

VIII.—*Odonata, Ephemeroptera, and Neuroptera of the New Hebrides and Banks Island.* By D. E. KIMMINS, Department of Entomology, British Museum (Natural History).

[Plate III.]

### ODONATA.

In compiling the following lists I have not confined myself to the material collected by Miss L. E. Cheesman, but I have also included sundry other specimens in the Museum collections from the New Hebrides and collections made by Dr. J. R. Baker in 1923 and 1927 (belonging to the Hope Department, University Museum, Oxford), and references from literature, in an endeavour to make the list as complete as possible. I believe that, prior to Miss Cheesman's visit to these islands, four species only had been recorded. Her collection, although not very large in numbers, included several interesting species, and it has been instrumental in raising the number of species and subspecies known from the New Hebrides group to eighteen. Of these, three are apparently new to science, and are described in this paper. Dr. Baker's collection increased the list by another four, giving a total of twenty-two species for the New Hebridean group. Further collecting would probably increase this number, for as yet no *Agriidæ* have been captured.

Six of the species listed have a wide distribution throughout the tropics east of Africa, and the remainder are largely restricted to the austro-oriental region. Twelve species occur also in New Guinea, eight in New Caledonia, nine in Queensland, seven in Fiji, and seven in Samoa.

All records, except those within square brackets [], refer to Miss Cheesman's collection. The 1923 collection made by Dr. Baker was determined by the late Mr. Herbert Campion.

#### LIST OF THE ODONATA OF THE NEW HEBRIDES.

##### Family LESTIDÆ.

*Austrolestes cheesmanæ*, sp. n.

##### Family CÆNAGRIIDÆ.

*Trineuragrion percostale* Ris.

*Ischnura torresiana* Tillyd.

*Agriocnemis exsudans* Selys.

— *vitiensis* Tillyd.

*Pseudagrion microcephalum* Ramb.  
*Nesobasis malekulana*, sp. n.

Family ÆSHNIDÆ.

*Anax guttatus* Burm.  
*Anacizschna jaspidea* Burm.  
*Gynacantha rosenbergi* Brauer.

Family CORDULIDÆ.

*Hemicordulia oceanica* Selys.  
*Hemicordulia fidelis* McL.

Family LIBELLULIDÆ.

*Agrionoptera insignis similis* Selys.  
*Orthetrum sabina* Drury.  
*Diplacodes hæmatodes* Burm.  
— *trivialis* Ramb.  
— *bipunctata* Brauer.  
*Neurothemis stigmatizans bramina* Guérin.  
*Pantala flavescens* Fabr.  
*Rhyothemis phyllis apicalis* Kirby.  
— — *æqualis*, sp. n.  
*Tramea limbata* Desj.

Family Lestidæ.

*Austrolestes cheesmanæ*, sp. n. (Text-figs. 1-4.)

1 ♂, Erromanga, vii. 30; 1 ♂, Banks Is., Vanua Lava, xi. 29.

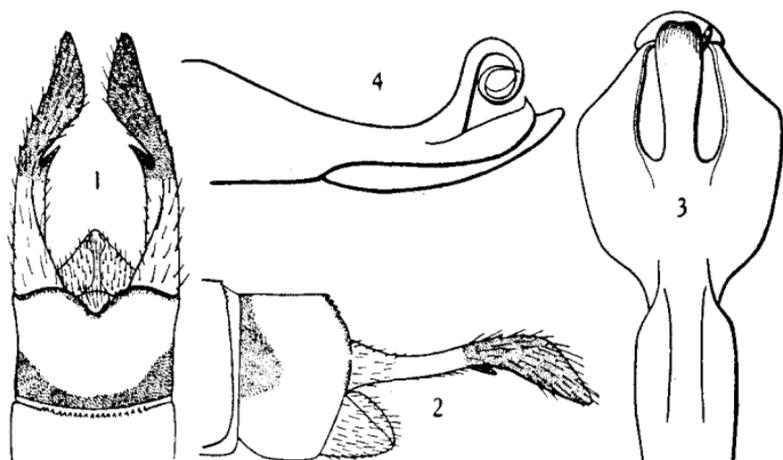
♂.—Labium yellowish; labrum, basal half of mandibles, anteclypeus, and genæ dirty yellowish; distal margin of labrum finely bordered with blackish. Dorsum of the head dull blackish, with a very slight metallic greenish tinge. Two small yellowish spots behind the ocelli. Occiput yellowish brown. Eyes dark brown; antennæ blackish.

Prothorax yellowish brown, marked with dull blackish laterally, and dorsally on the median lobes. Dorsum of synthorax dull blackish, slightly metallic, a narrow yellowish-brown band enclosing the median carina. Humeral bands yellowish brown, a little narrower than the black, somewhat constricted near their upper ends, and then widened again. Sides of synthorax pale yellowish, with a greenish-black band bordering the humeral stripe. Legs yellowish, femora and tibiæ black on their inner faces. Spines on the legs black, except those at base of anterior femur, which are pale, very short, and lanceolate.

Wings hyaline, neuration blackish brown. Pterostigma about two-and-a-half times as long as broad, sepia-brown, proximal margin more oblique than distal.

Abdomen slender, segments 1-9 blackish, with a faint greenish tinge above, yellowish beneath; a small yellowish spot laterally at the base of segments 3-7. Segment 10 yellowish, with a black band at the base, the black being more extensive laterally than dorsally; apical margin bordered with blackish and with an acute excision centrally.

Superior anal appendages yellowish, their apical halves black, shaped as in text-figs. 1 and 2. Inferior appendages yellowish.



*Austrolestes cheesmanæ*, sp. n., ♂.

Text-fig. 1.—Apex of abdomen from above.

Text-fig. 2.—Ditto from side.

Text-fig. 3.—Penis from beneath.

Text-fig. 4.—Ditto from side.

Length of abdomen+appendages 37 mm., of hind wing 22.5 mm.

Type ♂, Erromanga, paratype ♂, Banks Is., in the British Museum (Nat. Hist.). Attached to the paratype is a MSS. label, giving the colour of the insect in life as "pale greyish green below and apex of abdomen blue-green above."

#### Family Cœnagriidæ.

##### *Trineuragrion percostale* Ris.

Ris, Nova Caledonia, Zool. vol. ii. Lf. 1, no. 4, p. 63 (1915).

1 ♂, Banks Is., Vanua Lava, xi. 1929.

Previously recorded from New Caledonia.

(♀ unknown.)

*Ischnura torresiana* Tillyard.

Tillyard, Proc. Linn. Soc. N.S.W. xxxvii. p. 452 (1913).  
Liefinck, Nova Guinea, xv., Zool. 5, p. 110 (1932).

4 ♂, 1 ♀, Malekula, Ounua, ii.-iv. 29.

[1 ♂, Tanna, 20. ix. 25 (*P. A. Buxton*).]

[2 ♂, 7 ♀, Banks Is., Central Lake, Gaua, c. 1000 ft.,  
5-6. vi. 27 (*J. R. Baker*).]

[1 ♂, 1 ♀, Gaua, Hot Springs, 23. xii. 33 (*J. R. Baker*).]

These specimens appear to be quite typical. Tillyard described the species from examples from N. Queensland and Banks Island, Torres Strait, and it has since been recorded from New Guinea.

[*Agriocnemis exsudans* Selys.]

Selys, Bull. Acad. Roy. Belg. (2) xliii. p. 148 (1877).

Tillyard, Proc. Linn. Soc. N.S.W. xxxvii. p. 461 (1913); Trans  
Ent. Soc. Lond. p. 335 (1924).

Fraser, Trans. Ent. Soc. Lond. p. 432 (1925); Ins. Samoa, pt. vii.  
fasc. 1, p. 21 (1927).

[2 ♂, Esp. Santo I., Shark Bay, 22. i. 23 (*J. R. Baker*).]

This species, whose type-locality is New Caledonia, has been recorded from Vila, New Hebrides, and Fiji by Tillyard, and from Samoa by Fraser.

*Agriocnemis vitiensis* Tillyard.

Tillyard, Trans. Ent. Soc. Lond. p. 337 (1924).

Fraser, Trans. Ent. Soc. Lond. p. 432 (1925); Ins. Samoa, vii.  
fasc. i. p. 21 (1927).

14 ♂, 4 ♀, Malekula, Ounua, ii.-iv. 29.

1 ♂, 1 ♀, N.E. Malekula, v. 29.

2 ♂, Malekula, iii. 30.

1 ♂, Tanna, ix. 30.

3 ♂, Aneityum, xi. 30.

[10 ♂, 6 ♀, Tanna, 20. ix. 25 (*P. A. Buxton*).]

[1 ♂, 2 ♀, Gaua, Hot Springs, 20. xii. 33 (*J. R. Baker*).]

There is a certain amount of variation in the shape of the postocular spots in this series, but the red colouring of abdominal segments 8-10 in the male would seem to indicate the above species rather than *A. exsudans* Selys. A number of males exhibit pruinescence upon the legs but none upon the head and thorax. All the females have the six basal abdominal segments reddish.

Previous distribution : Fiji, Samoa.

*Pseudagrion microcephalum* Rambur.

Rambur, Ins. Névr. p. 259 (1842).

Selys, Bull. Acad. Roy. Belg. (2) xlii. p. 504 (1876).

Ris, Suppl. Ent. v. p. 40 (1916).

Lieftinck, Nova Guinea, xv., Zool. 5, p. 90 (1932).

2 ♂, Malekula, Ounua, ii.-iv. 29.

[1 ♂, 1 ♀, Esp. Santo I., Shark Bay, 22. i. 23 (*J. R. Baker*).]

This species, as defined by Ris, and more recently by Lieftinck, exhibits considerable variation in the form of the anal appendages. The New Hebridean examples (of which one only is complete) has the superior anal appendages most like those of the Simalur male (Ris's fig. 15). *P. microcephalum* has a wide range, being recorded from India, Ceylon, Silhet, Burma, Tonkin, Formosa, Philippines, Borneo, Singapore, Malacca, Sumatra, Simalur, Java, Bali, Flores, Celebes, Gilolo, New Guinea, Bismarck Archipelago, Queensland, New South Wales, and Victoria.

*Nesobasis malekulana*, sp. n. (Text-figs. 5 & 6.)

6 ♂, Malekula, Ounua, ii.-iv. 29.

♂.—Labium yellowish, labrum blue except at the base, where there is a narrow black band, somewhat broader centrally. Clypeus and head black, genæ blue. Basal joint of antenna black, remainder brown. Prothorax black, with a small oval yellowish or pruinose spot towards the lateral margins. Synthorax above greenish black, slightly metallic, with a narrow blue humeral stripe; laterally blue, with two brownish-black stripes. Legs yellowish except outer surface of coxæ, trochanters, and femora, and inner half of posterior tibiæ, which are blackish; spines black. Wings hyaline, pterostigma pale brown.

Abdominal segments 1-2 greenish black above, bluish at the sides and beneath. Segments 3-8 above brownish black, darker basally and apically, beneath paler. Segment 9 yellowish (? bluish in life), brownish at the sides and also at its base dorsally, where it forms a triangular mark. Segment 10 yellowish, apical margin blackish, raised and excised at its centre.

Superior anal appendages brownish, short, from above broad, apical margins concave, upper surfaces somewhat hollowed. From the side the appendage is roughly

triangular, the inner upper margin being higher than the outer. Inferior appendages yellowish, blackish at the apices; in lateral aspect broad at the base, its lower margin sharply angled, apex acute. From above, the appendages are evenly curved towards each other and bear each at its base on the inner surface a strong quadrate process, fringed with hairs.

Length of abdomen 34 mm., of hind wing 21 mm.

Type ♂ and 5 paratype ♂♂ in British Museum (Nat. Hist.).



*Nesobasis malekulana*, sp. n., ♂.

Text-fig. 5.—Apex of abdomen from above.

Text-fig. 6.—Ditto from side.

There are also three Platycnemine females, which do not appear to fit any existing genus. In the absence of a male I do not propose to describe them. The venation and shape of wing resembles that of *Leptocnemis*, but the pterostigma is much shorter. The localities are:—  
2 ♀, Malekula, Malua Bay, vi.–vii. 29 (incomplete).

[1 ♀, West Santo, Tatarii, 4000 ft., x.–xi. 33 (*J. R. Baker*).]

#### Family *Æshnidæ*.

[*Anax guttatus* (Burmeister).]

Burmeister, Handb. Ent. ii. p. 840 (1839) (*Æschna*).

Brauer, Reise d. Novara, Neur. p. 62, 1866 (*Anax*).

Martin, Coll. Zool. Selys, fasc. xviii. p. 23 (1908).

[2 ♂, Esp. Santo I., Hog Harbour, 21–22. ii. 27 (*J. R. Baker*).]

Not previously recorded from New Hebrides, but widely distributed in East Indies, India, Seychelles, Queensland, etc.

I should like to take this opportunity of correcting an error in my determination of the *Anax* collected by Miss Cheesman in the Society and Tuamotu Is., and recorded by her in Trans. Ent. Soc. Lond. p. 153, 1927. The species is *Anax guttatus* Burm., not *Anax gibbosulus* Ramb.

*Anaciæschna jaspidea* (Burmeister.)

Burmeister, Handb. Ent. ii. p. 840 (1839) (*Æschna*).

Martin, Coll. Zool. Selys, fasc. xviii. p. 30 (1908) (*Anaciæschna*).

1 ♀, ? Malekula.

*Distribution*.—S. India, Java, Sumatra, Lombok, Borneo, Formosa, Fiji, Samoa, Tahiti.

*Gynacantha rosenbergi* Brauer.

Brauer, Verh. zool.-bot. Ges. Wien, xvii. p. 295 (1867).

Martin, Coll. Zool. Selys, fasc. xx. p. 191 (1909).

Ris, Abh. Senckenberg. Naturf. Ges. xxxiv. p. 524 (1913); Nova Guinea, xiii. livr. 2, p. 107 (1915).

2 ♂, Malekula, Ounua, ii. 1929.

[Brit. Mus. Coll., 1 ♂, Aneityum.]

The specimens before me have the wings deep brownish hyaline, with scarcely a trace of yellow at the base of the hind wings.

*Distribution*.—Japan, Singapore, Celebes, New Guinea, Aru, Ceram, New Britain, Banks Is., and Queensland.

Mr. Cowley, in his paper on "Changes in the Generic Names of the Odonata" (Entom. lxvii. p. 200, 1934), follows Kirby in his use of the name *Acanthagyna* for *Gynacantha* Selys, 1883, and *Gynacantha* Rambur for *Triacanthagyna* Selys. I am unable to agree with him in this respect, as I think that Kirby was entirely unjustified in his selection of the genotype of *Gynacantha* Rambur (Cat. Odon. p. 94, 1890). My reasons for this are as follows:—

The genus *Gynacantha*, as defined by Rambur in 1842 (Ins. Névr. p. 209), contained the following species: *quadrifida*, *furcata*, *trifida*, *bispina*, *subinterrupta*, *bifida*, and *nervosa*. In 1857 Selys, in two papers dealing with a regional fauna (La Sagra, Hist. fis. pol. nat. Cuba, vii. (2) p. 184, and Hist. phys. pol. nat. Cuba, Ins. p. 459),

includes in *Gynacantha* two species, *trifida* Rambur and *septima*, sp. n. In Bull. Acad. Belg. (3) v. p. 745, 1883, de Selys, in his "Synopsis des *Æschnines*," erected a new genus *Triacanthagyna*, with genotype *Gynacantha trifida* Rambur, and gave several "types" or examples of the genus *Gynacantha* Rambur, of which three were originally included species. I consider that de Selys thereby restricted the genus *Gynacantha* and that any subsequent selection of genotype should be made from those three species. *Gynacantha* Rambur and *Triacanthagyna* Selys are undoubtedly distinct genera, and I consider Kirby's fixation of *trifida* Rambur as type of *Gynacantha* Rambur to be invalid, as that species had already been selected as the type of another genus. Therefore I am using the name *Gynacantha* Rambur in the sense of its restriction by de Selys, with the genotype *G. nervosa* Rambur, selected by Calvert in Biol. Centr.-Amer., Neur. p. 189, 1905.

#### Family **Corduliidæ**.

##### *Hemicordulia assimilis oceanica* Selys.

Selys, Bull. Acad. Roy. Belg. (2) xxxi. p. 251 (1871).

Ris, Nova Guinea, ix. livr. 3, p. 502 (1913).

Martin, Gen. Ins. fasc. clv. p. 23 (1914).

Fraser, Ins. Samoa, vii. fasc. 1, p. 37 (1927).

2 ♂, Aneityum, Anelgahaut, xi. 1930.

1 ♀, Malekula, Ounua, iv.-v. 1929.

1 ♂, " " iii. 1930.

[1 ♀, Efate Is., Teuma, 4. vii. 25 (*P. A. Buxton*).]

This insect is fairly widely distributed throughout Oceania.

##### [*Hemicordulia fidelis* McLachlan.]

McLachlan, Ent. Mon. Mag. xxiii. p. 104 (1886).

Martin, Gen. Ins. fasc. clv. p. 23 (1914).

Ris, Nova Caledonia, ii. Lf. 1, no. 4, p. 69 (1915).

[2 ♂, Tanna, April 1875.]

Martin quotes Loyalty Islands and New Caledonia as the distribution of this species.

#### Family **Libellulidæ**.

##### *Agrionoptera insignis similis* Selys.

Selys, Mitt. Mus. Dresden, p. 274 (1878).

Ris, Coll. Zool. Selys, fasc. x. p. 140 (1909).

1 ♂, Banks Is., Vanua Lava, xi. 1929.

1 ♀, N.E. Malekula, vii. 1929.



[3 ♂, 3 ♀, Esp. Santo I., E. coast, Shark Bay, 20-22. i. 23 (*J. R. Baker*).]

A widely distributed species occurring in the Seychelles, India, Ceylon, Burma, Hainan, Tonkin, Japan, Formosa, Penang, E. Indies, Philippines, New Guinea, Fiji, and Queensland.

[*Diplacodes bipunctata* (Brauer).]

Brauer, Verh. zool.-bot. Ges. Wien, xv. p. 503 (1865) (*Libellula*).  
Tillyard, Proc. Linn. Soc. N.S.W. xxxii. p. 722 (1908) (*Diplacodes*).  
Ris, Coll. Zool. Selys, fasc. xiii. p. 471 (1911).

[5 ♂, Banks I., Central Lake, Gaua, about 1000 ft., 5. vi. 27 (*J. R. Baker*).]

[1 ♂, West Santo, Tatarii, 4000 ft., x.-xi. 33 (*J. R. Baker*).]

[1 ♂, Gaua, Hot Springs, 23. xii. 33 (*J. R. Baker*).]

*Distribution*.—Australia, N. Zealand, Fiji, New Caledonia, New Britain, Marquesas, Christmas Is., Swain Is., Ellice Is., Samoa, Society Is., Austral Is.

*Neurothemis stigmatizans bramina* (Guérin).

Guérin, Voy. 'Coquille,' Zool. ii. 2, p. 194 (1832) (*Libellula*).  
Ris, Coll. Zool. Selys, fasc. xiii. p. 574 (1911) (*Neurothemis*).

2 ♀ (heterochromatic), Malekula, Ounua, iv.-v. 29.

[1 ♂, Esp. Santo Is., E. coast, Shark Bay, 22. i. 23 (*J. R. Baker*).]

[1 ♂, Banks Is., Gaua, Nombur, 8. vi. 27 (*J. R. Baker*).]

In the British Museum collections there are also a male and female collected at Santo Island, Big Bay, by Mr. P. A. Buxton on 1st August and 31st July 1925 respectively. This female is also of the heterochromatic form. Previous records of this subspecies include New Guinea, Bismarck Archipelago, Solomon Islands, Union Islands.

[*Pantala flavescens* (Fabricius).]

Fabricius, Suppl. Ent. Syst. p. 285 (1798) (*Libellula*).  
Hagen, Syn. Neur. N. Amer. p. 142 (1861) (*Pantala*).  
Ris, Coll. Zool. Selys, fasc. xv. p. 917 (1913).

[3 ♂, 1 ♀, Esp. Santo I., E. coast, Shark Bay, 20-22. i. 23 (*J. R. Baker*).]

[1 ♀, Esp. Santo I., Hog Harbour, i.-ii. 27 (*J. R. Baker*).]

*Distribution*.—Throughout the tropics and warmer temperate countries.

[*Rhythemis phyllis apicalis* Kirby.]

Kirby, Trans. Zool. Soc. Lond. xii. p. 319 (1889).

Martin, Mém. Soc. Zool. France, xix. p. 221 (1901).

Ris, Coll. Zool. Selys, fasc. xv. p. 948 (1913).

[1 ♀, *Aneityum*], Wallace (Kirby's type).]

This subspecies has also been reported from New Caledonia. The female only is known of *apicalis*, but the presence of a female in the series of *æqualis*, sp. n., collected by Miss Cheesman on Malekula removes any doubt that the males might be those of *apicalis*.

*Rhythemis phyllis æqualis*, sp. n. (Pl. III.; text-fig. 7.)

2 ♂, 1 ♀, Malekula, Ounua, iii.-iv. 29.

[1 ♂, 1 ♀, Esp. Santo I., Shark Bay, 21. i. 23 (*J. R. Baker*).]

♂.—Labrum, postclypeus, frons, and vertex metallic green-black; anteclypeus and suture between postclypeus and frons brownish; occipital triangle metallic black. Prothorax dull black, synthorax bronze above and at sides, black beneath. Abdomen dull black, legs black, wings hyaline with brown and yellow markings.

Anterior wing: the nodal marking extends basally 2-3 cells in the costal area, 1-2 cells in the subcostal area, and  $\frac{1}{2}$ -1 cell in the space behind the radius. Some of the antenodal cross-veins are bordered with brown. The postnodal spot covers 6 cells, extending to within 1 or 2 cells distance from the pterostigma in the costal area and 3-4 cells in the subcostal area, commencing about 1 cell nearer the base than in the costal area. Apical spot commencing at stigma and encircling the wing-tip as far as  $M_2$ .

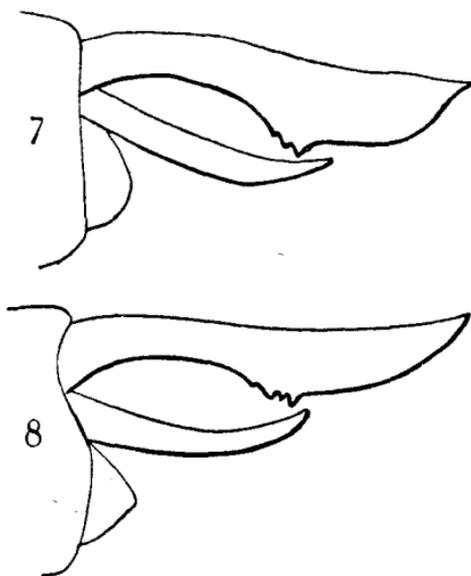
Posterior wing: a brown spur in the costal and subcostal areas as far as the first antenodal. Median cell clear yellowish. Anterior brown basal patch covering part or all of the cubital cell, extending to posterior angle of triangle and to apex of membranule. Yellow band 2-4 mm. in width;  $1\frac{1}{2}$ -2 mm. separating posterior brown patch from posterior margin of wing. Nodal spot smaller than in anterior wing.

♀.—Resembling the male, but the face is metallic green-black, with the exception of the anteclypeus, sides of the postclypeus, and lower portion of the frons, which are yellow-brown. The legs are reddish brown at their

bases. Nodal and postnodal spots in anterior wing smaller and more definite. Yellow band in posterior wing relatively larger, 3-4 mm. in width.

	Type ♂. mm.	Paratype ♂. mm.	Paratype ♀. mm.
Anterior wing ..	34½	33	32
Posterior ,, ....	31½	31	30
Abdomen .....	23	23	21

Type ♂, paratype ♂ & ♀, from Malekula, in British Museum (Nat. Hist.); paratype ♂ & ♀, from Esp. Santo I., in the Hope Department, University Museum, Oxford.



Text-fig. 7.—*Rhyothemis phyllis æqualis*, sp. n., ♂. Anal appendages from side.

Text-fig. 8.—*Rhyothemis phyllis marginata* Ris, ♂ (type). Anal appendages from side.

This subspecies resembles *Rh. phyllis marginata* Ris (Solomon Is., Bismarck Arch.), but differs in the following points:—♂. The brown and yellow bands in the basal area of the hind wing are of about equal width, whereas in *marginata* the yellow band is noticeably narrower; the nodal spot in the anterior wing is larger and extends more basalwards. The apical spot in both wings encircles the wing-tip. The apical portion of the

superior appendage is somewhat shorter, stouter, and more abruptly tapered (text-fig. 8).

I wish to express my sincere thanks to Monsieur Antoine Ball, of the Musée Royale d'Histoire Naturelle de Belgique, for his kindness in enabling me to study the type of *Rhyothemis phyllis marginata* Ris.

*Tramea limbata* (Desjardins).

Desjardins, Ann. Soc. ent. Fr. iv. p. iii (1835) (*Libellula*).

Ris, Coll. Zool. Selys, fasc. xvi. pp. 979, 987 (1913) (*Tramea*).

1 ♂, Malekula, Ounua, iii.-iv. 29.

A widely distributed species in the tropics, occurring in continental Africa, Madagascar and other African islands in the Indian Ocean, India, Burma, Indo-China, Formosa, Malaysia, Moluccas, Bismarck Archipelago, W. Australia, Polynesia. The present example belongs to Ris's "f" or Polynesian group of the species, and is practically indistinguishable from examples from Samoa and the Tuamotu Islands.

EPHEMEROPTERA.

Ephemeroptera in Miss Cheesman's collection are represented by a series of one species of *Cloëon* (fam. Baëtidae) which appears to be undescribed.

Family Baëtidae.

*Cloëon erromangense*, sp. n. (Text-figs. 9 & 10.)

10 ♂ im., 2 ♂ subim., Erromanga, Man-o'-War, 1-3. ix. 30.

1 ♂ subim., Erromanga, Utuppenbu, 13. viii. 30.

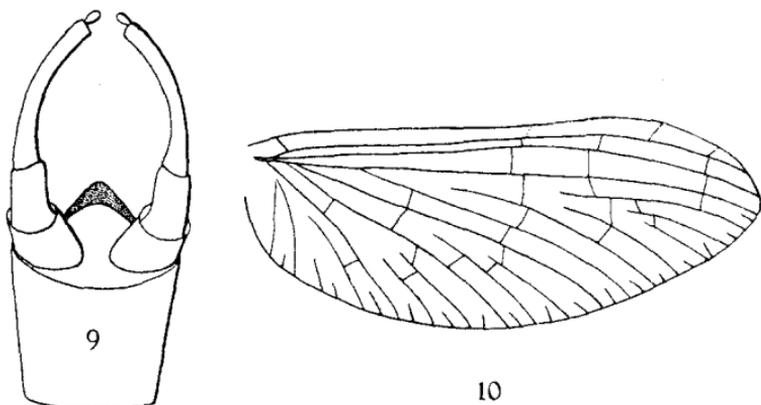
♂ im. (dried).—Head brown, eyes black; antennæ testaceous, apices of the two basal joints brown. Thorax shining pitchy brown, slightly paler beneath. Legs testaceous, a small crescentic reddish spot in the apical fourth of each femur. Wings hyaline, costal and sub-costal areas somewhat smoky; venation blackish, sub-costa and radius testaceous except near their apices. No cross-veins in the costal area between the great cross-vein and the level of the bulla, one weak vein between there and the pterostigma, two to five cross-veins in the pterostigma. Abdomen translucent pitchy brown, setæ

testaceous, ringed with brownish. Claspers testaceous, second joint less than half as long as the third, fourth joint very small and slightly clavate. Penis dark brown, from beneath elliptically produced, from the side appearing as a small upturned hook. Margin of the last ventral segment concave, not produced between the bases of the claspers.

Length of body 4 mm., of fore wing 4.5 mm.

♂ subim. (dried).—Body greyish brown, legs whitish testaceous, with the reddish spot on the femur as in the imago, setæ whitish, ringed with brown. Wings smoky grey, with darker venation.

Type ♂, 9 paratype ♂, 3 ♂ subimagines in the British Museum.



*Cloëon erromangense*, sp. n., ♂.

Text-fig. 9.—Genital claspers and penis from beneath.

Text-fig. 10.—Wing.

## NEUROPTERA.

The Neuroptera of the New Hebrides, as at present known, include only three families—Myrmeleonidæ, Chrysopidæ, and Hemerobiidæ—but further collecting will no doubt add others to the list. The Myrmeleonidæ have been worked out by Dr. P. Esben-Petersen. Of the remaining fourteen species four occur also in Queensland and five in Samoa. Most of them are distributed through the island areas around New Guinea, and some extend much further east as far as the Society Islands and the Marquesas, but in very few cases does their distribution extend north-westwards into Asia.

## LIST OF THE NEUROPTERA OF THE NEW HEBRIDES.

## Family MYRMELEONIDÆ.

- Eidoleon bistrigatus* (Rambur).  
*Formicaleo* sp. prox. *lentus* Walker.  
*Myrmeleon acer* Walker.  
 ——— *pictifrons* Gerstaecker.

## Family CHRYSOPIDÆ.

- Sencera scioneura* Navás.  
*Synthochrysa montrouzieri* (Girard).  
*Austrochrysa samoana* Esben-Petersen.  
*Nothochrysa chloromelas* (Girard).  
*Chrysopa innotata* Walker.  
 ——— *remota* Walker.  
 ——— *oceanica* Walker.  
 ——— *otalatis* Banks.  
 ——— *basalis* Walker.  
 ——— *matsumuræ* Okamoto.  
 ——— *maculithorax*, sp. n.

## Family HEMEROBIIDÆ.

- Eumicromus navigatorum* (Brauer).  
*Micromus tasmaniæ* (Walker).  
*Annandalia obliqua* (Banks).

## Family Myrmeleonidæ.

*Eidoleon bistrigatus* (Rambur).

- Rambur, Ins. Névr. p. 391 (1842) (*Myrmeleon*).  
 Banks, Ann. Ent. Soc. Amer. iii. p. 43 (1910) (*Distoleon*).  
 Esben-Petersen, Ark. Zool. ii. no. 26, p. 15 (1918) (*Eidoleon*).

2, Malekula, Ounua, iii.-iv. 29.

2, Malekula, iii. 30.

[1, Esp. Santo I., Hog Harbour, 1927 (*J. R. Baker*).]

[1, „ „ „ Big Bay, iv. 27 (*J. R. Baker*).]

A widespread species, occurring also in Australia, Fiji, Society Islands, Tuamotu Islands, and Hawaii.

*Formicaleo* sp. prox. *lentus* Walker.

1, Malekula, Ounua, iv.-v. 29.

[1, Esp. Santo I., Hog Harbour, at light, iv. 27 (*J. R. Baker*).]

[1, Esp. Santo I., Hog Harbour, vii. 27 (*J. R. Baker*).]

[1, Esp. Santo I., v. 27 (*J. R. Baker*).]

Dr. P. Esben-Petersen returned these specimens as *Formicaleo* ? *gravis* Walker, but suggested that I should compare them with other Walker types. This I did, and I think that they are nearest in relationship to *lentus* Walk. (E. Indies).

*Myrmeleon acer* Walker.

Walker, List. Neur. Ins. B.M. ii. p. 348 (1853).

1, Malekula, Ounua, ii. 29.

1, Malekula, iii. 30.

Previously recorded from Australia.

*Myrmeleon pictifrons* Gerstaecker.

Gerstaecker, Mitt. naturw. Ver. Neurop. u. Rügen, xvi. p. 96 (1885).  
Esben-Petersen, Ark. Zool. ii. no. 26, p. 20 (1918).

1, Malekula, Ounua, iv.-v. 29.

1, Malekula, iv. 30.

Previously recorded from Australia.

Family **Chrysopidæ**.

*Sencera scioneura* Navás.

Navás, Rev. Acad. cienc. Zaragoza, ix. pp. 27-28, fig. 4 (1924).  
Esben-Petersen, Ent. Mitt. xv. p. 23, (1926).

1, Malekula, Ounua, iii.-iv. 29.

1, Malekula, v. 30.

1, Erromanga, vii. 30.

[1, Esp. Santo I., Tungwi, about 500 ft., 12. iv. 27  
(*J. R. Baker*).]

Previously recorded from Bismarck Archipelago, Sumatra, Java, and Philippines.

*Synthochrysa montrouzieri* (Girard).

Girard, Ann. Soc. ent. France, 4th sér. ii. p. 611, pl. ix. fig. 6, 6 a  
(1862) (*Hemerobius*).

McLachlan, Journ. Ent. ii. p. 114 (1863) (*Apochrysa stigma* Girard).

Needham, Rec. Ind. Mus. iii. p. 202 (1909) (*Synthochrysa*).

1, Malekula, Ounua, iii.-iv. 29.

1, Malekula, iii. 30.

2, Erromanga, vii. 30.

This species was originally described by Girard in the above work (p. 609), using the manuscript name *Hemerobius stigma* given to it by its captor, Montrouzier. On pages 610-611 Girard suggests that there might be some confusion with *H. stigmaticus* Rambur, and that *H. montrouzieri* might be a better name. As the name *Hemerobius stigma* Girard (1862) is preoccupied by *Hemerobius stigma* Stephens (1836), I think that there is no reason why Girard's second choice of name should not be

adopted. The New Hebrides specimens compare very well with the excellent figures given by Girard, whose type was captured in New Caledonia.

[*Austrochrysa samoana* Esben-Petersen.]

Esben-Petersen, Ins. Samoa, pt. vii. fasc. 3, p. 98 (1928).

[2, Esp. Santo I., Tungwi, 500 ft., 12. iv. 27 (*J. R. Baker*).]

These specimens differ slightly from the type in the more closely placed cross-veins in the costal area, and one is a little smaller. From the condition of the wing-markings they would appear to be more teneral.

Previously recorded from Samoa.

*Nothochrysa chloromelas* (Girard).

Girard, Ann. Soc. ent. Fr. sér. 4, vol. ii. p. 607, pl. ix. figs. 5, 5 a (1862) (*Hemerobius*).

Hagen, Stett. Ent. Zeit. xxvii. p. 391 (1866) (*Chrysopa*).

Esben-Petersen, Proc. Linn. Soc. N.S.W. xxxix. p. 641 (1915) (*Nothochrysa*); xlii. p. 215 (1917).

2, Malekula, Ounua, ii. 29.

3, Malekula, v. 30.

[2, Malekula, 14. vi. 25 (*P. A. Buxton*), det. P. Esben-Petersen.]

It is evident from Girard's figure that his species should be transferred to the genus *Nothochrysa*. It shows some relationship with *N. evanescens* McL., and, judging by description, v. d. Weele's subspecies *javanica* must be very close to *chloromelas*. The insect described by Girard was from Lifu, New Caledonia, and Esben-Petersen records it from the Solomon Is. and Queensland.

*Chrysopa innotata* Walker.

Walker, List. Neur. Ins. Brit. Mus. pt. ii. p. 254 (1853).

Esben-Petersen, Ins. Samoa, pt. vii. fasc. 3, p. 101 (1928).

2, Malekula, Ounua, iii.-iv. 29.

Previously recorded from Australia, Samoa, Tonga Is.

[*Chrysopa remota* Walker.]

Walker, List. Neur. Ins. Brit. Mus. pt. ii. p. 238 (1853).

Esben-Petersen, Ins. Samoa, pt. vii. fasc. 3, p. 101 (1928).

Dr. Esben-Petersen records a single example from Tanna, ix. 25. The further distribution of this species is Samoa and Loo-Choo (Riu-Kiu) Is.

*Chrysopa oceanica* Walker.

Walker, List Neur. Ins. Brit. Mus. pt. ii. p. 238 (1853).

Kimmins, in Cheesman, Trans. Ent. Soc. Lond. 1927, p. 161.

Esben-Petersen, Ins. Samoa, pt. vii. fasc. 3, p. 102 (1928).

1, Malekula, Ounua, iv.-v. 29.

1, Malekula, Malua Bay, v. 29.

1, N.E. Malekula, vii. 29.

1, Santo, viii. 29.

1, Malekula, iii. 30.

3, Erromana, vii. 30.

[2, Esp. Santo I., Tanavo, 300 ft., 21. i. 27 (*J. R. Baker*).]

These specimens lack the reddish marks on frons and vertex present in the type, and the reddish-brown marks on the prothorax are stronger. The prothorax is definitely longer than broad. The species was first recorded from New Hebrides by Dr. Esben-Petersen in 1928, and it also occurs in Hawaii (the type-locality) and the Society Islands.

*Chrysopa otalatis* Banks.

Banks, Psyche, xvii. p. 102 (1910).

Esben-Petersen, Ins. Samoa, pt. vii. fasc. 3, p. 103 (1928).

1, N.E. Malekula, vii. 29.

1, Tanna, x. 30.

[12, West Santo, Betap, 3500 ft., "grassy slopes," 5. vii. 27 (*J. R. Baker*).]

Previously recorded from Australia, Samoa, New Caledonia.

*Chrysopa basalis* Walker. (Text-fig. 11.)

Walker, List. Neur. Ins. Brit. Mus. pt. ii, p. 239 (1853).

Kimmins, in Cheesman, Trans. Ent. Soc. Lond. 1927, p. 160.

Esben-Petersen, Ins. Samoa, pt. vii. fasc. 3, p. 105 (1928); Bishop Mus. Bull. cxlii. p. 13 (1935).

1 ♀, Banks Is., Pakea, x. 29.

1 ♂, Banks Is., Vanua Lava, xi. 29.

3 ♂, 4 ♀, Malekula, iii.-v. 30.

1 ♀, Erromanga, vii. 30.

[1, Malekula, 14. vi. 25 (*P. A. Buxton*).]

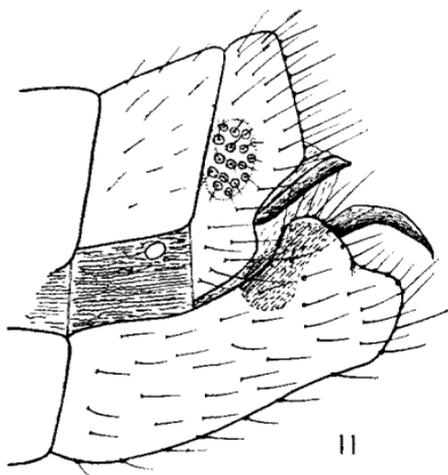
[2, Santo Is., 24. viii. 25 (*P. A. Buxton*).]

[1, Tanna, ix. 25 (*P. A. Buxton*).]

[1, Tangoa, 12. vi. 27 (*J. R. Baker*).]

From the material I have been able to examine it would appear that the males of this species are rather

smaller than the females and that the pterostigma of the hind wing is longer and more defined. Walker's type is now without abdomen, but from the size of the pterostigma I believe it to be a female. I am figuring the genitalia of one of the Malekula males. Superior appendages short and deep, with a large group of trichobothria. Terminal ventral segment long, from the side narrow, apex in the form of a median and a pair of lateral lobes. Tenth sternite appearing as a narrow chitinous arch,



*Chrysopa basalis* Walker, ♂.

Apex of abdomen of a Malekulan specimen from side.

directed upward and backward. Apex of the arch in dorsal view slightly produced and truncate. Parameres with their apices fused to form a downcurved hook, their free basal portions clavate in lateral view, thin, plate-like, and curving towards each other in dorsal view.

*C. skottsbergi* Esb.-Pet. is a synonym of *C. basalis* Walker. Owing to the inadequacy of Walker's description Dr. Esben-Petersen was unaware that *C. basalis* possessed a dark brown mark on the outer side of the basal segment of the antenna.

Previously recorded from Loo-Choo (Riu-Kiu) Is., Society Is., Tuamotu Is., Marquesa Is., Easter Is.

*Chrysopa matsumuræ* Okamoto.

Okamoto, J. Coll. Agric., Sapporo, vi. p. 68 (1914).

1, Erromanga, vii. 30.

[1, Santo Is., 24. viii. 25 (*P. A. Buxton*), det. P. Esben-Petersen.]

[1, Tangoa,  $\frac{1}{2}$  m. from S. coast of Santo, 12. v. 27 (*J. R. Baker*).]

Previously recorded from Japan.

*Chrysopa maculithorax*, sp. n.

5, Malekula, Ounua, ii.-iv. 29.

1, Banks Is., Vanua Lava, x. 29.

*Head* yellowish orange on the vertex, towards its posterior margin sometimes a pair of reddish spots. *Antennæ* yellowish, becoming brownish apically, nearly as long as anterior wing, basal joint without marking. *Prothorax* broader than long, yellow, the anterior and posterior angles each with a large reddish-brown spot. *Meso- and metathorax* and abdomen yellowish, mesothorax with a pair of rounded brownish spots dorsally. *Legs* yellowish, claws with a broad tooth at the base interiorly. *Wings*: venation pale yellowish throughout; stigma yellowish, without distinct cross-veins in the costal area; four to six cross-veins in subcostal area behind stigma. First cross-vein from *Rs* in fore wing touching *Psm* within the basal cell of the median fork. Both gradate series fairly parallel to the margin of the wing; inner row in fore wing consisting of six or seven cross-veins, commencing at the fourth or fifth cross-veinlet between *Rs* and *Psm*; eight or nine cross-veins in the outer series. Six to seven cross-veins in both series in hind wing.

Fore wing 11-14 mm., hind wing 9.5-12 mm.

*Type* and paratypes in British Museum.

Family **Hemeroblidæ**.

*Eumicromus navigatorum* (Brauer).

Brauer, Verh. zool.-bot. Ges. Wien, xvii. p. 508 (1867) (*Micromus*).  
Esben-Petersen, Ins. Samoa, fasc. iii. pt. 7, p. 93 (1928) (*Archæomicromus*).

6 examples, Tanna, x. 30.

[1, Tanna, ix. 25 (*P. A. Buxton*).]

[1, Vila, 4. vii. 25 (*P. A. Buxton*).]

[1, Elate Is., 31. i. 25 (*P. A. Buxton*).]

*Distribution*.—Fiji, Samoa, New Hebrides, Queensland.

The genus *Archæomicromus* of Krüger and Esben-Petersen appears to me to be synonymous with *Eumicromus* Nakahara (genotype, *Micromus numerosus* Navás). Krüger, in erecting new genera in his classification of the Hemerobiidae (Stett. ent. Zeit. 1922), appears to have overlooked Nakahara's paper on the Japanese Hemerobiinæ, as none of the genera and species described in the latter are mentioned in Krüger's list. The chief character separating *Eumicromus* from *Micromus* Rambur is that in the former  $M_{3+4}$  does not fuse with  $Cu_1$  in the hind wing.

*Micromus tasmanix* (Walker).

Walker, Trans. Ent. Soc. Lond. v. p. 186 (1859) (*Hemerobius*).

Tillyard, Proc. Linn. Soc. N.S.W. xli. p. 307 (1916) (*Micromus*).

1 ♀, Tanna, x. 30.

I believe I am correct in referring this female to the above species. It has not previously been recorded from New Hebrides, but occurs in New Zealand, Tasmania, New South Wales, S.W. Australia, and Queensland.

*Annandalia obliqua* (Banks).

Banks, Proc. Ent. Soc. Wash. xi. p. 81 (1909) (*Notiobiella*); Psyche, xxxix. p. 104 (1932) (*Annandalia*).

2 ♀, Tanna, x. 30.

1 ♀, Aneityum, xi. 30.

1 ♀, Erromanga, vii. 30.

[1 ♀, Santo Is., 24. viii. 25 (*P. A. Buxton*).]

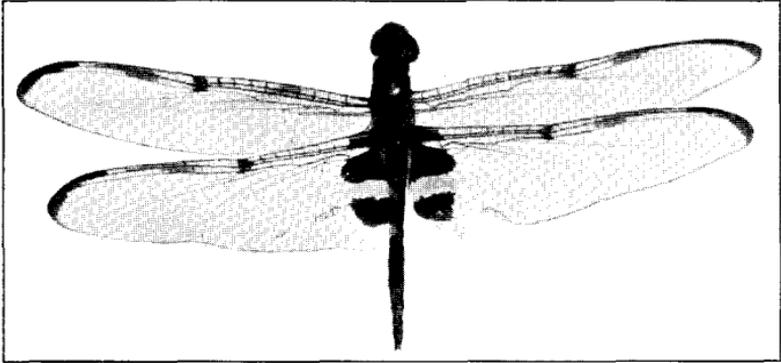
One female from Tanna agrees very well in pattern of the anterior wings with the description, but in the other the brown coloration (instead of extending in a simple band obliquely across the wing along the gradate series) between the radius and  $M_{3+4}$  spreads *basally* as far as the fork of  $M$ , sharply defined apically along the gradate series. From  $M_{3+4}$  to the posterior margin it extends to a similar extent *apically*, with a sharply defined basal margin, continuing the line of the gradate series.

The species has previously been recorded only from Queensland.

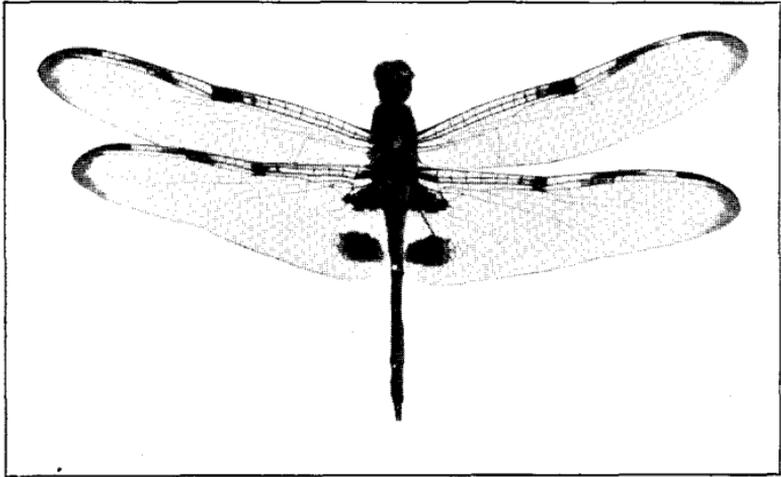
EXPLANATION OF PLATE III.

A. *Rhyothemis phyllis marginata* Ris, ♂, type.

B. *Rhyothemis phyllis æqualis*, sp. n., ♂.



A.



B.

A. *Rhyothemis phyllis marginata* Ris, ♂, type.

B. *Rhyothemis phyllis æqualis*, sp. n., ♂.

# Bibliography of the Neuropterida

*Bibliography of the Neuropterida Reference number* (r#):  
200

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