellum.

Front of head closely punctured; mesonotum with moderately strong and close puncturation, but variable in this respect, the surface dull or subopaque. Basal abdominal segment with coarse shallow punctures, second beneath with distinct and well-developed costae, and without a definite depression behind these. Length 7-11 mm.

Hab. Coasts and lowlands of Oahu, widely distributed and locally common.

Odynerus epipseustes.

Very like the common *O. nigripennis* Holmgr. but of larger average size, with the iridescence of the wings brighter, and the general colour of a deeper, more shining black. It is readily distinguished by the perfectly developed costae of the second abdominal segment beneath, which in *nigripennis* are obsolete or obsolescent and the impression behind the costae is very feebly indicated, the surface being polished. Length 12.5-16 mm.

Hab. Mountains of Oahu; much rarer—one in tens of thousands—than the ubiquitous *O. nigripennis*.

Odynerus tempe sp. nov.

Black, somewhat shining, the clypeus, front, pronotum, mesopleura, apical margin of the first abdominal segment, and sometimes the scutellum and propodeum marked with red.

Head in front closely punctured; the mesonotum with distinct punctures, more irregular posteriorly, the interstices shining and with the minute puncturation distinct; scutellum finely but distinctly punctured; propodeum somewhat smooth and with conspicuous punctures. Basal segment

of the abdomen not coarsely punctured; the second segment near the base somewhat abruptly and strongly raised; beneath, raised from behind the sulcature to about the height of the basal part of the segment; the costae distinct, the depression not wide but well-marked. Wings infusate and with blue iridescence. Length 7.5-9 mm.

Hab. Iao valley, Maui. Very like *O. monobius* of Molokai, but at once distinguished by the much less coarsely punctured basal segment of the abdomen, as well as by differences in colour, etc. I have not met with the male of this species.

***Odynerus monas* sp. nov.**

Black, opaque, slender, with the first abdominal segment mostly red, the second with red lateral spots. Clypeus very strongly emarginate, the front somewhat finely and shallowly and not closely punctured. Mesonotum dull, remotely and finely punctured, the two impressed lines posteriorly distinct; scutellum remotely punctured and with a median impressed line; propodeum dull, very finely rugulose, not or hardly punctate. Basal abdominal segment, except along the apical margin, almost impunctate, second longitudinally convex, but not abruptly raised from the base; beneath, with the depression very light, but distinct. Wings infusate and with blue iridescence. Length 7-8 mm.

Hab. Molokai (500-1000 ft.) the male only taken, rarely and singly. Apparently allied to *O. cephalostictus*, but very distinct.

***Nesodynerus paractias* sp. nov.**

Black, not shining, the front sometimes with a yellow dot, the hind margin of the basal abdominal segment sometimes obscurely testaceous. Clypeus very lightly emarginate. Front of head lightly, sometimes sub-obsolete, punctured. Mesonotum finely and not closely punctured, the interstices between the punctures dull and with the minute system of puncturation distinct. First abdominal segment shallowly punctate, second convex, but not conspicuously raised from the base; beneath, the costae short, the segment behind these flat, the basal part large and tumid, the depression absent. Wings infusate and with a blue iridescence. Length 5.5-7 mm.

Hab. Molokai, coast and lower slopes of mountains. Closely allied to *N. oblitus* of Oahu, but at once distinguished by the blue iridescence of the wings.

***Odynerus aprepes* sp. nov.**

Black, not shining, mandibles largely red, wings fuscous with a blue iridescence. Clypeus impressed at the apex, but scarcely emarginate. There is a small yellow dot behind each eye, the front of the head being shallowly punctate. Mesonotum dull, sparsely and feebly punctured, the interstices between the punctures having a very minute and shallow

puncturation; propodeum dull, and without evident punctures, second abdominal segment, somewhat raised near the base, strongly longitudinally convex in profile, but not conically tuberculate; beneath, abruptly raised behind the costae to a height equal to that of its basal part, the costae distinct, the depression shallow but wide and evident. Length 7 mm.

Hab. Maui, on the lower slopes of Haleakala, a very obscure species. I have not seen the female.

Mr. J. KOTINSKY read two papers: (1) "Some new Coccidae from the Hawaiian Islands;" (2) "Some new Aleyrodidae from the Hawaiian Islands," to be published elsewhere.

MAY 3rd, 1906.

The sixteenth regular meeting was presided over by Mr. F. W. Terry.

NOTES AND EXHIBITIONS.

Mr. Wilder exhibited specimens of cypress twigs, the bark of which was gnawed off by the Roach (*Eleutheroda dytiscoides*).

Mr. Muir exhibited two specimens of *Coccinella repanda* from Fiji. These specimens agreed with Froggatt's figure and description (Misc. Pub. No. 592 Agric. Gaz. of New South Wales, 1902) also with Crotch (Revision of Coccinellidae), and differed from Hawaiian specimens in several features, viz.: smaller and less ovate; much more finely sculptured and duller; thorax black anteriorly edged with orange—red expanding into blotches at anterior angles of thorax, the Hawaiian specimens having the orange-red much larger and a central mark running posteriorly; the anterior mark on elytra V-shaped, not broken into three distinct spots; a third spot on posterior end of elytra. The two cannot be referred to the same species; which then is *C. repanda*? if the Fijian is the type, then what is the Hawaiian?

Mr. Kotinsky exhibited two specimens of *Cryptorhynchus mangiferae* collected by Mr. Haughs in Moanalua Valley upon a piece of wood at the base of a mango tree below the Polo grounds. According to Mr. Haughs none of the trees in the vicinity are less than four or five years old and the question how these insects got there is interesting. Upon stabbing the specimens Mr. Kotinsky heard them make a distinct noise much like that produced by the stridulation of some Longicorns.

PAPERS.

The Secretary read the following paper:

**Note on Tomocera, a Genus of Scale-bug Parasites, with
Description of a New Species. [Hymen.]**

By R. C. L. PERKINS.

One of our most abundant species of scale-bug parasites is that which commonly infests species of *Lecanium* in these Islands, and is known as *Tomocera californica*. Its very distinct appearance and the frequent occasions on which one notices it sitting or walking on plants infested with *Lecanium*, must make it familiar to all who pay any attention to the smaller insects. It has existed here for a long time, having been collected by Blackburn some thirty years ago; and these specimens were described subsequently as forming a new genus and species, by Cameron, under the name of *Moranila testaceipes*, two years after Howard's description, under the name of *Tomocera californica*, had appeared. Yet I have no doubt that both here and in California this parasite has been introduced by man, with scale-infested plants. Of my own observation I know the Australian region to be rich in *Tomocera* and allied forms, and I believe the same to be true of the Oriental Region.

From China Mr. Koebele ten years ago introduced parasites for *Ceroplastes rubens*, once a most unsightly pest here. Amongst these was a species of *Tomocera*, I believe as yet undescribed, possibly on account of its extraordinary resemblance to *T. californica*. This undescribed species likewise attacks *C. ceriferus* in middle and north Queensland, but has apparently not yet reached South Queensland, nor New South Wales. I believe it has certainly been imported from China into North Queensland, and will eventually reach New South Wales, even if unassisted by entomologists in distribution.

Ceroplastes is not noticeably a pest in the parts where we found this *Tomocera*. I have not at the time of writing sufficiently good specimens of the males of *T. californica*, to enable me to say more than that in this sex, the specific differences are probably as slight as in the females; and in the case of the latter the extraordinary resemblance to *T. californica* necessitates only the briefest of descriptions. I therefore diagnose the species as follows:

Tomocera ceroplastis sp. nov.

Female; color and sculpture as in *T. californica*, but with the hind coxae never dark and metallic on the basal part, these being uniformly testaceous or brownish yellow. The large post-petiolar segment is uniformly smooth, or nearly so, while in *T. californica*, there are two large subcircular (apparently slightly raised) areas, of very dull appearance, owing to a covering of extremely minute microscopic tomentum. The size is that of well developed *T. californica*, the latter varying very much in size.

Hab. China, whence it was introduced by Koebele into the Hawaiian Islands, Queensland, Cairns and Bundaberg. My specimens I bred at Cairns. Koebele (2327) bred it at Bundaberg in October, 1904, two of these examples being in the collection of the Territorial Bureau of Agriculture. A short while since, I took specimens running on a tree of *Elaeocarpus bifidus* on Tantalus, this tree bearing a few scattered scales of *Ceroplastes rubens*.

The following paper was then read by the author, who exhibited specimens illustrating the life cycle of the moth:

On the Sweet-potato Vine Borer (*Omphisa anastomosalis* Guenee).

By O. H. SWEZEY.

Omphisa anastomosalis Guen.; Hampson, Fauna of British India, Moths, IV, p. 382, fig. 207, 1896.

Evergestis anastomosalis, Guen; Meyrick, Fauna Hawaiiensis, III, Part IV, p. 361, 1904.

This Indo-Malayan moth was first recorded for Honolulu in 1904. Since then it has no doubt been on the increase, and may possibly before long become a garden pest, if not so already. During January, February and March, 1906, I found the larvae boring in vines of sweet potato in my garden. Of about half a dozen hills, all were found to be infested. The larvae were found boring in the vines near the base, and hence just at the place to be the most injurious. Often two or more near together in the same vine, living upon the green, juicy pith of the stem. They probably do considerable boring in the potatoes also, as one was found in a potato from the market.

Description of larva.—Length about 30 mm., width about 3½ mm., head 2 mm.; color pale yellowish white, with conspicuous brown, very broad and flat tubercles; head yellowish

brown, ocelli black except the two upper and the lowest one which are white, mandibles black, a black line on postero-lateral margin of head; dorsal tubercles of two rows beginning with segment three, in each row, two per segment except segment four; a row of tiny tubercles, one per segment, just antero-ventral to each of the anterior dorsal tubercles in segments five to twelve; the spiracles of segments five to twelve have a group of four tubercles surrounding each, by their union on some segments there are but three of these, a similar cluster of tubercles occupies the position corresponding to spiracle on segments three and four; a line of tubercles just dorsal of the base of the feet; four ventral tubercles on segments 5, 6, 11, 12 (those segments having no feet); the ventral tubercles have two or three hairs, others mostly but one, a few hairs on the head also.

Description of pupa.—16 mm. long and 3 mm. wide, nearly cylindrical, abruptly tapering at the two posterior segments; uniform medium brown a slightly darker band on posterior margin of abdominal segments; tiny short hairs where there were hairs on the larva; wing-cases a little pointed, extending to posterior margin of fourth abdominal segment, one pair of leg-cases extends a little farther, about half way on the fifth segment; cremaster very short, blunt with a few hooked spines. The pupa is found in a slight cocoon inside the vine where the larva fed.

Habitat as given by Hampson: China, Sikkim, Khasia, Nilgiris, Ceylon, Burma, Andamans, Java, Duke of York Island.

In the discussion following these papers, Mr. Kotinsky said that although he had tried many expedients for breeding parasites from *Ceroplastes rubens*, he had so far not met with success. The one specimen of *Tomocera ceroplastes* secured was cut out of the scale. Mr. Craw stated that out of a number of consignments of parasitized *Ceroplastes* sent by him to Australia no parasites were secured.

JUNE 7th, 1906.

The seventeenth regular meeting was presided over by Mr. F. W. Terry.

Member elected: Mr. F. Muir.

NOTES AND EXHIBITIONS.

Mr. Kotinsky exhibited specimens of the Coccid *Morganella maskelli* Cock. on shoots of fig. After comparison with Leonardi's figure of *Aspidiotus (Morganella) longissimus* he concurs with Maskell in taking the local insect to be but a variety (*ornatus*) of the Demerara species.*

He also exhibited two Chalcids bred from *Ceroplastes rubens* one of these is a *Microterys*, probably *flavus*; it differs from this in that the light wedges on the wing unite, thus completely separating the apical dusky spot into a bar and spot. He further exhibited a Scymnid bred from *Ceroputo bahiae*, Ehr., on *Salicornia*, received from Mr. Koebele, collected near Alameda, California. A colony of twelve of this Scymnid were released at Waikiki upon a Banyan tree infested with *Pseudococcus nipae*. He also exhibited an avocado Pear twig which contained a batch of defunct eggs of some Locustid. Mr. Swezey expressed the opinion that the eggs were laid by *Elimaea appendiculata* when the twig was still very young and tender; this ascribes to this Locustid the habit of laying eggs in both twig and leaf edges.

Mr. Kotinsky also exhibited specimens of *Agromyza* sp., a Tortricid moth and several Chalcidoids bred from Radish leaves.

Since presenting the above note the author sent specimens to Mr. Newstead who kindly compared them with a specimen of Morgan's type lot in his collection, and found that they "agree in every detail with Morgan's co-type of his *Aspidiotus longispina*." This determination leaves Cockerell's *M. maskelli* and Maskell's var. *ornatus* as synonyms of Morgan's name.

