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FAUNA HAWAIIENSIS

VOL. II. PART I.

ORTHOPTERA

R. C. L. PERKINS.

Price Eight Shillings.
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A

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The Fauna Hawaiiensis is being published in parts at irregular intervals, and will it is hoped be completed in about two years.

Contributions have been made or promised by the following, viz.

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It is also intended to give a list of the Vertebrates, with their distribution, in the Islands.

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ORTHOPTERA

By R. C. L. PERKINS, B.A.

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FAUNA HAWAIIENSIS

OR THE

ZOOLOGY OF THE SANDWICH (HAWAIIAN) ISLES:

Being Results of the Explorations instituted by the Joint Committee appointed by

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DAVID SHARP, M.B., M.A., F.R.S.

SECRETARY OF THE COMMITTEE.

VOLUME II. PART I.

ORTHOPTERA

By R. C. L. PERKINS, B.A.

Pages 1—30; *Plate I coloured and Plate II uncoloured.*

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ORTHOPTERA.

By R. C. L. Perkins.

§ 1. General considerations on the Orthoptera.

The Hawaiian Orthoptera, although not very numerous in species, are nevertheless an interesting and important group. In all seventy-three species are at present known, but of these a large proportion have no place in the indigenous fauna. Of the seven great divisions of the Order, the Phasmodea alone are altogether unrepresented. The Mantodea and Acridiodea have each a single species, both of which are known from elsewhere, and have certainly been imported by man.

The Dermaptera and Blattodea are more numerously represented, and together form a considerable portion of the whole fauna, but nearly all the species are well-known insects outside the islands, and the importation of many of them has been rendered easy by their domestic habits. In the Dermaptera there are 4 genera represented, and 7 species, none of which are endemic; but they are nevertheless of some interest from the fact that some of them are in all probability natural immigrants. Thus *Anisolabis pacifica* has been found only on one of the islands, and there only at a considerable elevation above the sea in the mountain forests, where it is well established. Some of the species too exhibit very considerable variation, when a series of examples is examined, but whether these species are similarly variable in other countries I do not know, as the material necessary for such a comparison has not been available.

The Blattodea are a heterogeneous collection of 15 species, four of which belong to the genus *Phyllodromia*, the remaining eleven representing, each one, a different genus. Three species are not at present identified from any locality outside the islands, but in spite of this, two of them (*Phyllodromia hospes* and *Loboptera extranea*) will certainly prove to be recent importations, both being found in company with the foreign forms in the neighbourhood of houses, and in localities, where no native fauna now exists. The third species (*Phyllodromia obtusata*), on the other hand, is no doubt truly indigenous, frequenting the mountain forests, where it is found amongst the leaves of native plants, and beneath the bark of the larger trees. This species is notably variable, and on some of the islands the variation is in a definite direction, so that it would

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appear to be in the process of becoming differentiated into other distinct species. All the other species are well-known foreign forms, and in the islands they are generally found in the neighbourhood of settlements, and often within the houses themselves, although some have now spread widely over the lowlands and the lower slopes of the mountains.

Thus of the 24 species representing the four primary divisions of the Order thus far considered, one only has any claim to be considered indigenous, the rest, with the exception of two or three species, which may possibly be natural immigrants, having certainly been imported by man.

In striking contrast with these are the remaining two divisions of the Order, viz. the Locustodea and Gryllodea.

The Locustodea are represented by 13 species distributed in 4 genera. Two of these genera, each with a single species, are foreign, and both are certainly recent importations. The *Elimaea* has now spread throughout the group, over the lowlands, but the *Xiphidium* so far has been found only in Honolulu and the immediate neighbourhood, and its introduction is probably of very recent date. The other two genera, one with a single species, the other with ten, are peculiar to the islands, and they are evidently allied to one another, and the more highly peculiar *Brachymetopa* with its 10 species may well have developed from some such form as the genus *Conocephaloides*.

The Gryllodea are of great interest, and are the most important and extensive section of the Hawaiian Orthoptera. Ten genera are known, and these include 36 species. Four of the latter may be at once set aside, as being of foreign origin, and each of these four represents a different genus. The three species *Gryllus innotabilis*, *Gryllodes poeyi*, and *Gryllotalpa africana* are all well-known elsewhere, and a *Myrmecophila*, although now described as new, is certainly a recent importation, since it lives only in the nests of foreign ants, and has been found only in the city of Honolulu. The remaining 32 species are all peculiar to the islands, and are equally distributed between two divisions of the Gryllodea. The 16 species of the Trigonidiides are all referable to the genus *Paratrigonidium*, and no doubt others of this genus yet remain to be discovered on some of the islands. Elsewhere the genus is known from Asia. The other 16 indigenous species of Gryllodea are distributed in 5 allied genera, which are themselves also peculiar to the islands, and are so highly remarkable as to warrant the formation of a separate group for their reception. Three of the genera are represented by only a single species, but there is hope that others may yet be discovered, since neither genus has yet been found on more than one of the several islands. Of the other two genera, *Prognathogryllus* contains five, and *Leptogryllus* 8 species; the former has occurred on Kauai and Oahu only, while the latter is widely distributed, Kauai and Hawaii, at either end of the chain of forest-bearing islands, each having more than one species.

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The contrast between the indigenous portion of the Hawaiian Orthoptera and the foreign (whether introduced or naturally immigrant) is most strongly marked.

Thus the 29 foreign species are scattered through all the six great divisions of the Order represented in the islands, while the endemic, to the number of 44, are limited to three of these divisions. Moreover, the foreign species represent no less than 24 genera, with an average of little more than one species to a genus, whereas the indigenous represent but 9 genera, with an average of nearly five species to the genus.

Confining our attention to the indigenous portion of the fauna, the number of species which fail to extend their range beyond a single island is quite remarkable, more so, I believe, than is the case with any of the other Orders of insects.

The *Phyllodromia* is found throughout the whole group, but, as has been remarked, on certain of the islands the examples vary in a definite direction, as if tending to form distinct species.

In the Locustodea the unique *Conocephaloides* has been found only on Hawaii, and of the 10 species of *Brachymetopa* not one is common to any two of the islands.

Of the Trigonidiides two species of *Paratrigonidium* (*P. varians* and *P. pacificum*) are widely, the latter indeed universally, distributed over the 6 larger islands, but it should be noted that both these species exhibit local variation, and owing to the great difficulty of differentiating the species of this genus, it is possible that more than one is included under each of these names. So far as is known each of the remaining 14 species limits its range to one or other of the islands.

In the Prognathogryllides the genus *Leptogryllus* alone has species with a range extending over more than one of the islands, *L. nigrolineatus* having occurred on Oahu and Maui, and *L. forficularis* on Maui and Hawaii.

Thus of the 44 endemic species five only have been found to inhabit more than one of the islands, but the foreign species, excepting a few, which have certainly been only very recently imported, are mostly of general distribution over the group.

There are now added 44 species (35 being truly indigenous) to the list of Orthoptera, published by Herr Brunner in his paper in the Proceedings of the Zoological Society for 1895, wherein 29 species (9 only being indigenous) were enumerated. We are very much indebted to Herr Brunner for help in the identification of some foreign species discovered since 1895, as well as for the great assistance we have derived from the paper alluded to.

It may be noticed that a large Phasmid *Anchiale confusa* Sharp (*Cyphocrania maculata* West.), brought home by the Beechey expedition, is said to have been taken in the Sandwich Islands, as also are several other large and conspicuous Orthoptera of other families. Certainly none of these have any place in the fauna of these islands, although they may have been taken in those other islands in the Pacific known under the name of Sandwich.

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§ 2. Systematic account of the Orthoptera.

DERMAPTERA.

Anisolabis Fieb.

(1) *Anisolabis littorea* White.

Anisolabis littorea, Brunner P. Zool. Soc. London, Dec. 1895, p. 892.

Hab. Oahu and Maui (Blackburn). I have never met with this species.

(2) *Anisolabis maritima* Bon.

Anisolabis maritima, Brunner l.c.

Hab. Common all over the group, in the mountains.

(3) *Anisolabis pacifica* Erichs.

Anisolabis pacifica, Brunner l.c.

Hab. In the mountains of Kauai; not found elsewhere.

(4) *Anisolabis annulipes* Luc.

Anisolabis annulipes, Brunner l.c.

Hab. Generally abundant, both on the plains and in the mountains.

Labia Leach.

(1) *Labia pygidiata* Dubr.

Labia pygidiata, Brunner l.c.

Hab. Widely distributed; found under bark of trees in the mountains.

Chelisoches Scudder.

(1) *Chelisoches morio* Fab.

Chelisoches morio, Brunner l.c.

Hab. Taken on nearly all the islands, usually between the leaves of *Freycinetia*, or *Dracaena*.

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SPHINGOLABIS Borm.

(1) *Sphingolabis hawaiiensis* Borm.

Forficula hawaiiensis, Brunner l.c.

HAB. Common generally throughout the islands.

BLATTODEA.

PHYLLODROMIA Serv.

(1) *Phyllodromia germanica* L.

Phyllodromia germanica, Brunner Nouv. Syst. Blatt. p. 90.

HAB. In houses.

(2) *Phyllodromia hieroglyphica* Brunn.

Phyllodromia hieroglyphica, Brunner P.Z.S. Dec. 1895, p. 892.

HAB. Found on several of the islands.

(3) *Phyllodromia hospes*, sp. nov.

Tota testacea. Frons inter oculos nonnunquam plus minusve obscurata vel rufescens. Pronotum paullo latius quam longius, antice angustatum, margine postico rotundato. Tegmina testacea, venis testaceis. Alae hyalinae (antice testaceae), venis pallidis. Vena ulnaris 4-ramosa. Abdomen unicolor, testaceum. Lamina supra-analis ♂ apice obtuso, late levissimeque emarginato; lamina subgenitalis ampla. ♂.

Long. corporis, 13 mm.; Long. pronoti, 3 mm.; Lat. pronoti, 4 mm.; Long. tegminum, 11 mm.

The normal number of branches of the *vena ulnaris* appears to be 4, but some examples have only 3, and others 5. The left and right wings sometimes differ in the number of branches. The lamina supra-analis is sometimes hardly more than truncate at the apex.

HAB. Kauai, and Honolulu. Found in houses, and under stones on the plains, and is no doubt an imported species. Herr Brunner has informed us that it is allied to *P. conspersa* Br.

(4) *Phyllodromia obtusata* Brunn.

Phyllodromia obtusata, Brunner P.Z.S. Dec. 1895, p. 892.

HAB. Found throughout the group in the mountain forests. The species varies greatly; examples from Molokai are remarkable for their small size, those from Kauai are the largest, examples from Hawaii being on the average intermediate.

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LOBOPTERA Brunn.

(1) *Loboptera extranea*, sp. nov.

Nigrescens vel castanea. Frons inter oculos pallide signata. Antennae pallidae, plus minusve fuscescentes. Pronotum subtransversum, margine antico lateribusque flavo-marginatis. Tegmina lobiformia, marginibus internis contiguis, lateribus flavo-marginatis. Abdomen utrinque flavo-marginatum. Coxae pallidae, nigro-notatae; femora omnia (cum tibiis) pallida, nigro- vel fusco-notata, postica spinis compluribus bilineatim subtus armata. Cerci ad basim nigricantes, apicibus pallidis. Lamina supra-analis (♂♀) transversa, triangularis, parum producta; lamina subgenitalis ♀ ampla, medio margine apicali saepe levissime exciso. ♂♀. Long. 8·5—9·5 mm. Tegmen 2·5 mm.

HAB. Maui, on the coast. Hilo, Hawaii (Bro. Matthias Newell). Probably on all the islands, generally living in company with the young of *Periplaneta australasiae*. In the development of the tegmina the sexes are quite alike. The wings are represented by pale lobes at the sides of the metanotum, the inner margins being marked by a deep suture, but not free.

STYLOPYGA Fisch.

(1) *Stylopyga decorata* Brunn.

Stylopyga decorata, Brunner P.Z.S. 1895, p. 893.

HAB. Honolulu (Blackburn).

METHANA Stål.

(1) *Methana ligata* Brunn.

Methana ligata, Brunner l.c.

HAB. Honolulu (Blackburn).

POLYZOSTERIA Burm.

(1) *Polyzosteria soror* Brunn.

Polyzosteria soror, Brunner Nouv. Syst. Blatt. p. 219.

HAB. Common, in company with *P. australasiae*.

PERIPLANETA Burm.

(1) *Periplaneta americana* L.

Periplaneta americana, Brunner P.Z.S. 1895, p. 893.

HAB. Abundant throughout the islands.

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(2) *Periplaneta australasiae* Fab.

Periplaneta australasiae, Brunner Nouv. Syst. Blatt. p. 233.

HAB. Abundant throughout the islands.

ELEUTHERODA Brunn.

(1) *Eleutheroda dytiscoides* Serv.

Eleutheroda dytiscoides, Brunner P.Z.S. 1895, p. 893.

HAB. A common and injurious species; very abundant in Honolulu, and elsewhere.

LEUCOPHAEA Brunn.

(1) *Leucophaea surinamensis* Fab.

Leucophaea surinamensis, Brunner l.c.

HAB. Oahu, Kauai, Maui; and probably on all the islands.

NAUPHOETA Burm.

(1) *Nauphoeta bivittata* Burm.

Nauphoeta bivittata, Brunner Nouv. Syst. Blatt. p. 287.

HAB. Two examples taken under bark of trees in Honolulu.

ONISCOSOMA Brunn.

(1) *Oniscosoma pallida* Brunn.

Oniscosoma pallida, Brunner P.Z.S. 1895, p. 893.

HAB. Haleakala, Maui (650 m.). Blackburn.

EUTHYRRHAPHA Burm.

(1) *Euthyrrhapha pacifica* Coqueb.

Euthyrrhapha pacifica, Brunner l.c.

HAB. Taken on several islands, and probably to be found on all.

MANTODEA.

ORTHODERA Burm.

(1) *Orthodera prasina* Burm.

HAB. Kauai; introduced with fruit trees.

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ACRIDIODEA.

Oxya Serv.

(1) *Oxya velox* Fab.

Oxya velox, Brunner P.Z.S. Dec. 1895, p. 893.

Hab. Abundant on Kauai and Oahu, but had not spread to the other islands in 1897.

LOCUSTODEA.

Elimaea Stål.

(1) *Elimaea appendiculata* Brunn.

Elimaea appendiculata, Brunner l.c.

Hab. Very abundant throughout the islands, on the plains and lower slopes of the mountains.

Brachymetopa Redt.

The ten species, which represent this genus, are closely allied to one another, and for the most part very similar in general appearance. The genus, though peculiar to these islands, is allied to the widely distributed *Conocephalus*, but still more closely to the Hawaiian genus *Conocephaloides*, described hereafter. The latter indeed, with the general appearance of a *Conocephalus*, combines the characters of that genus with some of those which distinguish *Brachymetopa* from it. All the species of *Brachymetopa* have the tegmina and wings in a more or less rudimentary condition, and they are useless for purposes of flight in either sex, but serve as stridulating organs in the ♂. In *B. deplanata* ♂ the tegmina are extremely short, being only as long as the pronotum, but in some others they extend to the apex of the abdomen, while in others again they are intermediate in length between these extremes.

Several, and perhaps most, of the species have two distinct forms, a green and a darker (or at least not green) one, which are so strikingly different as to suggest at first sight that they are distinct species. There appear to be no really intermediate forms, although the examples that are not green are themselves variable, the colour varying from testaceous or ochreous to dark fuscous in some species. It is quite possible that the two forms are really tending to become distinct species, at least in certain cases, and the two Oahuan species *B. discolor* and *B. blackburni* may not improbably have originated from a single simply dimorphic species. Certain it is that,

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although numerous examples of both species have been examined, no green form of the former, or not-green one of the latter has yet been discovered. In this respect they stand alone, for of all the other species which have been examined in such numbers as these, the two distinct forms have been obtained. All the species are nocturnal in their habits, and rest by day on the leaves of various forest trees or plants. The males stridulate freely at dusk and through the night, and can be heard for a long distance, but it is extremely difficult to locate them by sound, and we have only occasionally been able to do so.

The modified cerci of the males, which form organs for copulation, in most cases furnish excellent specific characters.

(1) *Brachymetopa discolor* Redtb.

Brachymetopa discolor, Redtenb. Verh. z. b. Ges. Wien, 1891, p. 431; Brunner P. Z. S. Dec. 1895, p. 894.

(Plate I. figs. 1 & 1*a*; and Plate II. figs. 1 & 1*a*.)

This is a very distinct species, and may be known at once from dark varieties of several of the green species by the shining coal-black front of the head, and the black-spotted legs.

HAB. Both mountain ranges of Oahu. Mts. near Honolulu (1500—2000 ft.). Waianae Mts. (2000 ft.).

(2) *Brachymetopa blackburni* Bormans.

Conocephalus blackburni de Bormans Ann. Mus. Genova, XVIII. 1882, p. 346.

Brachymetopa blackburni Redtenbacher Verh. Ges. Wien, 1891, p. 431; Brunner P. Z. S. 1895, p. 894.

(Plate I. fig. 2.)

HAB. Mountains near Honolulu, 1500 ft. and upwards.

De Bormans says that this species is found on several of the islands, but the examples taken on islands other than Oahu, no doubt belong to different species. Although I have frequently taken the adult ♀, and young of both sexes, I have never seen an adult ♂.

(3) *Brachymetopa nitida* Brunn.

Brachymetopa nitida, Brunner Proc. Zool. Soc. Lond. 1895, p. 894.

(Plate I. figs. 3, 3*a*, & 3*b*; and Plate II. figs. 2 & 2*a*.)

HAB. The original examples were taken in Kona, Hawaii. I have since collected it on the lower slopes of Mauna Kea, above Hilo, and freely at Olaa in the Puna

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district. In neither of these localities do the specimens agree with the typical ones, or with each other, but owing to the variation exhibited, they cannot be regarded as distinct species.

Brachymetopa nitida, var. *hilöensis*, var. nov. ♂ with the tegmina shorter than in typical specimens, the greatest length shown by these examples being only 10 mm.

Brachymetopa nitida, var. *punae*, var. nov. Generally larger than the other forms, attaining the following dimensions.

Long. corporis (haud contracti) ♂ 25, ♀ 27 mm.; pronoti ♂ 6·5, ♀ 7 mm.; tegminum ♂ 11, ♀ 11—13 mm.; femorum post. ♂ 16, ♀ 17 mm.; ovipositoris 12 mm.

One or two of the ♂♂ however have the femora of only 13 mm. and therein agree with the var. hiloensis, but still remain distinct from the typical specimens by the short tegmina, the length of which is only 8 mm.

Brachymetopa nitida, var. *crassipes*, var. nov. The tibiae are evidently stouter than in the other forms. ♂.

Long. corporis 23 mm.; pronoti 6·5 mm.; tegminum 10·50 mm.; femorum post. 13 mm.

A single ♂ was taken at Kilauea (4000 ft.). This is the highest elevation at which the genus has occurred.

The ♂ characters seem to be identical in the various forms; the upper hooks of the cerci are bent upwards, the lower are very long and rise up behind the former to a considerably higher level.

(4) *Brachymetopa kauaiensis*, sp. nov.

Viridis. Mandibulae in parte apicali nigrae. Labrum cum fronte tota pallidum. Tegmina abbreviata, tympano ♂ minus infuscato, haud nitido. Tibiae posticae utrinque spinulis armatae. Unci cercorum ♂ inferiores decumbentes. ♂♀.

Long. corporis ♂ 19, ♀ 21 mm.; fastigii vert. ♂ 1·2, ♀ 1·5 mm.; pronoti ♂ 5·5, ♀ 6 mm.; tegminum ♂ 7·75, ♀ 8 mm.; femorum post. ♂ 12, ♀ 13 mm.; ovipositoris 11 mm.

HAB. Makaweli, Kauai (2000 ft.). Rare, 1 ♀ taken in 1895, and 1 ♂ in 1897.

(5) *Brachymetopa unica*, sp. nov.

Viridis. Mandibulae pallidae, margine interno nigro. Frons media plaga lata triangulari rufo-brunnea ornata. Fastigium verticis latum, apice fere truncato. Tegmina ad apicem abdominis se extendentia, subacuminata, densissime venosa. Tibiae posticae interne spinis raris, externe fere nullis (una tantum), armatae. ♀.

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Long. corporis 20 mm.; fastigii vert. 1·5 mm.; pronoti 6 mm.; tegminum 11 mm.; femorum post. 12 mm.; ovipositoris 10·5 mm. (Plate I. fig. 4.)

HAB. Mountains near Honolulu, Oahu. A single ♀ taken in 1896, amongst *B. blackburni* and *B. discolor*. It is a very distinct species, and the tegmina with their somewhat sharp apices with the margins narrowly reddish, are unlike any other species.

(6) *Brachymetopa affinis*, sp. nov.

Viridis. Mandibulae ad apices nigrae. Frons tota pallida. Tegmina sublonga, capite cum pronoto evidenter longiora. Tibiae posticae interne spinulis perpaucis armatae. ♀.

Long. corporis 22 mm.; fastigii vert. 2 mm.; pronoti 6 mm.; tegminum 11·5 mm.; femorum post. 13 mm.; ovipositoris 11 mm.

HAB. Mountains of Kauai, 3000 ft. One ♀ taken in June 1894. This individual was referred by Brunner to his *B. deplanata*, a species peculiar to Lanai. From an examination of the much larger material obtained during my second visit, I feel sure that no species of the genus is found on more than one island of the group. The present species is most closely allied to *B. blackburni*, but the absence of the distinct black transverse marks on the face at the base of the mandibles, and the less spinose posterior tibiae will easily distinguish it. The latter on their outer margin have only four spines.

(7) *Brachymetopa parvula*, sp. nov.

Laete viridis, subnitida. Mandibularum pars apicalis plus minusve nigra. Frons tota pallida. Tegmina capite cum pronoto haud longiora. Tibiae posticae externe spinulis nullis armatae. Unci cercorum ♂ superiores validi, fortiter erecti. Ovipositor ♀ perlongus, femore postico longior. ♂♀.

Long. corporis ♂ 18, ♀ 19 mm.; fastigii vert. ♂ 1, ♀ 1 mm.; pronoti ♂ 5, ♀ 5·5 mm.; tegminum ♂ 7·5, ♀ 8 mm.; femorum post. ♂ 9·5, ♀ 11 mm.; ovipositoris 12·5 mm. (Plate I. fig. 6.)

Brachymetopa parvula, var. *brunnea*, var. nov. Corpus totum pallide brunneum. (Plate I. fig. 6*a*.)

HAB. Mountains of West Maui above Lahaina (3000 ft.). One ♂ and several ♀ taken; var. *brunnea* a single pair taken off the same branch of a tree in the same locality. This is on the whole the smallest species of the genus. The male characters are quite distinct from those of any other species, the upper of the two processes of the modified cercus rises erect, and is both long and stout; the lower one is much bent and directed backwards. In the ♀ the ovipositor is of unusual length for the size of the species.

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(8) *Brachymetopa mauiensis*, sp. nov.

Nitida, viridis. Mandibulae apices versus nigrae. Frons pallida, juxta basim mandibularum utrinque nigropunctata. Tegmina fortiter reticulatim venosa, capite cum pronoto breviora. Tibiae posticae externe inermes. Unci cercorum ♂ superiores breves, inferiores suberecti et his multo longiores. ♂♀.

Long. corporis ♂ 18, ♀ 21 mm.; fastigii vert. ♂ 1, ♀ 1·25 mm.; pronoti ♂ 5·5, ♀ 5·5 mm.; tegminum ♂ 8—8·5, ♀ 8·5 mm.; femorum post. ♂ 10, ♀ 11·5 mm.; ovipositoris 10 mm. (Plate I. fig. 5; and Plate II. figs. 4 & 4*a*.)

Brachymetopa mauiensis, var. *ochracea*, var. nov. ♀ major (long. 24 mm.), colore ochraceo.

Hab. Maui. West Maui Mts. in the Iao Valley. ♂♀. Haleakala (4000 ft.) ♂. The ♂♂ from the latter locality have the tegmina slightly longer, but otherwise agree exactly with that from the distant western mountains. Var. *ochracea*, Iao Valley 1 ♀.

(9) *Brachymetopa molokaiensis*, sp. nov.

Viridis, praecedenti cognatissima, sed minus nitida. ♂ unco superiore cercorum multo longiore et fortiore: ♀ tegminibus apices versus magis longitudinaliter venosis, minus reticulatis, bene distinguenda. ♂♀.

Long. corporis ♂ 20, ♀ 25 mm.; fastigii vert. ♂ 1·5, ♀ 1·75 mm.; pronoti ♂ 5·5—6, ♀ 6 mm.; tegminum ♂ 8·5—10, ♀ 10 mm.; femorum post. ♂ 11·5, ♀ 12·5 mm.; ovipositoris 11·5 mm.

Hab. Mountains of Molokai (3000—4000 ft.).

The species here described was assigned partly (♂) to *B. nitida*, and partly (♀) to *B. deplanata* by Herr Brunner. The ♂ is quite distinct from the former by the unarmed outer margin of the posterior tibiae, and by the cerci, and the ♀ taken in the same locality agrees so well in most respects with the ♂ that I have little doubt of its identity.

(10) *Brachymetopa deplanata* Brunn.

Brachymetopa deplanata, Brunner Proc. Zool. Soc. Lond. 1895, p. 894.

(Plate I. fig. 7; and Plate II. figs. 3 & 3*a*.)

The ♂ of this species (I have not seen an adult ♀) is very distinct from any other, by the very short tegmina, which are subequal to the pronotum in length, and the cerci are also peculiar, the upper hook being simply transverse in direction and slightly

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curved, the lower is also transverse and decumbent with its apex inclined downwards. The females assigned to this species in the original description, I have otherwise disposed of (vide *B. affinis* and *B. molokaiensis*).

HAB. Lanai (2000 ft.).

DISPOSITIO SPECIERUM GENERIS BRACHYMETOPAE.

1. (*8*) Tibiae posticae utrinque spinulis multis armatae.
2. (*3*) Frons capitis tota pernigra ..... *discolor.*
3. (*2*) Frons pallida.
4. (*5*) Mandibulae subtotae nigrae; frons capitis juxta basim mandibularum utrinque linea nigra transversa signata ..... *blackburni.*
5. (*4*) Mandibulae ad basim pallidae; frons capitis haud nigrolineata.
6. (*7*) ♂ uncus cercorum inferior decumbens; ♀ tegmina capite cum pronoto evidenter breviora ..... *kauaiensis.*
7. (*6*) ♂ cercorum uncus inferior erectus; ♀ tegmina capite cum pronoto haud evidenter breviora..... *nitida.*
8. (*1*) Tibiae posticae in margine interno inermes vel perpaucis spinulis (4 ad max.) armatae.
9. (*10*) Tegmina ♂ brevissima, pronoto longitudine subaequalia ..... *deplanata.*
10. (*9*) Tegmina ♂ pronoto evidenter longiora.
11. (*12*) Frons capitis plaga magna triangulari rufo-brunnea ornata. Tegminum apices subacuminati ..... *unica.*
12. (*11*) Frons unicolor; tegminum apices rotundati.
13. (*14*) Tegmina capite cum pronoto evidenter longiora..... *affinis.*
14. (*13*) Tegmina capite cum pronoto haud longiora.
15. (*16*) Uncus superior cercorum ♂ erectus, supra inferiorem elevatus. ♀ ovipositor femore postico longior .... *parvula.*
16. (*15*) ♂ uncus superior cercorum haud erectus. ♀ ovipositor femore postico brevior.
17. (*18*) Magis nitida. ♂ uncus superior cercorum brevis. ♀ tegmina apices versus fortiter reticulatim-venosa ..... *mauiensis.*
18. (*17*) Minus nitida. ♂ uncus superior cercorum minus brevis. ♀ tegmina apices versus ex majore parte longitudinaliter venosae ..... *molokaiensis.*

CONOCEPHALOIDES, gen. nov.

A genere *Conocephalo* differt lobis genicularibus inermibus, a *Brachymetopo* lobis meso- et metasterni angustis, femoribus posticis perlongis, intermediis ter longioribus, alis tegminibusque perfecte explicatis, capite et corpore toto (excepto ovipositore) multo longioribus.

(1) *C. hawaiiensis*, sp. nov.

Viridis. Mandibulae flavae. Labrum pallidum, roseotinctum. Fastigium verticis inferum haud in spinam productum, vix longius quam latius, apice rotundato. Antennarum articulus basalis viridis, caeteri subtestacei, apicem versus fuscescentes. Pronotum

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supra utrinque fusco-lineatum, lateribus flavomarginatis. Alae tegminibus vix breviores. Femora omnia viridescentia, posticorum marginibus inferioribus spinis armatis. Tibiae pallide fuscescentes, posticae biseriatim spinosae. Tarsi graciles. Ovipositor rectus. ♀.

Long. corporis cum ovipositore 46 mm.; pronoti 8 mm.; tegminum 38 mm.; fem. post. 23 mm.; ovipositoris 17 mm. (Plate I. fig. 8.)

HAB. Olaa, Hawaii (2000 ft.); 1 ♀ taken, Dec. 1896.

XIPHIDIUM Serv.

(1) *Xiphidium fuscum* Fab.

Xiphidium fuscum, Brunner P. Z. S. 1895, p. 894.

HAB. Only in and around Honolulu.

GRYLLODEA.

GRYLLOTALPA Latr.

(1) *Gryllotalpa africana* Fab.

HAB. This introduced species abounds on the windward side of Oahu, and is injurious on the sugar plantations.

MYRMECOPHILA Latr.

(1) *Myrmecophila quadrispina*, sp. nov.

Atrofusca, ore, antennis, pedibus, cercisque, vel nonnullis ex his, pallidis. Frons capitis breviter pilosa. Corpus subtilissime sericeo-pubescens. Cerci conspicue pallido-pilosi. Femora postica obscurata, fortissime dilatata; tibiarum posticarum marginibus interioribus spinis quattuor armatis, prima (sive basali) brevi, secunda quartaque multo longioribus, tertia, quam spina basalis quoque, evidenter multo breviore. ♂♀. Long. 2·2 mm. (Plate II. fig. 7.)

HAB. Honolulu, in gardens in the city. An imported species, living in the nests of foreign species of ants.

GRYLLUS L.

(1) *Gryllus innotabilis* Walk.

Gryllus innotabilis, Brunner P. Z. S. Lond. 1895, p. 895.

HAB. Abundant on all the islands.

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GRYLLODES Sauss.

(1) *Gryllodes poeyi* Sauss.

Gryllodes poeyi, Brunner loc. cit.

HAB. Common generally on the plains, and lower slopes of the mountains.

Obs. An immature example of a second species of *Gryllodes* was obtained at Lahaina, Maui, but no adult.

PARATRIGONIDIUM Brunn. (1893).

The sixteen species of this genus are closely allied to one another, and in some cases the specific characters are difficult to appreciate. This is partly due to the variability of some of the species, but also to the changes which take place after the death of the insect in the process of drying. Thus *P. viridescens* in life is quite different in appearance (Plate I. fig. 11) to any other species of the genus, and its peculiar habits leave no doubt that it really is distinct, yet in dried examples its resemblance to several other species is extreme. *P. pacificum*, the first-described Hawaiian species, is in some respects the most aberrant of the series, since it differs from all the others in the structure of the ♂ genitalia, and of the ♀ ovipositor, as well as in the neuration of the lateral field of the tegmina (Plate II. fig. 6*a*).

As to the absence of wings in this genus, it is noteworthy that although in the adult insect the metathoracic wings are entirely wanting, yet in the penultimate state they are as well developed as the mesothoracic (or tegmina). Thus both the tegmina and the wings develope equally during the earlier stages up to the last ecdysis, when the tegmina undergo a further and very great developement, while the wings, on the other hand, not only cease to develope, but entirely abort.

The habits of the various species are interesting, and a large number are found to inhabit only one particular species of tree or plant. Thus *P. viridescens* and *P. filicum* live amongst ferns, but each is found only on one particular species of fern. *P. saltator* hides at the bases of the leaves of *Freycinetia*, *P. atroferrugineum* amongst those of *Metrosideros*. Several species are found only beneath the bark of large trees, but *P. pacificum* is to a large degree terrestrial. Most of the species are nocturnal in their activities, others are active by day, but generally only in damp shady gulches and dense forests. *P. pacificum* in such situations sings the whole day through, with a plaintive chirp, but at night all the species are most active and noisy. There is a considerable difference between the songs of some of the species, and in some cases the sound can be heard at a great distance. The power of leaping of most of the species is prodigious, and the time that must be spent to collect a series of the most active ones is very

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considerable. The ground-frequenting *P. pacificum* is on the whole the most easily captured, the arboreal species in spite of their small size will clear several feet in one jump, and several leaps will be made with astonishing rapidity. After this however the distance covered at a leap becomes shorter and shorter till eventually the power of leaping is nearly entirely lost, and the insect attempts to escape by running.

(1) *Paratrigonidium freycinetiae*, sp. nov.

Frons pallida. Antennarum articulus primus et secundus nigricantes. Pronotum atrum, postice nonnunquam pallidius. Femora antica et intermedia nigricantia. Femora postica supra nigra; ad apices etiam et externe et interne nigra, ad basim pallida. Tibiae pallidae, anticae et intermediae distincte nigronotatae. Tegmina, cerci, et antennae (basi excepta) pallide flavescentia. ♀.

Long. corporis 6 mm., pronoti 1·5 mm., tegminum 4·2 mm., femorum post. 5·2 mm., ovipositoris 2 mm.

Hab. Olaa, Hawaii (2000 ft.). Very rare, three females taken from *Freycinetia*. I saw one ♂, but was unable to capture it. It is excessively wild and active.

(2) *Paratrigonidium saltator*, sp. nov.

Frons cum pronoto pallida. Femora antica et intermedia nigra; femora postica supra nigricantia, externe interneque ex majore parte pallida. Tibiae intermediae anticaeque, plus minusve distincte, maculatae. Tegmina tota pallide flavescentia. Antennarum articulus primus sat pallidus. ♂. (Long. sp. praecedentis.)

This species is closely allied to the preceding, and only the male sex of the one and the female of the other was taken, but the different colour of the pronotum, and of the hind femora, will readily separate them. The superior tegmen of *P. saltator* is unicolorous, pale yellowish, with no dark mark adjoining the vena stridulans, and the front and intermediate femora are entirely of a dark pitchy or black colour.

Hab. Mountains of Oahu, above 2000 ft. Rare. Apparently attached to the *Freycinetia*.

(3) *Paratrigonidium roseum*, sp. nov.

Caput cum articulo primo antennarum, et femora omnia laete rosea. Tibiae tarsique pallidi. Tibiae posticae roseo-tinctae. Pronotum ex majore parte nigrum. Antennae, tegmina, et cerci pallide flavescentia. ♀.

Long. corporis 7 mm., pronoti 1·5 mm., tegminum 4·5 mm., femorum post. 5 mm., ovipositoris 2·5 mm. (Plate I. fig. 9.)

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HAB. Mountains of West Maui (3000 ft.). A single ♀ taken from *Metrosideros*. Like the preceding it is a very quick and strong jumper and difficult to seize. I saw several other specimens, when the individual described above was taken, but was unable to revisit the locality.

(4) *Paratrigonidium atroferrugineum* Brunn.

Paratrigonidium atroferrugineum Brunner P. Z. S. 1895, p. 895.

(Plate I. fig. 10.)

This is a very distinct species, and cannot be confused with any other. The black tegmen of the ♂ with its orange-coloured border, and the black femora with red apices in both sexes, give it a very distinctive appearance. The tegmina of the ♀ are generally entirely pale, but sometimes black in the centre with a ferruginous border, very much as in the ♂.

HAB. Island of Molokai only. Lives in the leaves of *Metrosideros polymorpha*, but chiefly if not solely in those of one special form of this very variable tree. The young of the cricket is entirely green in all its stages.

(5) *Paratrigonidium subroseum*, sp. nov.

Totum pallidum, plus minusve roseo-tinctum, femoribus tibiisque omnibus immaculatis. ♂♀.

Long. corporis ♂ 7·5, ♀ 7·5 mm.; pronoti ♂ 1·5, ♀ 1·5; tegminum ♂ 5·6, ♀ 4·8 mm.; femorum post. ♂ 5, ♀ 5·2 mm.; ovipositoris 2·5 mm.

This is a very distinct species. There is no dark spot on the tegmen behind the vena stridulans, such as is present in most of the Hawaiian species. In the immature stages the insect is entirely green. After death the rosy pigment has a tendency to become massed in certain parts, as is also the case with the green pigment in other species, but the legs are in reality quite unspotted.

HAB. Mountains of Oahu (2000 ft.). Attached to bushy trees of *Metrosideros*.

(6) *Paratrigonidium filicum*, sp. nov.

Brunneum, testaceum, vel olivaceum. Frons pallida, nonnunquam notis fuscis, plerumque minus distinctis, ornata. Antennae subinfuscatae, basim versus articulis paucis, rare dispositis, obscurioribus. Tibiae anticae minus distincte fusco-notatae. Femora postica interna fere concoloria, vel tantum duabus notis minus distinctis fuscis signata. Tibiae posticae supra pallidae. ♂ Tegmen dextrum post venam stridulantem plaga triangulari nigra ornatum: hac, majore ex parte, laevi, minus rugosa. Cerci minus elongati. (Plate II. fig. 6.) ♂♀.

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Long. corporis (cum tegminibus) ♂ 7·2, ♀ 6·7 mm.; tegminum ♂ 5·5, ♀ 4·5 mm.—Lat. tegminum ♂ 3 mm.—Long. femorum post. ♂ 5·4, ♀ 5·8 mm.; ovipositoris 2·7 mm.; cerci ♀ 3 mm.

Hab. Olaa, Hawaii (2000 ft.). In dense forest frequenting a tall soft fern, which covers the ground beneath the trees. Distinguished from the two following species by the much less distinct markings of the legs generally, and the almost entirely pale posterior tibiae. Immature examples are entirely green.

(7) *Paratrigonidium viridescens*, sp. nov.

Pallidum, subviridescens (vivum eleganter viride), nigro-ornatum. Frons nigro-notata. Pronotum lateribus nigris. Femora omnia cum tibiis distincte nigro-notata. Tegmen (♂) dexterum maculis distinctis circa venam stridulantem, et saepe ad latera, et ad apicem plus minusve ornatum. ♂♀.

Long. corporis ♂ 7·5, ♀ 7 mm.; pronoti ♂ 1·5, ♀ 1·5 mm.; tegminum ♂ 5·2, ♀ 4·5 mm.—Lat. tegminum ♂ 3 mm.—Long. femorum post. ♂ 5·2, ♀ 5·8 mm.; ovipositoris 2·5 mm. (Plate I. fig. 11.)

This species is very distinct in life, the general colour being then of a delicate light green. This unfortunately soon fades in dried specimens although a slight tint still remains. The most noticeable characters are the unusually sharply defined black markings, which vary in extent, but are scattered over the tegmen, and not entirely confined to the neighbourhood of the vena stridulans. The black marks on the legs are very distinct, and the tegmen is rather long in proportion to its width.

Hab. Olaa, Hawaii, 2000 ft. Lives amongst a beautiful creeping fern, which clothes the tree trunks in wet forests.

(8) *Paratrigonidium varians*, sp. nov.

Colore brunneo vel testaceo. Frons pallida, lineis maculisque nigris vel fuscis variabilibus ornata. Antennae basim versus articulis nigricantibus, rare dispositis, variegatae. Pronotum maculis fuscis vel nigris supra ornatum, lateribus fusco- vel nigro-marginatis. Tegmen ♂ dextrum macula nigra post venam stridulantem signatum, ibique ex majore parte fere planum, vix rugulosum; pars caetera (nonnunquam fere tota) plus minusve infuscata. Tibiae anticae et intermediae nigro-notatae; femora postica intus satis distincte nigro- vel fusco-notata. Tibiae posticae juxta basim pallidae; hac parte excepta, fere totae nigricantes, tantum ad basim spinarum pallidae.

Long. corporis ♂ 6·5, ♀ 6·5 mm.; pronoti ♂ 1·2, ♀ 1·2 mm.; tegminum ♂ 5, ♀ 4·4 mm.—Lat. tegminum ♂ 2·5 mm.—Long. fem. post. ♂ 5, ♀ 5·5 mm.; ovipositoris 2·7 mm.

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This species greatly resembles *P. viridescens*, in dried examples, although when fresh, and not discoloured, it has a totally different appearance. It appears to be a variable species, and the examples taken in different localities are rarely altogether similar.

HAB. Puna (2000 ft.), and Kau (4000 ft.), Hawaii; mountains of West Maui; Honolulu (2000 ft.); Makaweli, Kauai (2000 ft.). Apparently always rare. It is an arboreal species.

(9) *Paratrigonidium grande*, sp. nov.

Statura majore, colore testaceo vel brunneo. Frons cum pronoto plus minusve atro- vel fusco-notata. Antennae articulis multis nigricantibus variegatae. Tibiae anticae et intermediae distincte fusco- vel nigro-maculatae. Femora postica interna notis compluribus nigris ornata. Tibiae posticae supra ex majore parte fuscae vel subnigrae, ad basim spinarum pallidae. ♂ Tegmen dextrum post venam stridulantem plaga triangulari nigra, laevi, haud rugosa. ♂♀.

Long. corporis (cum tegminibus) ♂ 9·5, ♀ 8·7 mm.; pronoti ♂ 1·7, ♀ 2 mm.; tegminum ♂ 7, ♀ 5·75 mm.—Lat. tegminum ♂ 3·8 mm.—Long. femorum post. ♂ 6·2, ♀ 6·2 mm.; ovipositoris 3 mm. (Plate I. fig. 12.)

HAB. Hawaii, in the Puna, Kau, and Kona districts. Lives beneath the bark of trees, coming outside only at night. The young are of the same colour as the adult, not green like those of the three preceding species. The large size, combined with the smooth area behind the vena stridulans of the ♂, will distinguish this species from any other.

(10) *Paratrigonidium crepitans*, sp. nov.

Testaceum, capite plus minusve fusco-variegato, antennarum articulis basalibus pallidis. Pronotum fusco-variegatum. Femora omnia distincte nigro-notata; tibiae posticae variegatae. Cerci pallidi, breviores. Tegmen ♂ dextrum post venam stridulantem macula nigra ornatum, hac plaga tota rugulosa. ♂♀.

Long. corporis (cum tegminibus) ♂ 7, ♀ 6 mm.; pronoti ♀ 1·5 mm.; tegminum ♂ 5·5, ♀ 4·2 mm.; femorum post. ♂ 5·2, ♀ 5·5 mm.; cerci ♂ 3·25 mm.; ovipositoris 2·5 mm.

Very like *P. filicum* and the allied species in general appearance, but the ♂ is quite distinct by the evidently less smooth (more rugulose) dark area behind the vena stridulans.

HAB. Kauai (4000 ft.), rare, or at least very difficult to obtain, living amongst heaps of dead wood, or in low vegetation.

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(11) *Paratrigonidium robustum*, sp. nov.

Forma et colore fere praecedentis, sed major et cercis evidenter longioribus distinguendus. ♂.

Long. corporis 9 mm.; pronoti 1·6 mm.; tegminum 6 mm.—Lat. tegminum 3·5 mm.—Long. femorum post. 6 mm.; cercorum 4·6 mm.

Very like the preceding species but decidedly larger and with longer cerci. The species is altogether more robust than most others of the genus. The black area behind the vena stridulans well-marked, and rugulose as in the preceding.

HAB. Kauai (4000 ft.); 1 ♂ taken from beneath the bark of a tree.

(12) *Paratrigonidium molokaiense*, sp. nov.

Testaceum, fronte inter antennas tota nigra. Clypeus totus vel ex majore parte niger. Articulus antennarum primus et secundus nigri vel picei. Pronotum cum capite inter setas distincte pallide pubescens. Femora omnia cum tibiis distinctissime nigro-notata; femora postica notis minimis compluribus nigris intus ornata. Tegmen ♂ dextrum plaga post venam stridulantem nigra, tota rugosa, maculisque compluribus postice, necnon in campo laterali, signatum. Tegmina ♀ supra pallida, campo laterali toto nigricante. Cerci pallidi, minus longi. ♂♀.

Long. corporis ♂ 8, ♀ 7 mm.; pronoti ♂ 1·4, ♀ 1·4 mm.; tegminum ♂ 5·5, ♀ 4·5 mm —Lat. tegminum ♂ 3·2 mm.—Long. femorum post. ♂ 5·2, ♀ 5·2 mm.; ovipositoris 2·7 mm.; cercorum ♀ 3·2 mm.

Certainly a distinct species, the hind femora (at least in the ♂) rather more strongly clavate, than in most of the genus.

HAB. Mountains of Molokai (3000 ft.); rare, 1 ♂ 1 ♀ taken amongst low vegetation.

(13) *Paratrigonidium attenuatum*, sp. nov.

Pallide testaceum, angustum, elongatum, femoribus omnibus nigro-notatis. Tegmen ♂ dextrum post venam stridulantem plus minusve evidenter nigro-notatum, plaga nigra rugulosa, speculo angustissimo, fortiter elongato. ♂♀.

		Var. major.		Var. minor.
Long.	corporis	♂ 8,	♀ 8·25 mm.	♂ 7·25 mm.
	pronoti	2,	2 „	1·7 „
	tegminum	5·5,	5 „	5 „
Lat.	„	3,		2·75 „
Long.	fem. post.	6·5,	6·5 „	5·5 „
	ovipositoris		3·5 „	

(Plate I. fig. 13; and Plate II. fig. 5.)

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Apparently there are two forms, a larger and a smaller, of this species, the former being found at a greater elevation in the mountains than the latter. Except for the difference in size I see no other noticeable distinction between the adults, yet, if I am not mistaken, the immature forms of the larger examples are green, while those of the smaller are not.

This species is easily distinguished by the very narrow speculum of the ♂ tegmen. The large examples are not much less long than *P. grande*, but the ♂ is a much narrower insect.

HAB. Kauai (4000 ft.), the larger form. The smaller at an elevation of 2000—3000 ft. Both live beneath the bark of large trees.

(14) *Paratrigonidium debile*, sp. nov.

Angustum, testaceum, fronte cum pronoto pallida, fusco-notata. Tegmen ♂ dextrum circa venam stridulantem nigro-maculatum. Tibiae anteriores et intermediae distincte fusco- vel nigro-notatae. Femora postica notis parvis nigricantibus nonnullis interne signata. Cerci pallidi. ♂.

Long. corporis 6·8 mm.; pronoti 1·2 mm.; tegminum 4·5 mm.—Lat. tegminum 2·5 mm.—Long. femorum post. 5 mm.

HAB. Mountains of Oahu (2000 ft. and upwards). 3 ♂ taken.

(15) *Paratrigonidium exiguum*, sp. nov.

Minimum, brunneum, fronte et pronoto variegatis, haud concoloribus. Pronotum ex majore parte nigro-fuscum, pallido-notatum. Antennae articulis basalibus exceptis infuscatae. Femora omnia cum tibiis fortiter nigro-notata. Cerci fuscescentes. ♂ ♀.

Long. corporis ♂ 6, ♀ 6 mm.; pronoti ♀ 1·5 mm.; tegminum ♂ 4, ♀ 4 mm.—Lat. tegminum ♂ 2·5 mm.—Long. femorum post. ♂ 4·2, ♀ 5 mm.

A very small species, bearing a great superficial resemblance to *P. pacificum* Scud., but not really allied at all to that (so far as the Hawaiian species are concerned) isolated species. The variegated pronotum, short cerci &c., will distinguish it at a glance, while the different neuration of the lateral field of the tegmina, and the different form of ovipositor, show that it is really more nearly allied to any of the preceding species, than to *P. pacificum*, which it superficially so greatly resembles.

HAB. A single pair taken in the Waianae mountains, Oahu, at an elevation of 3000 ft. It is an arboreal species.

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(16) *Paratrigonidium pacificum* Scudd.

Trigonidium pacificum Scudder P. Boston Soc. XII. 1868, p. 139.

Paratrigonidium pacificum Brunner P. Z. S. Lond. 1895, p. 895.

This species may be known from any of the preceding by the different neuration of the lateral field of the tegmina. (Plate II. fig. 6*a*.) The pronotum is never variegate, nor have the posterior femora towards the base outwardly a large number of closely-set small, but separate, spots, as most of the species of the genus. The cerci are unusually long and in the ♀ extend far back behind the ovipositor. The ♂ genital armature (often withdrawn into the body) is quite different to that of any of the preceding, in all of which it terminates in two elongate free processes, which bear minute denticles. In the present species there are no such processes. The ovipositor is also of different form, being interrupted at about the middle of the length of its superior margin. In all the other species, the interruption is nearer the apex than the middle. The ♂ tegmina (which vary greatly in colour) are never maculate. In its habits this species is largely terrestrial, although it often ascends certain plants, especially frequenting the tree ferns, and the stems and dead leaves of the banana. In colour it varies from very dark brown (nearly black) to pale testaceous, and it also varies considerably in size. In the wet woods of Hawaii there would appear to be two races, a larger and generally paler one, and a smaller and very dark one with brightly shining thorax, the latter being the more strictly terrestrial in habits. When, however, examples from all the islands are compared, it seems impossible to keep the two as distinct, without making a number of other and ill-defined species.

HAB. Found on all the islands in the mountain forests, preferring damp and shady places, and moving freely by day.

Obs. There are several examples of this genus, which probably belong to other and distinct species, but they are too closely allied to some of those described above to be separated without the inspection of more material.

Group PROGNATHOGRYLLIDES, new group.

In the Proceedings of the Zoological Society (Dec. 1895) Herr Brunner v. Wattenwyl described a genus *Prognathogryllus* to include two species of Hawaiian crickets. The discovery of 14 additional species allied to these, has made it necessary to form several new genera, and to separate the two original species. The characters of the genus *Prognathogryllus* have in consequence required some modification. The

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five genera characterized below are well marked, and their peculiarities seem to warrant the establishment of a special group, Prognathogryllides. They are distinguished from the Podoscirtes group by the form of the head, which is strongly porrect; and by the armature of the apex of the posterior tibiae, there being only two calcaria on either side of each. The number given by Herr Brunner is five, three outer and two inner, but the examination of many more species and examples than were submitted to him, has led to the conclusion that the upper of what he considered to be the three outer calcaria should rather be counted as the apical spine of its series. In the first place its position and appearance are rather those of a spine than of a true calcar, and secondly in some of the species, in certain examples it may be altogether absent, whilst in others of the same species it is present. If this spine be admitted as a calcar, the apical spine of the inner series must in many of the species be also considered as such, since the appearance of both, and their position as regards the calcaria, are precisely similar. This apical spine of the inner series is also sometimes wanting in some examples of a given species, in which case there are no spines adjoining the calcaria, and these stand out distinctly as two on each side. (Cf. Plate II. figs. 10*b*, 10*c*, 10*d*; 15, 15*a*, 15*b*; etc.) In *Prognathogryllus* as now restricted, the apical spine of the inner series is very distinct from the calcaria, and this fact renders it probable that in the allied genera the true inner calcaria are also two, that which might at first sight be considered a third being merely the apical spine of the inner series.

All the species are of elongate and slender form, except *Prognathogryllus robustus*, which is comparatively short and robust. In *Thaumatogryllus* and *Leptogryllus* the tegmina are very small and scale-like, and sometimes only visible at the sides of the body at the hind margin of the pronotum, and the wings are wanting. *Aphonogryllus* has no free tegmina. In the ♀ of *Prognathogryllus* (the ♂ being unknown) they are about equal in length to the head and pronotum together, but in *P. robustus* they extend nearly to the apex of the abdomen. The wings in this genus are ill-developed, being about as long as the short tegmina in *P. alatus*, and much shorter than the tegmina in *P. robustus*, but they are always present.

In *Nesogryllus* ♂ (the ♀ being unknown), the tegmina are well developed for stridulation, but they do not extend back as far as the apex of the long and slender abdomen, and the wings are rudimentary.

Prognathogryllus and *Nesogryllus* have a distinct tympanum on the inner face of the front tibiae. The other genera have none.

The males of those species of *Leptogryllus*, which have the metanotum exposed, bear on this part two punctures, one on either side of the middle line, which are represented by two smooth points in the females. When the scale-like tegmina are larger, and conceal (at least for the most part) the metanotum, its basal part is depressed, and the punctures or orifices, which lie within this cavity, are furnished

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outwardly with a small curved process. In *Thaumatogryllus* this cavity is very deep and abrupt and apparently extends beneath the pronotum, which with the tegmina entirely conceals it. Instead of the two minute orifices there appears to be a large transverse slit, with a small hard spine at either extremity. As in *Leptogryllus* these structures are peculiar to the ♂.

All the species of this group are entirely nocturnal in their activities. In the day-time they conceal themselves beneath the bark of trees, in hollow stems, or amongst dead leaves attached to trees, but we have never met with any species that is not arboreal in its habits. All the species of *Prognathogryllus*, *Nesogryllus* and *Aphonogryllus* are extremely rare insects, while the *Thaumatogryllus* and several of the species of *Leptogryllus* have been taken in some numbers, but even these are rarely or never to be found unless a special search be made for them.

The genera of Prognathogryllides may be tabulated as follows:

1. (*2*) Cerci tribus articulis tarsorum posticorum conjunctis multo longiores .....*Prognathogryllus.*
2. (*1*) Cerci tribus articulis tarsorum posticorum haud longiores.
3. (*6*) Spinae tibiarum posticarum internae externis evidenter longiores. (Tegmina aut longa aut nulla.)
4. (*5*) ♂ tegmina nulla.....*Aphonogryllus.*
5. (*4*) ♂ tegmina longa .....*Nesogryllus.*
6. (*3*) Spinae tibiarum posticarum internae externis haud evidenter longiores. (Tegmina squamiformia, saepe minutissima.)
7. (*8*) Metatarsus anterior longissimus: calcar tibiarum posticarum externum et superius longum .....*Thaumatogryllus.*
8. (*7*) Metatarsus anterior minus longus, tantum bis terve longior quam latior: calcar tibiarum posticarum externum et superius breve .....*Leptogryllus.*

Prognathogryllus (sensu strictiori).

Prognathogryllus Brunner P. Z. S. 1895, p. 896.

Tegmina abbreviata, vel fere ad apicem abdominis extensa. Alae sat distinctae, ad apices tegminum extensae, vel, si haec longa, his multo breviores. Tibiae anticae tympano instructae; tibiae posticae spinis utrinque armatae, internis, quam externae, multo longioribus. Cerci ovipositori subaequales. ♀.

(1) *Prognathogryllus alatus* Brunn.

Prognathogryllus alatus Brunner P. Z. S. (1895) p. 896.

(Plate II. figs. 8, 8*a*, & 8*b*.)

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(2) *Prognathogryllus elongatus*, sp. nov.

Gracilis, elongatus, colore testaceo. Tegmina pallida, fere ad apicem segmenti abdominis secundi se extendentia, venis flavis. Femora postica gracillima, spinis internis externis evidenter longioribus. ♀.

Long. corporis 22 mm., pronoti 4, tegminum 5·5, femorum post. 11, ovipositoris 7 mm. (Plate I. fig. 15.)

A very distinct species, which, although of nearly the same length as the preceding, appears much longer, owing to its much narrower form. The posterior femora are very slender and much less wide at the base, and the inner series of spines on the posterior tibiae are much less strong.

HAB. The high plateau of Kauai. July, 1896.

(3) *Prognathogryllus robustus*, sp. nov.

Brunneo-niger, robustus. Tegmina fere ad apicem abdominis se extendentia. Tibiae posticae cum femoribus minus elongatae, spinis internis quam externis multo longioribus. ♀.

Long. corporis 16 mm., pronoti 4, tegminum 9, femorum post. 9, ovipositoris 10 mm. (Plate I. fig. 14.)

Quite unlike the other species in general appearance, of a dark brownish colour, and with well developed tegmina. The wings are much shorter than these. The posterior femora are formed much like those of *P. alatus*. The inner series of spines on the posterior tibiae is much more strongly developed than the outer, but they are shorter than those of *P. alatus*.

HAB. High central plateau of the Kauai mountains. Very rare, a single ♀ only taken, high up in a dead tree amongst the dry leaves that still adhered.

(4) *Prognathogryllus oahuensis*, sp. nov.

Haud robustus, flavo-testaceus, pronoto fusco-variegato. *P. elongato* simillimus, femoribus tibiisque posticis multo brevioribus facile distinguendus. ♀.

Long. corporis 16 mm., pronoti 4 mm., tegminum 5 mm., femorum post. 9 mm., ovipositoris 6 mm.

Easily known from *P. elongatus*, which (of the preceding species) it most resembles, by the shape of the posterior femora, which are much wider near the base in proportion to their length.

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The inner series of spines on the posterior tibiae is more strongly developed, and the whole insect is less slender and elongate.

HAB. Waianae Mountains, Oahu. A single ♀ taken under bark in Feb. 1896. It was being attacked by the introduced ant, *Pheidole megacephala*, which had already bitten off the greater part of the antennae and tarsi.

(5) *Prognathogryllus inexspectatus*, sp. nov.

Gracilis, elongatus, testaceo colore. Pronotum totum pallidum, haud fusco-variegatum. Tegmina abbreviata, venis flavis. Femora postica minus incrassata. ♀.

Long. corporis 19 mm., pronoti 3·75 mm., Lat. pronoti 3 mm., Long. tegminum 5 mm., femorum post. circa 9 mm., ovipositoris 6·50 mm.

Readily distinguished from *P. oahuensis* by the much narrower posterior femora, the unicolorous pronotum, which is also narrower, and the shorter spines of the posterior tibiae inwardly. From *P. elongatus* the evidently shorter posterior legs at once separate it.

HAB. Kauai (4000 ft.). Under bark of *Acacia koa*.

APHONOGRYLLUS, gen. nov.

Gracilis, elongatus, tegminibus alisque carens. Tibiae anticae tympano nullo instructae; posticae utrinque spinis armatae, internis, quam externae, multo longioribus; calcar internum et superius multo longius quam dimidium metatarsi. Cerci brevissimi, tarsorum articulis tribus posticorum, una conjunctis, haud aequales. ♂.

(1) *Aphonogryllus apteryx*, sp. nov.

Testaceus, dorso plus minusve fusco-variegato. Tegmina libera nulla, sed latera mesonoti lobate-producta. Femora postica minus fortiter elongata. Tibiae posticae supra infuscatae, spinis utrinque armatae, internis multo longioribus, basi nigris, media parte pallidis. ♂.

Long. corporis 16 mm., pronoti 3·25 mm., femorum post. 7·5 mm., cercorum 2 mm. (Plate II. figs. 9, 9*a*, 9*b*, 9*c*.)

HAB. Mountains of Oahu. Two males taken in 1896, one at an elevation of 2500, the other of 3000 feet.

NESOGRYLLUS, gen. nov.

Gracilis, elongatus. Tegmina capite una cum pronoto bis longiora. Alae tegminibus multo breviores. Tibiae anticae tympano instructae; posticae utrinque spinis armatae, internis, quam externae, multo longioribus; calcar internum et superius haud

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minus longum quam dimidium metatarsi. Cerci breves, metatarsis posticis subaequales. Venae tegminis superioris obliquae 2, necnon venae 3 breves ab angulo venae stridulantis externo emissae. Speculum vena transversa una in partes subaequales divisum. Campus apicalis brevissimus. ♂.

(1) *Nesogryllus stridulans*, sp. nov.

Gracilis, flavo-testaceus, tegminibus fere hyalinis, parte basali infuscata et opaca, venis pallidis. Antennae longissimae, testaceae, concolores. Pronotum fusconotatum. Femora omnia cum tibiis tarsisque pallide testacea et translucida. Tibiae posticae spinis pallidis utrinque armatae. ♂.

Long. corporis 22 mm., pronoti 4 mm., tegminum 13 mm., femorum post. 10·5 mm., cercorum 3·75 mm. (Plate II. figs. 11 & 11*a*.)

Hab. Mountains of Oahu, 3000 ft. A single ♂ taken (in June 1895) from the interior of a hollow twig.

Thaumatogryllus, gen. nov.

Elongatus cylindricus. Tegmina minima, maris metanotum fere totum, feminae dimidiam fere partem metanoti celantia. Tibiae anticae tympano nullo instructae. Metatarsi longissimi; tibiae posticae spinis brevibus utrinque subaequalibus armatae; calcaria superiora, et externa et interna, longissima et subaequalia. Cerci breves, parte tertia ovipositoris vix longiores. ♂♀.

(1) *Thaumatogryllus variegatus*, sp. nov.

Flavo-testaceus, colore fusco nigroque variegatus. Femora omnia cum tibiis intermediis et anticis fortiter nigronotata. Tarsi pallidi. Tegmina brevia, metanotum totum haud tegentia. ♂♀.

Long. corporis 15 mm., pronoti 4 mm., femorum post. 10 mm., ovipositoris 8·75 mm. (Plate I. fig. 16; and Plate II. figs. 10, 10*a*, 10*b*, 10*c*, 10*d*.)

Some individuals are considerably darker than others and there is some variation in size. The anterior legs are remarkably long and slender, their metatarsus being many times as long as wide. The posterior femora are somewhat more strongly and suddenly dilated on their basal part than is usual in the allied forms. The posterior tibiae are very long, and the spines on each side very short.

Hab. Mountains of Kauai (4000 ft.).

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LEPTOGRYLLUS, gen. nov.

Gracilis, subdepressus. Tegmina minima squamiformia, nonnunquam metanotum totum, vel fere totum, tegentia, saepe tantum ad latera extrema mesonoti antice vix discernenda. Alae nullae. Tibiae anticae tympano nullo instructae; metatarsus tantum bis terve longior quam latior. Tibiae posticae spinis brevibus utrinque subaequalibus armatae; calcar internum et superius, quam caetera, longius, parti dimidiae metatarsi haud aequale. Cerci brevissimi. ♂♀.

(1) *Leptogryllus nigrolineatus*, sp. nov.

Pallide flavo-testaceus. Femora cum tibiis immaculata. Abdominis latera late nigra. Femora postica perlonga, minus dilatata: tibiae utrinque spinis brevibus armatae. Tegmina metanotum totum haud tegentia. ♂♀.

Long. corporis 18 mm., pronoti 4·5 mm., femorum post. ♀ 12 mm., ♂ 11 mm., ovipositoris 7 mm., cercorum 2·5 mm.

HAB. Mountains of Oahu and Maui.

(2) *Leptogryllus nigromaculatus*, sp. nov.

Forma et colore fere praecedentis; femoribus posticis et tibiis evidenter brevioribus facile distinguendus. ♂♀.

Long. corporis (haud contracti) 15·5 mm., pronoti 3·5 mm., femorum post. 9 mm., ovipositoris 6 mm. (Plate I. fig. 17; and Plate II. figs. 12 & 12*a*.)

This species is very like the preceding, but the shorter posterior legs will distinguish it at once. Moreover the abdomen, instead of the continuous broad lateral stripes, has a series of diamond-shaped spots on each side. The tegmina as in the preceding.

HAB. Kauai. In the Mountains 3000—4000 ft.

(3) *Leptogryllus similis*, sp. nov.

Praecedentibus colore simillimus; pallide testaceus; abdomen utrinque late nigro-lineatum; femora antica et intermedia cum tibiis immaculata; metatarsi postici apex niger. Tegmina minutissima, tantum ad latera corporis videnda. ♂.

Long. corporis 12·5 mm., pronoti 3 mm., femorum post. 7·25 mm. (Plate II. fig. 13.)

HAB. Mountain above Hilo, Hawaii, 2000 ft.

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(4) *Leptogryllus elongatus*, sp. nov.

Praecedentibus forma et colore simillimus; femora antica et intermedia cum tibiis plus minusve distincte nigro- vel fusco-notata; pronotum utrinque saepius indistincte fuscum; abdomen utrinque fusco- vel nigro-lineatum, aut bilineatum. Tegmina (♂♀) minutissima. ♂♀.

Long. corporis (haud contracti) 14·5 mm., pronoti 3·5 mm., femorum post. 9 mm., ovipositoris 6 mm. (Plate I. fig. 18.)

HAB. Hilo, Puna, and Kau, Hawaii (2000—4000 ft.).

(5) *Leptogryllus kauaiensis*, sp. nov.

Forma fere praecedentium, colore variabili, testaceus, plerumque parte corporis majore nigro- et fusco-variegata; femora antica et intermedia cum tibiis nigro-annulata. Tegmina metanotum totum tegentia (♂), vel multo minora, unum ab altero longe distantia, et brevissima (♀). ♂♀.

Long. corporis 16 mm., pronoti 4 mm., femorum post. 8·5—9 mm., ovipositoris 6 mm.

HAB. Mountains of Kauai (2000—4000 ft.).

(6) *Leptogryllus fusconotatus*, sp. nov.

Praecedentis colore et facie; ♂ tegminibus minutissimis bene distinctus. ♂.

Long. corporis 14 mm., pronoti 3·75 mm., femorum post. 9 mm.

HAB. Mountains of Oahu (2000 ft.). One ♂ taken in 1896.

(7) *Leptogryllus forficularis* Brunn.

Prognathogryllus forficularis Brunner P. Z. S. 1895, p. 897.

(Plate II. figs. 14, 14*a*, & 14*b*.)

In the ♀ of this species the tegmina are extremely small and visible only at the extreme sides beyond the margin of the pronotum. It closely resembles the preceding, but its shorter and less wide posterior femora easily distinguish it. The length of these is only about 6½ mm. I have taken a single ♂ which appears to belong to this species, although taken on a different island. Apart from the sexual characters it does not seem to differ at all from the ♀.

HAB. Kona, Hawaii, 3000 ft. Iao Valley, Maui. 1 ♂.

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(8) *Leptogryllus simillimus*, sp. nov.

L. forficulari simillimus, tibiis posticis minus spinosis distinguendus. ♂♀.

Very closely allied to *L. forficularis*, but generally if not always with the body darker in colour. The spines on the tibiae are evidently less close and do not extend nearly so far back towards their base. I have examined a series of specimens. The ♂ is often slightly shorter and less robust than the ♀.

Long. corporis (haud contracti) ♀ 14 mm.; pronoti 3·25 mm., femorum post. 6·5 mm., ovipositoris 5 mm. (Plate I. fig. 19; Plate II. figs. 15, 15*a*, & 15*b*.)

HAB. Haleakala, Maui (4000—5000 ft.).

The following works are all that contain matter relating to the indigenous Hawaiian Orthoptera.

1. SCUDDER, S. H. A century of Orthoptera. Decade I. Gryllides. P. Boston Soc. XII. 1868, pp. 139—143.
Trigonidium pacificum, n. sp., p. 139.

2. BORMANS, A. DE. Faune orthoptérologique des îles Hawaï ou Sandwich. Ann. Mus. Genova, XVIII. 1882 and 1883, pp. 438—448.
17 species, 2 new.

3. REDTENBACHER, J. Monographie der Conocephaliden. Verh. Ges. Wien, XLI. 1891, pp. 315—562.
Description of *Brachymetopa*, p. 430, and of *B. discolor*, *blackburni*, p. 431.

4. BRUNNER VON WATTENWYL, C. On the Orthoptera of the Sandwich Islands. P. Zool. Soc. London, 1895, pp. 891—897.
29 species, 6 new. This paper deals with the collections received by the Committee previous to 1895.

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DESCRIPTION OF PLATE I. (VOL. II.)

ORTHOPTERA.

Fig. 1. *Brachymetopa discolor* ♂; 1 *a* front view of head of the same.

Fig. 2. *B. blackburni* ♀.

Fig. 3. *B. nitida* ♂; 3 *a* variety of the ♀; 3 *b* example in the attitude assumed when the insect is molested.

Fig. 4. *B. unica* ♀.

Fig. 5. *B. mauiensis* ♀.

Fig. 6. *B. parvula* ♀; 6 *a* var. *brunnea* ♂.

Fig. 7. *B. deplanata* ♂.

Fig. 8. *Conocephaloides hawaiiensis* ♀.

Fig. 9. *Paratrigonidium roseum* ♀.

Fig. 10. *P. atroferrugineum* ♂.

Fig. 11. *P. viridescens* ♂.

Fig. 12. *P. grande* ♂.

Fig. 13. *P. attenuatum* ♂.

Fig. 14. *Prognathogryllus robustus* ♀.

Fig. 15. *P. elongatus* ♀.

Fig. 16. *Thaumatogryllus variegatus* ♀.

Fig. 17. *Leptogryllus nigro-maculatus* ♀.

Fig. 18. *L. elongatus* ♀.

Fig. 19. *L. simillimus* ♀.

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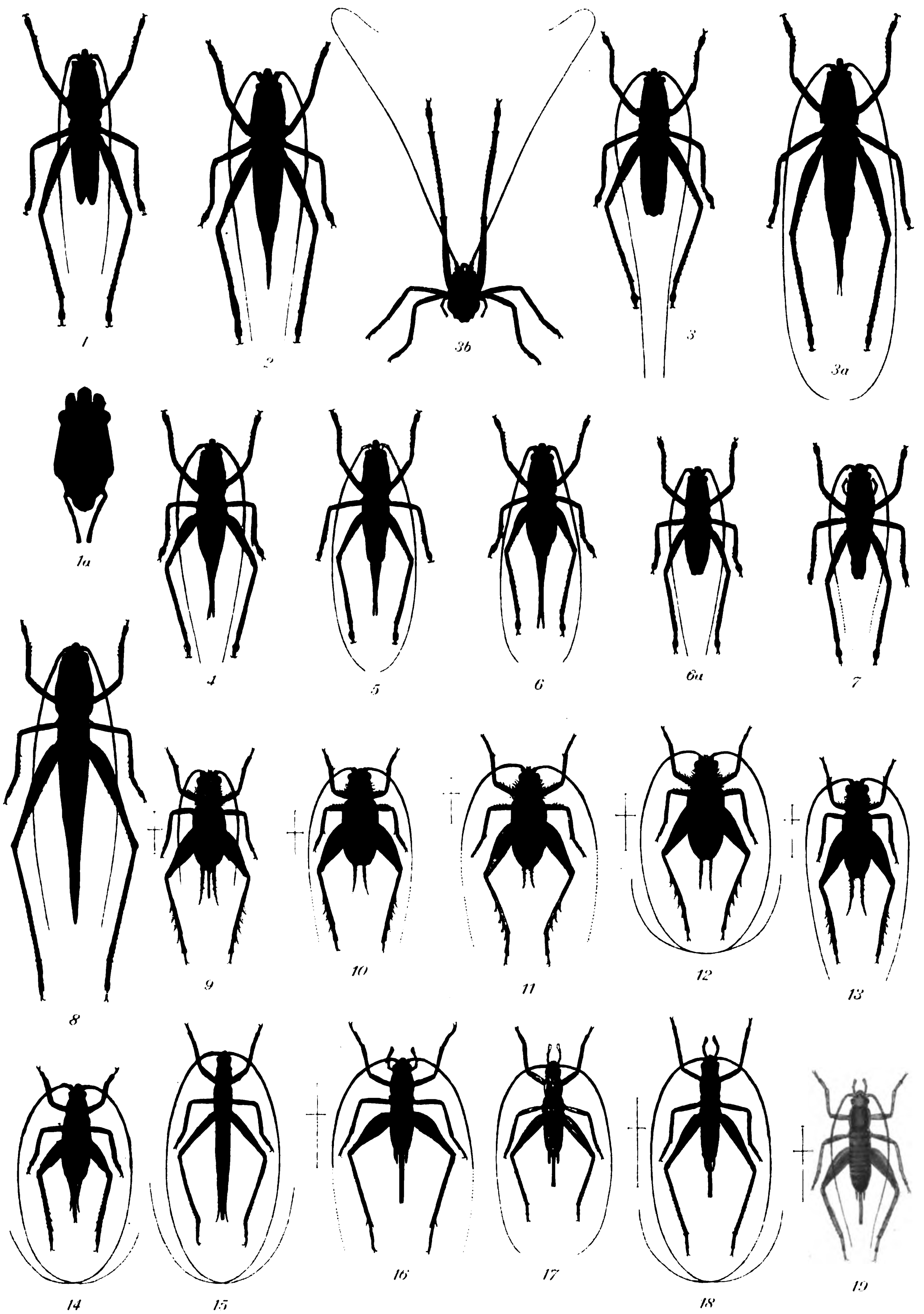

F. Wilson, lith. Cambridge

Perkins Orthoptera

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DESCRIPTION OF PLATE II. (VOL. II.)

ORTHOPTERA.

Fig. 1. *Brachymetopa discolor*, apex of abdomen showing cerci in dorsal view; 1 *a* the same in apical view.

Fig. 2. *B. nitida*, cerci in dorsal view; 2 *a* apical view of the same.

Fig. 3. *B. deplanata*, cerci in dorsal view; 3 *a* apical view of the same.

Fig. 4. *B. mauiensis*, cerci in dorsal view; 4 *a* apical view of the same.

Fig. 5. *Paratrigonidium attenuatum*, var. *minor*, before the last ecdysis, showing wings and tegmina about equally developed. The former entirely disappear at the last moult.

Fig. 6. Lateral field of superior tegmen of *P. filicum*; 6 *a* the same of *P. pacificum*.

Fig. 7. *Myrmecophila quadrispina*, posterior tibia with four spines on its inner margin.

Fig. 8. *Prognathogryllus alatus*, posterior tibia in dorsal aspect; 8 *a* apex of tibia viewed outwardly; 8 *b* the same on inner side (*s*, *s'*, the apical spine of the two series, *c'* and c^3 the upper and lower calcar in each figure).

Fig. 9. *Aphonogryllus apteryx*; 9 *a* meso- and metathorax in lateral aspect; 9 *b* outer, and 9 *c* inner aspect of apex of posterior tibia (the lettering as before).

Fig. 10. *Thaumatogryllus variegatus*, mesothorax, metathorax and first abdominal segment of ♂, showing the scale-like tegmina; 10 *a* the same parts in the ♀, the tegmina less developed (*teg.* tegmina concealing more or less of the meso- and metathorax, *ab* 1 the first abdominal segment); 10 *b* and 10 *c* the two lateral views of apex of posterior tibia, the lettering as before; 10 *d* dorsal aspect of apex of posterior tibia of another example, in which the apical spine of either series is very far removed from the calcaria. Only the apex of one of these spines is shown, that on the other side being situated still further towards the base.

Fig. 11. *Nesogryllus stridulans*; 11 *a* superior tegmen of the same enlarged.

Fig. 12. *Leptogryllus nigromaculatus*, ♂ tegmina; 12 *a* the same in the ♀ (lettering as in fig. 10 and 10 *a*).

Fig. 13. *L. similis* ♂, mesothorax with very small tegmina, and metathorax.

Fig. 14. *L. forficularis*, posterior tibia in dorsal aspect; 14 *a* and 14 *b* outer and inner aspects of apex of the same (the lettering as in fig. 8).

Fig. 15. *L. simillimus*, posterior tibia in dorsal aspect; 15 *a* and 15 *b* outer and inner aspects of apex of tibia of a variety of the same, in which the apical spine of either series is very remote from the calcaria (the lettering as in fig. 8).

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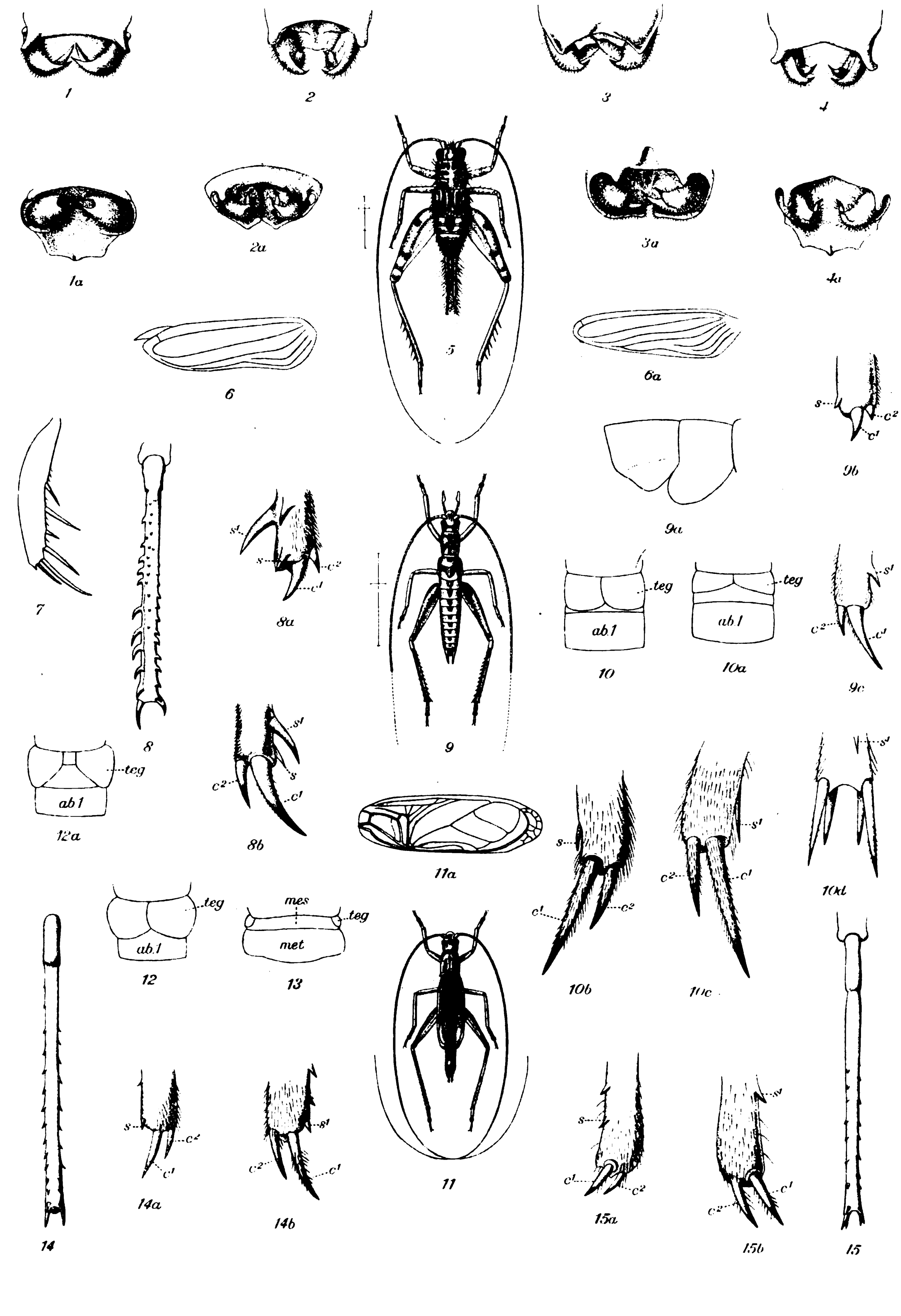

Perkins Orthoptera

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