FAUNA HAWAIIENSIS

OR THE

ZOOLOGY OF THE SANDWICH (HAWAIIAN) ISLES:

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

THE ROYAL SOCIETY OF LONDON FOR PROMOTING NATURAL KNOWLEDGE

AND THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

And carried on with the assistance of those Bodies and of the Trustees of

THE BERNICE PAUAHI BISHOP MUSEUM AT HONOLULU.

EDITED BY

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

SECRETARY OF THE COMMITTEE.

VOLUME II. PART II.

NEUROPTERA

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

Pages 31—89; *Plates III, IV, V, uncoloured.*

CAMBRIDGE:

AT THE UNIVERSITY PRESS.

1899

September 25, 1899.

London: C. J. CLAY AND SONS,
CAMBRIDGE UNIVERSITY PRESS WAREHOUSE,
AVE MARIA LANE.
Glasgow: 263, ARGYLE STREET.

Leipzig: F. A. BROCKHAUS.
New York: THE MACMILLAN COMPANY.
Bombay: E. SEYMOUR HALE.

NEUROPTERA.

By R. C. L. Perkins.

§ 1. General considerations on the Neuroptera.

THE Neuroptera are rather numerously represented in the islands, but the fauna as represented by this group is of the same fragmentary character, as is seen in the other Orders of insects, some of the extensive divisions of Neuroptera being totally unrepresented.

At present the total number of species known to us amounts to 111, of which 54 or nearly one-half belong to the Hemerobiidae (including herein Chrysopides and Myrmeleonides), 29 to the Odonata or dragon-flies, and 25 to the Psocidae. The remaining three species belong to two other divisions and consist of two Termitidae, and a solitary species of Embiidae.

The divisions Ephemeridae and Trichoptera (or Phryganeidae), and the smaller groups Perlidae, Sialidae and Panorpidae are absolutely unrepresented. The entire absence of the first four of these divisions is a very remarkable fact, as they are aquatic in habits, and the numerous mountain streams and rivers would appear to be admirably adapted for many species; so that one must conclude that these water-frequenting insects are ill-adapted for passing over wide expanses of ocean.

The Hemerobiidae, excluding the Myrmeleonides, have 52 species which belong to 6 genera. Not one of these species is known to occur in other countries, but two of the genera, which are represented by single species, have no alliance with the other forms, and when this family has been extensively collected in other countries, these two species will probably be found elsewhere. This is almost certain to be the case with the small *Chrysopa microphya*, a species which is abundant in gardens in towns and settlements, although it has extended its range to a considerable elevation up the mountain sides. A single species, referred temporarily to *Megalomus* (although not a true member of that genus), is more remarkable; it may even prove to be peculiar to the islands, but will more probably ultimately be found elsewhere. It is noteworthy that both these insects are of general distribution over the islands, in contrast with most other species of this family, which are so often confined to a single island.

Nineteen species are included in the genus *Nesomicromus*, which has been founded

for their reception. The simpler forms of this genus are very similar to the well-known genus *Micromus*, but the more remarkable species have the wing-contour of *Drepanopteryx*, and bear to *Micromus* a relation very similar to that which *Drepanopteryx* bears to *Megalomus* or *Hemerobius*. Between the extreme forms of *Nesomicromus* species are found in quite intermediate conditions, so that one is compelled to treat the whole series of species as forming but a single genus, and their relationship is strongly evidenced by the apical abdominal appendices of the ♂♂, which though differing in detail in many species, nevertheless possess notable peculiarities common to all.

Allied to *Nesomicromus*, and no doubt evolved within the islands from some such form, are the other two genera, *Pseudopsectra* and *Nesothauma*, each with but one species at present known. The former is in most respects intermediate between the latter and *Nesomicromus*. Both these insects, but especially the *Nesothauma*, have claim to be considered amongst the most remarkable of all known species of *Neuroptera*. *Nesothauma* has no trace of posterior wings and the front pair are almost of the consistency of the elytra of a Coleopterous insect. *Pseudopsectra* is likewise incapable of flight, but the front pair of wings are less abnormal, and the posterior pair are represented by small lobes. Although reminding one of the anomalous and rare genus *Psectra*, *Pseudopsectra* is, without doubt, not related in any way to that genus. The ♂ characters of both *Pseudopsectra* and *Nesothauma* are formed entirely on a similar plan to those of *Nesomicromus*. The two insects included in these abnormal genera are very local and rare, and both frequent the same locality, Haleakala on Maui, where they are found at an elevation of five or six thousand feet above sea-level.

As above mentioned the single species of *Chrysopa* is almost certainly foreign, but another genus, *Anomalochrysa*, not known from elsewhere, includes no less than 29 species. These species form a most interesting series, but are excessively difficult to differentiate, owing to the great variability in colour of many of them, and the instability of the characters afforded by the nervuration. Here again the terminal segments of the ♂ afford great help in many instances, and on these characters there would appear to be two good genera, but the females of the two sections appear to present no points for generic division, at least in dried examples, the distortion of the body after death being much greater in this sex than in the ♂.

The species of Hemerobiidae have in general a much more restricted range than have the indigenous Agrionidae of the Odonata. Excluding the single *Megalomus* and *Chrysopa* as probably foreign, of the genus *Nesomicromus* 15 out of the 19 are restricted each one to a single island, the remaining four being widely distributed insects, Hawaii and Maui each having four species peculiar, while the latter likewise has also its peculiar genera *Pseudopsectra* and *Nesothauma*. The species of *Anomalochrysa* are even more localized, two only of the 29 occurring on more than one of the islands. In this genus the island of Hawaii is extraordinarily rich, since it has 12 species peculiar to itself, and both of the two more widely distributed species are also found there. The

following table of the indigenous Hemerobiidae gives the percentage of species peculiar to each of the islands.

	Species peculiar to.	Total number of species.	Percentage of peculiar species.
Kauai	7	8	87·5
Oahu	6[1]	9	60
Molokai	6	8	75
Lanai	—	2	—
Maui	9	12	75
Hawaii	16	20	80

Of the two Myrmeleonides I have not met with the *Formicaleo perjurus* Walk., which is almost certainly becoming extinct; the other, *Formicaleo wilsoni*, is locally common in open places on the lava-flows of Hawaii, where there is a stunted vegetation, and it also is found on other of the islands. Very probably it will prove to be a natural immigrant, and will ultimately be found elsewhere.

If we compare this table with that of the Agrionidae given on p. 34 it will at once be seen that the percentage of species peculiar to the several islands is much more nearly equal in the Hemerobiidae than is the case with the dragon-flies. In both tables Kauai stands first in the proportion of its peculiar species to the total number found upon it, and this is no doubt due, at least to a considerable extent, to the greater distance between it and the neighbouring island of Oahu, and probably in a lesser degree to its position at the extremity of the forest-bearing islands. The extraordinary richness of Hawaii in species of *Anomalochrysa* may perhaps point to that island as the spot where these insects first became established. The small percentage of species of *Agrion* peculiar to most of the islands is probably partly due to their greater powers of flight as compared with the Hemerobiidae, the high percentage of species peculiar to the more remote island of Kauai rather pointing to this conclusion, but it may be that they have been established for a shorter time in the islands than the Hemerobiids, or, even if antecedent to these, they may be less susceptible to the effects of isolation and the changes in environment thereby produced. However that may be, there is no doubt that several of the species of *Agrion* are at the present time in the process of forming other distinct species, owing to the isolation and change of conditions brought about by individuals having spread to more than one of the islands.

The Odonata or dragon-flies. The 29 species of Odonata are distributed in 5 genera, but no less than 24 are assigned to the genus *Agrion*. No doubt they will ultimately be separated from that genus, and will themselves form not less than three distinct genera, but at present it seems better to leave them under that name, as many of the species are difficult, being very variable even in important characters, and some have already formed more or less distinct local races, or subspecies, so that the question as

[1] *Anomalochrysa rufescens* McL., the locality of which is not recorded, is included here as being probably Oahuan.

to which are true species is as yet by no means absolutely settled. In the females the climax of difficulty is reached, for these have no structures suitable for distinguishing the species that can compare with the terminal appendages of the abdomen of the ♂, while the superficial distinctions, such as colour, details of nervuration, etc. are notably variable. All the species of *Agrion* are peculiar to the islands and are probably all related to one another, as more or less transitional forms are found between the different groups, and it is probable that all originated from some single species which reached the islands in remote times. Of the other four dragon-flies the *Tramea*, *Pantala*, and *Anax junius*, are no doubt natural immigrants, being all species of powerful flight and all are distributed throughout the group, whereas a large proportion of the species of *Agrion* are either restricted in range to one island, or when occurring on more than one are tending to form other distinct species, or local forms. The larger *Anax*, which is a very fine insect, is so far as is known peculiar to the islands, and has probably been established there sufficiently long to acquire characters which separate it from any other of the genus. It is very powerful on the wing, and is widely distributed over the islands, and extends its range far up the mountain sides. Another moderate-sized species, assigned to *Sympetrum* by Karsch, but for which Kirby has established a genus, *Nesogonia*, is also, so far as is known, peculiar to the islands. It is generally distributed over the group, in the mountains, and is notably variable in size, colour and nervuration.

If we limit our investigation to the species of *Agrion* it will be seen that in the number of species peculiar to it, Kauai ranks easily first of the six larger islands. Excluding *A. xanthomelas* and *A. pacificum*, species ubiquitous over the islands, seven species are restricted to Kauai, nor has it any species that even extends to the neighbouring island of Oahu. The latter island has four species peculiar to itself, and five others which are found also on one or more of the others. Maui, Molokai and Hawaii have each but a single species peculiar to them, while the little island of Lanai with seven or eight species has none. It should be added however with regard to these islands that some of the species upon them form varieties very distinct from the typical examples, and this is especially the case with several of the species found on Hawaii, where diminution in size and corresponding changes in nervuration are often evident. Nevertheless the occurrence of examples in a condition intermediate between the typical and extreme forms of such species renders it inadvisable to consider them as belonging to more than one species. The following table shows the percentage of species of *Agrion* peculiar to each of the islands.

	Species peculiar to.	Total number of species.	Percentage.
Kauai	7	9	77·7
Oahu	4	10	40
Molokai	1	8	12·5
Lanai	—	7	—
Maui	1	10	10
Hawaii	1	9	11·1

Psocidae are richly represented in the islands and twenty-five species are dealt with in the present paper. No doubt many others yet remain to be discovered, indeed other species are certainly included in those collected by me, but owing to their small size and poor state of preservation it was not advisable to attempt the description of the species. Nearly all are subject to much distortion and contraction of the body-segments after drying, as well as discoloration, and owing to the exudation of a sticky substance they are with difficulty relaxed, so as to be suitable for examination. Evidently there are good characters in the terminal abdominal segments of the ♂, but these are not available in dried examples. Many of the species exhibit great variability (in colour, nervuration, etc.), which is so remarkable a feature of so many Hawaiian insects. The difficulties of study in this group are so great from the causes above enumerated, that the present paper on these insects can only be regarded as a preliminary sketch, especially as regards the species referred to the genus *Elipsocus*, in which the instability of nervuration is so great, as to render the discrimination of species almost hopeless, without special attention to the insects in the field. In this preliminary study I have not considered it advisable to enter minutely into the generic question, but have referred all the species to three well-known genera. The solitary species referred to *Stenopsocus* temporarily, is clearly generically distinct therefrom, but only one example, in mutilated condition, was secured. It is very different to any other Hawaiian Psocid, and is interesting as having been taken at a high elevation in the mountains, where the nights, even in August, were cold, with hard frosts. Of the other 24 species, 14 are assigned to *Psocus*, most species of which appear to be confined, each one, to a single island, while 10 are placed in the genus *Elipsocus*. Some species of this latter genus are so variable in nervuration, that not only generic, but even characters of superior value, are affected.

The other components of the Neuropterous fauna are comparatively of little interest. The two Termites belong to the genus *Calotermes*. The smaller of these, *C. marginipennis* Latr., is certainly an introduced species and has done great damage to wooden buildings in the city of Honolulu. The larger one, referred to *C. castaneus* Burm., is very possibly distinct from that species, which was described from winged forms. The soldiers of the Hawaiian species possess well-developed eyes, and it is noteworthy that they are found (and probably only found) in the native forests, and series of them from three of the islands vary distinctly in the length of the gular area on the under-side of the head, as though they were already forming distinct races on the various islands. It is possible however that this variation, although affecting an important character, is merely such as occurs in different communities, and is not due to isolation on different islands, the material at hand not being sufficient for deciding this point.

The solitary Embiid (*Oligotoma insularis* M^{c}Lach.) is an interesting insect on account of the dorsal sclerites of the thorax in the winged ♂ not being of the simple structure usual in these insects, and very different to those of the apterous ♀. An

account of its habits and development is published in the Entomological Monthly Magazine, XXXIII. (1897), p. 56.

§ 2. Systematic account of the Neuroptera.

HEMEROBIIDAE.

HEMEROBIIDES.

The Hemerobiidae represented by the genera *Megalomus*, *Nesomicromus*, *Pseudopsectra*, and *Nesothauma*, as well as the numerous species of *Anomalochrysa* and the solitary[1] one of *Chrysopa* of the subdivision Chrysopides and including also Myrmeleonides form the most extensive section of the Hawaiian Neuroptera. Nearly all the species are confined to the mountain forests. The larvae of the Hemerobiids proper appear to feed on the species of Psocidae, those of *Anomalochrysa*, I have little doubt, prey on Lepidopterous larvae. Their mandibles are sharp and strong, so that they can give quite a sharp bite, when they fall upon the face or neck, as is often the case when one is beating the branches of trees. All the species appear to be nocturnal, although some are very readily disturbed, as one walks through the brush in the daytime.

MEGALOMUS Ramb.

(1) *Megalomus hospes*, sp. nov.

Head, thorax, and abdomen varying in colour from nearly uniform dark brown or blackish, with obscure pale markings, to a nearly uniform yellowish colour; generally brown with pale markings, or yellow with fuscous markings.

Anterior wings grey, more or less fulvescent, with a more or less distinct dark spot on the cubitus posticus, towards the base. Nervuration set with hairs, and with alternate light and darker spaces. The gradate nervules form two more or less distinct, transverse, oblique darker lines, and there is a third near the base. In one example the whole middle portion of the wing between the inner and the basal series of gradate nervules is deeply infuscate, forming a wide blackish transverse fascia. Radius with three sectors. The posterior wings are almost hyaline, and beautifully iridescent, their nervuration pale.

[1] We have excluded the *Chrysopa oceanica* Walk. from the list as probably not belonging to the Hawaiian fauna. Several species brought home by the Beechey expedition with the locality "Sandwich Is." appear to have come from the other islands of that name.

♂ appendices very long and narrow, the sides subparallel, with an apical depression outwardly, rounded at their extremities; inwardly on their apical portion furnished with short somewhat spinose hairs, which are directed inwardly. Between the appendices there may be seen a short chitinous process, with the apex bifid, forming two spines. Ventral valve very narrow, sublinear, its sides parallel in dorsal or ventral aspect, curved upwards and clothed with long hairs. (Plate IV. figs. 1, 2, 16 & 16 *a*.)

Expanse 13—17 mm.

Hab. Found all over the group, in the mountains, but not very abundant. This species has no relation with the rest of the Hawaiian Hemerobiidae, and I suspect it has been introduced.

Nesomicromus, gen. nov.

Allied to *Micromus*, some of the species having the superficial appearance, as well as the nervuration of that genus. The wings are either rounded at the apex, or falcate, somewhat resembling *Drepanopteryx*, the one form passing gradually into the other, so that the species cannot be subdivided on this character, although the extreme forms are vastly different. The species with simply rounded wings can (so far as I can see) only be separated from *Micromus* by the length of the joints of the maxillary palpi, in which they also agree with the species which have falcate wings. The penultimate joint of these palpi is very short, being only about half as long as the terminal.

The ♂ characters are very similar throughout the genus, the appendices being rarely very conspicuous, usually of triangular form and pointed at the apex. In all the species they give off each from their lower margin towards the base a fine spine, and slight differences in the length, form, etc. of these spines furnish useful specific characters. The general similarity in the form of the appendices, which extends also to the two following genera, is very remarkable. As in *Micromus*, there is no free cellule formed by a recurrent nervule at the base of the wing.

(1) *Nesomicromus vagus*, sp. nov.

Brown or black; face, legs and palpi paler. Antennae varying in colour from testaceous to nearly black. Thorax with short pale pubescence.

Anterior wings brownish or grey-brown (grey in immature examples), generally with a small pale spot towards the base, situated on the cubitus posticus. Gradate nervules more or less infuscate, forming two transverse darker lines on the wings, often irregular and broken, sometimes wanting. Apical margin evidently, but slightly excised, giving the wings a hooked appearance at the tip. Nervuration dark, sometimes (with the pterostigma) more or less pink, the nervures with short and very inconspicuous hairs.

Radius normally with 5, rarely 4 or 6 sectors; in the latter cases the number is often different on the two sides of the same insect.

Posterior wings subinfuscate, but paler than the front wings and more transparent, nervuration generally dark, the apical margin very slightly excised below the tip of the wing.

♂ appendices viewed laterally, sub-triangular, narrowly rounded at the apex, on their inferior margin inwardly they are furnished each with a fine spine, curved upwards, and under a very strong lens finely serrate or dentate, the spines extending backwards rather beyond the apices of the processes. (Plate IV. fig. 3.)

Expanse 12—18 mm.

HAB. Common all over the group in mountain forests, and sometimes found on the coast.

(2) *Nesomicromus latipennis*, sp. nov.

Allied to the preceding, and of similar colour.

Anterior wings brown, posterior pair infumate. Radius with 5 sectors. Readily known by the very broad and short wings, the apical margin not perceptibly emarginate; the posterior pair very obtuse, their apical margin almost straight, not slightly concave. (Plate IV. fig. 4.)

Expanse 15 mm.

HAB. Kona, Hawaii (3500 ft.); 1 ♀ June, 1892.

(3) *Nesomicromus angustipennis*, sp. nov.

Closely allied to *N. hawaiiensis*, but with the wings narrower and the apex somewhat more produced. The radius gives off 6 or 7 sectors. The cellules formed between the outer and inner series of the gradate nervules are extremely narrow in proportion to their length, and this fact gives a character to the wing by which the species may be easily recognized.

The body and anterior wings are brown, but only gradually arrive at this colour, being pale for some time after the emergence of the insect. Normally there is a small pale spot towards the base of the wing on the cubitus posticus, and the radius bears alternate pale and dark spots as in *N. hawaiiensis*. The variation of the present species also appears analogous to that of the other, the nervuration and pterostigmata being pink in some examples, and the wings in some are evidently less narrow than usual, etc.

The ♂ characters differ, in that the spines of the apical processes are shorter, and do not reach to the apices of the processes themselves. (Plate IV. fig. 5.)

Expanse 12—16 mm.

HAB. Mountains of Kauai (4000 ft.).

(4) *Nesomicromus drepanoides*, sp. nov.

Dark brown or nearly black, legs and antennae pale. Anterior wings dark brown more or less mottled with lighter yellowish-brown, or nearly entirely pale yellowish-brown with the gradate nervules delineated by transverse dark lines, the radius with the usual alternate dark spots, and some dark markings near the base of the wing. Posterior wings more or less infuscate. Pterostigma sometimes pink.

Allied to the preceding species, but with the apical margin of the anterior wings more deeply excised, and the dorsal margin from the apex to about the middle, evidently, but very slightly, concave. The wings are also less narrow. The sectors of the radius are 6 or 7 in number, whereof the two which are nearest the base sometimes unite close to their point of origin. The general appearance of the nervuration is that of the preceding. In the ♂ the spines of the apical processes appear to extend about to the apex of each process, and they cross each other near the base. (Plate IV. fig. 6.)

Expanse 14—16·5 mm.

HAB. Kauai (4000 ft.). 1 ♂, 3 ♀ taken. Of the latter one example is much paler than the others (as described above), and it also has broader wings, but I doubt whether it is specifically distinct; in fact no two individuals out of the four agree.

(5) *Nesomicromus paradoxus*, sp. nov.

Nearly black, the legs and antennae and some marks on the dorsum of the thorax pale. Anterior wings dark brown, the costal area hyaline for the most part, and some pale spots around the margins, especially along the apical. Posterior wings nearly entirely infuscate.

The apical margins in both pairs of wings are excised, in the inferior, very lightly. The dorsal margins of the superior pair are also deeply excised to about the middle, forming there a conspicuous rounded lobe, after which they are slightly concave to the base. The nervuration is black and distinct, and hardly perceptibly furnished with hairs. There are 6 sectors to the radius. (Plate IV. fig. 7.)

Expanse 12 mm.

HAB. Kilauea, Hawaii (4000 ft.); 1 ♀.

(6) *Nesomicromus fulvescens*, sp. nov.

Dark brown with pale markings, antennae and legs pale. Anterior wings pale yellowish-brown, largely but not deeply infuscate from the region of the inner gradate series to the apical margin. The outer gradate nervules are blackish and infuscate,

forming a distinct transverse dark line, the dorsal margin near the base is also dark, as also spots on the costa, radius, and the cubital nervures. Posterior wings subhyaline, with rather pale nervuration, the outer series of gradate nervules darker.

Anterior and posterior wings very broad in proportion to their length, their apical margins hardly perceptibly emarginate. In the former the radius gives off 5 sectors, the 5th twice furcate before reaching the outer series of gradate nervules.

No doubt some examples of this species will have 6 sectors to the radius.

Expanse 16·5 mm.

Differs from *N. drepanoides* and *angustipennis*, much as *N. latipennis* does from *N. hawaiiensis*.

HAB. Waianae Mts., Oahu (3000 ft.); 1 ♀.

(7) *Nesomicromus bellulus*, sp. nov.

Black, or more or less brown, head and sometimes the prothorax with pale spots, legs pale, front and middle tibiae with two distinct black rings. Antennae with the two first joints black, the rest pale at their base, and dark at the apex. Anterior wings ♂ whitish, subtransparent, iridescent, with a large dark irregular and broken blotch at the base, and another more or less evident at the apex, bounded inwardly by the suffused nervules of the outer gradate series. All the nervuration with alternating dark and pale spaces, the dark ones on the radius very distinct. In the ♀ the anterior wings are much suffused with ochreous-brown, a round spot between the upper parts of the two gradate series being less suffused, but not very distinct. The posterior wings are transparent and iridescent, infumate at the extreme base along the dorsal margin, and their nervuration is to a large extent pale, becoming dark towards the apex. In the ♀ these wings are more clouded, especially along the dorsal margins, and the nervuration is on the whole darker.

The anterior wings are simply rounded at their apices, the apical margin not at all emarginate, but forming a continuous curve with the hind margin. There are 5 sectors to the radius, sometimes 6, at least on one side.

Abdomen ♂ with the terminal appendices yellow; their apices very narrow and somewhat produced, slightly turned upwards and inwards and subtuberculate. The spines are long and very fine, their extremities curved upwards, but they do not extend backwards so far as the apices of the appendices themselves. (Plate IV. fig. 8.)

Expanse 16—17 mm.

HAB. Haleakala, Maui (5000 ft.); very rare, 3 ♂, 1 ♀ taken.

(8) *Nesomicromus molokaiensis*, sp. nov.

Female, very closely allied to the preceding, the anterior wings much more infuscate, dark brown in colour, with paler markings, the chief of which is a roundish spot near the apex, between the two gradate series. The posterior wings are entirely infumate, except for a pale apical spot on each, corresponding to those on the front wings, their nervuration is chiefly dark, and the nervures do not bear alternate light and dark spots, although some are entirely pale.

In the anterior wings the radius has 6 sectors.

Expanse 16·5 mm.

HAB. Molokai, above 4000 ft.; 1 ♀ taken in June, 1893. It is possible that this form may prove to be a variety of the preceding species.

(9) *Nesomicromus minor*, sp. nov.

Female closely allied to *N. bellulus*, but smaller, the wings much shorter, the anterior pair for the most part infumate, costal area and the upper part of the wing below and along the radius clearer.

Five sectors to the radius, the sectors themselves, at least towards the base, with alternate dark and light spaces, as also the radius. Posterior wings entirely, but lightly infumate, except for an ill-defined pale spot near the apex. Nervuration for the most part dark, without distinct alternating light and dark spaces.

Antennae pale, testaceous, the joints infuscate at their apices, the two basal joints brownish.

Expanse 14 mm.

HAB. Waianae mountains, Oahu (3000 ft.); 1 ♀ taken in February, 1896.

(10) *Nesomicromus infumatus*, sp. nov.

Female closely allied to *N. bellulus*, anterior wings darkly infumate, with only sparse small pale spots, especially along the dorsal margin; costal area paler than the rest of the wing; at the base there are some dark markings, and the gradate nervules are distinct, as two zigzag transverse lines, darker than the ground colour.

The wings are very narrow in proportion to their length. There are 5 or 6 sectors to the radius (5 one side and 6 the other).

Posterior wings infumate, but transparent, no trace of a paler apical spot, the cubitus posticus very strong, black, except at the extreme base.

Two basal joints of antennae dark, the other joints infuscate, slightly paler at their bases.

Expanse 16 mm.

HAB. Haleakala, Maui (5000 ft.); 1 ♀ taken in Oct. 1896.

(11) *Nesomicromus longispinosus*, sp. nov.

Dark brown or blackish, antennae, including the two basal joints, testaceous, the apices of the joints lightly infuscate. Legs testaceous, front and intermediate tibiae largely fuscous.

Anterior wings brownish-grey, nervuration for the most part dark, but interrupted by pale spots, radius very distinctly alternately light and dark. At the extreme base of the dorsal margin and about the cubitus towards its base, there is more or less dark infuscation, and one or both of the series of gradate nervules are more or less infuscate, and form dark lines. The wings are rounded at the apex, and the radius gives off 6 sectors.

Posterior wings hyaline, nervuration pale, but darker along the outer series of gradate nervules, so as to form an evident dark line. Radius connected with the sector by several transverse nervules.

♂ appendices pale, narrow, the spines unusually strongly developed, and very finely spinulose along one edge, very long, extending far behind the apices of the appendices, and crossing one another. (Plate IV. fig. 15.)

Expanse of ♂ 13 mm.; ♀ 15 mm.

HAB. Kilauea, Hawaii (4000 ft.); 1 ♂ and 1 ♀ taken. Remarkable for the long spines of the ♂ appendices, and the additional transverse nervules in the posterior wings of both sexes.

(12) *Nesomicromus haleakalae*, sp. nov.

Female closely allied to the preceding, rather larger and with the anterior wings more grey, less tinged with brown.

The black markings of the wings are more distinct, the dark markings along the cubitus forming with the blackish suffusion along the gradate nervules of the inner series a distinct curved blackish line. The radius gives off 5 sectors, and the elongate cellules formed between the two series of gradate nervules, are evidently less narrow and numerous than those of the preceding species.

Posterior wings very much as in *N. longispinosus*, nearly hyaline, the radius and sector connected by several transverse nervules.

The antennae agree with those of the preceding species in having the two basal joints testaceous, but the rest are much darker, pale narrowly at the base.

Expanse 16 mm.

HAB. Haleakala, Maui (4000 ft.); 1 ♀ taken in April, 1894.

(13) *Nesomicromus brunnescens*, sp. nov.

Brown or blackish brown, legs and antennae testaceous, the joints of the latter infuscate on their apical portion.

Anterior wings brown, or brownish grey (the latter colour probably only in examples not fully mature), rounded at their apices, radius giving off 7—9 sectors, the gradate nervules forming two obliquely transverse, fine dark lines, sometimes very indistinct, the cellules between the two series very narrow in proportion to their length.

Posterior wings subhyaline, somewhat iridescent, nervuration light brown or yellowish, the outer series of gradate nervules darker.

♂ appendices narrow towards the apex, not strongly produced, their spines somewhat strong, curved upwards, serrulate, and extending back to the apices of the appendices or even slightly beyond them. (Plate IV. fig. 9.)

Expanse 14—16 mm.

HAB. Molokai, Lanai, and Haleakala, Maui. Rare (2000—5000 ft.).

(14) *Nesomicromus rubrinervis*, sp. nov.

Head, thorax, legs and antennae testaceous, abdomen darker.

Anterior wings narrow, their apices rounded, pale brown, tinged with pink, the nervuration pink. Radius with four sectors. Nervules of inner gradate series subinfuscate, forming a faint dark line. In this series four of the transverse nervules are nearly continuous and form a slightly oblique line, but the two upper ones of the series are greatly separated from the four lower, and from one another. Posterior wings nearly hyaline, the nervuration and pterostigma pink.

Spines of the appendices of ♂ reaching about to their apex, and curved upwards.

Expanse 13—14·5 mm.

Var. *α*. Dark brown in colour, wings dark, shorter and wider than in the type, pterostigmata and nervuration pink. Radius with 5 sectors.

The dark colour may really be normal, the two examples described above being possibly immature. The pinkish tinge to the wings and the condition of the inner series of gradate nervules is so similar, that I have little doubt that the two forms are one species, in spite of the additional sector to the radius.

Expanse 14 mm.

HAB. Kilauea, Hawaii (4000 ft.); 1 ♂ 2 ♀.

(15) *Nesomicromus forcipatus*, sp. nov.

Head, thorax and abdomen all pale, subtestaceous. Basal joint of the antennae suffused with pink.

Anterior wings rounded at the apex, dull yellowish, with obscure fuscous spots. Nervuration pale, interrupted by spaces of a pink colour. Radius with 4 sectors. Posterior wings with pale nervuration, more or less pink in parts.

Appendices of ♂ long and strong, of about equal width (in lateral view) from near the base to the apex, their extremities slightly turned inwards, the spines on their inferior margin near the base very short, not nearly extending back to their apices. (Plate IV. figs. 14 & 14*a*.)

Expanse of ♂ 11 mm. (♀ unknown).

Hab. Makaweli, Kauai (above 2000 ft.); 1 ♂ taken. The form of the appendices will distinguish it at a glance from any other species.

(16) *Nesomicromus distinctus*, sp. nov.

Female, with the head and thorax yellowish-brown, metathorax and abdomen darker. Legs and antennae testaceous.

Anterior wings rounded at their apices, pale yellowish-brown; the outer series of gradate nervules black, and with blackish infuscation around them, forming a very distinct, and but slightly oblique, transverse dark line. Inner series hardly infuscate. Radius with distinct black spots at the points of origin of the sectors, which are five in number. Posterior wings pale, subhyaline, pterostigma and nervuration pink, nervures in the region of the outer gradate series deep black, forming a conspicuous curved marking at the apices of the wings.

Expanse 14 mm.

Hab. A single ♀ taken in the mountains on Molokai, August, 1893.

(17) *Nesomicromus subochraceus*, sp. nov.

Head and thorax yellowish or testaceous, abdomen generally darker, legs and antennae testaceous, the latter with darker annulation.

Anterior wings rounded at the apex, pale greyish-fulvous, more or less mottled with fuscous. Nervures alternately dark and light; radius with 4 sectors, the number being constant in the series examined. Posterior wings hyaline and iridescent with very pale nervuration, the nervures near the apical margin becoming black and forming a distinct marking.

♂ appendices of the usual form, the spines hardly reaching to their apex. Apical ventral segment narrow, tongue-like. (Plate IV. fig. 10.)

Expanse 13—16 mm.

HAB. Molokai, Maui, and Hawaii (from 3000—5000 ft.).

(18) *Nesomicromus stenopteryx*, sp. nov.

Small, blackish, antennae and the posterior legs testaceous, anterior and middle tibiae and femora for the most part dark, their tarsi testaceous.

Wings very narrow; anterior pair rounded at the apex, greyish-fuscous, slightly fulvescent, with a black streak from the base, uniting with the dark inner series of gradate nervules, to form a curved dark line. Radius with 5 sectors, nervuration dark, interrupted by pale spaces. Posterior wings subhyaline, very lightly infumate, nervuration somewhat dark for the most part, the nervures not conspicuously blackened towards their apices; apical margin very faintly, but just perceptibly excised.

♂ with the spines of the appendices, somewhat strong, extending to their apices, crossing each other towards the apex.

Expanse 11 mm.

HAB. Haleakala, Maui (5000 ft.); 1 ♂.

(19) *Nesomicromus minimus*, sp. nov.

Usually of a dark brown or black colour, sometimes paler, prothorax generally with brown or yellowish markings in the darker specimens.

Anterior wings rounded at the apex, narrow, greyish, or yellowish-grey, near the base with two small black spots, one above the other and close together, situated one on the cubitus anticus the other on the cubitus posticus. Other black or fuscous spots are often present, but these are the most conspicuous, and apparently are never absent. Radius normally with 4, rarely with 3 sectors.

Posterior wings hyaline, nervuration pale and inconspicuous, but towards the apical margin the nervures become black, and form a delicate marking. Pterostigma often quite pallid and inconspicuous, but passing from yellow in some to testaceous in others, and then very conspicuous.

♂ with the appendices of the usual form, their spines very finely serrulate, curved upwards, extending slightly beyond their apices. (Plate IV. fig. 11.)

Expanse 10—14 mm.

HAB. Mountains of Molokai and Hawaii (3000—4000 ft.).

PSEUDOPSECTRA, gen. nov.

Allied to *Nesomicromus*. Antennae longer than the anterior wings. Maxillary palpi with the terminal joint long, acuminate, twice as long as the preceding. Prothorax short.

Anterior wings very short, rounded at the apex, strongly convex above, and concave beneath, coriaceous and opaque, costal and apical margins fringed, the dorsal one bare. Nervuration without hairs. Costal area with no recurrent nervule at the base, and not strongly dilated. Six or seven sectors to the radius.

Posterior wings very minute in both sexes, forming small subtriangular lobes.

♂ characters as in *Nesomicromus*, the appendices each furnished towards the base on their inferior margin with an upturned spine, which is finely serrulate.

(1) *Pseudopsectra lobipennis*, sp. nov.

Brown or nearly black, the legs and antennae testaceous, the latter with darker annulations, the former with the front and intermediate tibiae with more or less distinct fuscous markings.

Anterior wings brown or yellowish-brown, gradate nervules infuscate forming dark lines, nervuration with alternate darker and paler spaces, and there are distinct dark spots placed all round the margins of the wings. Posterior wings subtriangular narrowly rounded at the apex, with one very thick longitudinal nervure, and one or two others much less distinct.

Appendices of ♂ short, clothed with long hairs, their spines strongly developed, crossing one another, and extending to the apices of the appendices. (Plate IV. fig. 12.)

Expanse 9 mm.

HAB. Haleakala, Maui (5000 ft.). One ♂ and one ♀ taken.

NESOTHAUMA, gen. nov.

Antennae short, apical joint of maxillary palpi long, about twice as long as the preceding. Head and thorax strongly, densely and roughly punctured.

Prothorax bilobate in front. Anterior wings very small, their texture almost that of the elytra of a Coleopterous insect, the dorsal margin very strongly rounded, the costal margin much less strongly. Their surface is strongly convex, but somewhat depressed along the margins, which are reflexed. At the base, for about one-third its length, the wing is strongly compressed into a strong longitudinal carina, which in the

natural position of the wings marks off a dorsal from a lateral field. The nervuration is not to be definitely made out, but the transverse nervules are excessively numerous and divide the wing up into great numbers of small square or subcircular cellules; the nervures bear no hairs, nor is there any trace of a marginal fringe. Posterior wings, none.

The ♂ characters are similar to those of *Nesomicromus* and *Pseudopsectra*.

(1) *Nesothauma haleakalae*, sp. nov.

Black, head with pale markings and sometimes the thorax. Antennae variable in colour, the basal joint sometimes black, sometimes testaceous.

Wings black with yellow markings, or yellow with black and fuscous markings, very variable in colour. (Plate IV. figs. 13, 13*a* & 13*b*.)

Appendices of ♂ narrow towards the apex, and pale in colour, their spines slender, long, crossing each other, and extending considerably behind the extremity of the appendices.

Length about 4 mm. Expanse 6—7 mm.

HAB. Haleakala, Maui (5000 ft.). Rare.

CHRYSOPIDES.

ANOMALOCHRYSA M^c^Lachl.

(1) *Anomalochrysa princeps*, sp. nov.

Head, thorax, abdomen, legs and antennae flavous. A large species of slender form, but variable in size.

Prothorax with pale and rather long pubescence, gradually attenuate from the base forwards, and with a transverse impressed line near the base.

Wings with pale nervuration, the anterior much broader than the posterior, the latter subfalcate. The former are ornamented with sparse black, or blackish, spots. Their nervuration is not conspicuous, many of the nervules being in part, or wholly, almost colourless, and for the rest of a pale yellow colour, the whole set with pale hairs. The gradate nervules form four longitudinal rows of cellules, the two middle ones sometimes more or less confused, and one or other of them incomplete. Dividing nervule of third cubital cellule received in the apical side of the cellule, instead of in the upper (i.e. the cubital nervure), as is usual in the genus. Posterior wings subfalcate, three distinct rows of cellules formed by the gradate nervules, a fourth sometimes more or less indicated. All the pterostigmata pallid, the wings subhyaline, tinged with yellow.

Abdomen in ♂ with pale pubescence, its apical dorsal plate not strongly dilated, erect, clothed along the margins with pale hairs, and armed, on either side, on the margin at the base beneath with a long fine spine, the apex of which is strongly incurved. Apical ventral valve narrow, tongue-like, not closed against the dorsal plate, its surface clothed with long pale hairs. (Plate III. fig. 1 and Plate IV. figs. 20 & 20*a*.)

Length 11—14 mm. Expanse 33—43 mm.

HAB. Hawaii; various localities in dense and damp forests (2000—3000 ft.).

(2) *Anomalochrysa molokaiensis*, sp. nov.

Closely allied to the preceding, flavous with a bright sulphur-yellow median longitudinal stripe extending the whole length of the insect. May be distinguished at once from the preceding by the condition of the third cubital cellule, which is of the usual form, the dividing nervule received by the cubitus.

The wings have no black dots. The nervuration is rather more complex; there are four rows of cellules and indications of a fifth formed by the gradate nervules in the anterior wings; four more or less complete rows in the posterior.

Expanse of ♀ about 43 mm.

HAB. Mountains of Molokai (4000 ft.). A single ♀ found drowning in a pool of water.

(3) *Anomalochrysa sylvicola*, sp. nov.

Flavous, with a median longitudinal stripe of a sulphur-yellow colour more or less distinct.

Allied to the preceding species but smaller, the wings of very similar shape, the posterior pair very distinctly pointed at their apex. Nervuration and hairs pale, but the gradate nervules in the anterior wings are more or less black or blackish, and form evidently four longitudinal rows of cellules with a tendency to a fifth, the intermediate series being more or less irregular; posterior wings with four, more or less complete, rows, one of these sometimes consisting of but few cellules. In the anterior wings the gradate nervules (except the lowest series slightly), although dark themselves, have not an evident infuscation along their margins. Abdomen clothed with pale hairs, the apical dorsal plate not greatly dilated, formed much as in the preceding. (Plate III. fig. 2.)

Expanse 35—37 mm.

HAB. High plateau of Kauai (4000 ft.).

(4) *Anomalochrysa debilis*, sp. nov.

Form and colour as in *A. sylvicola* (the yellow longitudinal stripe not always visible in dried examples), but considerably smaller. Nervuration pale; gradate nervules in the anterior wings black or dark forming four rows of cellules, the two middle ones not generally completely separated; posterior wings with three rows. All the cellules in the gradate series distinctly but lightly infuscate on each side of the gradate nervules. Abdomen clothed with pale hairs, apical dorsal plate of ♂ not strongly dilated, erect, the spine on each side at the base beneath, exceedingly fine and hair-like, both dorsal and ventral plates clothed with pale hairs.

Length 8 mm. Expanse 24—27 mm.

HAB. Kona, Hawaii (about 3000 ft.).

(5) *Anomalochrysa peles*, sp. nov.

Form, colour and general appearance much as in the two preceding species. From *A. sylvicola* it may be at once distinguished by the infuscation of the front wings, which is more conspicuous than in *A. debilis*, nearly all the cellules of the anterior wings being narrowly but distinctly clouded along the nervules; and from either of those species it may be known by the form of the third cubital cellule, the apical portion of which has its apical and inferior angle strongly produced outwardly. Of the cellules formed by the gradate nervules the upper and lower rows are distinct and very similar in size; between these there are at least three other rows more or less confused. In the posterior wings four rows are more or less evident. Abdomen of ♂ much as in the preceding species. In the only example I have seen, the basal joint of the antennae, the head, and front of the prothorax, are darker in colour, with a reddish tinge, but this is hardly likely to be a constant character. The hairs on the nervures of the wings are rather long and conspicuous. Ventral valve of apical abdominal segment with long pale hairs.

Expanse 32 mm.

HAB. Kilauea, Hawaii; a single ♂ taken.

(6) *Anomalochrysa montana* Blackb.

Anomalochrysa montana Blackburn, Ann. Nat. Hist. (5) XIV. (1884), p. 419.

HAB. Mauna Loa, Hawaii, at an elevation of nearly 7000 ft. (Blackburn). Kilauea, Hawaii (4000 ft.).

(7) *Anomalochrysa angulicosta*, sp. nov.

Thorax, abdomen, legs and antennae yellowish, probably more or less green in life, as traces of that colour can still be detected on the metathorax of the ♀. Prothorax rather short.

Wings somewhat broad, costal margin in the ♂ angulated about the middle, the costal area being suddenly narrowed at that point. In the ♀ the costal margin is simple except that it is perceptibly but slightly emarginate before the pterostigma. Nervuration pale yellowish or green, pterostigma pale.

In the anterior wings the gradate nervules form three distinct rows of cellules, whereof the upper are extremely high, the lower towards the apex show a tendency to further division. In the posterior wings there are also three rows. All the cellules of the anterior wings containing fuscous spots or lines. Apical portion of the third cubital cellule pentagonal. Abdomen with pale pubescence, the apical ventral valve with long hairs. (Plate III. fig. 3.)

Expanse 32—34 mm.

HAB. Mountains of Molokai; 1 ♀ taken at an elevation of 4500 ft. in June, 1893, and 1 ♂ at 4000 ft. June, 1896.

(8) *Anomalochrysa cognata*, sp. nov.

Female very closely allied to the preceding, but smaller and with narrower wings. Colour very similar, probably with a bright sulphur-yellow mediodorsal stripe in life. Anterior wings with the cellules infuscate along their nervules; gradate nervules forming four rows of cellules, of which those of the upper row are not very high, and have their sides straight (not bent as in the preceding); the third row consists of small and somewhat irregular cellules. In the posterior wings there are three rows. Dividing nervule of the third cubital cellule meeting its apical side, somewhat as in *A. princeps*, but nearer its upper extremity. The lower portion of this cellule is therefore quadrangular, instead of pentagonal, as is usual in the genus.

Expanse 31 mm.

HAB. Mountains near Honolulu (3000 ft.); 1 ♀ taken in 1896.

(9) *Anomalochrysa rufescens* McLachl.

Anomalochrysa rufescens, McLachlan, Ann. Nat. Hist. (5) XII. (1883), p. 300.

HAB. Hawaiian Islands (loc. ?). Blackburn.

(10) *Anomalochrysa viridis*, sp. nov.

Green in life, generally fading after drying to yellow, testaceous, or brown. Prothorax usually with more or less distinct brown spots.

Posterior wings considerably narrower than the anterior pair, pointed at the apex. Pterostigmata olivaceous in mature examples, at least in the ♀, paler apparently in the ♂.

The nervuration although fine is clear and conspicuous in mature examples, but is much darker in some than in others, and is set with very fine hairs, which are evidently easily abraded, being much more numerous in pallid examples which have recently emerged. In the anterior wings, which are moderately broad, but somewhat variable in this respect, four rows of longitudinal cellules are formed by the gradate nervules, of which the two intermediate rows consist of cellules not much higher than wide, and are often more or less confused and incomplete, the nervules, which divide them, failing towards the apex of the wing. One example has three rows only. Posterior wings with three rows.

The abdomen is clothed with subdecumbent pubescence, the apical dorsal plate in the ♂, is erect, not very wide, and fringed with dark hairs, which on its ventral (or inner) surface at the extreme base extend across it for some distance on each side. I can detect no sign of the two fine lateral spines which are present in all the preceding species examined, at about the spot where in this species the fringe of hairs is directed transversely, as just mentioned. These internally-placed hairs are however themselves of a spinose nature, and at their apices are beautifully curved inwards. The apical ventral valve is clothed with somewhat long hairs. (Plate III. fig. 4.)

Expanse 28—32 mm.

HAB. Mountains of Kauai (4000 ft.).

(11) *Anomalochrysa soror*, sp. nov.

Closely allied to the preceding, but probably of smaller average size, with narrower wings, and the nervuration, which is green, paler. It may be known at once by the shape of the wings which are almost perfectly rounded at their apices, instead of forming a distinct angle thereat.

The form and pubescence of the abdomen is much like that of the preceding, the apical dorsal plate is furnished with similar spinose hairs, which are situated along the

lateral margins of the plate beneath, forming a longitudinal row; their colour is dark and their apices are strongly curved.

The characters of the nervuration are those of the preceding species.

Expanse 25—28 mm.

HAB. Haleakala, Maui, 5000 ft.; 3 ♂, 1 ♀. Probably common but overlooked.

(12) *Anomalochrysa frater*, sp. nov.

Closely allied to and with the general appearance of *A. viridis*, which it resembles in the form of the wings, and in the nervuration, and varies in the same way. The pterostigmata are sometimes pale, sometimes olivaceous and very distinct.

The ♂ is easily known by the pubescence of the abdominal segments, the apical portions of which are covered especially towards the sides with long and generally black pubescence, which is directed towards the base of the abdomen, while the basal half of each segment has only short and inconspicuous hairs. The apical dorsal plate has curved hairs, similar to those of the two preceding species, but they are differently disposed, occupying a considerable portion of the lower surface of the plate.

I see no constant differences between the ♀ of this species and that of *A. viridis*, in spite of the conspicuous distinctions between the ♂♂, but the abdomen of the former sex is invariably so greatly distorted in dried examples, that it is useless for the investigation of specific characters. (Plate IV. fig. 18.)

Expanse 26—32 mm.

HAB. Island of Hawaii (2000—4000 ft.); common and generally distributed.

(13) *Anomalochrysa nana*, sp. nov.

A very small species, bright apple-green in life, with a sulphur-yellow mediodorsal stripe from the front of the vertex to the apex of the abdomen. In the dried example the body has for the most part become testaceous, or yellowish, and the yellow line has to a considerable extent become indistinct, or disappeared.

Anterior wings narrow, obtuse at the apex, hyaline and somewhat iridescent, the nervuration green partly faded to yellowish, and rather conspicuously clothed with hairs, which are not very closely set. Gradate nervules very regular, forming an upper and a lower entire row of cellules, and between these other two rows for the length of a few cellules, after which one of the series of gradate nervules fails and there is only a single row of cellules between the upper and lower. There are only about 19 ante-pterostigmatic cellules.

In the posterior wings the nervuration is less distinct. The gradate nervules form three rows of cellules.

Abdomen clothed with fine pale hairs.

Expanse 23 mm.

HAB. Molokai mountains (3000 ft.), June, 1892; 1 ♀ taken.

(14) *Anomalochrysa paurosticta*, sp. nov.

Yellow, pronotum with some fuscous markings, meso- and metanota towards the sides greenish. Head, legs and antennae concolorous with the body.

Wings hyaline, iridescent, with yellow nervuration and pterostigmata, and a few small black spots on the basal portion of the anterior pair, the spots being situated on the nervuration, the gradate nervules are also mostly black, and form four rows of cellules, of which the upper and lower are complete, the part between them not being divided for its whole length. The third cubital cellule has the apical inferior angle greatly produced, so that the length of the upper side of the whole cellule is about equal to the lower. The posterior wings are distinctly pointed at the apex, and have three rows of cellules in place of the four of the anterior. These rows are quite distinct, although the two lower may not be completely divided. The nervuration of the wings is set somewhat sparsely with rather long hairs, which are not at all conspicuous.

Male unknown.

Expanse 37 mm.

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

(15) *Anomalochrysa longipennis*, sp. nov.

Dark brown, base of antennae and front legs rosy red, thorax especially the prothorax also with red markings, meso- and metathorax also partly pale. (Plate III. fig. 5.)

Wings hyaline, but not perfectly transparent, the anterior pair with a few intracellular dark spots along the dorsal margin. Nervuration green in life, more or less yellow after drying, very similar to that of the preceding species, to which it is very closely allied. It differs from *A. paurosticta* as follows: the dark spots on the wings are placed within the cellules, instead of on the nervuration, the wings themselves are longer, the hairs on the nervules are evidently closer and more conspicuous, the third cubital cellule is more widely produced apically, and the thickening of the dorsal

margin near the base of the wing is more conspicuous, and closes, or nearly closes, the apical portion of the cellule above it.

Male unknown.

Expanse 42 mm.

The entirely different colour of this insect and the preceding cannot be taken into account in separating the two, as they belong to a group in which different individuals of the same species often show differences in coloration precisely similar to that exhibited by these two insects, but I believe they are really distinct.

HAB. Kilauea, Hawaii; 1 ♀ taken in August, 1896.

(16) *Anomalochrysa maclachlani* Blackb.

Anomalochrysa maclachlani Blackburn, Ann. Nat. Hist. (5) XIV. (1884), p. 418.

HAB. Mauna Loa, Hawaii (6000 ft.) in May, 1882. (Blackburn.)

(17) *Anomalochrysa deceptor*, sp. nov.

This is a very variable species, and the extreme forms are totally unlike one another in general appearance.

The following three forms of coloration no doubt constantly occur.

(1) Head, thorax and abdomen entirely flavous, or partly greenish (in life probably sometimes entirely green). (2) Abdomen and sides of the thorax yellowish or green, face yellow or pink, and a crimson stripe extending from the front of the vertex of the head to the mesothorax, antennae at the base in these examples often pink. (3) Whole body dark brown, or with the meso- and metathorax, or one of these parts more or less pale, green or yellow.

Intermediate forms occur, e.g. a large part of the thorax may be yellow or greenish, the abdomen dark, and the face pink, &c.

The wings also vary, and may be hyaline and colourless, or themselves slightly greenish, or they may be whitish and opaque; nor is this condition of the wings confined to examples with a particular coloration of the body. These white-winged examples generally have dark spots on the anterior pair, but this is not invariably the case, and the spots are generally few, and confined to the base of the wing along the dorsal margin, but sometimes are more extensive.

The nervuration is always pale, green or yellow, except that the gradate nervules are usually, if not always, more or less dark, and the dorsal margin of the anterior wings is sometimes pink.

Anterior wings in the ♀ long and narrow, generally somewhat broader in the ♂; the gradate nervules form four rows of cellules, in the upper of which the cellules are very high and narrow; the intermediate rows are subject to further division, so that in some examples as many as 5 or 6 cellules may sometimes be seen in a transverse line at some portion of the wing. In one example there are 5 complete rows.

In the posterior wings there are also 4 rows, but one is often incomplete or may be entirely obsolete. The superior row, as in the anterior wings, consists of extremely high and narrow cellules, with the sides more or less curved.

The third cubital cellule has its inferior apical angle considerably produced, and the dividing nervure is evidently shorter than its apical margin (i.e. the nervure between it and the fourth).

Apical dorsal plate of ♂ strongly dilated, with very short hairs on its margin above, on the margin beneath they are also short, and form a fringe directed inwardly. Apical ventral valve tongue-like, its surface nearly glabrous. (Plate III. fig. 6 and Plate IV. figs. 19 & 19*a*.)

Expanse 33—38 mm.

HAB. Hawaii, various localities (2000—4000 ft.). Haleakala, Maui (5000 ft.). Koolau range, Oahu (above 2000 ft.).

(18) *Anomalochrysa simillima*, sp. nov.

Extremely closely allied to the preceding, flavous, fading to testaceous, or brown, the latter variety with the wings whitish, and subopaque. Probably varies in colour like the preceding.

On the anterior wings 5 rows of cellules result from the series of gradate nervules, and there is a tendency to further division.

The species may be distinguished by the following characters; the cellules of the upper row formed by the gradate nervules, especially in the hind wings, are less high, and not so narrow in proportion to their height. The third cubital cellule is less produced (as a rule hardly at all) at its inferior apical angle, and the dividing nervure is about equal to the apical side of the cellule.

In this, and the other species of the genus, the dorsal margin of the anterior wing is greatly thickened at the base just beyond the petiole, and with the nervure above an elongate cellule is formed. In the preceding species this cellule, although narrow, is distinct and open, but in the present one it is nearly obliterated, owing to the fact that the greatly dilated margin in parts touches, or almost touches, the nervure above.

HAB. High plateau of Kauai (4000 ft.).

(19) *Anomalochrysa gayi*, sp. nov.

Closely allied to *A. deceptor*, and exhibiting analogous variation, but I have not seen any dark-bodied forms such as are found in that species.

Entirely flavous, or the thorax more or less green, sometimes with a bright crimson dorsal stripe on the thorax, and the head and base of the antennae of that colour.

Wings with pale nervuration, green or yellow; anterior pair with 3 very distinct rows of cellules formed by the gradate nervules. Third cubital cellule with its inferior apical angle extremely strongly produced, dividing nervule much shorter than the apical side, and only about one-third the length of the lower side of the cellule.

Posterior wings with 3 more or less complete rows of cellules in the gradate series.

Abdominal characters of ♂ as in *A. deceptor*. (Plate III. fig. 7.)

Expanse 32—39 mm.

Hab. High plateau of Kauai. I have much pleasure in naming this distinct species after my friend Mr Francis Gay of Kauai, on whose estate the specimens were captured, and to whom I am indebted for much assistance when working on that island, and for much botanical information.

(20) *Anomalochrysa zoe*, sp. nov.

This species is also closely allied to *A. deceptor* and probably varies in much the same way.

Yellow with a dorsal longitudinal stripe of a brownish colour, extending over the vertex, pro- and mesothorax, or entirely dark, except that the metathorax is more or less greenish, and the apical segments of the abdomen pale. Face, antennae and legs sometimes crimson, as also the dorsal margin of the anterior wings and sometimes of both pairs.

Wings with pale nervuration, green or yellowish, the wings themselves also sometimes with a greenish tinge. Gradate nervules in the anterior pair forming 4 distinct rows of cellules; third cubital cellule with its inferior apical angle strongly produced, but evidently less so than in *A. gayi*, its apical side much longer than the dividing nervule, which is about half as long as the lower side of the cellule. Sometimes there are intracellular spots on the wings, in which case these are less transparent than in unspotted examples, just as was the case in *A. deceptor*.

Posterior wings with three distinct rows of cellules formed by the gradate series.

Expanse 33—39 mm.

Hab. Mountains of Molokai (4000 ft. and upwards). Very rare.

(21) *Anomalochrysa raphidioides*, sp. nov.

Head, legs and antennae usually red in the ♀, the antennae and head sometimes nearly black; in the ♂ the antennae and legs are paler, yellowish, and sometimes also the head. Thorax and abdomen nearly black in the ♀, and sometimes nearly as dark in the ♂, but probably usually paler, the apical dorsal plate yellow.

Wings with very distinct and conspicuous nervuration, in the ♀ nearly entirely dark brown in colour, in the ♂ paler, although many of the nervules are quite dark. The anterior wings are suffused with brown, very conspicuously in the ♀, in the ♂ less deeply, the colour paler (more yellow). The posterior wings are at least for the greater part hyaline and finely iridescent. All the pterostigmata in the ♀ are dark brown or reddish brown, and extremely conspicuous, but much less so in the ♂, and pale in colour.

Prothorax attenuate in front, and conspicuously elongate.

Anterior wings very narrow in the ♀, much wider in the ♂, the gradate nervules form three longitudinal rows of cellules, but the second is often partially divided to form a few cellules of an additional row, and rarely this row is complete. In the posterior wings, which in the ♀ are not much narrower than the anterior, there are three distinct rows, which are usually complete or very nearly so.

The apical dorsal plate of the ♂ is conspicuously dilated, its pubescence pale, somewhat short and inconspicuous. The ventral plate, which is applied to the dorsal, has only very short and inconspicuous hairs. Apex of the abdomen of ♀ reddish. (Plate III. fig. 8.)

Expanse 31—37 mm.

Hab. Kona district of Hawaii, on Mauna Loa and Hualalai, at elevations of 4000 ft. and upwards. I have taken about a dozen examples of this very distinct species, three only being males.

(22) *Anomalochrysa reticulata*, sp. nov.

Dark brown, head more or less red, thorax paler in parts which are probably greenish or yellowish in life; when immature, entirely pale, testaceous, no doubt green or yellow in life. Having seen but two mature, and one immature example I cannot judge of the variation.

Wings hyaline and iridescent, scarcely infuscate, pterostigmata olivaceous, nervuration for the most part dark in both pairs of wings, and very clear and distinct throughout. In the anterior wings the gradate nervules form three complete rows of cellules, and in each of the three examples examined another row between the second and third is represented by 3 cellules. The third cubital cellule is scarcely produced at its apical and inferior angle.

In the posterior wings, there are three distinct rows of cellules formed by the gradate nervules, the rows being almost or quite complete. I have not seen a ♂ of this species. It is probably allied to *A. proteus*, but the darker and more distinct nervuration, which is of a simpler character, easily distinguishes it. In size, shape of wings, &c. it resembles that species.

Expanse 35—36 mm. (♀).

HAB. Kona, Hawaii (4000 ft.).

(23) *Anomalochrysa biseriata*, sp. nov.

Dark brown, olivaceous, or more or less testaceous. A rather small species with the wings clear, hyaline, or almost so, and brightly iridescent. In general appearance, but for its smaller size, it greatly resembles the preceding species.

Wings with the nervuration for the most part dark and very distinct. In the anterior pair the gradate nervules form three complete rows of cellules, in the posterior pair only two. In this respect this species agrees with *A. haematura*, but that is readily separated by the crimson terminal segments of the abdomen, and the dense clothing of somewhat long black hairs with which the ventral surface of the abdomen is covered. In *A. biseriata* the hairs on this part are very short, and comparatively inconspicuous. The hairs with which the nervuration is set are very fine and but little evident. (Plate III. fig. 9.)

I have not seen a ♂ of this species.

Expanse 24—27 mm.

HAB. Waianae mountains, Oahu (2000 ft.); 5 ♀ taken.

(24) *Anomalochrysa haematura*, sp. nov.

Female dark brown, or nearly black, head and scape of the antennae red, legs yellow or reddish yellow. Apical segments of the abdomen bright crimson, sometimes yellowish. Pterostigmata pale olivaceous, or brightly pink.

Wings very clear, hyaline, and iridescent, nervuration very distinct, for the most part very dark brown, or black. In the anterior pair the gradate nervules form three rows of cellules, the lower of which consists of 4 or 5 cellules only, the upper of about twice as many. In the posterior wings there are only two rows.

The abdomen is clothed with obscurely-coloured hairs on the dark segments, with pale ones on the apical.

Expanse 27—32 mm.

I have not seen the ♂, but the ♀ is very distinct from that of any other species.

HAB. A single specimen taken in October, 1892, and three more in 1896 in the mountains near Honolulu (3000 ft.). The three latter were all at rest on a low plant.

(25) *Anomalochrysa ornatipennis* Blackb.

Anomalochrysa ornatipennis Blackburn, Ann. Nat. Hist. XIV. (1884), p. 419.
HAB. Mauna Loa, Hawaii (4000 ft.); 1 ♀ (Blackburn).

(26) *Anomalochrysa hepatica* M^{c}Lachl.

Anomalochrysa hepatica M^{c}Lachlan, Ann. Nat. Hist. XII. (1883), p. 299.
(Plate III. fig. 10 and Plate IV. fig. 17.)
HAB. Haleakala, Maui (4000—5000 ft.). Not rare.

(27) *Anomalochrysa proteus*, sp. nov.

An extremely variable species, entirely yellow, green, or liver-coloured, or reddish, often particoloured, the thorax at least being usually more or less yellow or green in some parts.

Wings normally hyaline, colourless or nearly so, sometimes however suffused with pale brown, and sometimes with few or many intracellular blotches of a brown colour. In these spotted examples the wings tend (as has been noticed in regard to other species) to become white and opaque.

In the anterior wings of the ♂ the gradate nervules divide off 5 rows of cellules, sometimes a sixth is partly formed, rarely there are only 4 complete, and a fifth indicated by a few cells. The cellules of the middle rows are generally more or less irregular and confused. In the ♀ there are 4 rows and indications of a fifth, but the wing in this sex sometimes has the nervuration as complicated as in the ♂, although in general there seems to be a tendency to a diminution of the number of cellules.

Posterior wings with 4 rows in the same parts, sometimes more or less of a fifth in the ♂; in the ♀ 4, with one more or less incomplete, sometimes only 3.

The nervuration in general is pale, yellow or green, but some of the nervules are more or less dark, at least those of the gradate series. The third cubital cellule has its inferior apical angle not at all, or only a little produced, and the dividing nervule is equal, or nearly equal, to the apical side of the cellule.

Abdomen in the ♂ somewhat densely clothed with pubescence, which is generally black or dark, and is always directed towards the base of the abdomen, the hairs being suberect. The apical dorsal plate is strongly dilated and its ventral valve glabrous or nearly so. The ♀ in life probably somewhat resembles the ♂ in the character of the abdominal pubescence, as appears from the better preserved examples, but as a rule the

abdomen in this sex is greatly distorted in drying, and the characters are lost. (Plate III. figs. 11, 12 & 13.)

Expanse from about 29 to about 37 mm.

HAB. Oahu and Hawaii. Found at elevations of from 2000—8000 ft. I have examined about 100 examples of this species. The Oahuan specimens seem to be of smaller average size.

(28) *Anomalochrysa fulvescens*, sp. nov.

Face and basal joint of the antennae red, brown, or yellowish, pro- and mesothorax generally red or reddish brown, the sides of the latter and the metathorax often pale, testaceous or yellowish. Abdomen varying in colour from yellow to dark brown. Legs varying in colour from pale yellow to red.

Anterior wings strongly fulvescent, often more or less spotted with dark fuscous, or banded, or even entirely suffused with that colour, but always with a fulvous tinge.

The nervuration in the field of the gradate nervules is extremely complicated, and consists for the greater part of large numbers of small cellules, most of which are but little higher than wide, forming a dense reticulum, and not regularly disposed in rows. The third cubital cellule has its basal side exceedingly strongly thickened in the ♂, and in both sexes the dividing nervule almost meets the upper extremity of the apical side, both being received in an evident thickening on the cubital nervure. The colour of the nervuration varies from yellow to brown through bright pink. The posterior wings are hyaline and iridescent distinctly tinged with fulvous, but much less deeply coloured than the anterior pair. Their nervuration is also irregular and confused, but the gradate nervules are generally less numerous than in the anterior wings. The pterostigmata vary in colour from very pale yellow to reddish.

In the ♂ the abdomen has only an excessively minute and short pubescence, the apical dorsal plate is not strongly dilated, and has an apical fringe of pale hairs; on its lower margin inwardly it is furnished with a row of spinose hairs, directed inwardly, and with curved apices. The ventral valve with only some short pubescence. (Plate III. figs. 14, 15 & 16.)

Expanse 28 mm. (very small ♂) to 37 mm.

HAB. Haleakala, Maui (4000—5000 ft.). I have examined about 50 examples of this remarkable insect. Of the examples with dark-spotted or banded wings there are no two alike, nor do the markings ever agree on the two sides of the same insect.

(29) *Anomalochrysa rhododora*, sp. nov.

Brown, more or less tinged with red, head, basal joint of the antennae, and front and intermediate legs red.

Wings obtuse, the nervuration pale, somewhat densely set with a conspicuous pubescence. Anterior pair greyish, the nervures, especially those at the base of the wings, and the gradate nervules, with a somewhat faint brownish infuscation. The form of the nervuration is very similar to that of *A. fulvescens*, and the third cubital cellule is as in that species, pterostigmata pale. Posterior wings hyaline and iridescent.

♂ characters much as in the preceding.

Expanse 33—35 mm.

Var. ♀ *xerophylla*, var. nov.

Anterior wings brown and white, opaque; posterior pair, white, dull and opaque, with a few obscurely coloured spots. The colour of the antennae, legs and body is less bright than that of typical examples. The insect in a resting position bears an extraordinary resemblance to a small dead leaf that has been attacked by insects. Although its general appearance is utterly unlike the type, there is no doubt it is an extreme form of that species, the variation being analogous with that of other species of the genus.

Expanse 34 mm.

HAB. Kilauea, Hawaii. Very rare, 1 ♂ 1 ♀ taken; var. *xerophylla* 1 ♀. The species is evidently allied to the preceding, but its general appearance is altogether different.

CHRYSOPA Leach.

(1) *Chrysopa microphya* McLachl.

Chrysopa microphya McLachlan, Ann. Nat. Hist. (5) XII. 1883, p. 299.

HAB. Common all over the Islands, in the mountains, and in gardens in Honolulu, and elsewhere. Probably introduced.

MYRMELEONIDES.

(1) *Formicaleo perjurus* Walk.

Myrmeleon perjurus Walker, Cat. Neuropt. Brit. Mus. 1852, p. 340.
Formicaleo perjurus McL., Ann. Nat. Hist. (5) XII. 1883, p. 301.
Myrmeleon violentus Walker, op. cit. p. 348; *Formicaleo perjurus* var., McL., Ann. Nat. Hist. (5) XII. 1883, l.c.

HAB. Honolulu, Oahu (Beechey expedition); Maui (Blackburn).

(2) *Formicaleo wilsoni* McLachl.

F. wilsoni McLachlan, Ann. Nat. Hist. (6) x. 1892, p. 178.

HAB. Hawaii, locally common, from sea-level to 5000 ft. Lanai (Scott B. Wilson).

ODONATA.

LIBELLULINA.

PANTALA Hag.

(1) *Pantala flavescens* Fab.

HAB. Abundant all over the Islands in open country, and in the streets and gardens of Honolulu.

TRAMEA Hag.

(1) *Tramea lacerata* Hagen.

HAB. All the Islands, in open country on the lowlands.

SYMPETRUM[1] Newm.

(1) *Sympetrum blackburni* McLach.

Lepthemis blackburni, McLachlan, Ann. N. H. (5) XII. (1883), p. 229.

HAB. On all the Islands, in mountain forests, or deep valleys, but not very abundant. The species is variable in colour, size, &c.

AESCHNINA.

ANAX Leach.

(1) *Anax junius* Drury.

HAB. Very abundant all over the Islands.

(2) *Anax strenuus* Hagen.

Anax strenuus, Hagen, Verh. Ges. Wien, 1867, p. 34 (♀); Blackburn, Ann. N. H. (5) XIV. 1884, p. 413, (♂).

HAB. Kauai, Maui and Hawaii, and probably all the Islands, in the mountains. Not rare but often difficult to catch.

[1] A new genus, *Nesogonia*, Kirby, Ann. Nat. Hist. (7) II. 1898, p. 347, has now been established for this insect.

AGRIONINA.

AGRION Fabr.

The dragon-flies of the genus *Agrion* are amongst the most important representatives of the Order of Neuroptera in the Hawaiian Islands. Several species are found on all the more important islands of the group, and the range of many of them extends over several islands; wherein they differ from the greater part of the endemic insects, which are for the most part confined to a single island; or to one or two of those which lie most closely together. At the same time, when a series of examples of a species from different islands is compared, certain more or less constant differences are often observable, especially as regards size.

Perhaps the most interesting facts relate to the earlier stages, or nymphs, which are aquatic and carnivorous. Excluding these dragon-flies and a few water-beetles, the insect fauna of the streams and pools is almost non-existent. The Ephemeridae, Perlidae, and Trichoptera, usually so numerous, are entirely unrepresented in the Islands, although the mountain streams, rising at high altitudes, with their superb waterfalls, and various temperatures, appear admirably adapted for many of these. It is therefore not a little surprising to find the group of dragon-flies so well represented, and that the individuals are so numerous, being on the whole the most conspicuous of all the endemic insects. In the absence of the groups above mentioned, I believe that their main food-supply comes from without, consisting of such creatures as accidentally fall into the water. Under ordinary circumstances this is not great, but after rain, when the streams rise very quickly, food becomes abundant. When the streams, as is often the case, become nearly dry, large numbers of creatures resort to the pools that are left, for the sake of the moisture, and the numbers that come to grief is often astonishing, the whole surface being covered with the drowned and drowning.

There are, however, other species, the nymphs of which live under very different circumstances. These have given up their aquatic life, and live hidden at the bases of the leaves of a liliaceous plant—*Astelia veratroides*. Sometimes a little water is held by the plant around the stem, but more often there is merely a collection of damp earth and dead leaves. These nymphs would even appear to dislike the collections of water, for in wet weather they often crawl half-way up the leaves, instead of remaining at the base, where the water accumulates. They differ in some points from those which frequent the water; they are shorter and stouter, and much more sluggish, and the caudal appendages are very short and thick, differing therein greatly from some of the aquatic species, the appendages of which form beautiful tracheal gills.

On the whole they are without doubt better off as regards a food supply than the aquatic species, for there is generally abundance of animal life around them.

A number of interesting beetles breed only in this plant, and minute young of molluscs and earthworms are generally abundant in the same, as well as the larvae of small moths. Moreover nymphs of various sizes often frequent a single plant, and if hard pressed for food the larger, no doubt, devour the smaller individuals.

In consequence of these habits, some of these species of dragon-flies, although their powers of flight are feeble, may often be seen in numbers in localities remote from water, and where they would not naturally be looked for.

These terrestrial nymphs are able to endure extreme drought. On one occasion when out shooting, having no more convenient receptacle, I carried a number for the greater part of the day in an envelope. In the evening, although very dry, they were still quite lively. They were then placed in a tumbler of water, where they remained on the bottom, not being able to crawl up the sides. Here they remained for a day, apparently as happily as on dry land, when they were taken out and preserved.

McLachlan (Ann. Nat. Hist. (5) XII. (1883), p. 238) established a new genus *Megalagrion* for the two species *A. blackburni* and *A. oceanicum*, on the character that the post-costal area was complicated by the division of its cellules. We have not adopted that genus on account of the instability of the nervuration in this respect. (Cf. description of *A. kauaiense, infra.*)

(1) *Agrion xanthomelas* Selys.

Agrion (*?*) *xanthomelas* Selys, Synop. Agrionines, légion *Agrion*, p. 174. McLachlan, Ann. Nat. Hist. (5) XII. 1883, p. 232.

(Plate V. figs. 1, 4 & 4*a*.)

HAB. Probably occurs all over the Islands. Very common on Oahu, Maui and Hawaii. Found both on the coast and in the mountains as high as 3000 ft.

(2) *Agrion pacificum* McLachl.

Agrion (*?*) *pacificum* McLachl., Ann. Nat. Hist. (5) XII. 1883, p. 234.

(Plate V. figs. 6 & 6*a*.)

HAB. Not so abundant generally as *A. xanthomelas*, but found on all the Islands.

(3) *Agrion hawaiiense* McLachl.

Agrion (*?*) *hawaiiense* McLachl., Ann. Nat. Hist. (5) XII. 1883, p. 232.

HAB. "Oahu, at no great elevation above the sea." (Blackburn.) I have not met with this species.

(4) *Agrion nigro-hamatum* Blackb.

Agrion (*?*) *nigro-hamatum* Blackburn, Ann. Nat. Hist. (5) xiv. 1884, p. 414. (Plate V. figs. 5 & 5*a*.)

Race *nigro-lineatum*, var. nov.

Of considerably smaller average size than typical specimens and with a distinct black line on the upper side of the femora. This point of difference had already been noticed by Mr Blackburn in his note on the species (*l. c.*), but the other distinctions between the type and his Oahuan examples, as there given, will hardly hold in a series of the two forms.

Hab. Typical examples common on Maui and Molokai. Race *nigro-lineatum* common on Oahu and also found on Hawaii.

Obs. The bright yellow face and the colour of the eyes, which are bright green or turquoise blue on the lower half, and red on the upper, give this species a most remarkable appearance when flying around the streams. The colour of the eyes fades after death.

(5) *Agrion koelense* Blackb.

Agrion (*?*) *koelense*, Blackburn Ann. Nat. Hist. (5) xiv. 1884, p. 417.

This species varies considerably in several of the points that are used in the original description. The number of cellules surmounted by the pterostigma is variable in all, or nearly all, the Hawaiian species and of no specific value here or in other species. The number of cellules between the quadrilateral and nodus is three or four. The post-cubitals are usually 16 or 17 in number. The upper margin of quadrilateral usually about one-third the length of the lower, in the front wings, but more than one-third in the posterior pair. Sometimes, as is also the case in allied species, the ♂ assumes more or less the colour of the ♀, the femora being pale beneath, and the sides of the thorax bearing pale longitudinal stripes as in that sex; in fact these are the only characters of colour by which the ♀ is usually distinguished. The valvules are sometimes pale, sometimes black, their appendages, as also the superior pair, are black.

In the ♂ the superior appendages, viewed laterally, have their upper and lower margins subparallel, the apical angles produced into two processes of which the upper is somewhat more strongly developed than the lower. (Plate V. figs. 7 & 7*a*.)

Hab. Mountains of Lanai (2000 ft. and upwards) and in the Iao Valley of the West Maui Mountains.

(6) *Agrion asteliae*, sp. nov.

Extremely like the preceding in general appearance, sometimes larger, sometimes of equal size. Post-cubital nervules usually 19 to 21 in the anterior wings, but in one ♀ there are only 14. The ♂ characters are extremely like those of *A. koelense*, but are quite sufficiently distinct by the greater development of the inferior apical process of the superior appendages which is rather larger than the upper process, and both of these processes are somewhat more strongly bent inwards, and also towards each other.

Female with the femora pale beneath, some pale markings on the sides of the thorax and sometimes two lateral longitudinal stripes on the dorsum. Superior appendages black, valvules pale, their appendages black. In one example the abdomen is almost entirely black, in the other the bases of the segments have a very narrow distinct pale band, hardly indicated in the former.

Hab. Mountains of Oahu, 3000 ft. Nymphs taken freely in the leaves of growing plants of *Astelia veratroides*. A single pair taken in copula at Kilauea Hawaii (4000 ft.). The individuals from the two Islands do not altogether agree, but I doubt whether they could be separated, even with a long series of examples.

(7) *Agrion amaurodytum*, sp. nov.

Dull black, or in the ♀ (and rarely in the ♂) greenish black with metallic lustre. ♂ with the head, thorax and base of the abdomen usually more or less covered with a slate-coloured pruinose efflorescence, rarely altogether absent in this sex, though invariably wanting in the ♀. Labrum pale along the apical margin. Sides of face along the inner margin of the eyes below the antennae pale, these markings connected, or nearly so, by a pale line in the ♀. Vertex black, the region of the post-ocular spots occupied usually by two patches of bluish pruinosity. In the ♀ the post-ocular spots are sometimes absent, often very small, but sometimes well-developed, and yellow in colour. Prothorax with a transverse pale line in front in the ♀, and sometimes some spots posteriorly, usually unspotted in the ♂, but occasionally with markings like those of the ♀. Thorax with a yellow stripe on each side of the dorsum in front in the ♀, which is rarely, more or less distinctly, present in the ♂; the sides with pale markings (variable) in the ♀, which are generally less bright in the ♂, and sometimes entirely absent. Legs black in the ♂, the femora more or less pale beneath in the ♀. Wings with 19—21 post-cubital nervules. Four or five cellules between the quadrilateral and nodus. Pterostigma dark, not very elongate. Abdomen in the ♀ with a more or less

distinct very narrow pale band at the base of most of the segments; sometimes these bands appear also in the ♂; 1st and 2nd segments often with a pale spot or line at the sides.

♂ superior appendages as long as the 10th segment, entirely black, or sometimes more or less pale inwardly, the apices bent inwards and armed with an excessively short and minute spine. On the inferior margin about half-way between the apex and base of the appendage there is a stout blunt spine directed inwards, so that the appendages may be looked upon as being produced into a long superior and a short inferior process. The inferior margin, as viewed inwardly, is not at all strongly rounded, so that the upper and lower margins are subparallel. Inferior appendages short, pale or black, their apices directed inwards.

♀ superior appendages black, subacute; valvules pale, their appendages dark.

Var. A. Two or three males taken high up on the ridges of the West Maui Mts. are larger than the typical specimens, and show none of the pale-bluish colour on the dorsum of the thorax and abdomen, which would appear to be the case with specimens from Molokai only when the ♀ colouration is assumed.

Race *Waianaeanum*, var. nov. Oahuan specimens from the Waianae Mts. differ from typical ones as follows:

♂ With no bluish pruinose efflorescence. Post-ocular spots sometimes present. Prothorax with pale spots. Dorsum of thorax with longitudinal lateral stripes. Femora pale beneath. Abdomen with distinct narrow pale basal bands to the segments.

♀ Rhinarium and part of the post-clypeus pale, legs almost entirely pale, as also the appendages of the valvules. Abdomen with a yellowish transverse medio-dorsal band on the second segment.

Race *peles*, var. nov.

Much smaller than the preceding forms. Post-cubital nervules usually 13—16. Typically this race exactly resembles the Molokai examples in general appearance, and exhibits similar variation, the pruinose efflorescence being absent, when the markings of the ♀ are assumed. There are only three cellules between the quadrilateral and the nodus.

Var. *fallax*, var. nov.

Where the typical form abounds an extraordinary variety is sometimes found. This has the abdomen more or less red in both sexes, the third segment generally almost entirely so; the legs are almost wholly pale. The post-ocular spots are red or yellow, large and connected (or almost so) by a red or yellow line. The prothorax is much spotted and the longitudinal lateral lines of the dorsum of the

thorax are broad and distinct, while the pale marks which border the eyes inwardly are connected by a transverse band just behind the posterior margin of the clypeus.

The measurements of this species are about as follows:

Typical form and race *waianaeanum*. Length of abdomen 36—38 mm.; of post. wings 25—27 mm.; expanse 52—54 mm.

Var. from W. Maui. Length of abdomen 42 mm.

Race *peles* and var. *fallax* Length of abdomen 30 mm.; of post. wings 19 mm.; expanse 43 mm.

HAB. Typical specimens from Molokai (3000—4000 ft.), and from the Iao Valley, Maui. Larger and darker var. from high ridges of W. Maui Mts. (4000 ft.). Race *waianaeanum* from the Waianae Mts., Oahu (2000—3000 ft.). Race *peles* widely distributed on Hawaii (2000—4000 ft.), the var. *fallax* found with it.

(8) *Agrion eudytum*, sp. nov.

Closely allied to the preceding and very similar in most respects. Black; ♂ with the post-ocular spots, those on the prothorax, the lateral longitudinal lines of the dorsum of the thorax, the greater part of its sides, the first two segments of the abdomen, and the femora beneath pruinose, of a bluish, almost white, colour. Face below the antennae obscurely pallid.

Female with the face yellow below the antennae, as also the post-ocular spots which are distinct and a line on the posterior margin of the vertex. Prothorax with yellow spots. Thorax with the latero-dorsal lines reaching half-way to the insertion of the wings, its sides for the most part pale. Femora almost entirely pale. Abdomen with the first two segments and base of the third pale at the sides and also partly above.

Anterior wings with 3 or 4 cellules between the quadrilateral and the nodus, and about 20 post-cubitals. Upper side of quadrilateral very short; one-fourth as long as the lower in the anterior, one-third the length of the lower, in the posterior wings.

♂ superior appendages as long as the 10th segment, pale inwardly on the basal portion, formed very like those of *A. amaurodytum*, but more dilated, the inferior apical spine evidently smaller, between which and the base, on the inferior margin of the appendage there is a minute black tubercle. Inferior appendages black, pale at the base, curved upwards, the narrow apical portion longer than in the preceding species and much less strongly bent inwards.

♀ superior appendages black, valvules and their appendages pale.

HAB. Kauai (about 1000 ft.). 1 ♂, 1 ♀ taken. Probably not rare as I spent only an hour or so in the locality and did not revisit it.

(9) *Agrion adytum*, sp. nov.

Closely allied to the preceding, and like it of very slender form in the ♂. Neither sex pruinose. Abdomen dark, black or more or less piceous. Apex of labrum pale, otherwise the face below the antennae nearly black in the ♂, in the ♀ it is nearly entirely pale. Post-ocular spots wanting in the three ♂ examples, but one has a pale line on the posterior margin of the vertex in the middle. Dorsal thoracic markings present or absent in this sex, in the single ♀ the latero-dorsal stripes are abbreviated into a spot on either side in front. Legs black or piceous, femora more or less pale beneath. Abdomen of ♀ with a yellow spot on the sides of the first and second segments. Wings with 18—22 post-cubitals in the front pair, and 3 or 4 cellules between the quadrilateral and the nodus.

♂ characters very like those of the preceding, but the apical process of the superior appendages is shorter and the minute tubercle on the inferior margin between the apical inferior tooth and the base is absent. They are distinct at once from those of *A. amaurodytum* by the small size of that tooth.

♀ superior appendages black, valvules and their appendages pale.

HAB. Mountains of Kauai (4000 ft.).

(10) *Agrion oresitrophum*, sp. nov.

Male of very slender form with red abdomen, the 6th and 7th segments at least black. Face below the antennae red or pale, post-ocular spots of the same colour and connected. Prothorax spotted, the front and hind margins also red or yellow. Latero-dorsal lines of thorax and median crest similarly coloured. Legs red or pale, with black spines. Wings with 14—17 post-cubitals in the front pair, and 3 cellules between the quadrilateral and the nodus.

Superior appendages very short, much shorter than the 10th segment in lateral view, the apex black and directed downwards, viewed inwardly the inferior margin is very strongly rounded, and near the base gives rise to an acute spine directed upwards, its point attaining to about the level of the superior margin of the appendage. Lower appendages long extending considerably behind the superior, curved inwards and upwards, their apices black, very slightly emarginate (hardly perceptibly in some examples), to form two exceedingly minute spines. Tenth segment angulately excised.

Two female examples from the same locality may belong to this species; the abdomen is entirely blackish above, with a narrow pale ring at the base of the segments. Clypeus and labrum black or blackish at the base. Wings as in the ♂. (Plate V. figs. 8 & 8*a*.)

Length of abdomen 31—36 mm. Posterior wing 20·5—23 mm. Expanse 44—49 mm.

HAB. Mountains of Kauai (4000 ft.). Not noticed at lower altitudes.

A. leptodemas is closely allied to this species and has very similar ♂ characters but the tubercle of the superior appendages of that species inwardly is differently situated, not reaching higher than half the height of the appendage, and the lower appendages extend only about as far back as the superior pair.

(11) *Agrion orobates*, sp. nov.

Male of the form, size and colour of the preceding. Superior appendages short, in lateral view shorter than the 10th segment, resting on the lower pair, and terminating in a black tubercle. Viewed inwardly, they are much less strongly rounded on the lower margin than is the case with that species, and on this margin towards the base they are armed with an extremely minute black spine, which is not directed upwards to the level of the dorsal margin. Lower appendages long, directed upwards and inwards, their apices meeting in the middle line, each armed with two minute but distinct spines, the inferior rather the stronger. Tenth segment extremely deeply excised, almost to its basal margin.

A single ♀ taken in the same locality may belong to this species. It resembles those mentioned under the preceding in most respects but has the abdomen nearly entirely red, a dorsal longitudinal line on the second segment and the apex of this and the five following segments being black.

HAB. Mountains of Kauai above Waimea (4000 ft.). A single ♂ taken in May, 1894.

(12) *Agrion leptodemas*, sp. nov.

A small and very slender species. Face below the antennae entirely red, vertex of head posteriorly with a red transverse line. Prothorax with the front and hind margin and four spots on the dorsum yellow; thorax above and at the sides with yellow or red stripes, the median ridge red. Legs red, the spines black. Four basal and three apical segments of the abdomen red, the intermediate ones dark. Thirteen post-cubital cellules in the front, eleven in the hind wings. Three cellules between the quadrilateral and the nodus. Upper side of quadrilateral $\frac{1}{3}$ in the upper wings, in the lower $\frac{1}{2}$ the length of the lower side.

Superior appendages very short, in lateral view hardly half as long as the 10th segment, very strongly dilated, almost from the extreme apex, which forms a small

black tooth directed transversely and downwards as is easily seen in an apical view. The strongly curved margin of the dilatation is dark, and inwardly, at about the middle of the height of the appendage, gives rise to a distinct black spine or tubercle directed upwards. Inferior appendages with acute black apices, and directed inwards and upwards.

Length of abdomen, 29 mm.; post. wing, 18·5 mm.; expanse, 40 mm.

HAB. Halemano, Oahù, above 2000 ft. A single ♂ taken in February, 1893.

(13) *Agrion calliphya* M'Lachl.

Agrion (?) calliphya M'Lachl., Ann. Nat. Hist. (5) XII. 1883, p. 236 (♂).

I have examined many examples of this species. The abdomen (♂) of those from Haleakala attains a length of 40 mm. and that of the largest examples from Lanai is only a little shorter. In those from Molokai the length is about 35 mm., but some are considerably shorter, as is also the case in some from Lanai. The number of cellules between the quadrilateral and the nodus is variable, 3, 4, or 5, the number to some extent apparently depending on the size of the individual.

The ♀ typically is very unlike the ♂ in general appearance, the abdomen being for the most part black, the base of segments 1—7 very narrowly pale or red and (except on the first and second) with a red spot near the apex of each of these segments. The three terminal segments are red in the middle, black at the sides. Clypeus black on the basal portion, thoracic markings as in the ♂. Posterior margin of prothorax strongly raised and sinuate, its middle portion being strongly produced posteriorly. Superior appendages dark, valvules and their appendages pale. (Plate V. figs. 9 & 9 *a*.)

Race *microdemas*, var. nov.

Like the typical individuals in colour and form but of uniformly smaller size; length of abdomen about 30 mm. or less, posterior wing 19 mm. Usually 12—14 post-cubitals. Three cellules between the quadrilateral and the nodus.

This dwarf form of the species is analogous to the race *peles* of *A. amaurodytum*, which indeed is nearly always found with it.

The colour of the ♂ is somewhat variable, the darkest example has only the first three and the last two segments of the abdomen red, while in others it is nearly entirely this colour. I have several times taken the sexes coupled.

HAB. Molokai, Maui and Lanai. Race *microdemas*, abundant on Hawaii.

(14) *Agrion nesiotes*, sp. nov.

Very slender in form, with the abdomen black, the two basal segments entirely or for the most part red above, as also the two apical. Face pale below the antennae, clypeus black above in the ♀. Posterior margin of head pale, post-ocular spots present or absent. Thorax with the median carina and lateral dorsal lines yellow or red. Legs red or pale. Abdomen with five or six segments more or less pale in tesseral examples, otherwise as above. Wings with 16—20 post-cubitals. Three cellules between the quadrilateral and the nodus. Post-pterostigmatic cellules of the posterior wings more or less duplicated. Posterior margin of the prothorax in the ♀ produced backwards in the middle, the lobe so formed subtruncate.

♂ superior appendages very long, twice as long as the 10th segment, gently curved on their outer margins, the extreme apex bent inwards, dilated only for a short distance at the base, the inferior margin of the dilated portion armed at its apex inwardly with a black spine. Inferior appendages bent inwards, acute at the apex, short, extending only about as far back as the apex of the dilated portion of the superior pair. Tenth segment strongly raised at the apex about the middle of its margin, and narrowly excised, with a regular fringe of hair along the excision.

♀ superior appendages short, black; valvules and their appendages pale. (Plate V. figs. 10 & 10 *a*.)

Length of abdomen 36 mm.; posterior wing 23 mm.; expanse 49 mm.

Hab. Hawaii (2000—4000 ft.); widely distributed, but rarer than the other species found on this Island. Taken in Kona, Kau, and Puna districts.

(15) *Agrion jugorum*, sp. nov.

Very slender and elongate in form; abdomen with several of the basal segments red.

Face below the antennae entirely or almost entirely red or yellowish in the ♂, base of clypeus and labrum more or less black in the ♀. Post-ocular spots red or yellow and always united by a line of the same colour. Pronotum with the anterior and posterior margins and some spots on the dorsum red or yellow. Median crest of the thorax, a line on either side of the dorsum and the sides more or less of one or other of these colours. Legs red or yellow with black spines. Wings with 22—24 post-cubital cellules, pterostigma bright wine-red in the Lanai examples, generally much less brightly coloured in those from Maui. Post-pterostigmatic cellules often forming two complete rows, and nearly always forming more or less of a double series at least in one wing, but very variable, sometimes slightly infuscate. Three, four, or five cellules between the quadrilateral and the nodus. Abdomen of ♂ with the first four segments nearly entirely red, the next three usually black, or dark, the three apical for the most part red. In the ♀ three to five segments from the base are red with their apical

margins black, as well as two or three of the terminal segments, but the colour is very variable.

♂ superior appendages red on the basal portion, curved inwards but not very strongly, about equal in length to the 10th segment, strongly and suddenly dilated on more than their basal half. The black apex is armed inwardly with an extremely minute tubercle; the dilated portion bears on its apical margin a well-developed black tooth, directed inwardly, and situated just above its inferior apical angle (when the appendages are viewed inwardly). The lower appendages are short and bent inwards, their apices forming a black spine. The apex of the 10th segment is emarginate.

Female superior appendages short, red or piceous, rounded at the apex, not very acute. Valvules more or less pale, their appendages of the same colour or piceous. (Plate V. figs. 2, 11 & 11 *a*.)

Length of abdomen 40—47 mm. Wing post. 27 mm. Expanse 56 mm.

HAB. Mountains of Lanai and high ridges of the W. Maui Mts. (4000 ft.).

(16) *Agrion molokaiense*, sp. nov.

Almost exactly like the preceding in general form and appearance and of the same dimensions. Three males (one much mutilated) differ as follows. The basal part of the clypeus is black, the post-ocular spots are somewhat smaller. The pterostigma is of a dark brownish colour. The post-pterostigmatic cellules, especially in the posterior wings, are very distinctly clouded. The third segment of the abdomen and the three apical ones are nearly entirely red, the two basal are much suffused with black, the rest black or blackish. It is probable that none of these distinctions would hold good in a long series, but the species is easily known by the genitalia.

Superior appendages in strict dorsal view, very little produced beyond the extremity of the dilated portion: in lateral view the apex is obliquely truncate and each of these angles is produced into a minute tooth or spine. The dilatation of the appendages is very gradual and the spine at its inferior apical angle is evidently smaller than that of the preceding species.

A single ♀ which belongs to this species differs from the preceding, so far as I can see, only in the smaller size of the post-ocular spots and the almost black basal two segments of the abdomen.

A single ♂, which is evidently somewhat immature, almost exactly resembles this ♀ in colour, and is so different in colour to that sex as described above, as to make it doubtful whether the species could be separated from the preceding without the examination of the appendages.

Length of abdomen, &c. as in *A. jugorum*.

HAB. Mountains of Molokai, above 4000 ft., but one taken at about 1000 ft. less elevation.

(17) *Agrion oahuense* Blackb.

Agrion (*?*) *oahuense* Blackburn, Ann. Nat. Hist. (5) xiv. 1884, p. 414 (♂).

Female with the abdomen black or more or less piceous, most of the segments with a narrow pale basal band. Apex of labrum widely, and a transverse band behind the clypeus pale. Post-ocular spots present, connected, sometimes obscure. Posterior margin of prothorax slightly produced in the middle. Latero-dorsal lines of thorax and median carina reddish. Legs pale. Three cellules between the quadrilateral and the nodus. Post-pterostigmatic cellules at least in the posterior wings more or less duplicated. This series consists of 12—14 cellules at least, the divided cellules, which vary from one only to many, being considered as single cellules in the count. Superior appendages dark, valvules and their appendages generally of an obscure colour, sometimes quite pale. Size about that of the ♂, and of similar slender form, the abdomen very slightly stouter. (Plate V. figs. 12 & 12 *a*.)

Hab. High ridges of mountains on Oahu (3000 ft.). Nymphs living between the leaves of *Astelia veratroides*.

(18) *Agrion satelles* Blackb.

Agrion (*?*) *satelles* Blackburn, Ann. Nat. Hist. (5) xiv. 1884, p. 414.

Hab. Haleakala, Maui (4000 ft.). (Blackburn.) I cannot identify this species with any known to me. A large form of *Agrion deceptor* and a similar one of *A. calliphya* are common in the locality.

(19) *Agrion deceptor* M^{c}Lachl.

Agrion (*?*) *deceptor* M^{c}Lachlan, Ann. Nat. Hist. xii. 1883, p. 235.

A common species in most parts of the Islands. Examples from Maui, Lanai and Molokai are generally larger than the Oahuan specimens, the largest attaining a length of 46 mm., the front wings often having as many as 22 post-cubitals. The thoracic markings and the amount of red on the abdomen are variable. In Maui specimens the two basal abdominal segments are often nearly entirely black above in the ♂. In dark-coloured ♀♀ the two basal segments are black above, with or without red spots, the third black at the base and apex and with a median black line in the central red portion, the following segments except for a narrow pale basal band nearly entirely dark, the apex of the 8th and 9th and the whole of the 10th more or less red. In the ♂ the small lower

tooth of the upper appendages is rather less developed in some specimens than others, but there is no constancy in this respect even with examples from the same locality. Some specimens show an evident tendency to the form of nervuration on which the genus *Megalagrion* was founded.

HAB. All the Islands from Oahu to Hawaii inclusive.

(20) *Agrion vagabundum*, sp. nov.

Allied to *A. deceptor* M^{c}Lachl., larger specimens of which it sometimes exactly resembles in general appearance. Abdomen usually with the first 6 segments red. Face below the antennae pale, clypeus more or less dark in the ♀. Post-ocular spots large and connected. Prothorax spotted, thorax with longitudinal latero-dorsal stripes. Legs reddish. Wings usually with 4, sometimes 5, cellules between the quadrilateral and the nodus. Four to six post-pterostigmatic cellules in the posterior wings. Pterostigma not brightly coloured.

♂ superior appendages as long or longer than the 10th segment, curved inwards but not very strongly, widely dilated on the basal half, the inferior margin within bearing a very minute tubercle, sometimes hardly visible, towards the apical angle, which is rounded off. No distinct tooth or spine at the inferior apical angle, such as is seen in *A. deceptor*. Inferior appendages acute, extending rather beyond the dilated portion of the upper ones, curved inwards and upwards.

♀ superior appendages red or blackish, valvules pale. (Plate V. figs. 13 & 13 *a*.)

Length of abdomen 31—36 mm.; hind-wing 23·5 mm.; expanse 50 mm.

HAB. Widely distributed on Kauai from 1000 ft. to 4000 ft. or more, in the mountains.

Some females which certainly belong to this species show hardly any red colour on the abdomen, the variation being much as in *A. deceptor*, from which the ♀ can hardly be distinguished.

(21) *Agrion kauaiense*, sp. nov.

Face below the antennae red or pale, as also the post-ocular spots which are connected. Prothorax with red or pale spots; thorax above and at the sides with red or pale lines. Legs red with long black spines. Pterostigma bright red. Abdomen with the basal five segments and the two apical ones (more or less) red; 6th, 7th and 8th black usually, but the 6th sometimes red. First five segments often with a narrow apical black band.

Wings with 16—22 post-cubital cellules. Upper side of the quadrilateral about $\frac{1}{3}$ the length of lower in the front wings, somewhat longer in the posterior pair. Post-costal area with either a single row of cellules, or with a double row for a considerable part of its length, extremely variable in the number of cells that are divided.

♂ superior appendages terminating above in a stout hook very strongly curved inwards, below this is a distinct but much smaller black tooth, and on the lower margin inwardly nearly half-way between the latter tooth and the base of the appendage is a third very minute tooth or tubercle. The appendages themselves more or less red, the teeth black. Inferior appendages red with black tips curved upwards and inwards.

♀ superior appendages generally black, sometimes red, pointed; valvules more or less pale, their appendages generally dark.

Length of abdomen 33—40 mm.; posterior wing 25—28·5 mm.; expanse 57 mm.

Allied to *A. deceptor* but generally larger and with the nervuration of the postcostal area more complicated. The ♂ is very distinct by the form of the superior appendages which are much more strongly curved inwards at the apex, and also by the position of the second tooth which, if the appendage be viewed inwardly, is seen to be situated about in the middle of its greatest height, whereas in *A. deceptor* the tooth is situated at the lower angle. The bright colour of the pterostigma is also a useful character.

Hab. Kauai, widely distributed (2000—4000 ft.).

(22) *Agrion oceanicum* McLachl.

Megalagrion oceanicum McLachl., Ann. Nat. Hist. (5) xii. 1883, p. 239 (♂).

Female with the wings, &c. as in the ♂, which it resembles in most respects, but the abdomen is stouter and the amount of black colour is more extensive than is usual in that sex. Posterior margin of the prothorax strongly raised, angulate in the middle, and fringed with long hairs. (Plate V. figs. 14 & 14 *a*.)

Hab. Island of Oahu, common and widely distributed, frequenting the streams of both the mountain ranges.

(23) *Agrion blackburni* McLachl.

Megalagrion blackburni McLachl., Ann. Nat. Hist. (5) xii. 1883, p. 238.

(Plate V. figs. 15 & 15 *a*.)

Hab. Maui, Lanai (Scott B. Wilson), Molokai and Hawaii (windward side). Common generally.

(24) *Agrion heterogamias*, sp. nov.

Male with the abdomen red, that of the ♀ greenish-black. Labium, apex of labrum, a space along the inner margin of each eye, connected by a transverse line, pale. Vertex of head black with pale post-ocular spots, which are nearly connected by a pale line. Prothorax more or less spotted. Dorsum of the mesothorax with the median crest and two lateral lines pale, rarely reddish; sides of thorax more or less pale. Legs pale or reddish, with long black spines. Wings with elongate pterostigma of an obscure colour. Post-costal area of both pair with a double row of cellules for a great part of its length. Abdomen in the ♂ generally with the apical half of the 6th, the 7th, and more or less of the 8th black, the rest nearly entirely red, and not very variable; in the ♀ the abdomen is nearly entirely greenish-black above, with the basal margins of the 3rd to the 7th segments very narrowly pale and the apices of the following obscurely and narrowly reddish, or testaceous.

♂ superior appendages as long as the 10th segment somewhat incurved, the apex black and armed at its extremity with a minute tubercle directed inwards; inwardly, a short way behind the apex, is a second minute spine or tubercle, from which the appendage is greatly produced downwards and dilated: at the apex of the lower margin of the dilated portion inwardly there is a small black spine directed inwardly, and the margin itself now becomes thickened and strongly raised, and near the base of the appendage gives rise to another black spine directed upwards. Lower appendages elongate-triangular, extending beyond the dilated portion of the superior pair, hardly curved inwards, red, terminating in a minute tubercle or spine. Tenth segment angulately excised.

Female superior appendages acute, triangular, black or obscurely reddish; valvules pale, their appendages darker. (Plate V. fig. 3.)

Length of abdomen 36—40 mm.; of hind-wing 29 mm.; expanse 64 mm.

Hab. Kauai, widely distributed from near sea-level to 4000 ft. Allied to *A. oceanicum* and *A. blackburni*, the females of which are quite distinct from the present species by their general appearance, and the males by the form of the appendages.

PSOCIDAE.

In this group we have followed Reuter in the description of wing-nervuration.

Psocus Latr.

(1) *Psocus haleakalae*, sp. nov.

Head with the labrum dark, the post-clypeus pale with longitudinal dark lines, the front more or less pale, with dark markings. Eyes in the ♂ not very large, the space between them in a front view of the head being (where least) fully equal to, or rather

greater than, the width of the two together. In the ♀ they are somewhat more remote. The antennae of the ♂ near the base are clothed with long and conspicuous hairs, which stand out on all sides nearly erect from the surface, but towards the apex they become less so. In the ♀ the antennal hairs are much shorter, and inconspicuous.

The surface of the mesothorax is dull, and its margins more or less pale.

Wings hyaline, the anterior slightly infuscate along the margin about the apex. At the extreme base there is a dark band, and a very distinct unbroken transverse fascia about the middle. The apical portion of the pterostigma, a spot beneath and adjoining this, and one on the transverse portion of the inner branch of the cubitus, are also black or dark. Posterior wings with an infuscation on the dorsal margin towards the base.

Legs pale, the tarsi dark.

Abdomen more or less pale, at least in some examples. The apical ventral segment of the ♂ is flat at the base, but the apical portion is bent upwards at right angles to this and forms a sort of long process.

Expanse 8·5—10 mm.

HAB. Haleakala, Maui (5000 ft.).

(2) *Psocus simulator*, sp. nov.

Resembles the preceding in general appearance. It is rather larger, the median transverse fascia of the anterior wings is slightly interrupted about the middle. There is a small spot on the cubitus about half-way between the base of the wing and the median fascia. In the ♂ the eyes are much larger, the width of one of them (in a front view of the head) being considerably greater than the distance between its inner margin and the nearest ocellus.

Expanse 10—11·2 mm.

HAB. Haleakala, Maui (5000 ft.). The ♂ is quite distinct by the size of the eyes should the slight colour distinctions prove inconstant.

(3) *Psocus unicus*, sp. nov.

One of the largest Hawaiian species, wings hyaline, faintly clouded. The pterostigma is for the most part brownish and there is no spot adjoining it. There is a faint fuscous stain, forming a transverse band, which passes through the cubitus at its furcation. Otherwise the wings are without markings. The median lobe of the mesothorax is faintly shining in front. The unique example appears to be a ♀, but the eyes are more prominent than is usual in that sex, although they are widely separated. The pubescence of the antennae is short and inconspicuous.

Expanse 13·5 mm.

HAB. Haleakala, Maui (5000 ft.); unique.

(4) *Psocus hualalai*, sp. nov.

Allied to *P. haleakalae*, but readily distinguished by the less conspicuous wing-markings. The apical portion at least of the pterostigma is black, and there is a spot below adjoining it, and one on the transverse portion of the inner branch of the cubitus, as in that species. The median fascia is usually represented by two or three disconnected spots, which, however, are sometimes sufficiently developed to form a transverse band, but this is always more or less interrupted. The head above the antennae is for the most part dark. The antennae of the ♂ have a pubescence similar to that of *P. haleakalae*, and the eyes are widely separated, the width of one of these being only about equal to the distance between its inner margin and the nearest ocellus. In the ♀ the eyes are still smaller.

Expanse circa 9 mm.

HAB. Mauna, Hualalai (about 8000 ft.).

(5) *Psocus konae*, sp. nov.

Allied to *P. simulator*, but distinguished by the lack of the distinct median fascia of the anterior wings, which is represented by two or three detached spots. The small spot on the cubitus between the base of the wing and the median fascia is also wanting. In the wing-markings this species exactly resembles some examples of *P. hualalai*, but from that species the large eyes of the ♂, which are similar in size to those of *P. simulator*, will easily separate it.

I have not seen the ♀ of this species.

Expanse 10 mm.

HAB. Kona, Hawaii (4000 ft.).

(6) *Psocus kauaiensis*, sp. nov.

Of smaller average size than any of the preceding species, and varying greatly in the wing-markings. Sometimes the anterior pair have an entire submedian transverse dark fascia, as in *P. haleakalae*, &c., sometimes this is broken up into two or three separate spots, as in *P. hualalai*, &c., or the wings may be without any markings, except the dark pterostigma. The most usual form is that which resembles typical *P. hualalai* in markings. The transverse portion of the inner branch of the cubitus is dark on the part towards the costal margin, pale towards the other extremity, but it is not traversed by a distinct black spot as in all the preceding species, and at the most shows a hardly perceptible infuscation along its margins.

The ♂ is readily distinguished by the antennae, the pubescence of the third joint being less long and conspicuous; nor does it stand out suberect from the surface, but on both upper and lower surfaces is strongly inclined in the direction of the apex. The eyes are large and in a front view of the head the width of one of them is much greater than the distance from its inner margin to the nearest ocellus.

Expanse to 9 mm., generally less.

HAB. Mountains of Kauai (4000 ft.). Examples from Haleakala (5000 ft.) appear identical with those from Kauai, but of slightly greater average size.

(7) *Psocus molokaiensis*, sp. nov.

A small species, the dark markings of the anterior wings as follows: the apex of the pterostigma, and a spot adjoining it, the costal margin to the pterostigma (generally), more or less infuscation along the cubitus, a spot close to the base of its inner branch, and another on the transversely-directed portion of the same, a band or line along the dorsal margin from the base to the middle of the wing. These markings vary, but are sufficient to distinguish the species, from the fact that their general tendency is longitudinal and not transverse as in the other species. In the ♂ the eyes are moderately large, but the space between them is rather wide, being about equal to the width of the two taken together. The pubescence of the antennae is short and inconspicuous and not erect. Thorax in both sexes with the surface dull.

Expanse to about 8 mm.

HAB. Mountains of Molokai (3000 ft.). On *Cyathodes*.

(8) *Psocus distinguendus*, sp. nov.

Wing-markings and general appearance as in *P. haleakalae*. The transverse fascia is narrow, and sometimes interrupted, and, as in the other species, the markings are generally rather more developed in the ♀ than in the ♂.

P. distinguendus may be known from any of the preceding species by the polished surface of the mesothorax, at least in front both of the median and lateral lobes.

The hairs on the third joint of the antennae of the ♂ are shorter than those of *P. haleakalae*. Its eyes are very large, the space (where least) between their inner margins being hardly wider than the width of one of these organs. In the ♀ the eyes are comparatively small, and widely separated.

Expanse min. 8, max. 11 mm.

HAB. Molokai (3000 ft.); Lanai, Maui, Hawaii.

(9) *Psocus oahuensis*, sp. nov.

I have not seen the ♂ of this species; the female is very like that of *P. distinguendus*, to which it is closely allied. The mesothorax is highly polished, the abdomen has bright yellow transverse stripes above. It may be distinguished by the evidently wider and more distinct submedian dark fascia of the anterior wings; the absence of the black spot on the *cubitus* at about the middle of its length, and that on the transverse portion of the inner branch of the same nervure is almost obsolete.

Expanse 10 mm.

HAB. Waianae Mountains, Oahu.

(10) *Psocus lanaiensis*, sp. nov.

Somewhat similar in general appearance to the other Hawaiian species. The anterior wings have a more or less evident transverse median band, the pterostigma contains a large dark spot, and there is another adjoining this, without it. The radius is pallid, a character which readily distinguishes the species from any of the preceding. The cubitus is also often pale (yellow), but sometimes infuscate. Elsewhere also the nervuration is widely interrupted by pale spaces, but the terminal furcations of the nervures are always dark.

The face in the ♂ in front of the ocelli bears a yellow mark enclosing a dark spot: around the ocelli it is dark; in the ♀ the face is pale with dark markings; antennae very long, and towards the base in the ♂ clothed with rather long hairs; the eyes exceedingly large, the width of one of them even greater than the distance (where least) between their inner margins; in the ♀ the eyes are small and distant.

Mesothorax dark with yellow margins, and sometimes a median yellow stripe. Abdomen more or less pale above.

Expanse 8—8·5 mm.

HAB. Mountains of Lanai.

(11) *Psocus sylvestris*, sp. nov.

Very closely allied to the preceding, but the ♀ has the mesothorax pale. The ♂ appears to vary somewhat in this respect; it may be distinguished, however, by the less conspicuous pubescence of the third joint of the antennae, and the hairs on the lower side of this joint are less erect.

Expanse as in the preceding species.

HAB. Kona, Hawaii (4000 ft.).

(12) *Psocus heterogamias*, sp. nov.

General appearance very like that of the two preceding species. Thorax almost entirely pale. Nervuration almost entirely of a pale yellow colour, the apical furcations of the nervures being all pale. There is an evident, but not deep, infuscation along the apical margin of the anterior wings, which extends also on to the dorsal margin and thence inwardly to the pterostigma, thereby enclosing a clearer space. The eyes of the ♂ are evidently smaller, and more widely separated, than those of the preceding species. The pubescence of the antennae is subdecumbent and inconspicuous. The ♀ is micropterous, and robust in life, but distorts so in drying that its characters cannot be satisfactorily determined from pinned specimens.

Expanse 8—8·5 mm.

HAB. Mountains of Oahu.

(13) *Psocus monticola*, sp. nov.

Closely allied to *P. heterogamias*. The apical margin of the anterior wings has an infuscate band as in that species, but it is rather more definite, narrower, and less diffuse. Of the furcations of the inner branches of the radius and cubitus, which terminate in the apical margin of the wing, those of the latter are all dark; of those of the radius the outer is yellow at the extreme base, the inner for fully half its length, the apical half dark. The eyes in the ♂ are not very large, the width of both together being subequal to the distance between their inner margins. The pubescence of the antennae is inconspicuous and subdecumbent. In the ♀ the eyes are smaller and more remote, and the pubescence of the antennae extremely short and inconspicuous.

Expanse 8·5—9 mm.

HAB. Mountains of Kauai (4000 ft.).

(14) *Psocus vittipennis*, sp. nov.

Extremely like the preceding in general appearance. The single ♂ that I have seen has the radius in the anterior wings dark, but it is pale in the females, as in all the allied species, and probably would often be so in the ♂. Superficially the present species may be distinguished as follows: the apical margin of the wing has a darker border, which is very distinct and definite, and the inner apical branch of the radius is pale for a shorter distance, the yellow part not extending so far as the apical

furcation of the inner branch of the cubitus. The mesothorax in both sexes is more or less smooth and shining. The third joint of the antennae in the ♂ is conspicuously clothed with long hairs, which stand out strongly from the surface of the joint. The eyes are of about the size of those of the preceding.

Expanse 9—10 mm.

HAB. Mountains of Kauai (4000 ft.).

STENOPSOCUS Hag.

(1) *Stenopsocus pulchripennis*, sp. nov.

Head black, the face shining, behind the post-clypeus with indefinite brown markings. Antennae black, with very long and slender joints, the third with the apex dark, the rest pale, the pubescence is short in general, but at intervals there are placed rather long single hairs.

Anterior wings hyaline, with three transverse dark fasciae, the basal one broad, extending from near the radius to the dorsal margin, the middle one very narrow along the inner branch of the cubitus. The apical fascia extends transversely from the costa, at the apex of the pterostigma, to the inner branch of the cubitus, when it becomes deflected along that nervure and its terminal furcations, forming an irregular dark apical mark, containing two clear spaces. All the nervuration pale as far as the basal fascia from the base of the wing, beyond this, dark. Discoidal area quadrangular. Pterostigma at the apex obliquely truncate, its inner angle connected by a pale nervule to the point of furcation of the inner branch of the radius. Area postica very small, triangular, appendiculated at its vertex, the area adjoining it on the apical side very large, longer than high, as large or larger than the other two areas formed by the apical furcations of the inner branch of the cubitus, taken together. Posterior wings clear, nervuration dark.

Length of anterior wing 2·5 mm.

HAB. Mount Hualalai, Hawaii (8000 ft.). This is certainly no true *Stenopsocus*, but as I have seen only one much mutilated example, I have only been able to examine it very imperfectly. The wings show no trace of a marginal fringe, nor of hairs on the nervuration, but it is possible that this may be due to abrasion.

ELIPSOCUS Hag.

(1) *Elipsocus montanus*, sp. nov.

Body black or dark brown, the front of the head, the margins of the thorax, and generally some lines on the abdomen more or less pale.

Post-clypeus and the front of the head along the inner margins of the eyes, somewhat shining. Eyes in the ♂ widely separated, the space between them greater than their combined width. Antennae with short pubescence. Wings subhyaline, anterior pair usually evidently clouded, but not deeply. Their markings are very faint and consist of five fuscous spots along, but not touching, the apical margin, and two others placed in a line with the second of the series, at equal distances apart towards the base of the wing. There is often also a spot adjoining the pterostigma, one on the cubitus about the middle, and another in the angle at the meeting of the anal and dorsal nervures, the latter sometimes forming, with infuscations placed inwardly to it, a very faint transverse band. The pterostigma varies in colour from being entirely pale to a dark brown colour, its apical margin is long. There is a distinct but narrow space between the inner branch of the cubitus and the vertex of the area postica. The nervuration is nearly entirely dark in both pairs of wings.

Expanse circa 9 mm.

HAB. Haleakala, Maui (5000 ft.).

(2) *Elipsocus inconstans*, sp. nov.

This species varies greatly in size and in the wing-markings. In strongly marked examples nearly one-half of the anterior wings is fuscous from the base; there is then a transverse hyaline or subhyaline fascia, and the apical portion of the wing is strongly variegate with fuscous, enclosing hyaline spots. In other examples the wings are but little infuscate on the basal portion, and the other markings may be disconnected and form only detached spots, in which case the species bears a considerable resemblance to *E. montanus*, but the markings are never so faint as in that species, and the area postica is always, at least partly, infuscate. It may further be at once distinguished from the preceding species by the entirely dull surface of the post-clypeus, and of the front of the head, which is more depressed transversely.

The area postica is sometimes free, with a distinct space between it and the inner branch of the cubitus, but sometimes its vertex touches (or is connected by an excessively short transverse nervule with) that branch. In the latter case a closed discoidal area is formed and the examples have no longer the nervuration of the genus. This variation is exhibited by examples of the most different superficial appearance, as well as in those of similar general aspect, and the nervuration on the two sides of the same insect may be markedly different, so that it is evidently in a very unstable condition. Examples from the most widely separated islands of the group show analogous variation.

In any case the more highly variegated wings easily distinguish the species from any other of the genus found in the Islands.

Expanse 6·5—8·5 mm.

HAB. Found throughout the group in mountain forests (2000—5000 ft.).

(3) *Elipsocus psylloides*, sp. nov.

Head pale, yellowish or testaceous; thorax and abdomen also more or less pale. Wings hyaline, nervuration on the basal part mostly pale, becoming dark towards the apex. Space between the inner branches of radius and cubitus evidently, but faintly, infuscate. Pterostigma pale. The extremities of the nervures in the dorsal and apical margins are slightly infuscate, giving them the appearance of being slightly thickened at their apices. The inner branches of the radius and cubitus do not directly meet at the points where they are angulated near their base, but the angles are connected by a very short transverse nervule. This character, however, appears to vary, as the angles approach each other more nearly in some examples than in others. Antennae with short pubescence in both sexes.

Expanse circa 8 mm.

HAB. Haleakala, Maui (5000 ft.); Kona, Hawaii (2000—4000 ft.).

(4) *Elipsocus criniger*, sp. nov.

Very like the preceding, the nervuration pale, darker towards the apex in the anterior wings, but the extremities of the nervures have not the appearance of being thickened. There is a distinct (but somewhat faint) fuscous blotch within the pterostigma, and another in the area postica, and the basal portion of the inner branches of the cubitus and radius, to their point of contact, is infuscate. The species may further be recognized by the longer hairs on the front of the head, as well as those of the antennae, which are somewhat long and irregular.

Expanse 8 mm.

HAB. Kona, Hawaii (2000 ft.); one example.

(5) *Elipsocus debilis*, sp. nov.

Allied to *E. psylloides*, but smaller, the wings less clear, with a slight yellowish tinge. Head, thorax and abdomen for the most part pale. As in that species the terminations of nervures are slightly infuscate, and have an appearance of being thickened at the margins of the wings. Near the base there is a somewhat extensive,

but vague, infuscation, and the clouding of the apical part of the wings is more extensive, not being confined to the area between the inner branches of the cubitus and radius, although that part is generally slightly more deeply clouded than the rest. The apex of the pterostigma is more obtuse, and the inner branches of the radius and cubitus are directly in contact at the point where they are angulated.

Expanse 6 mm.

HAB. Waianae Mountains, Oahu (above 2000 ft.).

(6) *Elipsocus erythrostictus*, sp. nov.

Allied to the preceding, the apical extremities of the nervures with a similar appearance. Anterior wings with a yellowish tinge, the nervuration pale at the base, dark towards the apex. This species is readily distinguished by the two crimson or pink marks in the pterostigma, one of which is small, and situated at the basal extremity, the other at the apical is paler and more diffuse.

Expanse 5·2 mm.

HAB. Kona, Hawaii (2000 ft.).

(7) *Elipsocus vinosus* M^{c}Lachl.

Elipsocus vinosus M^{c}Lachlan, Ann. Nat. Hist. (5) XII. 1883, p. 228.

The colour of the pterostigma which is given as the main character of this species is probably not constant. The species appears to vary greatly in size and colour and also in the shape of the pterostigma itself. Some examples have the wings entirely infuscate.

HAB. Many and probably all of the Islands, in the forests.

(8) *Elipsocus inaequifuscus*, sp. nov.

Allied to *E. vinosus*, but easily distinguished by the more variegate appearance of the anterior wings. These are rather deeply infuscate for the most part but clearer in places. The greater part of the area postica, and more or less of the wing adjoining it, are always pale and subhyaline, and the region between this area and the nearest branch of the inner division of the cubitus is always very perceptibly more deeply infuscate than the wing in general. The nervuration is dark and very similar to that of *E. vinosus*, but in that species the infuscation of the wings, whether deep or light,

is much more uniform over the whole surface. The pterostigma is uniformly infuscate like the wings, but not otherwise darkened.

Expanse 5·5—6 mm.

HAB. Haleakala, Maui (5000 ft.).

(9) *Elipsocus micramaurus*, sp. nov.

Face yellowish, the post-clypeus with dark lines, generally with a radiate arrangement, front dark about the ocelli, and a number of very conspicuous dark spots, placed closely together near the inner margins of the eyes, on each side. Thorax and abdomen dark. The anterior wings are strongly infuscate, the infuscation extending from near the base to the apex, and occupying a large part of the middle of the wing and about the apical branches of the inner division of the cubitus. The general appearance of the wings is dark with paler areas. The latter are chiefly the region around the pterostigma, some small spots on the apical margin, part of the area postica and the region adjoining this on the basal side, and sometimes more or less of the wing at the base. The nervure forming the apical side of the area postica is colourless to the vertex, which touches and is confluent for some distance with the inner branch of the cubitus. The pterostigma is abruptly truncate at the apex, its apical margin, and more or less of the inner margin towards the apex conspicuously blackened, as also the spot at its base. The inner branches of radius and cubitus at the point where they are angulated do not meet, but the angles are rather distant, and connected by a transverse nervule of a white colour.

Expanse 4·5 mm.

HAB. Kona, Hawaii (4000 ft.). This minute species is easily distinguished by the form of the area postica, and the nervuration is not that of the genus *Elipsocus* at all. Nevertheless I have not cared to separate it, because of the fact that other species have a tendency towards a similar nervuration, e.g. *E. inconstans* (supra, q.v.).

(10) *Elipsocus frigidus*, sp. nov.

Size and general appearance of the preceding, from which it differs in the less strongly blackened apical margin of the pterostigma, and the fact that the nervure defining the vertex of the area postica, though contiguous to, does not become confluent with the inner branch of the cubitus at that point. I have seen but two examples which are in poor condition, and it is not improbable that a good series of examples would show this to be a variation of the preceding species. (Cf. variation of *E. inconstans*.)

HAB. Hualalai, Hawaii (8000 ft.).

TERMITIDAE.

CALOTERMES Hag.

(1) *Calotermes castaneus* Burm.

C. castaneus Burm., M^c^Lachlan, Ann. Nat. Hist. (5) XII. 1883, p. 227.

Soldier with distinct eyes and variable in the length of the head beneath. Several royal pairs often found in a small colony. The abdomen of the ♀ appears to undergo little or no increase in size after the perfect state is attained.

HAB. All the Islands, in the mountain forests. Colonies often occupy the whole of a large forest tree.

(2) *Calotermes marginipennis* Latr.

C. marginipennis Latr., M^c^Lachlan, loc. cit.

HAB. Towns and settlements. Abundant and destructive to the wooden buildings in Honolulu.

EMBIIDAE.

OLIGOTOMA Westw.

(1) *Oligotoma insularis* M^c^Lach.

Oligotoma insularis M^c^Lachlan, Ann. N. H. (5) XII. p. 227; Perkins, Ent. Mag. 1897, p. 56 (development and habits).

HAB. Most and probably all of the Islands. Kauai, Oahu, Molokai, Maui and Hawaii, from sea-level to 3000 ft.

BIBLIOGRAPHIC LIST (arranged chronologically).

1. WALKER, F. Catalogue of the specimens of Neuropterous insects in the collection of the British Museum. London, 1852.

Myrmeleon perjurus, n. sp., p. 340; *M. violentus*, n. sp., p. 348.

2. HAGEN, H. Notizen beim Studium von Brauer's Novara-Neuropteren. Verh. Ges. Wien, XVII. 1867, pp. 31—62.

2 spp.—*Anax strenuus*, n. sp., Oahu, p. 34; *A. severus* and *ocellatus*, synonyms of *A. junius*.

3. SELYS-LONGCHAMPS, E. DE. Synopsis des Agrionines. 5me Légion. Bruxelles, 1877.

A.? xanthomelas, n. sp., p. 174.

4. McLACHLAN, R. Neuroptera of the Hawaiian Islands. Part I. Pseudo-Neuroptera. Ann. Nat. Hist. (5) XII. 1883, pp. 226—240.

17 spp., 9 of them new. *Megalagrion*, n. g.

5. ——. Neuroptera of the Hawaiian Islands. Part II. Planipennia. *T. c.* pp. 298—303.

6 spp., 4 of them new. *Anomalochrysa*, n. g.

6. BLACKBURN, T. Notes on Hawaiian Neuroptera, with descriptions of new species. Ann. Nat. Hist. (5) XIV. 1884, pp. 412—421.

7 n. spp. and numerous notes on habits.

7. McLACHLAN, R. Supplementary note on the Neuroptera of the Hawaiian Islands. Ann. Nat. Hist. (6) X. 1892, pp. 176—178.

Formicaleo wilsoni, n. sp.

8. PERKINS, R. C. L. A collecting trip on Haleakala, Maui, Sandwich Is. Ent. Mag. XXXII. (1896), p. 194.

Brief note on habits of *Agrion*.

9. ——. Notes on *Oligotoma insularis* McLach. (Embiidae), and its immature conditions. Ent. Mag. 1897, pp. 56—58.

10. ——. Notes on some Hawaiian Insects. P. Cambridge Soc. IX. 1897, pp. 373—380.

Note on habits of *Agrion*, pp. 373, 374. [Repeated here. Cf. p. 63 ante.]

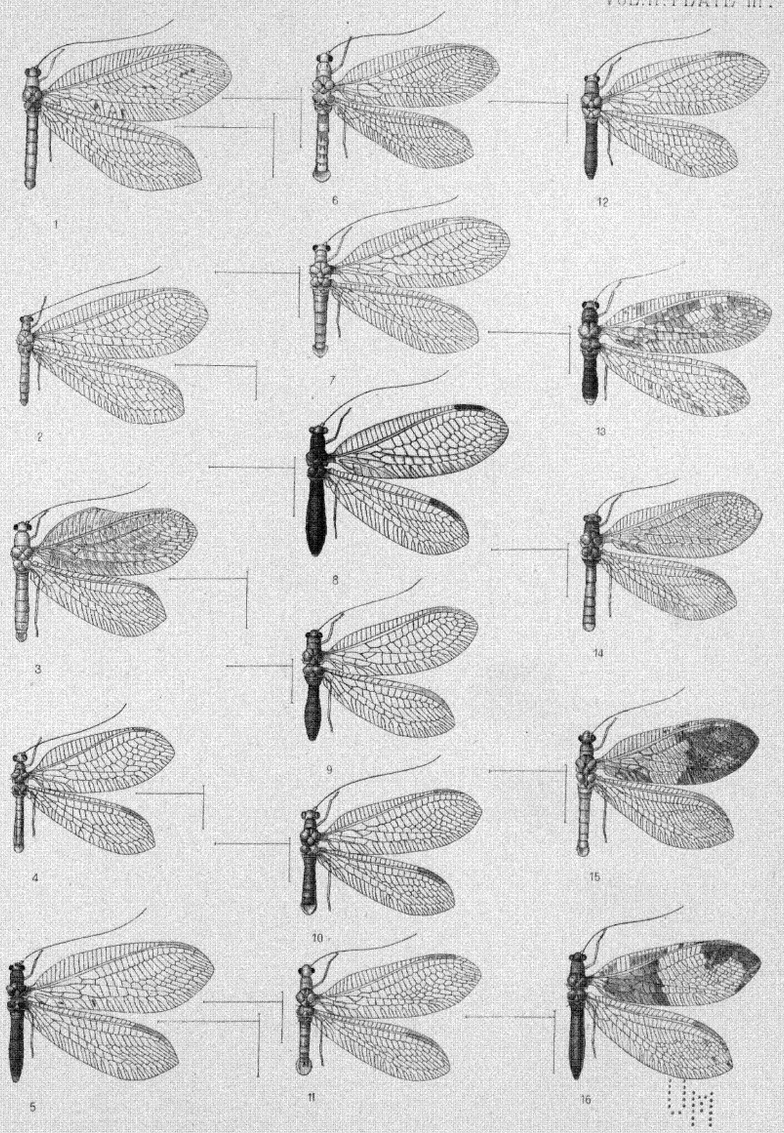
11. KIRBY, W. F. Description of a new genus of Odonata. Ann. Nat. Hist. (7) II. 1898, pp. 346—348.

Nesogonia, n. g. for *Lepthemis blackburni* McLachl.

DESCRIPTION OF PLATE III. (VOL. II.)

NEUROPTERA. *CHRYSOPIDES.*

Fig. 1. *Anomalochrysa princeps* ♂.
Fig. 2. *A. sylvicola* ♂.
Fig. 3. *A. angulicosta* ♂.
Fig. 4. *A. viridis* ♂.
Fig. 5. *A. longipennis* ♀.
Fig. 6. *A. deceptor* ♂.
Fig. 7. *A. gayi* ♂.
Fig. 8. *A. raphidioides* ♀.
Fig. 9. *A. biseriata* ♀.
Fig. 10. *A. hepatica* ♂.
Fig. 11. *A. proteus* ♂.
Fig. 12. *A. proteus* ♀.
Fig. 13. *A. proteus* ♀ var.
Fig. 14. *A. fulvescens* ♂.
Fig. 15. *A. fulvescens* ♂ var.
Fig. 16. *A. fulvescens* ♀ var.



Edwin Wilson, lith. Cambridge.

Perkins. Neuroptera.

DESCRIPTION OF PLATE IV. (VOL. II.)

NEUROPTERA. *HEMEROBIIDES* and *CHRYSOPIDES*.

Fig. 1. *Megalomus hospes.*

Fig. 2. *M. hospes* var.

Fig. 3. *Nesomicromus vagus.*

Fig. 4. *N. latipennis.*

Fig. 5. *N. angustipennis.*

Fig. 6. *N. drepanoides.*

Fig. 7. *N. paradoxus.*

Fig. 8. *N. bellulus.*

Fig. 9. *N. brunnescens.*

Fig. 10. *N. subochraceus.*

Fig. 11. *N. minimus.*

Fig. 12. *Pseudopsectra lobipennis.*

Fig. 13. *Nesothauma haleakalae;* 13*a*, the same in profile; 13*b*, terminal segment and appendices in dorsal aspect.

Fig. 14. *Nesomicromus forcipatus*, ♂ terminal segments in dorsal aspect; 14*a*, the same in lateral view.

Fig. 15. *N. longispinosus*, ♂ terminal segments in dorsal aspect.

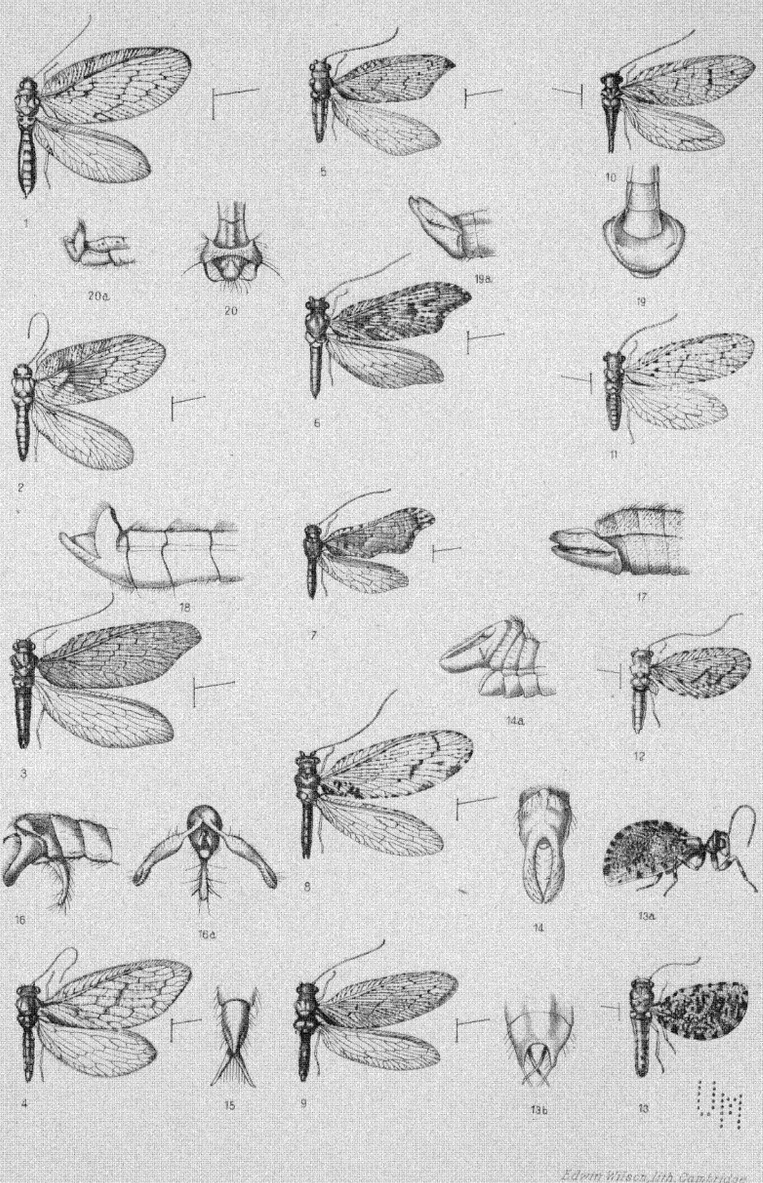
Fig. 16. *Megalomus hospes*, ♂ terminal segments in lateral view; 16*a*, the same seen from the apex.

Fig. 17. *Anomalochrysa hepatica*, apical segments of abdomen of ♂ in lateral view.

Fig. 18. *A. frater*, apical segments of abdomen of ♂ in lateral view.

Fig. 19. *A. deceptor*, apical segments of abdomen of ♂ in dorsal aspect; 19*a*, the same in lateral view.

Fig. 20. *A. princeps*, apical segments of abdomen of ♂ in dorsal aspect; 20*a*, the same in lateral view.



Perkins: Neuroptera.

DESCRIPTION OF PLATE V. (VOL. II.)

ODONATA.

Fig. 1. *Agrion xanthomelas* ♂.

Fig. 2. *A. jugorum* ♂.

Fig. 3. *A. heterogamias* ♂.

Fig. 4. Terminal segment and appendices of *Agrion xanthomelas* ♂ in dorsal; 4*a*, in external lateral view.

Figs. 5 & 5*a*. The same parts in *A. nigrohamatum*.

Figs. 6 & 6*a*. The same in *A. pacificum*.

Figs. 7 & 7*a*. The same in *A. koelense*.

Figs. 8 & 8*a*. The same in *A. oresitrophum*.

Figs. 9 & 9*a*. The same in *A. calliphya*.

Figs. 10 & 10*a*. The same in *A. nesiotes*.

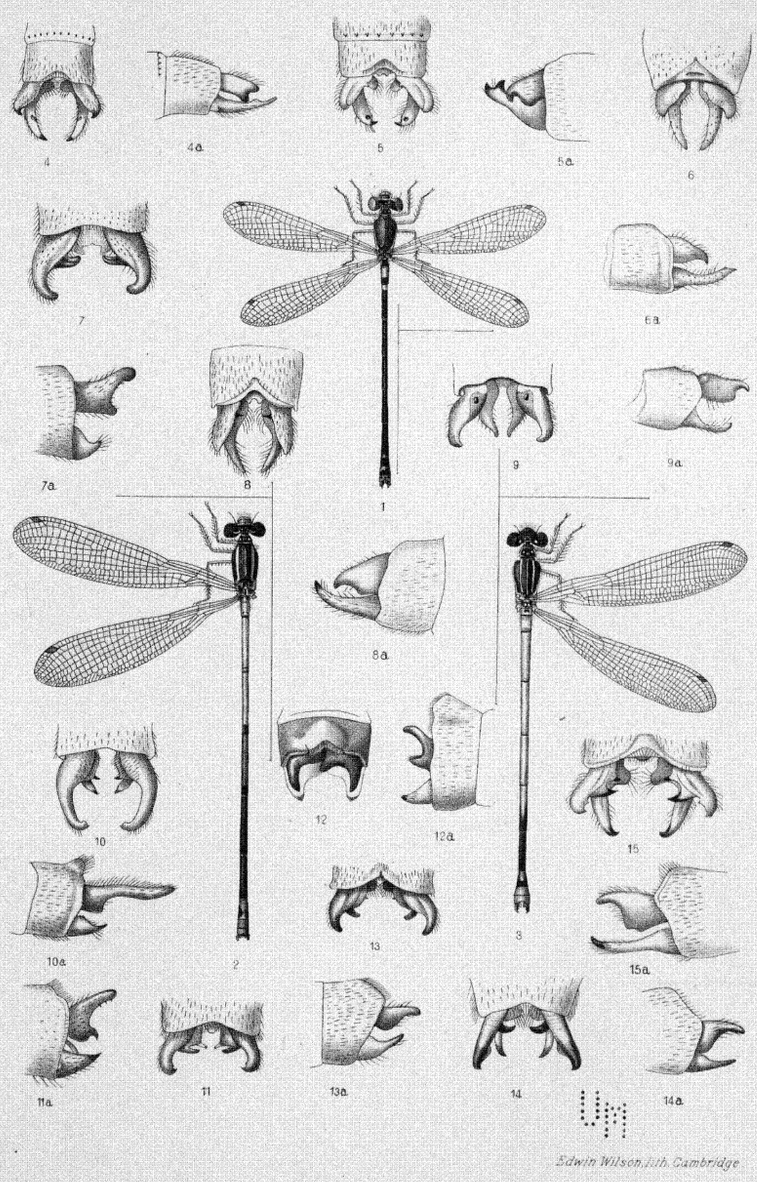
Figs. 11 & 11*a*. The same in *A. jugorum*.

Figs. 12 & 12*a*. The same in *A. oahuense*.

Figs. 13 & 13*a*. The same in *A. vagabundum*.

Figs. 14 & 14*a*. The same in *A. oceanicum*.

Figs. 15 & 15*a*. The same in *A. blackburni*.



Perkins. Neuroptera.