

XXXIII.—*Neuroptera of the Hawaiian Islands*.—Part II.
Planipennia, with General Summary. By ROBERT
 McLACHLAN, F.R.S. &c.

THE materials for this group are very limited, consisting only of one species of Hemerobiidæ, four of Chrysopidæ, and one of Myrmeleontidæ.

The only interesting feature consists in the existence of aberrant and probably strictly endemic forms of Chrysopidæ.

Hemerobiidæ.

Megalomus, sp.

One ♀, gummed on card (*Blackburn*, No. 25).

I do not feel justified in naming and describing this insect in the absence of the other sex or of more materials, especially as there are no striking colour-characters. It is of the size and form of the European *M. hirtus*, L., and also resembles it in colour to some extent; but the transverse markings on the anterior wings are less pronounced, and the apical spots on the posterior wings are wanting. It would not be safe to hazard an opinion as to the species being endemic or otherwise. Small Hemerobiidæ are liable to be carried on plants and shrubs when in the pupa state.

Chrysopidæ.

• ANOMALOCHRYSA, n. g.

In form and facies similar to *Chrysopa*, but the wings have *three or more series of gradate nervules* (at any rate in the anterior pair), which are sometimes irregular; dividing nervule of the third cubital cellule angular beneath (thickened on its inner side), so that the cellule it forms is triangular; subcosta confluent with the costa before the apex of the wing.

Antennæ scarcely longer than the wings.

Labrum truncate (this character a little doubtful owing to the condition).

Tarsal claws dilated internally at the base.

Abdomen of male *ending in a dilated flattened superior plate, beneath which is an elongate triangular inferior appendage*, the whole structure causing the apex to appear dilated.

The characters emphasized in the foregoing description indicate structures aberrant for the family as a whole; but nevertheless the two species have the aspect of *Chrysopa* in all respects, and should be placed near *Hypochrysa*.

Anomalochrysa hepatica, n. sp.

Body liver-coloured, with a purplish tint (probably varied with paler on the pectus &c. in the living insect). Head polished, paler posteriorly; face yellowish (at any rate in the male); palpi brownish; antennæ brownish (paler in the male and darker in the female in the pair before me), the basal joint strongly bulbous.

Pronotum scarcely longer than broad, hardly narrowed anteriorly; a very deep transverse impression before the posterior margin.

Legs pale yellow, the tarsi (especially the apical joint and claws) darker; posterior tibiae with a fuscous line above (more distinct in the female).

Abdomen of the male clothed above with rather long and dense hairs directed toward the base (in the female there are only a few scattered short hairs directed in a contrary manner). In the male the terminal segment forms a large nearly circular plate, shallowly concave above, but with an incrassate rim; beneath this plate is the large broadly triangular inferior appendage, which nearly equals the superior plate in length, and is obtuse and inturned at its apex; between these parts is seen a styliform process (penis?), curved downward, its apex resting in the inturned apex of the inferior appendage (the lateral edges of this appendage are thickened and concave at the base).

Wings vitreous, shining, and iridescent, moderately elongate, the apex obtuse (the posterior considerably narrower); neuration olivaceous (probably greenish in life), but appearing darker in certain lights; the base of the radius and the commencement of the sector (which is thickened at that part) blackish; all the neuration furnished with rather long black hairs, each of which proceeds from a black point or minute tubercle; pterostigmatic region olivaceous, rather long, the subcosta ending with it; *five* series of gradate nervules in the anterior wings, of which the inner consists of about twelve nervules, the second of about seven or eight, the third of six or seven, the fourth and fifth of about seven each (but the intermediate series are more or less irregular); about twenty-five anteposterostigmatic costal nervules; in the posterior wings there are only four series of gradate nervules.

Length of body 8 millim.; expanse, ♂ 27 millim., ♀ 30 millim.

"Occurs at an elevation of about 4000 feet on Haleakala, Maui" (*Blackburn*, one ♂, one ♀, No. 30).

Anomalochrysa rufescens, n. sp.

Body pale reddish. Head polished; antennæ, palpi, and legs concolorous with the body; the basal joint of the antennæ strongly bulbous; claws darker.

Pronotum longer than broad, slightly narrowed anteriorly, with a deep transverse impressed line before the posterior margin.

Abdomen apparently varied with darker (blackish?), and with pale margins to the segments; hairy clothing slight and ordinary. In the male the apex has an analogous formation to that seen in *A. hepatica*; but the superior plate is more oval and less conspicuous (inferior appendage probably narrower, but uncertain, owing to the method of preparation of the specimen).

Wings vitreous, iridescent, those of the male distinctly shorter and broader than in the female; in the male *there is a peculiar formation of the costal margin* of the anterior pair; this is shallowly excised soon after the base, and before the pterostigmatic region it is rather suddenly elevated and incrassated, after which the costal area is very narrow (in the posterior wings the only peculiarity is a thickening and slight elevation of the costa at the corresponding point; in the female there is a slight thickening of the costa in both pairs of wings, but with no sudden elevation); neuration strong, olivaceous (probably decidedly greenish in life), set with short black hairs; pterostigmatic region dingy yellowish (the texture at this region is altered and is subcoriaceous); *three* series of gradate nervules in the anterior wings, of which the inner consists of eight nervules in the male and eleven in the female, the second of seven in the male and nine in the female, and the third (or outer) is continuous with the superior cubitus (in the male the sector and the inner series of gradate nervules are thickened); posterior wings with only two series of gradate nervules.

Length of body, ♂ 9 millim., ♀ 10 millim.; expanse, ♂ 21 millim., ♀ 25 millim. (*Blackburn*, one ♂, No. 20, one ♀, No. 21).

This is less complex in its neuration than *A. hepatica*, but the diversity in the form in the two sexes and the very singular condition of the costal margin in the male render it in some respects the more peculiar.

Chrysopa microphyta, n. sp.

Body yellowish testaceous ("bright green" in life). Head polished; palpi, antennæ, and legs concolorous with the body;

basal joint of antennæ strongly bulbous; claws dilated internally at the base.

Abdomen apparently having a blackish band on either side, in which are yellow (or greenish) spots; clothed with rather long, but not dense, hairs. In the male it is terminated by a broad oval superior plate, concave beneath, and ventrally by a much shorter nearly semicircular plate.

Wings vitreous, slightly iridescent, ovate, subobtusate; venation strong, open; longitudinal nervures greenish, transverse and gradate nervules mostly blackish, the costal nervules pale at either end, the whole set with rather long black hairs; pterostigmatic region elongate (very long and somewhat dilated in posterior wings of male), greenish; subcosta becoming confluent with the costa before the apex; partition nervule of the third cubital cell extending beyond the nervule above it (the cellule oval); six and eight nervules in the two gradate series in the anterior wings of male, and four and five (or six) in those of the female (in the pair before me); fifteen to seventeen anteposterostigmatic nervules.

Length of body 6 millim.; expanse, ♂ 20 millim., ♀ 22 millim.

One of the smallest species and, in some respects, aberrant, the condition of the subcosta showing analogy with *Hypochrysa*, and the formation of the apex of the abdomen with *Anomalochrysa*; but as there are only two series of gradate nervules it cannot be located in the latter genus.

"Not uncommon near Honolulu" (*Blackburn*, one ♂, one ♀, No. 22).

Chrysopa oceanica, Walker.

Chrysopa oceanica, Walker, Brit. Mus. Neuropt. p. 238.

In the British Museum, from Capt. Beechey; not sent home by Mr. Blackburn (*cf.* McLachl. Journ. Linn. Soc., Zoology, vol. ix. p. 268).

Myrmeleontidæ.

Formicaleo perjurus, Walker.

Myrmeleon perjurus, Walker, Brit. Mus. Neuropt. p. 340.

Myrmeleon violentus, Walker, *l. c.* p. 348, var.

In the British Museum, from Captain Beechey. "Occurs sparingly in a ravine rising very abruptly from the sea-coast near Uluolu, Maui" (*Blackburn*, No. 27).

Violentus is the form in which the dark streak in the apex of the posterior wings is absent. One of Mr. Black-

burn's examples shows no trace of this streak ; in the other it is faintly indicated, but incomplete.

In the Journ. Linn. Soc., Zoology, vol. ix. p. 277, I united this with *F. striola* (Leach), Walker, a species occurring in Australia and also in several of the Pacific islands (and which in all probability is *F. bisignatus*, Rambur). Perhaps this connexion is just, but it is well to have further information.

Summary of Hawaiian Neuroptera.

PSEUDO-NEUROPTERA.

Termitidæ.

Calotermes castaneus, *Burm.*

Calotermes marginipennis, *Latr.*

Embidæ.

Oligotoma insularis, n. sp.

Psocidæ.

Psocus, sp.

Elipsocus vinosus, n. sp.

Odonata.

Pantala flavescens, *F.*

Agrion (?) *hawaiiense*, n. sp.

Tramea lacerata, *Hag.*

— *pacificum*, n. sp.

Lepthemis Blackburni, n. sp.

— *deceptor*, n. sp.

Anax junius, *Drury.*

— *calliphya*, n. sp.

— *strenuus*, *Hag.*

Megalagrion Blackburni, n. sp.

Agrion (?) *xanthomelas*, *Selys.*

— *oceanicum*, n. sp.

PLANIPENNIA.

Hemerobiidæ.

Megalomus, sp.

Chrysopidæ.

Anomalochrysa hepatica, n. sp.

Chrysopa microphya, n. sp.

— *rufescens*, n. sp.

— *oceanica*, *Walk.*

Myrmeleontidæ.

Formicaleo perjurus, *Walk.*

Twenty-three species in all. No Trichoptera have been discovered, but it seems to me impossible to believe that none exist ; nevertheless their number is probably limited ; they should be sought for on the mountains where there is constant fresh water.

Meagre as the Neuropterous fauna of the islands apparently is, the materials are nevertheless instructive. Three

distinct faunistic factors seem to have played a part. The North-American element is represented by two, no doubt artificially introduced, species of white ants, and certain large dragon-flies, which having flown over at some time continue to breed. The Australian element is very small, and probably consists solely of the single ant-lion, which may be regarded as Polynesian. The strictly endemic element is the largest, and is represented by (*inter alia*) the Agrionidæ and the peculiar forms of Chrysopidæ, two groups of very different habits—the former necessitating a constant supply of fresh water with aquatic animal life for food, the latter a supply of small soft-bodied plant-frequenting insects on which their larvæ feed.

Such, then, is my opinion on the materials for the order of insects of which I have made a special study; but any broad generalization on the Insect-fauna must be left until the reports of other specialists on the results of Mr. Blackburn's investigations can be collated and correlated.

XXXIV.—*On the Answerable Divisions of the Brain in Vertebrates and Invertebrates.* By Prof. OWEN, C.B., F.R.S., &c.

THE principles or generalizations of homology and analogy force themselves on the attention of naturalists in many relations, and suggest questions on divers subjects. Take the heart of a Cephalopod, for example. Is it the homologue or the analogue of that of a fish? Is its relation thereto only that of identity of function, sometimes expressed by the term "homodynamous," which is synonymous with "analogous" in questions of this nature?

No naturalist, it may be presumed, doubts the homology as well as analogy or homodynamy of the heart of the cuttle-fish with the heart of the snail. If the latter were propounded as the subject of the inquiry, a biologist of eminence might pronounce that it was merely homodynamous with the heart of a fish, conceiving relations of position to be essential in determining the question of homology. Accepting the current views of such topical relations he might, probably would, reply, "The heart of the snail is on the back or 'dorsal' aspect of the body, while that of the fish is on the opposite or 'ventral' aspect."



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