# SYNOPSIS OF THE ODONATE FAUNA OF THE BISMARCK ARCHIPELAGO AND THE SOLOMON ISLANDS

by

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With one map and 12 text-figures

## INTRODUCTION

In the present small paper an attempt has been made to put on record all that is at present known of the Odonate fauna of Northern Melanesia [1], viz the Admiralty Islands, the Bismarck Archipelago and the Solomon Islands. There is hardly another region in the entire world about which so little is known entomologically as these extensive island groups. With regard to the Odonata of the Solomon chains, which cover an area 600 miles in length, I believe that these islands are the most neglected of the entire Pacific, and no doubt many interesting facts connected with their distribution remain to be brought to light.

Very little is still known of the rough interior of the Bismarck Islands, which are almost entirely covered with primeval forests; the mountains on New Ireland attain a height of 2150 metres, while the highest recorded altitude on New Britain (Mt Ulawun) is about 2300 m.

As to the topography of the Solomon Islands the reader is referred to the classical work of GUPPY [2] and LEVER's interesting accounts [3]. It may suffice here to acknowledge the fact that much of the interior of the islands is still unmapped and even unknown to white men. The greatest height attained within the British Protectorate is almost 2450 metres on Guadalcanal, and on most islands there are extensive areas of over 1000 metres elevation. Kolombangara and San Cristoval for instance, rise to a height of 1780 and 1250 metres above sea-level (see also LEVER's instructive maps, *l. c.*). In the politically distinct but geologically identical island of Bougainville, the summits of some of the snow-capped mountains in the interior attain an elevation of almost 3200 metres.

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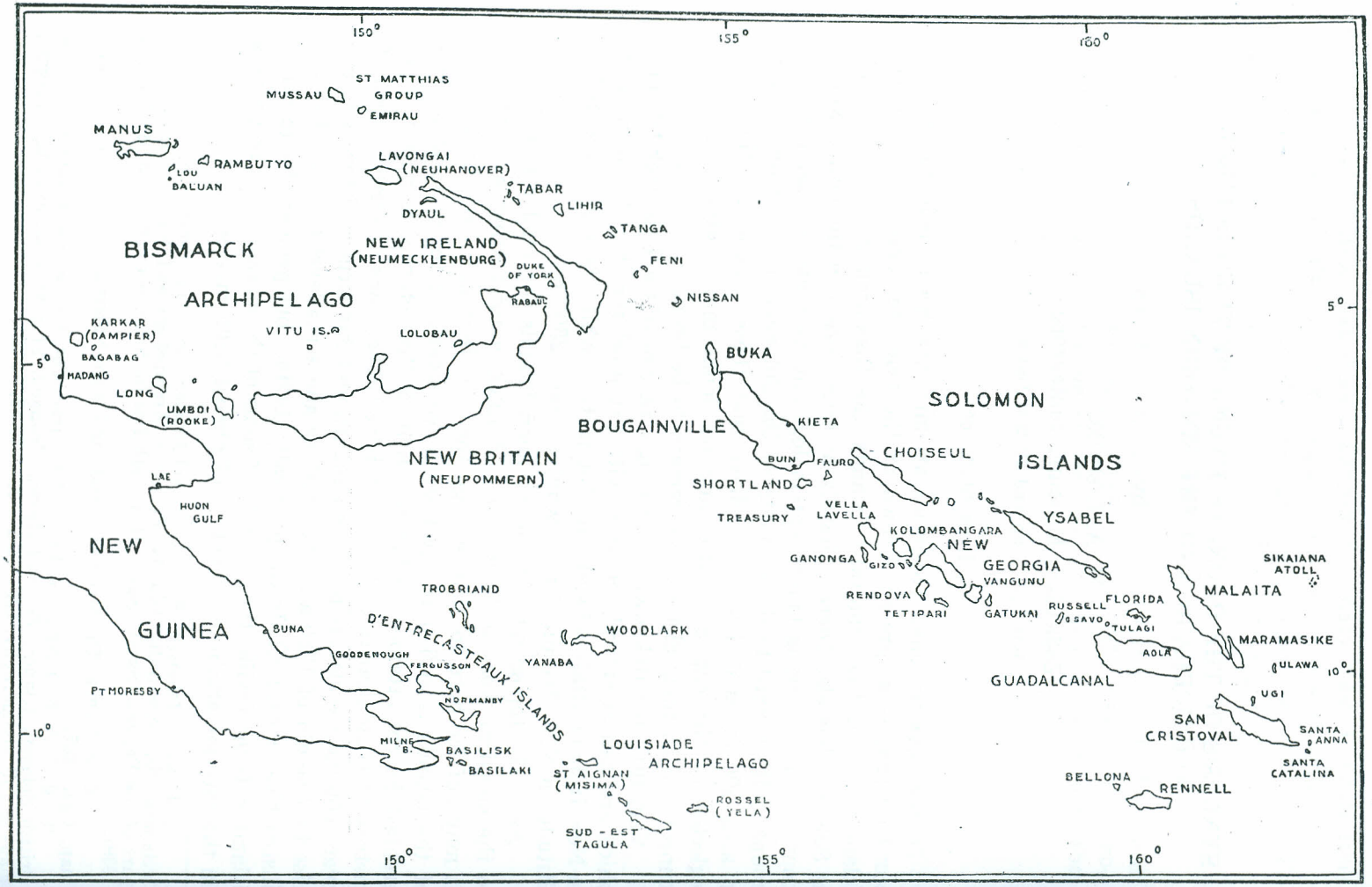
[1]) I have followed E. MAYR's subdivision here in considering Northern Melanesia (the Admiralty Islands, Bismarck Archipelago and Solomon Islands) as part of the Papuan (Sub-) Region. (*Proc. 6th Pacific Sci. Congress*, Berkeley, 4 : 193, 1939).

[2]) H. B. GUPPY, The Solomon Islands and their Natives. London, xvi & 384 pp., map, figs, 1887.

[3]) R. J. A. W. LEVER, The Physical Environment, Fauna and Agriculture of the British Solomon Islands. *Tropical Agric., Trinidad*, 14 : 281-285, 307-312, photogr., maps & full bibliography, 1937; *ibid.*, 20 : 40-42, 1943.




Map of Northern Melanesia.

Absolutely nothing is yet known of the autochthonous fauna of the interior of these islands and hardly any forms have yet been found whose habitat is uncleared forest and uncultivated land. In this connection H. HEDIGER's remarks are worthy of quotation: — "die Erforschung des Inlandes [von Bougainville] mit seinen Gebirgen und Seen dürfte in zoologischer Hinsicht noch mancherlei Überraschungen bieten. Die von uns besuchten Orte liegen jedoch ausschliesslich an der Küste oder in der flachen, zwischen ihr und den Bergen gelegenen Waldebene" (*l. c.*: 446).

Our knowledge of the dragonfly fauna of New Britain and the archipelago to which it belongs is contained in two papers by R. RIS, published some fifty years ago, namely, "Neue Libellen vom Bismarck-Archipel" (*Entom. Nachrichten,* 24: 321-327, 1898), and "Libellen vom Bismarck-Archipel gesammelt durch Prof. FRIEDR. DAHL" (*Archiv f. Naturgesch.,* 66: 175-204, Taf. 9-10, 1900). In the last mentioned article, 27 species are recorded for New Britain. In 1919, H. CAMPION published a small paper entitled "A Note on some Dragonflies from New Britain" (*Entomologist,* 52: 246-249, fig., 1919), in which one species, viz *Idiocnemis inornata* SELYS, is added to the list.

Recently, E. SCHMIDT has published a useful "Check-list of Odonata of Oceania" (*Ann. Ent. Soc. Amer.,* 31: 322-344, 1938), compiled from the literature, in which 30 species are enumerated for the Bismarcks, but only 12 for the Solomon Islands. In spite of the fact that a number of species reported since 1932 from one or the other of the archipelagoes have been omitted from this list, the bibliography on the subject being incomplete, it demonstrates clearly our deplorable knowledge of the distribution of this order in the islands. It has been the task of the present writer to assemble all available data, and to quote all important references to the literature under the heading of each species, of which 64 are now known to occur in the area surveyed.

As is well known, the Bismarcks have an impoverished Papuan fauna, and there is abundant evidence in support of MAYR's opinion (*l. c.*) that even the fauna of the Solomons — at one time included with Polynesia — shows a close affinity to that of the Papuan Region, containing an appreciable number of elements derived from the New Guinea region. [1]) This general paucity of forms is best demonstrated by the fact that whereas New Guinea (including the Aru Islands), as far as at present known [2]), comprises 345 species and subspecies of Odonata, our lists of the Bismarcks and the Solomons now contain the names of only 40 and 41,

[1]) An interesting analysis of the herpeto-fauna of New Britain has been given by H. HEDIGER in his "Beitrag zur Herpetologie und Zoogeographie Neu Britanniens und einiger umliegender Gebiete" (*Zool. Jahrb.,* Abt. Syst., Oekol. u. Geogr. d. Tiere, 65 : 441-582, textfigs, bibliography, 1934).

[2]) The actual number of species of Odonata inhabiting the continent of New Guinea alone has been estimated roughly to be at least five or six hundred (See LIEFTINCK, *Nova Guinea,* N.S., 5 : 3, 1949).

Table I

Analytical table of known Odonata of the Admiralty Is., Bismarcks and Solomon Islands, indicating numerical distribution of species and subspecies as compared with New Guinea (incl. Aru Is.)

| Family | New Guinea | Admiralties | Bismarcks | Solomons | Entire Area |
|---|---|---|---|---|---|
| *Agriidae* | 3[1]) | — | 1 | — | 1 |
| *Chlorocyphidae* | 6 | — | 1 | 3 | 3 |
| *Amphipterygidae* | 1 | — | — | — | — |
| *Lestidae* | 8 | — | 1 | — | 1 |
| *Megapodagriidae* | 21 | — | 1 | — | 1 |
| *Platystictidae* | 12 | — | — | — | — |
| *Protoneuridae* | 37 | — | 4 | 1 | 4 |
| *Platycnemididae* | 16 | — | 2 | — | 2 |
| *Coenagriidae* | | | | | |
| *Argiinae* | 19 | — | — | — | — |
| *Coenagriinae* | 84 | 1 | 6 | 11 | 14 |
| *Gomphidae* | 1 | — | — | 1 | 1 |
| *Aeshnidae* | 20 | — | 5 | 4 | 6 |
| *Corduliidae* | 18 | — | 2 | 2 | 3 |
| *Libellulidae* | 99 | 1 | 17 | 19 | 28 |
| Total | 345 | 2 | 40 | 41 | 64 |

respectively. A comparison with the bird fauna of the Solomons, which are much better known than the Odonata, reveals that while New Guinea has 520 native species, the Solomon Islands have only 127 (MAYR, *l. c.*). Although the decrease in number of species is only natural when considering the comparatively small size of the islands and their prolonged isolation from continental New Guinea, a comparison of the above totals suggests clearly that we may anticipate, by analogy of the avifauna, much higher figures for the dragonflies actually occurring in these islands.

The principal object of this paper, therefore, is to stimulate those who are fortunate enough to have the opportunities to fill the gaps in our knowledge of the local fauna.

[1]) Including a third species of *Neurobasis*, not yet described.

## PRELIMINARY ANALYSIS OF THE ZOOGEOGRAPHICAL ELEMENTS COMPOSING THE ODONATE FAUNA OF THE AREA SURVEYED

It has been emphasized earlier that our knowledge of the regional fauna is still very incomplete and, as a matter of fact, quite insufficient to allow of any definite conclusions being made about its composition from the zoogeographical standpoint. Both groups of islands are certainly poor in Odonata, comparing unfavourably with the Papuan province, but it is beyond doubt that many elements already known from other parts of the Indo-Australian archipelago, sedentary as well as migratory, remain to be discovered. Besides, it must be admitted that the percentage of endemic species in the Bismarcks and Solomon Islands may be modified with an increase in knowledge, and it appears very likely that it will be raised considerably, especially on the Solomons.

For these reasons the following analysis can only be considered as tentative.

In Table II a mark of interrogation placed before the specific name, or in one of the columns, indicates that the identity of the species is not yet difinitely known, its occurrence in one of the island groups, however, being well established. It follows that all questionable species are included in the totals of each column.

Table II

Giving the distribution of all regional species and subspecies within the area surveyed, and their occurrence in New Guinea

| List of species | New Guinea | Admiralty Is. | Bismarcks | Solomons |
|---|---|---|---|---|
| Fam. Agriidae | | | | |
| *Neurobasis (?) australis* | + | | + | |
| Fam. Chlorocyphidae | | | | |
| *Rhinocypha tincta semitincta* | + | | + | ? |
| *Rhinocypha tincta adusta* | | | | + |
| *Rhinocypha liberata* | | | | + |
| Fam. Lestidae | | | | |
| *Lestes spec. indet.* | | | + | |
| Fam. Megapodagriidae | | | | |
| *Argiolestes aurantiaca* | | | + | |
| Fam. Protoneuridae | | | | |
| *Tanymecosticta filiformis* | | | + | |
| *Notoneura commutata* | | | + | |
| *Notoneura nigrofasciata* | + | | + | |
| *Notoneura salomonis* | + | | + | + |

| List of species | New Guinea | Admiralty Is. | Bismarcks | Solomons |
|---|---|---|---|---|
| Fam. Platycnemididae | | | | |
| *Idiocnemis inornata* | + | | + | |
| *Idiocnemis spec. indet.* | ? | | + | |
| Fam. Coenagriidae | | | | |
| *Ceriagrion (?) erubescens* | + | | | + |
| *Pseudagrion incisurum* | | | ? | + |
| *Pseudagrion microcephalum* | + | | + | + |
| *Papuagrion gurneyi* | | | | + |
| *Teinobasis aluensis* | | | | + |
| *Teinobasis emarginata* | | | | + |
| *Teinobasis spec. indet.* | | | | + |
| *Teinobasis rufithorax* | + | | + | + |
| *Xiphiagrion cyanomelas* | + | | + | |
| *Mortonagrion martini* | | + | + | |
| *Ischnura a. aurora* | + | | | + |
| *Agriocnemis femina* | + | | + | |
| *Agriocnemis salomonis* | | | | + |
| *Agriocnemis pygmaea* | + | | | + |
| Fam. Gomphidae | | | | |
| *Ictinogomphus australis lieftincki* | + | | | + |
| Fam. Aeshnidae | | | | |
| *Agyrtacantha dirupta* | + | | + | + |
| *Gynacantha mocsaryi* | + | | + | + |
| *Gynacantha rosenbergi* | + | | + | + |
| *Anaciaeschna melanostoma* | | | | + |
| *Anax guttatus* | + | | + | |
| *Anax maclachlani* | + | | + | |
| Fam. Corduliidae | | | | |
| *Hemicordulia oceanica* | | | + | + |
| *Macromia terpsichore* | + | | + | |
| *Eusynthemis frontalis* | | | | + |
| Fam. Libellulidae | | | | |
| *Nannophlebia imitans* | | | + | |
| *Diplacina fulgens* | | | + | |
| *Nesoxenia mysis cingulata* | | | | + |
| *Nesoxenia mysis dahli* | | + | + | |
| *Agrionoptera insignis allogenes* | + | | | + |
| *Agrionoptera similis* | + | | + | + |
| *Protorthemis coronata* | + | | + | |
| *Protorthemis woodfordi* | | | | + |
| *Orthetrum s. sabina* | + | | + | + |
| *Orthetrum villosovittatum bismarckianum* | | | + | + |

| List of species | New Guinea | Admiralty Is. | Bismarcks | Solomons |
|---|---|---|---|---|
| *Brachydiplax denticauda* | + | | | + |
| *Brachydiplax duivenbodei* | + | | | + |
| *Diplacodes nebulosa* | + | | + | |
| *Diplacodes bipunctata* | + | | + | |
| *Diplacodes trivialis* | + | | + | + |
| *Neurothemis ramburi papuensis* | + | | + | |
| *Neurothemis stigmatizans bramina* | + | | + | + |
| *Crocothemis nigrifrons* | + | | | + |
| *Rhodothemis rufa* | + | | | + |
| *Rhyothemis regia juliana* | + | | + | |
| *Rhyothemis phyllis marginata* | | | + | + |
| *Rhyothemis phyllis chloe* | | | | + |
| *Rhyothemis resplendens* | + | | + | + |
| *Pantala flavescens* | + | | + | + |
| *Hydrobasileus brevistylus* | + | | | + |
| *Tramea liberata* | | | | + |
| *Tramea propinqua* | + | | + | |
| *Aethriamanta subsignata* | | | | + |
| Total | 38 | 2 | 40 | 41 |

From this Table it appears that, out of a total of 40, the Bismarck Islands have 28 species and subspecies (or 70 per cent) in common with New Guinea. For the Solomons this figure is about 56 per cent, only 23 out of the 41 species inhabiting one or more of the islands having been found also on New Guinea.

An impression of the components of the regional fauna can be gained by our Table III, indicating the various divisions of the zoogeographical regions concerned and the probable origin of the non-endemic species and subspecies, and exhibiting the amount of endemism in these islands.

## ENDEMISM

B i s m a r c k s. — Of the species confined to this archipelago probably only seven are peculiar to the islands. All except *Mortonagrion martini* belong to genera which have their headquarters in the Papuan Region, and even the doubtful *Lestes* and *Pseudagrion* might belong to species already known from New Guinea.

*Mortonagrion martini*, only known from the Admiralties, Umboi and New Britain, is of great interest as it stands rather apart from the other members of the genus, and ought perhaps to be placed in a distinct genus.

Nearly all species are Indomalayan, and the genus is absent from New Guinea and the Australian Region.

*Nannophlebia imitans* and *Diplacina fulgens* are closely allied with the Papuan members of these genera. The fact that *Nesoxenia mysis dahli* stands more apart from the Papuan nominotype *mysis* than does the subspecies *mysis cingulata* from the Solomons, is especially worth notice.

Table III

Analysis of the species of Odonata in the Bismarcks and the Solomon Islands

| Distribution | *Zygoptera* | *Anisoptera* | *Odonata* | Percentage of whole fauna |
|---|---|---|---|---|
| BISMARCK & ADMIRALTY IS.: | | | | |
| Endemic | 4 | 3 | 7 | 17.5 |
| Papuasian | 8 | 13 | 21 | 52.5 |
| Polynesian | — | 2 | 2 | 5.0 |
| Australian | — | — | — | — |
| Spread | 4 | 6 | 10 | 25 0 |
| Total | 16 | 24 | 40 | 100.0 |
| SOLOMONS: | | | | |
| Endemic | 8 | 5 | 13 | 31.7 |
| Papuasian | 3 | 13 | 16 | 39.0 |
| Polynesian | — | 2 | 2 | 4.9 |
| Australian | — | 2 | 2 | 4.9 |
| Spread | 4 | 4 | 8 | 19.5 |
| Total | 15 | 26 | 41 | 100.0 |

S o l o m o n s. — In spite of the fact that in this division we must include a fairly large number of *Zygoptera,* only one of these, viz *Rhinocypha liberata,* is of exceptional interest, all the others belonging to Papuan or even to widely distributed genera.

*Rhinocypha liberata* belongs to an old complex of species within the genus having a very limited distribution in some islands of the southern Moluccas. In point of fact this remarkable species strongly resembles *R. ustulata* BRAUER (from Ceram and Ambon) and *aurulenta* FÖRST. (from Buru), approaching most closely to the former. Were it not for some differences in the shape of the wings and body-colouring, and for the widely separated habitat, I would not hesitate to regard both forms as

races of but one species. The extraordinary similarity and curious distribution of *R. ustulata* and *liberata* could possibly be understood if we were to accept WEGENER's theory of the drift of continental masses, as exemplified recently by Dr F. E. ZEUNER, in his most interesting article on the systematics of the genus *Troides*. [1]) It is tempting in this connection to quote in full the following paragraphs from ZEUNER's paper:

> According to this theory, the Australian block has been drifting northwards during and since the Tertiary. The theory was applied to the Australasian Archipelago for the first time by Wegener (latest editions, 1924, 1937), then by Smit Sibinga (1927) and du Toit (1937). The conceptions of these workers differ in details, but they agree in the following important points:—
>
> In the course of the Tertiary and the Pleistocene, the Australian Block has moved north and, with its frontal portion, New Guinea, entered into and interfered with the island chains emanating from Sundaland. In the past, therefore, New Guinea occupied a more southerly latitude than the northern Moluccas, and the incurving of the island chains around the Banda Sea is the result of New Guinea having been pushed into this alignment. The most obvious evidence for this movement is to be found on and around Timor...
>
> Whether one admits the major movements of Australia from the far south or not, a withdrawal of New Guinea out of the island chains towards the south (more accurately south-east, see du Toit, 1937, p. 190, and Wegener, 1937, p. 86), so that the Arfak Peninsula would lie approximately where now the centre of New Guinea is situated, would suffice to straighten out the disturbed island chains and *bring the northern Moluccas near to the Solomons.* The evidence contained in the strata shows that the latest movements resulting in compression are Neogene, with a very pronounced phase at the end of the Pliocene, and less intense movements lasting into the Pleistocene. The advance of New Guinea to its present position, therefore, may have been as late as this, and late enough for the *Ornithoptera*-group to have reached the Solomons before the island chain Moluccas-Solomons was broken.

Since *R. ustulata* is restricted to the islands of the s o u t h e r n Moluccas (whence *tincta* is unknown), the present example does not exactly correspond to the hypothesis put forward above. The matter is further complicated by the fact that *R. liberata,* as far as we know at present, is confined to the e a s t e r n m o s t islands of the Solomons, the other islands being occupied by one or more subspecies of the widespread *R. tincta,* a species which has a continuous distribution ranging from the n o r t h e r n Moluccas as far as New Georgia.

Thus, we see that a satisfactory explanation of the isolated occurrence of *R. ustulata* and *liberata* can not be given.

An other species whose characters and distribution present somewhat similar difficulties, is *Aethriamanta subsignata* SELYS, which definitely approaches the Moluccan form more closely than the Papuan, the latter being even considered a distinct species.

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[1]) F. E. ZEUNER, Studies in the Systematics of *Troides* HÜBNER (Lepid., Papilionidae) and its Allies; Distribution and Phylogeny in Relation to the Geological History of the Australasian Archipelago. *Trans. Zool. Soc. London,* 25 : 107-184, figs 1-115, 1943.

The endemic *Papuagrion gurneyi* is of interest as it is the first species of its genus found outside New Guinea and Aru. *Teinobasis* is also typically a Papuan genus; no less than three species appear to be peculiar to the Solomons.

About the *Anisoptera* the most noteworthy fact is the discovery of a new species of *Eusynthemis*, a genus hitherto confined to the mainland of Australia. This insect might be considered one of the oldest elements in the fauna, supposed to have reached the Solomons by way of an old land bridge. Since the Australian *Eusynthemis* are weak-flying insects, confined to large rivers and fast mountain-streams, representatives of this genus could have reached the Solomons only before some old continental connection was finally broken, just as the Fijian *Synthemis macrostigma* was supposed by TILLYARD [1]) to have reached these islands. However, there is no evidence in support of the theory of a former land connection between Australia and the Solomons, and therefore one might well ask whether the forerunners of these dragonflies could not conceivably have been carried by wind from Australia towards eastern New Guinea and from there have spread slowly from island to island until they gained a footing in the Solomons?

It is beyond doubt that the non-endemic and more or less migratory Libellulines, *Agrionoptera insignis allogenes* and *Rhyothemis phyllis chloe*, are much later additions to the fauna, which could readily have crossed considerable stretches of water and colonized the Solomons directly from Australia.

## MATERIAL AND ACKNOWLEDGEMENTS

This paper is based on a study of some 400 specimens, about one-third of which were from collections in European and American Museums brought home by such early travellers as A. S. MEEK, C. RIBBE and C. WAHNES, the remainder from more recent acquisitions. Many specimens were examined and studied during short visits to various Museums in Europe and Australia, whilst others were loaned to me from the Basle, Hamburg and Michigan Museums.

I wish to express my deep appreciation to Mrs LEONORA K. GLOYD of the Museum of Zoology, University of Michigan, Ann Arbor, for placing the F. FÖRSTER collection at my disposal and for her patience with respect to the return of the numerous specimens entrusted to me.

Through the kindness of Dr EDWARD S. ROSS of the Science Museum, California Academy of Sciences, San Francisco, I have been able to examine three collections from the Solomons, viz two made on Guadalcanal by J. A. KUSCHE and C. H. FOGGITT, and one throughout Melanesia by M. WILLOWS Jr, as a member of the 1933 TEMPLETON-CROCKER Expedition.

[1]) The Dragonflies of Fiji... &c., *Trans. Ent. Soc. Lond.* (1923): 339, 344, 1924.

During his residence in the Solomons, Dr R. A. LEVER, at one time government entomologist at Tulagi, forwarded to me from time to time the Odonata taken by himself from 1934 till 1936 on many different islands of the archipelago. I am also indebted to Messrs E. A. CHAPIN, A. B. GURNEY, and K. V. KROMBEIN, of the Smithsonian Institution, Washington D.C., for allowing me to examine a small collection made for the United States National Museum by Dr GURNEY and others on Bougainville, the Treasury Islands and New Georgia.

The authors's warm thanks are hereby extended to Prof. Dr Ed. HANDSCHIN and Prof. Dr H. HEDIGER, of the Naturhistorisches Museum at Basle, for the loan of interesting specimens (chiefly collected by H. HEDIGER in 1930) on the Bismarcks, Umboi, Kunua and Bougainville; and I must apologize for the long time it has taken me to study this material adequately.

In the aggregate the material mentioned in the last two paragraphs represent, I believe, the most important collections of these insects hitherto made in the islands, and I am much indebted to all those who took an interest in my work for the opportunity of studying them.

In the enumeration of material examined the names of scientific institutions and private collections are indicated by the following abbreviations:—

AAM — Michigan Museum, Ann Arbor
AMS — Australian Museum, Sydney
BM — British Museum (Natural History), London
CAS — California Academy of Sciences, San Francisco
CC — Collection of JOHN COWLEY
MH — Zoologisches Staatsinstitut u. Museum, Hamburg
MNP — Muséum National d'Histoire Naturelle, Paris
MRB — Musée Royal d'Histoire Naturelle, Brussels
NMB — Naturhistorisches Museum, Basle
NRS — Naturhistoriska Riksmuseet, Stockholm
RML — Rijksmuseum van Natuurlijke Historie, Leiden
USNM — United Stated National Museum, Washington, D.C.
ZMB — Zoologisches Museum, Berlin.

## SYSTEMATIC

Fam. Chlorocyphidae

*Rhinocypha tincta adusta*, subsp.n. ..... Shortland Is., Solomons

Fam. Coenagriidae

*Pseudagrion incisurum*, sp.n. ..... Guadalcanal I., Solomons
*Papuagrion gurneyi*, sp.n. ..... Bougainville I., Solomons
*Teinobasis emarginata*, sp.n. ..... Shortland Is., Solomons
*Agriocnemis salomonis*, sp.n. ..... Ganonga I., Solomons

Fam. Aeshnidae

*Anaciaeschna melanostoma*, sp.n. ..... Guadalcanal I., Solomons

Fam. Corduliidae
*Eusynthemis frontalis*, sp.n. ..... Guadalcanal I., Solomons
Fam. Libellulidae
*Tramea liberata*, sp.n. ..... Shortland Is. & Guadalcanal I., Solomons

## Fam. Agriidae

### Neurobasis ?australis SELYS.

1949. LIEFTINCK, Nova Guinea, N.S., 5 : 15, 20-21 (notes). — ♂ New Britain; ♂ Duke of York (*australis* subspec.? or sp.n.).

Bismarcks: 1 ♂ (semiad.), New Britain, "Neupommern, Dr W. MEYER, *Neurobasis australis* SELYS ♂" (FÖRSTER's hand; AAM). 1 ♂ (ad., imperfect), Duke of York, with purple labels "180" and "D. York" in SELYS's hand (MRB).

With the poor and very scanty material at hand I am unable to decide upon the status of *Neurobasis australis* from the Bismarck group. At the moment I have nothing to add to my notes in the paper cited above.

## Fam. Chlorocyphidae

### Rhinocypha liberata LIEFTINCK.

1949. LIEFTINCK, Nova Guinea, N.S., 5 : 27-29, fig. 9 (♂ penis).— ♂ Ugi I. (Solomon Is.).

Solomons: 2 ♂ (ad.), Ugi I., May 6, 1934, R. A. LEVER (type and paratype; RML). 1 ♂ (juv.), Guadalcanal I., Lavoro Plantation, E. C. HART, 1926-27 (AMS).

The teneral example which I have seen in the Australian Museum does not differ in any way from the type specimen.

The isolated occurrence of *R. liberata* in the Solomons and its apparent close relationship with the S. Moluccan species *terminata* BRAUER, is a problem for which no satisfactory explanation can at present be given, unless the theories of continental drift — which assume very considerable horizontal movements of parts of the earth's crust — are taken into account and applied to the Australasian Archipelago. (See p. 327 of the present paper.)

### Rhinocypha tincta RAMBUR

The *tincta* group of *Rhinocypha* is restricted entirely to the eastern part of the Indo-Australian archipelago, from the Philippines in the northwest across the Moluccas and New Guinea to the Solomon Islands, their eastern limit, as far as I know, being reached on the little island of Gizo, in the New Georgia group.

In two previous papers (*l. c., postea*) I have attempted to analyse the various forms of dark-winged *Rhinocypha* of New Guinea and adjacent islands, and I am well aware of the fact that the simple system of

nomenclature followed in these surveys does not represent adequately the complicated set of interrelationships of the various races, nor does it express the curious isolating mechanisms operating on the mainland of New Guinea. In view of marked individual variation and the absence of structural characteristics, I have been compelled to treat some forms as geographical subspecies which others perhaps would regard as worth specific rank, both courses being open to criticism. Only through very careful and systematic collecting and a thorough survey of the entire area can we hope to solve the problems of speciation here.

As has been pointed out so very well by MAYR [1]), the concept of the species as one continuous population is an abstraction which exists only rarely in nature: the range of a species like *R. tincta* is subdivided by a network of geographical and ecological barriers which break the species up into numerous colonies and local populations.

Eastwards from Milne Bay and the island of Goodenough in the d'Entrecasteaux group, *R. tincta* is not yet known, but in a more north-eastern direction it extends into New Britain and the Solomon Islands.

The subspecies inhabiting New Britain is indistinguishable from that of the Moluccas and the lowlands of southern New Guina (*t. semitincta*), but in the Solomons we meet with a darker race that deserves closer examination. Our material from these islands is not only very scanty but at the same time not quite homogeneous, and it is possible that with more material from many islands several subspecies can be recognized. It is evident that geographical isolation and the influence of sea barriers have played an important part in the formation of subspecies in these islands. To our purpose of establishing the mutual relationships of the members of the *tincta* group it would be of the greatest interest to collect good series of these insects on as many islands of the Solomon chains as possible.

**Rhinocypha tincta semitincta** SELYS (fig. 1).

1900. RIS, Archiv f. Naturgesch., 66 : 193.— ♂♀ New Britain (*semitincta*).
1917. TILLYARD, Biol. Drag., Cambridge, pl. I fig. 5 (♂ ins. col. New Britain).
1938. LIEFTINCK, Nova Guinea, N.S., 2 : 57, 60, 63, fig. 40 (♂ abdomen, New Britain). — ♂ New Britain; ♂ Duke of York.
1949. LIEFTINCK, Ibid., N.S., 5 : 27.— ♂ New Britain.

Bismarcks: 1 ♂ (ad.), New Britain, Herbertshöh (ZMB). 1 ♂ (ad.), id., "Sommer 1900, C. WAHNES" (AAM). 3 ♂ (ad.), Duke of York, Mioko, C. RIBBE (MRB & RML).

The few specimens which I have seen from the Bismarck group are inseparable from examples of South New Guinea.

[1]) E. MAYR, *Systematics and the Origin of Species.* Columbia Univ. Press New York, p. 226, 1944.

**Rhinocypha tincta adusta**, subsp. n. (fig. 1).

1937. COWLEY, Trans. R. Ent. Soc. Lond., 86 : 6, fig. 20A (♂ penis, Shortland Is., *frontalis*) ; ? fig. 26 (♂ penis, Gizo I., *semitincta*).

1938. LIEFTINCK, Nova Guinea, N.S., 2 : 63.— Solomon Is., loc. diff. (sine nomine, prox. *t. semitincta*).

1949. LIEFTINCK, ibid., N.S., 5 : 27 (notes).— Solomon Is., loc. diff. (sp. n.? prox. *t. semitincta*).

Solomons: 2 ♂ (ad.) Shortland Is., "*R. frontalis*" (det. R. MARTIN), "Penis drawn, J. COWLEY" (BM.) 3 ♂ (ad.), Shortland Is., Hisiai River, Oct. 22, 1936, R. A. LEVER (RML). 1 ♂, Shortland Is., Alu (BM). Holotype ♂, Shortland Is., Hisiai River, Oct. 22, 1936, R. A. LEVER (RML).

General characters of the species (LIEFTINCK, *l. c.*: 58-59, 1938), with the following peculiarities:

Male (ad). — Anterior surface of head black, rather shiny; tips of mandibles chestnut-brown. A small triangular creamy spot on the mandible-bases and a somewhat larger spot on the genae. Head otherwise velvet-black with four yellow points, one on each side immediately postero-lateral to the posterior ocelli, and two more widely separated points, one on either side, just in front of the occipital carina.

Prothorax velvet-black, with three blue spots on either side, one on the anterior lobe and two slightly larger ones on the middle portion of that segment. Synthorax velvet-black, with a shiny blue or creamy-yellow spot at the mesothoracic spiracle and with an irregular blue band extending alongside the thorax from the lower angle of the mesinfraepisternite as far as the postero-dorsal edges of the metepimeron. Ventral surface black, only the poststernum with two yellow points placed one after the other on the median suture.

Legs black, the flattened inner surfaces of all tibiae palest creamy-yellow.

Wings with the petiole distinctly shorter, hence the disk more rapidly widened and postnodally a trifle broader than in typical *tincta* and *semitincta* [1]), apices perhaps a little more obtuse than in these races. Opaque areas more extensive and decidedly less sharply defined basad than in any of the other known subspecies of *tincta*. Bases of both pairs tinged brownish-yellow, the boundary of the opaque area oblique and very diffuse; brown colour in *c-sc* commencing already at $Ax_1$ and posteriorly somewhat beyond *Arc*, the quadrangle, and one or two cells in the area posterior to $Cu_2$. Under surface of disk of posterior wing, from a little beyond distal side of *q* as far out as about 1-5 cells proximal to *pt*, brilliant dark metallic-blue.

Abdomen blue marked with black similarly to *semitincta*, dorsum of all segments entirely black, the lateral blue marks completely isolated

[1]) Careful measurements reveal that in point of fact the length and breadth ratios are practically the same in topotypes of the three subspecies involved (*tincta*, 100 : 26.8, *semitincta*, 100 : 26.5, *adusta* 100 : 29.0).

and no vestiges present of paired baso-dorsal blue points on any of the segments. Posterior border of 10th segment not excavated.

Size small. Length: abd. + app. 16.0-16.5, hw. 20.0 mm.

Additional material (of doubtful identity): 1 ♂ (ad.), Bougainville I., STAUDINGER (RML). 2 ♂ (juv.-ad., defective spirit specimens), id., W-coast, Kunua, Aug. 7, 1930, and 2 ♀ (id.), id., S-coast, Buin, Aug. 1930, H. HEDIGER (NMB). 2♂, 1 ♀ (1 ♂ semiad.), Bougainville I., Nov. 16, 1944, A. B. GURNEY (USNM & RML). Some further examples I have seen from "Solomon Is.", Bougainville (E-coast, Kieta), and a ♂ from Gizo I., A. S. MEEK coll. (CC), are no longer available for study.

These specimens are all rather considerably larger in size than any of the type series. Three ♂ from Bougainville measure: abd. + app. 17.5-19.0, hw. 22.0-23.0 mm, whilst the abdomen of one and the posterior wings of three ♀ measure 17.5, and 24.0-25.0 mm, respectively.

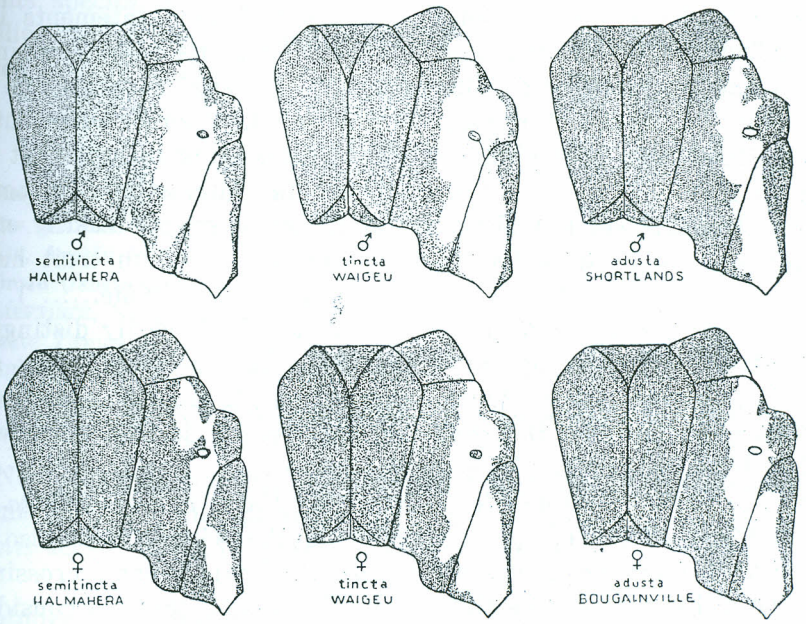


Fig. 1. Colour-pattern diagrams of some subspecies of *Rhinocypha tincta* RAMB.

In the adult ♂ from Bougainville the opaque colouring of the wings is equally ill-defined as in the type series but it commences a few cells further distad, the membrane of the petiole being not so dark in colour. It also differs in that the head is entirely black, lacking yellow spots and points on the face and vertex.

In one ♀ the wings are entirely brown, except that the marginal cells of the hind wing tips are milky-white, and the petiole yellowish-brown. In a second ♀ both pairs of wings are semitransparent, though strongly suffused with yellow, each carrying in addition a diffuse brown

band about midway between nodus and pterostigma, these cloudy bands about half as wide as shown in fig. 3C for *R. t. dentiplaga* in LIEFTINCK (*l. c.*: 53, 1938); tip of hind wing milky-white. Lastly, a third ♀ is intermediate as far as the extent and depth of the opaque colouring of the wings are concerned.

In all males from Bougainville the blue bands on the thoracic pleurae are a little wider and more irregular in shape than in typical *adusta* but noticeably narrower than in *semitincta*.

Fortunately enough, I have for comparison with this new race fine series of both sexes of topotypical *tincta*, from Waigeu Island, as well as topotypes of *semitincta*, from N. Halmahera. As I have pointed out elsewhere, most original and subsequent descriptions of these races in the Selysian synopses are either based on mixed characters, or too incomplete to admit of their recognition. Both sexes of *tincta* and *semitincta* have been re-defined and figured by the present writer. Of typical *semitincta* we have, in addition, SELYS's significant statements in the 2nd and 3rd 'Additions au Synopsis' referring to its large size and the shape of the lateral thoracic blue band: "..... sur les côtés une large bande bleue échancrée et presque divisée en deux supérieurement sous les ailes, allant d'un bout à l'autre." It is interesting to note that the ♀ differs markedly from the ♂ in that the blue lateral band is not only considerably narrower but also very different in shape, lacking entirely the triangular black dorsal intrusion. (SELYS: "..... un trait huméral supérieur; une bande latérale plus étroite que chez le mâle.....").

The ♀ of *tincta*, apart from its smaller size, is easily distinguished from that of *semitincta* by the lateral thoracic blue band being almost identical in shape and width to that of the ♂. In the accompanying colour-pattern diagrams the shape of these bands is clearly shown for ♂ and ♀ topotypes of all three subspecies. [1])

Our new subspecies *adusta* differs from *tincta* and *semitincta* in the greater extent of the opaque colouring on the wings; it is also easily distinguished from both by the differently shaped band crossing the second lateral suture of the thorax, which in both sexes is considerably narrower and devoid of a superior metepisternal blue off-shoot, the presence of which, as mentioned above, is a constant feature of ♂ *tincta* and *semitincta*. With respect to this, all available specimens from the Solomon Islands are alike, except that in the males from Bougainville, as stated before, the bands tend to increase a little in width.

## Fam. Lestidae

**Lestes** spec. indet.

1900. RIS, Archiv f. Naturgesch., 66 : 201, 203.— ♂♀ & larva, New Britain (*praemorsa*),
1949. LIEFTINCK, Nova Guinea, N.S., 5 : 34 (footnote) (spec. prox. *quercifolia*).

[1]) Exact topotypical ♀ of *adusta*, from the Shortlands, are not yet known.

I have not seen genuine *praemorsa* of the Bismarcks. Judging from RIS's notes on examples of New Britain, it is almost beyond doubt that they belong to a species different from *praemorsa*. RIS compared his specimens with those described by DE SELYS LONGCHAMPS from Celebes and the Sula Islands under the name of *quercifolia*, and it might belong to that species. A more likely possibility, however, is its identity with *L. pertinax* LIEFT., described from North New Guinea (*Nova Guinea* 15, Zool. 5: 493-495, fig. 1, 1932).

## Fam. Megapodagriidae

**Argiolestes aurantiaca** RIS.

1898. RIS, Entom. Nachrichten, 24 : 324-325.— ♂ New Britain.
1900. RIS, Archiv f. Naturgesch., 66 : 193-194.— Same specimens.
1919. CAMPION, Entomologist, 52 : 249.— ♂ New Britain (*aurantiacus*)

This species is evidently closely allied to *A. montivagans* FÖRSTER and allies, which are members of the *ornatus* group; these species are confined to New Guinea and adjacent small islands.

## Fam. Protoneuridae

**Tanymecosticta filiformis** (RIS).

1898. RIS, Entom. Nachrichten, 24 : 325-326.— ♂ New Britain (*Isosticta*).
1900. RIS, Archiv f. Naturgesch., 66 : 196, T. X, fig. 15 (♂ wing-base).— Same specimen (*Isosticta*).
1932. LIEFTINCK, Nova Guinea, 15 Zool. 5 : 553-554, 557 (transferred to *Stenosticta*, recte *Tanymecosticta*).
1949. LIEFTINCK, Nova Guinea, N.S., 5 : 82 (addit. notes on type).

In August, 1938, I have examined the type and only specimen known in the Berlin Museum. It is very closely allied to *T. fissicollis* (LIEFT.) from New Guinea, but easily distinguished from that species by the different shape of the posterior lobe of the prothorax. The type of *filiformis* lacks the end-segments of its abdomen.

**Notoneura commutata** LIEFTINCK.

1900. RIS, Archiv f. Naturgesch., 66 : 194-195, T. X fig. 13 (♀ proth., ♂ wing-base).— ♂♀ New Britain (*Caconeura exul*).
1913. RIS, Abh. Senckenb. Naturf. Ges., 34 : 509 (♂ key), 512.— ♂ New Britain (*Caconeura exul*).
1937. LIEFTINCK, Nova Guinea, N.S., 1 : 22 (note, ?*exul*).
1938. LIEFTINCK, Nova Guinea, N.S., 2 : 90-91, fig. 23 (♂ thor., New Britain).— ♂ Duke of York I. (nom.nov.).

Bismarcks: 1 ♂ (ad., imperfect), Duke of York I., "Neu Lauenburg, Mioko, C. RIBBE" (MRB).

No new material. The holo- and allotype of *commutata*, from Herbertshöh and Ralum in New Britain, are in the Senckenberg Museum at Frankfurt.

**Notoneura nigrofasciata** LIEFTINCK.

1932. LIEFTINCK, Nova Guinea, 15 Zool. 5 : 523, 527 (♂♀ keys), 537-538, fig. 32 (♂♀ thor.), 33 (♂ apps).— ♂♀ New Guinea; ♂♀ Aru Is.

Bismarcks: 1 ♂, 4 ♀ (ad.), New Britain, "Neupommern, Tobera" (FÖRSTER's hand; AAM)..

These specimens are identical with a series in our collection from North New Guinea.

**Notoneura salomonis** (SELYS).

1886. SELYS, Mém.cour. Acad. Belg., 38 (4) : 188-189.— ♂ Solomon I. (*Alloneura*).
1900. RIS, Archiv f. Naturgesch., 66 : 195-196, T. X fig. 14 (♀ proth., ♂ wing-base).— ♂♀ New Britain (*Caconeura Salomonis*).
1913. RIS, Abh. Senckenb. Naturf. Ges., 34 : 512 (pars, New Britain only!) (*Caconeura*).
1932. LIEFTINCK, Nova Guinea, 15 Zool. 5 : 535-537 (full references, figs, notes).— ♂ Bougainville (Solomon Is.).
1949. LIEFTINCK, Niva Guinea, N.S., 5 : 76.— ♂ Shortland I.

Solomons: 2 ♂ (ad., def.), Bougainville I., S-coast, Buin, Sept. 3, 1930, H. HEDIGER (NMB). 4 ♂ (ad.), Shortland Is., Lofung, Oct. 12, 1936, R. A. LEVER (RML). 1 ♀ (ad.), Guadalcanal I., Dec.-Jan., 1920-21, J. A. KUSCHE (CAS). 1 ♂ (semiad.), Malaita I., Uras Cove, May 28, 1933, M. WILLOWS Jr (CAS).

## Fam. Platycnemididae

**Idiocnemis inornata** SELYS.

1919. CAMPION, Entomologist, 52 : 246-248, fig. (♂ apps).— ♂♀ New Britain.
1937. LIEFTINCK, Nova Guinea, N.S., 1 : 4-5 (note).
1949. LIEFTINCK, ibid., N.S., 5 : 94.— ♂ Duke of York.

Bismarcks: 2 ♂ (def.), Duke of York I., "Neu Lauenburg, Mioko, C. RIBBE" (MRB).

**Idiocnemis** spec. indet.

In 1937 I have seen in the Paris Museum (R. MARTIN's collection) two strongly pruinescent males, both unfortunately lacking their terminal abdominal segments, labelled "N. Mecklenburg" (New Ireland). These specimens come closest to *I. pruinescens* LIEFT., recently described by me from Milne Bay, easternmost point of New Guinea (*Nova Guinea*, N.S., 5: 96-100, fig. 105, 1949); they were incorrectly attributed to *bidentata* SELYS, by MARTIN). More material is needed to decide upon the identity of the insect from the Bismarcks.

## Fam. Coenagriidae

**Pseudagrion incisurum**, sp. n. (fig. 2).

?1900. RIS, Archiv f. Naturgesch., 66 : 198.— ♂ New Britain (*ustum*).

Solomons: 2 ♂ (ad.), Guadalcanal I., C. H. FOGGITT, E. C. VAN DYKE don. (CAS & RML). 1 ♂ (ad.), Guadalcanal I., Dec.-Jan., 1920-21,

J. A. KUSCHE (RML). 1 ♂ (ad., last abd.-segments missing), Guadalcanal I., Lavoro, Febr. 18, 1934, R. A. LEVER (RML). Holotype: Guadalcanal, Dec. 1920, J. A. KUSCHE (CAS).

The occurrence in the Bismarcks of *Pseudagrion ustum* SELYS, from the Moluccan islands of Sula and Buru, and from Celebes, stands in need of verification and is extremely unlikely. It was doubtfully recorded by RIS from New Britain on the basis of a ♂ lacking most of its abdomen. As this species has never been met with in New Guinea, whence several allied species have since been described, there can be little doubt that RIS's specimen was incorrectly associated with *ustum*. Whether the new species described below might be the same as that reported by RIS is a question that cannot now be decided.

M a l e (ad.). — Labium, and the entire anterior surface of the head, as far upwards as a transverse line across the posterior ocelli, including also the sockets and first segment of antennae, unicolorous antimony yellow. A pair of black dots situated on the inside of the posterior ocelli. At about the same level a fine, slightly irregular, black sutural line runs obliquely from the margin of the compound eye inwards and backwards towards either end of the occipital ridge, where it merges into the black colour of the rear. This pattern rather similar to that shown in fig. 3 for *P. microcephalum*, but still more reduced. The postocular spots thus enclosed, as well as the occipital area, ecru-olive. Rear of the head deep black with a thick yellow stripe abruptly leaving off half-way up, along the margin of compound eyes.

Pro- and synthorax throughout yellow-ochre; an ill-defined area on either side of the mid-dorsal carina and a diffuse band joining the humeral suture on the dorsum of the synthorax, ecru-olive. Prothorax with the median division outlined in black and with black sutural lines, the anterior and posterior lobes as well as the sides unmarked; posterior lobe rounded, slightly triangularly projecting on middle. Black marks on thorax reduced to a spot on the middle of the mesinterepisternum (mesoprescutum), a fine line bordering the mid-dorsal carina, a tiny streak across mesinfraepisternite, a black dot near upper end of humeral and second lateral sutures, and a few specks along the dorsal carina of the meso- and metapleurae. Ante-alar triangles also bordered with black.

Coxae, trochanters and legs orange-buff; all femora with a brown, rather diffuse, exterior stripe, and with a pale apical exterior spot, the dark stripe thickened and deepening to black on anterior pair; tibiae with a deep black interior line; apices of tarsal segments obscured; spines black.

Wings clear. Postnodals 12-13 on fore, 12 on hinder wings. (14-15 and 11-13, respectively, in one paratype from Lavoro). Pterostigma lozenge-shaped, very little longer than wide, brown surrounded by a fine yellowish line.

Abdomen slender. Ground-colour of segm. 1-3 and 9-10 yellow-ochre; all segments metallic greenish-black on dorsum, these markings gradually expanded from before backwards, those on 1-2 restricted to the dorsum, on 2 rather vase-shaped. Segm. 3-8 with very narrow basal ochreous rings, interrupted on mid-dorsum; 9 and 10 yellow-ochre, 9 with sharply defined black apical half-ring, and 10 also obscured apically and on the middle along base; posterior border of the latter deeply excavated behind the black apical rim, whose upper margin is rather corrugated and beset with golden brown hairs.

Anal appendages dark ochreous, the distal two-thirds of superiors obscured. Superior pair about as long as 10th segment with broadly rounded tips as seen in profile; inner surface of appendage with a deep antemedian excavation which is preceded by a conspicuous knob-like sub-basal prominence, directed inwards; on the opposite side of the concavity the inner margin of the appendage carries a rectangular tooth-like projection. Inferior appendages shorter than superiors, shaped as shown in fig. 2. (In this figure the lower divisions of the superior appendages are stippled, while the inner portions of the inferior appendages are shaded; apical dark areas of segm. 9-10 also stippled.)

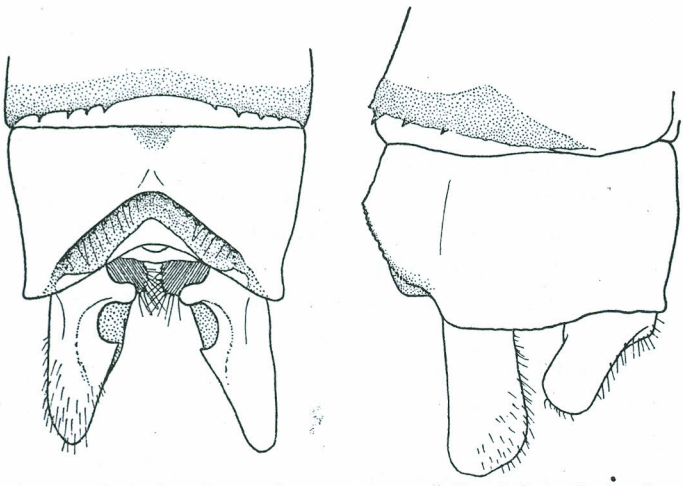

Fig. 2. *Pseudagrion incisurum*, sp.n. ♂ Guadalcanal. Anal apps, dorsal view and right side.

Length: abd. + app. 36.0, hw. 22.5 mm (holotype); 34.5-35.0, 21.5 mm (paratypes).

Female unknown.

Among its Indo-Australian congeners this new species seems to find its nearest allies in the Papuan *P. silaceum* LIEFT. and *P. civicum* LIEFT., from both of which it differs in the shape of the anal appendages (Cf. *Nova Guinea* 15, Zool.: 568-572, or 84-88 sep., 1932).

**Pseudagrion microcephalum** (RAMB.) (fig. 3-4).

1900. RIS, Archiv f. Naturgesch., 66 : 198.— ♂ New Britain.

1949. LIEFTINCK, Nova Guinea, N.S., 5 : 179 (note, references).— ♂ New Britain; ♂♀ Russell I.

Solomons: 1 ♂, 1 ♀ (in cop.), Russell I., Lingatu, Dec. 23, 1935, R. A. LEVER (RML).

The ♂ from Matupi (New Britain) is no longer available for comparison (MRB).

The following is a description of the pair from Russell I., which are remarkable for the great amount of blue colouring on the body.

Male (ad.) — Labium and inner mouth-parts pale ochreous. Head entirely greenish-ochreous in front and above (colours faded, possibly bluish-green during life), with no other black marks than three tiny black spots at base of postclypeus, five black dots on vertex, three of which partly surrounding the ocelli, and a slightly irregular black line, interrupted (or nearly so) anteriorly against the margin of compound eyes, surrounding a pair of very large blue-green "postocular" spots. Antennae blue-green, the second joint somewhat obscured apically. Rear of the head deep black with a thick yellow stripe bordering the eye-margin.

Prothorax above blue, the sides rather more ochreous, marked with black on dorsum, as shown in fig. 3.

Synthorax blue-green (discoloured) with all black markings greatly reduced, as shown in the accompanying sketch.

Coxae and trochanters pale-coloured, greenish-ochreous; femora ochreous, their outer surfaces with a thick brownish-black stripe; tibiae and tarsi yellow, the apices of tarsal joints and claws finely black; spines black.

Wings with the neuration yellowish-brown. Pterostigma brown, normally shaped, oblique, a little longer than high, sides sub-parallel with the costal side only little longer than anal side. 12-13 postnodals on fore, 10 on hinder wing.

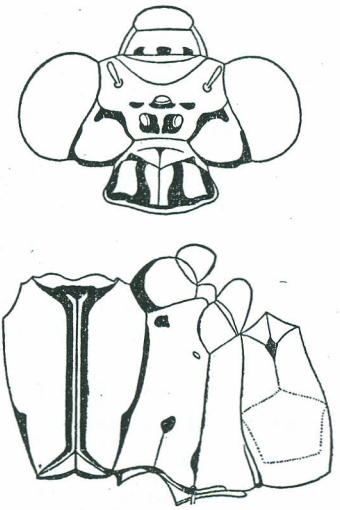

Fig. 3. *Pseudagrion microcephalum* (RAMB.), ♂ Russell I. Colour-pattern of head and thorax; head drawn on larger scale.

Abdomen blue marked with bronze-green, as follows; dorsum of segm. 1 with a square basal spot, broadly sessile anteriorly, covering almost three-fourths of the back; 2 with a tiny apical ring supporting a goblet-shaped marking, concave anteriorly, which extends not quite half-way towards base, and with a low triangular basal spot on middle, the intersegmental ring remaining blue. Segm. 3-6 with fairly broad dorsal stripes rather abruptly and bluntly pointed anteriorly and nearly reaching the base of each segment (except on 3, where it is more gradually narrowed to in front); apically, these marks are connected with very narrow (incomplete) rings, strongly expanding laterally before

joining the apical rings; 7 with a similar though broader and less abruptly expanded dorsal band. Segm. 8-10 blue; 8 and 9 each with a narrow black apical ring and with the spines also black; 10 with a black dorsal spot from end to end which is strongly constricted on middle.

Anal appendages ochreous, the main body of the superiors and the upturned seam of the toothed inner border of the shelf-like projection, black (fig. 4).

F e m a l e (ad.) — Greatly resembling the male, but ground-colour apparently pale olive-green and rusty-brown, as in typical *microcephalum*. Head-markings still more reduced than in the ♂, the black spots on vertex reduced to mere points. Thorax with the mid-dorsal carina finely black,

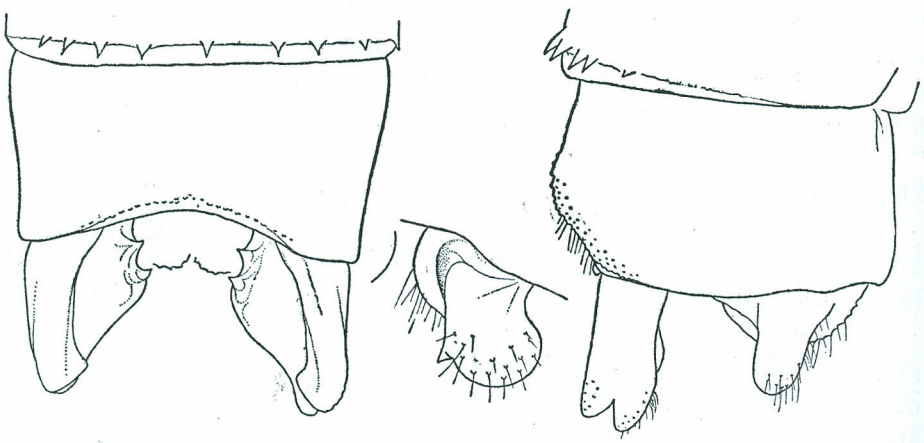

Fig. 4. *Pseudagrion microcephalum* (RAMB.), ♂ Russell I. Anal apps, dorsal view and right side, and left inf. app., viewed from below.

the black line on either side closely parallel with it reduced to tiny ventral streaks; otherwise unmarked. Legs pale ochreous, only the apices of femora black.

Abdomen blue-green with bronze-green dorsal markings very similar to the ♂ but a little more reduced: segm. 2 with tiny arrowhead-shaped mark not extending as far as base of segment; 3-7 as in ♂; dorsum of 8 wholly bronze-black, except narrow basal and terminal blue lines; 9 and 10 blue, 9 above with a pair of oval dots, one on each side of the middle, attached to the base of segment; 10 unmarked. Valves and appendages greenish.

L e n g t h: ♂ abd. + app. 30.5, hw. 19.0; ♀ 29, 20 mm.

As with such species as *Agriocnemis femina* (BRAUER) and *Pseudagrion pilidorsum* (BRAUER), this species appears to show an unusually strong tendency to produce geographical races. The affinities of some of the blue *Pseudagrion* of the *microcephalum* group are therefore diffi-

cult to discover. Several of RIS's forms [1]) have since been recognized as distinct species because they are definitely known to occur side by side with strains of genuine *microcephalum* and could be held apart also on structural characters. Were it not for this, it would be possible to regard all populations as representatives of one widely spread species. In the present instance, however, I am puzzled as to the question 'species or subspecies', and although no doubt further material will show it to be easily separable from typical *microcephalum* (RAMB.), originally described from Bombay, I have referred the present examples from the Solomons to *microcephalum*, pending a careful revision of this polymorphic species.

The above described specimens are easily distinguished from Malaysian populations of *microcephalum* by the extreme reduction of the black markings on the head and thorax, and at the same time by slight differences in the anal appendages. They do not conform to the Papuan form either, differing from these in having the lower branch of the superior appendage of the same length as the upper one instead of being longer than this; and although Papuan *microcephalum* has considerably less black on the body than Indian and Malaysian populations, it shows not nearly as great a reduction of the black marks as does our ♂ from the Solomon islands.

From *P. pacificum* TILL. (Fiji) and *P. samoensis* FRAS. (Samoa) our specimen differs also in the greater amount of blue colouring on the body. I have not seen either of these two species, but judging from the available descriptions and figures both appear to be well characterized species.

**Papuagrion gurneyi**, sp. n. (fig. 5).

Solomons: 1 ♂ (ad.), Bougainville I., Aug. 6 - Nov. 16, 1944 (no precise date), A. B. GURNEY. The specimen is the holotype (USNM).

Male (ad.). — Head of moderate size. Labium pale lemon-yellow. Labrum ochreous centred with light blue; mandible-bases pale blue. Genae, clypeus and frons, as far upwards as the insertion-point of antennae and median ocellus, glaucous-blue, this colour gradually changing to greenish bronzy-brown. Ocelli surrounded by a fine yellowish line, each of the lateral ocelli connected with the ground-colour behind the antennal sockets by an indistinct yellowish line. Antennae yellowish, or pale blue, the apex of the second joint obscured. Occipital lobes posteriorly, and rear of the head, greenish-yellow.

Prothorax and synthorax dark bluish glaucous changing to pale dull glaucous-blue laterally and underneath. Prothorax with a mid-dorsal, cordate brown spot joined on either side of the middle by fawn colour; posterior lobe short and broad, evenly rounded and depressed, with a tiny median metallic-green spot. Dorsum of synthorax with a complete

[1]) See RIS, in *Supplem. Entom. Berlin*, 5 : 40-43, figs, 1916.

but narrow metallic-green median band, evenly and but slightly widened from below upwards, where it is about 1½ times as broad as each of the uncoloured parts of the mesepisterna. Ante-alar triangles also metallic-green. Remainder of thorax unmarked.

Coxae glaucous-blue, rather shiny. Femora also bluish, but each with a somewhat diffuse brown exterior stripe; posterior femur with two rows of six widely spaced brown spines, the distal ones barely longer than the interspaces. Tibiae and tarsi yellow, the spines brown; tarsal claws definitely toothless.

Wings normal, their shape approaching *P. auriculatum* LIEFT., from New Guinea, rather closely. Membrane hyaline; neuration dark brown. Petiole distinct, as far as the nervure *Ac*, which is situated much beyond the middle of the distance between $Ax_1$ and $Ax_2$, especially so on posterior wing; from this point the wings are evenly and distinctly expanded, attaining their greatest width about mid-way between nodus and pterostigma, apices evenly rounded. *Ab* enters the wing-border well distal to *Ac* in both pairs of wings. Course of $M_4$ and $Cu_2$ not strongly zigzagged; $M_4$ straight as far as the level of $Px_9$, $Cu_2$ straight as far as

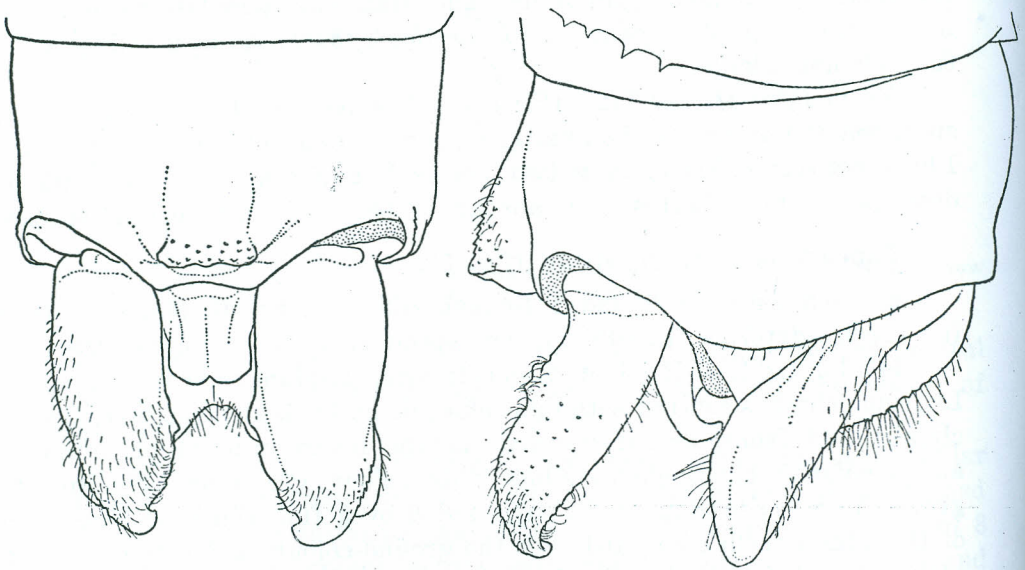

Fig. 5. *Papuagrion gurneyi*, sp.n. ♂ Bougainville I. Anal apps, dorsal view and right side.

$Px_2$-$Px_3$. $M_2$ originates at $Px_7$ in all wings, $M_1a$ four cells further distad. Medio-anal link entire in fore wing, very slightly fractured in hinder wing. Postnodal cross-veins 15-16 on fore, 15 on hinder wings. Pterostigma small, covering one underlying cell, oblique but with parallel sides, distinctly longer than high; isabella-coloured, surrounded with a light yellow line. Posterior border of all wings very slightly but noticeably outbent at the point where the veins $M_3$ and $Cu_1$ enter the wingmargin.

Abdomen long and slender, the terminal segments from end of 7 to end of 9 gradually expanded in both dimensions, the apex truncated. Segm. 1-2 blue, apical third of 1 with a small bronzy-green dorsal spot, and dorsum of 2 with a shiny metallic greenish-brown band, ill-defined laterally, from end to end. Segm. 3-7 shining dark metallic-green fading to brown laterally, each of these segments with a tiny bluish basal spot, interrupted in the median line by the abruptly and bluntly pointed dorsal bands. Segm. 8-10 with complete greenish-black dorsal bands, slightly narrower than those on the preceding segments so as to leave the sides broadly ochreous, the intersegmental rings between 8-9 and 9-10 conspicuously yellow; sides of 10 with a brownish spot more or less confluent with the black on dorsum. Tenth abdominal tergite shaped as shown in fig. 5, the sloping posterior prolongation black basally, bright ochreous apically; this process in dorsal view at first somewhat constricted between the superior appendages, but finally again expanded and swollen, ending into a bilobed club; in posterior and lateral view this downward prolongation of the tergite appears in the form of two downcurved, bluntly pointed hooks.

Anal appendages reddish-ochreous, the superiors only little longer than the inferior pair, shaped as shown in fig. 5.

Length: abd.+app. 49.8, hw. 32.0 mm.

Female unknown.

This interesting new species is the first of its genus found outside New Guinea and the Aru Islands, whence 22 species and subspecies have so far been recorded. It is of the same strong build as most other species of the genus and at the same time is very similar in structure and outward appearance to such species as *laminatum, auriculatum* and allies. The insect is easily recognisable by details of the venation, the simple posterior lobe of the prothorax, and by the shape of its anal appendages.

Named in honour of its discoverer, Dr A. B. GURNEY, entomologist at the United States National Museum, Washington, D.C.

**Teinobasis aluensis** CAMPION.

1924. CAMPION, Ann. Mag. Nat. Hist. (9) 14 : 614, fig. 2 (♂ apps).— ♂ Alu (Shortland I.).

In 1947, I have examined the type in the British Museum.

It is a species of large size (abd. 48, hw. 31.5 mm) with narrow wings. The median longitudinal dark band on the dorsum of the thorax is not sharply delimited laterally. The veins $M_3$ and *Rs* originate close together but they remain separated beyond the subnodus. There are three antenodal postquadrangular cells in all wings. Legs short with short bristles; the tarsal claws are destitute of a sub-apical tooth.

In 1947 I have also seen an imperfect ♂ of possibly this species, form the Santa Cruz Archipelago, Materan I., Mohawk Bay, July 9,

1933, collected by M. WILLOWS Jr. As the anal appendages of this male were lacking the specimen was returned unnamed to the Science Museum, San Francisco.

**Teinobasis emarginata**, sp. n. (fig. 6).

Solomons: 1 ♀ (juv.), Shortland Is., Hisiai River, Oct. 22, 1936, R. A. LEVER. The specimen is the holotype (RML).

Female. — Immature and of the red colour-phase.

Head, including the rear, brilliant metallic greenish-black. Labium, mandible-bases and genae light pink; labrum, clypeus and most of the frons as far upwards as a level just in front of the anterior ocellus, red, the median parts of this area more deeply coloured than the rest. Top of frons with a dark crescent-shaped spot on middle, situated in front of the anterior ocellus. On each side of the lateral ocelli a tiny reddish streak connects the latter with the light-coloured antennal sockets so as to almost cut off a transverse metallic-green median patch from the similarly coloured area posterior to it. There is, in addition, a transverse reddish bar along the middle of the occipital ridge.

Prothorax yellowish, dorsally with faint metallic glaze, the sutures finely obscured; posterior lobe pale, depressed, shaped as shown in fig. 6.

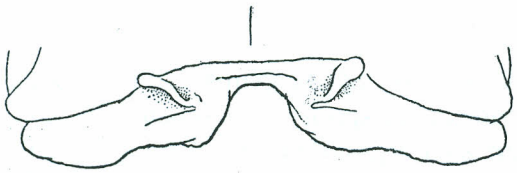

Fig. 6. *Teinobasis emarginata*, sp.n. ♀ Shortland Is. Prothorax, dorsal view.

Synthorax red, the pleurae and under surfaces paler. A brilliant metallic-green band on dorsum divided by a fine red line over the mid-dorsal carina, occupies about the inner three-fourths of each mesepisternite, the ante-alar triangles being red bordered posteriorly with metallic-green.

Coxae yellowish; legs otherwise unicolorous red, with strong black bristles, five on posterior, four on intermediate, three on anterior femora. Claws without inferior tooth.

Wings comparatively broad and distinctly petiolated; the venation brown and the pterostigma yellowish-white centred with grey. Postnodals $\frac{18.18}{17.18}$ of first series, $\frac{16.17}{16.15}$ of second series. $M_3$ arising well in advance of, *Rs* at the subnodus, both veins not approximated and $M_3$ rather strongly curved at origin. *Ac* placed well before the level of $Ax_2$ and *Arc* situated at $Ax_2$. Three postquadrangular antenodal cells in all wings. Pterostigma oblique but rather high, slightly irregular in shape, with the costal and distal sides nearly equal in length, both a little shorter than the proximal and anal sides, which are also of the same length. Area posterior to *pt* slightly wider than usual, with one divided cell in right anterior wing.

Abdomen with the two first segments red, the remaining segments yellowish. Segm. 1 unmarked; 2-7 above greenish-black; these dorsal marks not expanded apically, but each with a narrow yellow basal ring, progressively a little wider from before backwards; sides with a yellow stripe along margin which becomes narrower from segm. 5 backwards. Segm. 8-9 pale-coloured, each with a narrow dark mid-dorsal stripe from end to end; 10 dark above. Anal appendages shorter than 10th segment, conical. Valves short, pale reddish, apices barely surpassing apex of last segment.

Length of abdomen 43.5, hind wing 29.5 mm.

**Teinobasis** spec. indet.

Solomons: 1 ♀ (juv.), Russel I., Faiami, Febr. 7, 1936, R. A. LEVER (RML).

Female. — Immature and of the red colour-phase.

Head orange-red with no other dark markings than a transverse metallic-green band connecting the eyes immediately in front of the posterior ocelli and across the anterior one. On either side this mark is prolonged backward along the eye-margin as a broad bar of the same colour, ending abruptly and obliquely about 1 mm before reaching the border of the postocular lobes. This dark spot is almost divided into two parts by a yellow streak of the ground-colour that connects each lateral ocellus with the base of the antennae, which themselves are also pale-coloured. Rear of the head pale.

Prothorax orange-red, unmarked. Posterior lobe (slightly distorted) strongly modified into two large, depressed, almost semicircular blades which are separated from one another by a very deep U-shaped notch at the bottom of which a minute cup-shaped protuberance (the rudiment of a median lobe) is just visible when looked at from above.

Synthorax orange-red. Dorsum with faint indication of a bronzy-green median band, ill-defined laterally.

Legs reddish with strong bristles of the same colour, numbering 4 on posterior femora. Claws without inferior tooth.

Wings with the venation pale brown and the pterostigma yellowish. Postnodals $\frac{16.16}{15.16}$ of first series, $\frac{12.12}{13.12}$ of second series. $M_3$ arising slightly in advance of, *Rs* at the subnodus, both veins rather closely approximated. *Ac* situated a little before $Ax_2$ and *Arc* slightly distal to $Ax_2$. Three post-quadrangular antenodal cells in all wings. Pterostigma very oblique but parallel-sided, a little longer than high.

Abdomen orange-red, the first segment unmarked; succeeding segments above bluish black, 3-7 with narrow yellow basal rings and the dark dorsal bands on 3-7 expanded laterally so as to form distinct terminal rings. Segm. 8 and 9 yellowish, the apical two-fifths of 8 and

one-half of 9 reddish-brown; 10 pale brown. Anal appendages very small, conical, pointed. Valves pale brown, apices surpassing the 10th segment for almost the length of this segment.

Length of abdomen 40.0, hind wing 26.5 mm.

This specimen resembles in coloration the female from the Shortlands, which I have described as a new species and with which it is no doubt rather closely allied. It differs in its smaller size, the different structure of the posterior lobe of the prothorax, and in details of venation. Neither of them can be attributed to *aluensis* CAMPION, of which the ♀ remains to be discovered.

**Teinobasis rufithorax** SELYS.

1900. RIS, Archiv f. Naturgeschichte, 66 : 199.— ♂♀ New Britain (*Telebasis*).
1913. RIS, Abh. Senckenb. Naturf. Ges., 34 : 522 — Same specimens.
1949. LIEFTINCK, Nova Guinea, N.S., 5 : 164.— New Britain; Duke of York; Lavongai; New Ireland; Shortland Is.

Bismarcks: Long series, New Ireland, W-coast, Nusa I., 1899, C. WAHNES (AAM & RML).

Solomons: 1 ♀, Solomon Is., MATHEW (ex coll. MCLACHLAN) and 2 ♂, 1 ♀, Shortland Is., Alu I. (id., one ♂ labelled "*Telebasis superba*, Alu, 87.3"), all in BM. 1 ♂, 1 ♀, Shortland I., 1894, C. WAHNES (AAM). 2 ♂, Shortland I., Lofung, Oct. 12, 1936, R. A. LEVER. 1 ♂, Ysabel I., N. S. HEFFERNAN, no K. 50867 (AMS). 1 ♂, Guadalcanal I., Dec.-Jan., 1920-21, J. A. KUSCHE (CAS). 2 ♂, Guadalcanal I., Lavoro Plantation, C. E. HART, 1926-27 (AMS).

**Ceriagrion ?erubescens** SELYS.

Solomons: 2 ♂ (ad., defective), Guadalcanal I., Dec.-Jan., 1920-21, J. A. KUSCHE (CAS).

Both specimens have lost their terminal abdominal segments and hence are worthless as to their proper identification. In other respects they agree with individuals of *erubescens* from New Guinea and Australia. This is the only species that ranges so far east.

**Xiphiagrion cyanomelas** SELYS.

1898. RIS, Entom. Nachrichten, 24 : 326-327.— ♂ New Britain (*Karschi*).
1900. RIS, Archiv f. Naturgesch., 66 : 197.— Same specimens (*Karschi*).
1913. RIS, Abh. Senckenb. Naturf. Ges., 34 : 519 (note, ?subspec. *karschi*).
1929. LIEFTINCK, Tijdschr. Ent., 72 : 143-147 (descr. notes, figs).
1949. LIEFTINCK, Nova Guinea, N.S., 5 : 195 (synonymy), 197 (notes).— ♂ Duke of York.

**Mortonagrion martini** (RIS) (fig. 7).

1900. RIS, Archiv f. Naturgesch., 66 : 199-200, T. X fig. 16 (♂ apps).— ♂ New Britain (*Argiocnemis Martini*).
1932. LIEFTINCK, Nova Guinea, 15 Zool. 5 : 587.— ♂ Umboi (Rooke I.) (transferred to *Mortonagrion*).

Admiralty Is.: 1 ♀ (ad., segm. 6-10 missing), Admiralitäts Inseln, N-Küste, Seeadler Hafen, Papitalei, No. 140 der Hamburg Südsee Expedition, Oct. 18-20, 1908, G. DUNCKER (MH).

Bismarcks: 1 ♂ (ad., segm. 7-10 missing), Umboi (Rooke I.), April 5, 1930, H. HEDIGER (RML ex NMB).

The present specimens are the first to be discussed since the original description of the type was published by RIS. In 1932, I have transferred *martini* to *Mortonagrion* on the evidence of the venation. A character which is constant for all the species of the genus that I have been able to examine (all, except *arthuri* FRAS., from Malaya), but one which I have not seen noted, is that the posterior wing is rather noticeably shorter than the anterior one, in both sexes.

Although, by its superior size and robust build, *martini* stands rather remote from its congeners, I am unable to detect any characters sufficiently important to justify its separation from *Mortonagrion.*

The ♂ of *M. martini* is a very striking insect, and chiefly remarkable on account of its colours, which are creamy-white and deep black, quite unlike other members of the genus.

The type is from Lowon (N. New Britain) and differs somewhat from the present example in details of coloration. Our male has been preserved in spirit and unfortunately lacks its terminal abdominal segments.

The postocular spots are apparently much larger than in the type (which I know only from the description), and the colour-scheme of the thorax of the present example does not altogether agree with the description either. The accompanying drawings (fig. 7) may serve to its recognition.

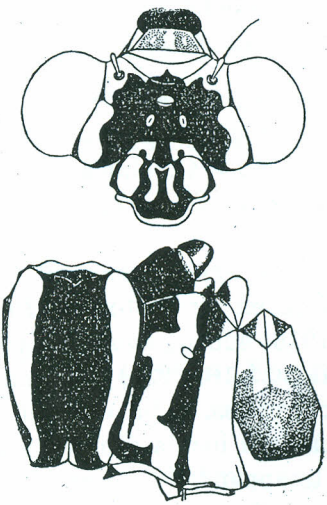

Fig. 7. *Mortonagrion martini* (RIS), ♂ Umboi. Colour-pattern of prothorax, head and thorax; head drawn on larger scale.

Length of fore wing 19.0, of hinder wing 17.5 mm.

In 1928, I found a single defective ♀ of apparently this species in a small consignment of Odonata sent to me for identification. This specimen, identified by me with *martini,* has long since been returned to Hamburg, but I have still kept the following notes on it:

"Robust species. Coloration dark reddish-brown without definite markings. Traces of a black median thoracic band. Legs reddish; posterior femur with 5 strong bristles. Wings exactly as described for *martini;* postnodals 14-15 on fore, 11 on hinder wing; medio-anal link entire. Pterostigma orange. Length of posterior wing 19 mm." (March, 1929).

No species of *Mortonagrion* are so far known from New Guinea.

**Ischnura a. aurora** BRAUER.

1949. LIEFTINCK, Nova Guinea, N.S., 5 : 222 (notes).— ♂ Guadalcanal; ♂♀ Cook Is.

Solomons: 1 ♂ (ad.), Guadalcanal I., May 23, 1933, Kau Kau Plantation, M. WILLOWS Jr. 2 ♀ (ad., isochromatic!), Sikaiana islets, E. of Malaita I., May 15, 1933, M. WILLOWS Jr (CAS & RML).

I have received also a series of 3 ♂ and 12 ♀ from the Cook Islands, Puka Puka I., April 9, 1933, same collector. These specimens have been recorded already in my last report on this species (*loc. cit.*).

[? *Austroagion* spec. indet.

1947. LAIRD, Trans. Roy. Soc. New Zealand, 76 : 463, fig. 4 (larva).— New Britain (*Austroagrion* sp.).

Larvae of an unidentified species of possibly this genus are reported by LAIRD from the more permanent ground pools about Palmalmal, Jacquinot Bay. This insect has been left out of consideration here as its identity is very doubtful.]

**Agriocnemis femina** BRAUER.

1900. RIS, Archiv f. Naturgesch., 66 : 200-201, T. X fig. 18 (♂ apps).— ♂ New Britain (*materna*).

1949. LIEFTINCK, Nova Guinea, N.S., 5 : 231.— ♂ New Britain.

Bismarcks: 1 ♂ (ad.), New Britain, SW-coast, Lovely Islands, ("Liebliche Inseln"), No 342 of the Hamburg Südsee Expedition, Dec.-Jan., 1908-09, G. DUNCKER (MH).

**Agriocnemis pygmaea** (RAMB.) (fig. 8).

Solomons: 1 ♂ (ad.), Guadalcanal I., Jan. 1921, J. A. KUSCHE; 1 ♂ (ad.), Guadalcanal I., Kau Kau Plantation, May 22, 1933, M. WILLOWS Jr (CAS & RML).

The ♂ of this widespread little species is easily recognized by the characteristic shape of its anal appendages. These organs have been well figured by TILLYARD (*Proc. Linn. Soc. N. S. Wales,* 37, pl. 48 fig. 15-16, 1913, sub *hyacinthus,* and by CHUJO (*Trans. Nat. Hist. Soc. Formosa,* 21, fig. 13-16, 1931), but since the articles of these authors are not so easy of access, I have taken the present opportunity of giving some fresh camera lucida drawings of the prothorax, and the terminal segment with its appendages of one of the males listed above.

NEEDHAM's sketches (*Philipp. J. Sci.* 70, pl. 18 fig. 267-268, 1939, sub *velaris*) do not show well enough the shape and armature of the appendages, and in the other drawings published by the same author after a Chinese example (*Zool. Sinica,* 11, pl. 19 fig. 1-2, 1930) a large interior spine is shown at the superior appendages, which is absent from all specimens of *pygmaea* examined by me.

Also, FRASER's description and figures of the said organs in the F.B.I. volume (*Fauna Brit. India,* Odon. 1: 398-401, 1933) leave consider-

able doubt as to the correctness of the identification of at least part of the Indian material of *pygmaea* discussed by this author. FRASER states that "The male, when fully adult, becomes pruinescent on the dorsum of head and thorax, and in the dry season of the year specimens are met with where these parts of the body are snowy white, all markings beneath being quite obscured". As no pruinescent examples of genuine *pygmaea* have ever been found in other parts within the range of this

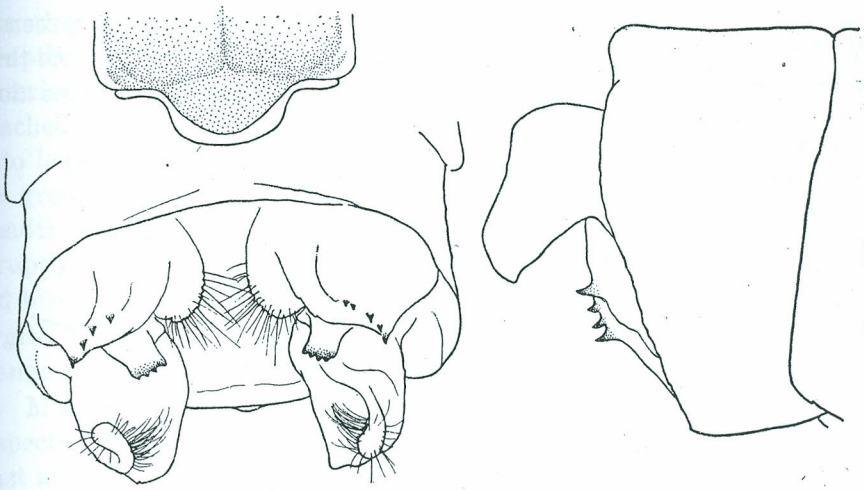

Fig. 8. *Agriocnemis pygmaea* (RAMB.). ♂ Guadalcanal. Prothorax, dorsal view, and anal apps, postero-dorsal view and right side.

species, it would be interesting to know whether or not FRASER'S notes and drawings of the anal appendages of supposed *pygmaea* correspond with such pruinescent males from India. If this be the case, then the species figured by FRASER is decidedly not *pygmaea*.

**Agriocnemis salomonis,** sp.n. (fig. 9).

S o l o m o n s: 4 ♂ (ad.), Ganonga I. (south of Vella Lavella), Koreovuka, Oct. 2, 1936, R. A. LEVER (RML).

Allied to *exsudans* SELYS.

M a l e (semiad.) — Labium, mandibles, anteclypeus, and genae, as far upwards along margin of the compound eyes as the antennal sockets, bright chrome-yellow. Labrum brilliant metallic purple, finely bordered with chrome-yellow and fringed with golden hairs. Postclypeus shining black with slight purplish reflections. Head above mat bronzy-black, with a pair of isolated, broadly oval, light blue postocular spots, which are placed in the long axis of the head. No pale marks along occipital border. Rear of the head chrome-yellow, only the centre black.

Prothorax bronzy-black, the entire anterior lobe as well as the lower part of the sides of the main body, light blue; posterior lobe slightly

elevated, shaped as shown in fig. 9, its hind margin finely bordered with yellow.

Synthorax above bronzy-black, almost as far down as half-way between the humeral and first lateral suture. Dorsum with a pair of narrow, interrupted, light green antehumeral bands; these bands are shaped like exclamation-marks, the main portion of each stripe continued downwards over the mesothoracic spiracle and the lamina mesostigmalis, which are also light green, the upper portion being linear. Suture between the mesepisterna and ante-alar triangles finely but distinctly green in colour. Thoracic pleurae light green, including also the lower one-third of the mesinfraepisternites. A narrow, though complete, black stripe along

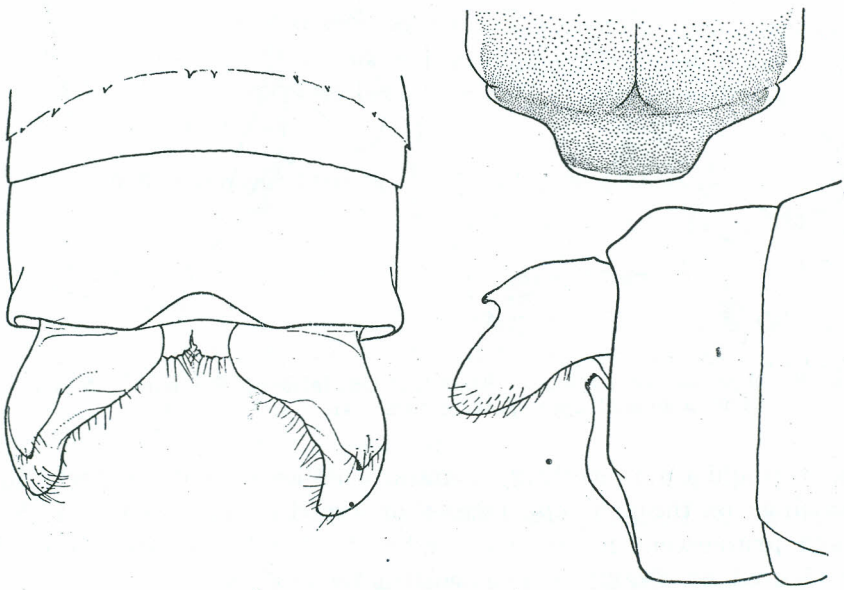

Fig. 9. *Agriocnemis salomonis*, sp.n. ♂ Ganonga I. Prothorax, dorsal view, and anal apps, dorsal view and right side.

full length of second suture; this line continued ventrad between the meso- and metacoxae, bordering also the upper portion of the metinfraepisternite. Under surfaces yellow-green, the median suture black and, posterior to this, a brownish spot on either side just inside the latero-ventral carina.

Legs, including the coxae, dirty ochreous; exterior surfaces of all femora heavily striped with black, these stripes expanding apically to form black "knees". Spines normal, black in colour, four on posterior femur.

Wings normal; neuration brown. Three postquadrangular antenodal cells in all wings. Fore wing with 7-8 (usually 8), hinder wing with 5-6 postnodal cross-veins of first series. Pterostigma of fore wing brown, of

hinder wing slightly darker brown, surrounded with a light brown line; differing in shape from most other species, *i.e.* distinctly longer than in *exsudans:* costal side about 2½ times as long as proximal side, the distal side more oblique than the proximal one.

Abdomen with the first two segments light green, segments 3-7 creamy-yellow, the remainder red. Segm. 1 with quadrangular bronze-green mark covering the whole dorsum of the segment; 2 with broad dorsal band of the same colour, slightly expanded immediately after its base, thence after a slight constriction again a little widened and finally abruptly narrowed apically to form a short broad stalk attached to the posterior margin. Segm. 3-7 each with a blackish-brown dorsal mark finely attached to the anterior margin but expanded immediately behind it so as to leave tiny, paired, ivory-yellow basal spots, confluent laterally with the ground-colour; posteriorly, these dorsal marks diminish a little in breadth but at about two-thirds to three-fourths of their length are abruptly expanded in rectangular fashion, so as to form very conspicuous and broad terminal black rings almost reaching the lateral margin of the tergite. The terminal segments and anal appendages are unicolorous orange-red (fig. 9).

Male (ad.) — Differs from the less matured ♂ in the following respects: Frons, upper parts of prothorax, and dorsum of synthorax at least as far down as the first lateral suture, covered with a dense chalky-white pruinescence entirely hiding the ground-colour. Coxae and inner surfaces of all femora also pulverulent white. In two of the three adult specimens the last three abdominal segments are black, each segment having a dull black dorso-lateral band, only the lower one-third of the sides and the intersegmental rings remaining orange-red; in one of these males the 9th segment carries a reddish median spot near its base. In the third pruinescent male the terminal segments are red, and in all of them the anal appendages remain of that colour.

Length: abd. + app. 19.5-20.5, hw. 11.5-12.5 mm.

Female unknown.

This handsome new species seems to be most closely related to *exsudans* SELYS, from New Caledonia, the New Hebrides, Fiji, and Samoa. It differs markedly from that species, in the shape of the superior anal appendage, the apical part of which is considerably longer than it is in *exsudans;* and also, in details of the colour-pattern of the abdominal segments, the much longer and differently coloured pterostigma, and in its smaller body-size.

Of *exsudans,* I have for comparison one pair from Anuda Island, of the Santa Cruz group, taken on July 15, 1933 by M. WILLOWS Jr (RML). The labrum in these specimens is pale-coloured, but otherwise the general agreement is so close that I have little hesitation in referring

them to the Selysian species. The anal appendages are crushed and although agreeing closely in shape with TILLYARD's sketches of these organs (*Proc. Linn. Soc. N.S.W.* 37, pl. 48 fig. 13-14, 1913, and *Trans. Ent. Soc. London* (Jan. 1924), fig. 20, 1923), they are useless for critical purposes and figuring.

Fam. Gomphidae

**Ictinogomphus australis lieftincki** SCHMIDT.

1934. SCHMIDT, Archiv f. Hydrobiol., Suppl. 13 : 359 (key ♂♀), 362-363, fig. 57e, 61e, 65 (structures, thor. ♂).— ♂♀ N. New Guinea (*Lieftincki*).

1942. LIEFTINCK, Treubia, 18 : 566-570, pl. 41, fig. 158-161 (structures, thor. ♂).— ♂♀ W. & N. New Guinea; ♀ Halmahera.

Solomons: 1 ♂, 1 ♀ (ad.), Guadalcanal I., Dec. 1920, J. A. KUSCHE (CAS).

Although rivalling in size the largest individuals from New Guinea, the present examples are absolutely inseparable from dark-coloured populations of *lieftincki* reported from certain localities in that country.

In addition to the existing descriptions, I here offer the following colour-notes on the two examples from Guadalcanal.

Male. — The transverse green band bordering the anterior carina on the dorsal surface of the frons is a little broader than the black basal stripe, which projects forwards on middle forming a low black triangle, attaining at that point about twice the depth of the green band. Anteriorly the green frontal band on either side of the middle surpasses the transverse carina so as to form a small crescent-shaped green spot when viewed directly from in front. In many individuals from New Guinea the colouring of the head is exactly similar to that just described for the example of Guadalcanal.

The pale marks on the dorsum of the thorax are comparatively narrow (as in many Papuan specimens) and the antehumeral band is slightly interrupted near its upper end.

Wings hyaline. Pterostigma brownish-black. Antenodals 21 on fore, 15-16 on hinder wing; postnodals 12-13 and 13, respectively. Anal triangle with 5-6 cells.

Female. — Agrees with the ♂ in every respect except for the sexual characters. It is an aged individual, with the wing-membrane strongly tinged with brownish-yellow.

Occiput as described for specimens from New Guinea. Antenodals 19-21 on fore, 14-15 on hinder wing; postnodals 12-13 on both pairs of wings. Pterostigma as in ♂.

Length: ♂ abd. + app. 50.5, hw. 39.5, pt.fw. 6.0; ♀ 51.0, 43.0, 6.5 mm.

I am still of opinion that *lieftincki* is not specifically distinct from *australis*, as was thought by SCHMIDT. The latter is a much brighter and

more vividly coloured insect, but structurally the two races are practically alike. In one of the ♀ of *australis* that I possess, from Marrakai, Northern Territory of Australia, the small projections along the posterior border of the occipital plate are all but invisible, so that the only characters which can be used as a means of distinction between the two races are colour and average body-size.

Since publication of my 1942 notes on this species, I have seen examples of *lieftincki* from the island of Salawati (off the W.-coast of New Guinea), various localities in the Vogelkop, and from the Kei Islands. So far as at present known, it ranges from Halmahera as far as the Solomons.

## Fam. Aeshnidae

**Agyrtacantha dirupta** (KARSCH).

1937. LIEFTINCK, Nova Guinea, N.S., 1 : 60.— ♂♀ New Ireland.
1942. LIEFTINCK, Treubia, 18 : 570.— New Ireland; Shortland I. (Solomon Is.).

Bismarcks: 1 ♀ (ad.), New Ireland, coll. STAUDINGER acq. 1903, from FÖRSTER's collection, identified with "*Plattacantha Mondor* FÖRST." (RML). 2 ♂, 2 ♀ (ad.), New Ireland, W-coast, Sept. 6, 1899, C. WAHNES; 1 ♀ (ad.), 2 ♀ (juv.), New Ireland, W-coast, opposite Nusa I., 1899, C. WAHNES, "*Gynac. mondor,* n. sp. ♀" (FÖRSTER), one with a label in E. B. WILLIAMSON's hand: "*Platycantha mondor* from FÖRSTER" (AAM).

Solomons: 1 ♀ (ad.), Shortland Is., Lofung, Oct. 9, 1936, R. A. LEVER (RML). 1 ♀ (ad.), Bougainville I., Buin, STAUDINGER vdt (RML).

**Gynacantha mocsaryi** FÖRSTER.

1900. RIS, Archiv f. Naturgesch., 66 : 192-193.— ♂♀ New Britain.

Solomons: 1 ♂ (juv., 1 ♀ ad., indet.), Bougainville I. (MNP); 1 ♂ (ad.), Bougainville I., S-coast, Buin, Aug. 1930, H. HEDIGER (RML).

**Gynacantha rosenbergi** BRAUER.

1913. RIS, Abh. Senckenb. Naturf. Ges., 34 : 525 — ♂ New Britain.

Bismarcks: 1 ♂ (ad.), New Ireland, W-coast, 1899, C. WAHNES, with the following labels: "*Gynacantha anddu,* n. sp. (FÖRSTER), "Not labelled Type, C. H. K(ENNEDY)", "*Platycantha* 94 b, C. H. K." (AAM). 2 ♀ (ad.), New Britain, ex Mus. GODEFFROY, acq. 1886, identified by H. W. VAN DER WEELE and PÖHL (RML).

Solomons: 2 ♂ (ad.), Guadalcanal I., C. H. FOGGITT, E. C. VAN DYKE don. (CAS & RML).

The ♂ specimen from New Ireland measures 55 mm for the abdomen, 47 mm for the hindwing. One of the Guadalcanal males is slightly larger, abd. + app. 56, hw. 50 mm. Both individuals are inseparable from Papuan specimens.

**Anaciaeschna melanostoma**, sp.n. (fig. 10).

Solomons: 1 ♂ (semiad.), Guadalcanal I., Aola, Aug. 1938. The specimen is the holotype (NMB).

Similar to *jaspidea* (BURM.) in general appearance, but immediately distinguished from that species by the dark-coloured front of head, the narrower pale bands on the thoracic pleurae, and by the reduced light spots on the segments of the abdomen.

Male (in fragments). — Labium light brown; mandibles blackish-brown with a yellow longitudinal stripe on the visible part. Labrum, clypeus and frons unicolorous deep purplish-black; the clypeus and frons with a sharply defined bright yellow lateral stripe, about 0.8 mm wide, extending upwards from antero-lateral edge of postclypeus along full length of the margin of compound eye almost as far dorsad as the level of antenna, where it ceases rather abruptly; dorsal surface otherwise yellowish-brown shading to blackish-brown anteriorly, with two very diffuse pale basal spots on either side of the median line. Frons a little longer and more protuberant than in *jaspidea*, with the anterior edge obtuse-angulate, distinctly triangularly projecting in dorsal view (*jaspidea*: almost rounded), the transverse ridge sharp, shaped similarly to *jaspidea*. Vertex shorter and less swollen than in that species, brown in colour. Occipital triangle small, pale brown. Rear of the head brown.

Pro- and synthorax reddish-brown, apparently similar to *jaspidea*, but dorsum with a pair of definite, though slightly diffuse, subtriangular antehumeral yellow spots, placed just in front of the ante-alar triangles, filling in the dorso-lateral edges of each mesepisternite. Thoracic sides with two sharply delimited light green bands similar in principle to those of *jaspidea*, but considerably narrower than in that species, the mesepimeral band parallel to, but separated from, the humeral suture, the anterior border of the metepimeral band separated from the second suture by a narrow area of the ground-colour and also distant posteriorly from the latero-ventral margin by a space of about 1.5 mm width. Venter brown.

Legs shaped and coloured as in *jaspidea*.

Wings (posterior pair shrivelled and damaged) apparently similar to *jaspidea*, but with the membrane very strongly and deeply stained with golden yellow, especially at the bases. Neuration almost identical to *jaspidea*, only the triangles comparatively a little longer and narrower, veins brown. Anal triangle three-celled, not different in shape from *jaspidea*. Membranula greyish-black, basal half bordered exteriorly by a fine whitish line. Anal loop consisting of the ordinary number of 8-9 cells. Nodal index of fore wing 9.20.19.9, of hinder wing 12.12.11.10. The first and seventh cross-vein in the antenodal space of fore wing thickened.

Abdomen of the same slender build as *jaspidea*, segments gradually expanded posteriorly from the constriction on middle of 3 as far as the

end of 9. Ground-colour of basal segments reddish-brown, the abdomen becoming darker posteriorly; pale greenish-yellow markings considerably reduced, as follows:— segm. 1 with rudmentary AL and a narrow transverse L bordering the posterior margin; 2 almost wholly obscured, only an incomplete AML, tapering upwards, and, separated from this, a narrow transverse posterior stripe, widest just dorsal to the auricles, extending upwards along the transverse carina and fused with a small MD so as to form a complete pale ring; sides in addition with a small yellow spot on middle, placed in the long axis of the segment, and a small transverse streak of the same colour along the supplementary carina, behind which is a much wider transverse band filling in most of the narrow area between the supplementary carina and the posterior border of the segment. Segm. 3 with AL reduced and almost completely divided into two parts; a baso-lateral transverse line, widening ventrad and narrowly fused along ventral border with a much larger, somewhat trapezoidal, posterior division bordering the transverse carina; MD and PD absent; ML and PL very small and widely separated from one another. Segm. 4-7 with vestigial, paired MD and with small, completely isolated AL, ML and PL, progressively smaller from before backwards, AL being largest in size, rather comma-shaped on 3rd segment. On segm. 8 ML and PL are a little larger and apparently fused together; 9-10 without visible markings. Auricles with two rather incurved apical teeth. Genitalia distorted.

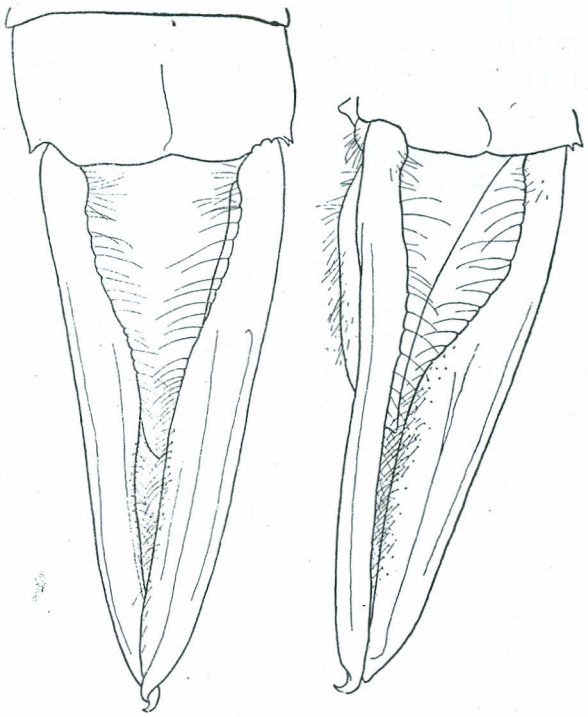

Fig. 10. *Anaciaeschna melanostoma*, sp.n. ♂ Guadalcanal. Anal apps, dorsal aspect and viewed obliquely from above.

Anal appendages similar in principle to those of *jaspidea*, but the superior pair are more slender, with the basal one-third (the "stalk") a little longer and decidedly narrower, the distal two-thirds slightly less abruptly expanded than in that species (fig. 10).

Length: ♂ abd. 42.5 + 5.5, hw. 44.0, pt.fw. 3.5 mm.

Apart from the characters mentioned above, this new species differs from *jaspidea* also in having the wings comparatively longer and slightly more pointed (*jaspidea:* abd.: hw. = 42.5: 40.0). The black face, the presence of dorsal incomplete antehumeral spots, and the great breadth of the brown pleural area separating the two green bands on the sides of the thorax, are all characters by which *melanostoma* can be easily held apart from *jaspidea*.

*A. jaspidea* is a wide-ranging species, which has been reported from Peninsular India across S.E. Asia into the Pacific area as far east as Tahiti.

**Anax guttatus** (BURM.).

1942. LIEFTINCK, Treubia, 18 : 588.— ♂♀ New Britain.

Bismarcks: 1 ♂, 1 ♀ (ad., ex alcohol), New Britain, N-coast, Hanam Harbour, mouth of Geysir River, No. 438, Hamburg South Sea Exped., Nov. 27, 1908, G. DUNCKER (MH).

The spirit specimens from New Britain have been included in my revision of the Austro-malayan species of the genus.

**Anax maclachlani** FÖRSTER.

1900. RIS, Archiv f. Naturgesch., 66 : 191-192, 202-203 (larva), T. IX fig. 12 (♂ apps).— ♂♀ New Britain (*Maclachlani*).

## Fam. Corduliidae

**Hemicordulia oceanica** SELYS (fig. 11).

1871. SELYS, Bull. Acad. Belg. (2) 31 : 251.— ♂ Tahiti.
1907. MARTIN, Cat. Coll. SELYS, 17, Cordul. : 11 ("iles Salomon, Alu, Rubiana," sub *assimilis*), 12.— ♂ Taiti (♀ "Nouv.-Calédonie" doubtful).
1913. RIS, Nova Guinea, 9, Zool. : 500 (key), 502-503, fig. 22 (♂ apps).— ♂ Tonga; ♀ New Britain (doubtful, teste RIS).
1914. MARTIN, in WYTSMAN, Gen. Ins., Cordul. : 23, pl. 1 fig. 2 (♂ insect, type?).— "Taiti"; (?not "Nouv.-Calédonie").
1915. RIS, Nova Caled., 2 : 71 (note).
*nec* 1921. CAMPION, Ann. Mag. Nat. Hist. (9) 8 : 45-46.— ♂♀ New Caledonia.
1925. FRASER, Trans. Ent. Soc. Lond.: 436 (notes).— ♂♀ Samoa.
1927. FRASER, Insects of Samoa, 7, fasc. 1 : 37.— ♂♀ Samoa; ♀ New Hebrides (*assimilis oceanica*).
1933. NEEDHAM, Pacific Entom. Surv., Publ. 7, art. 12 : 91 fig. la (♂ apps, hab. ign.!).
1936. KIMMINS, Ann. Mag. Nat. Hist. (10) 18 : 75.— ♂♀ New Hebrides (*assimilis oceanica*).
1942. LIEFTINCK, Treubia, 18 : 547-548 (holotype Tahiti, redescribed).

Solomons: 2 ♀ (ad.), Bougainville I., Buin, Aug. 13, 1930, H. HEDIGER (RML).

As an exception I have quoted above all basic literature referring to this species, which is admittedly still imperfectly known.

As has been pointed out by RIS (in FRASER, 1925, *l. c. supra*), who examined some Samoan examples forwarded to him by Dr FRASER, these specimens agreed with a ♂ from Tonga, described by RIS in 1913 and identified by SELYS himself with *oceanica* (*l.c. supra*). But, according to RIS, this fact did not imply that they were the real *oceanica* of the original description, of which he added: "What *oceanica* really is, cannot be made out without an examination of the Tahiti specimen."

In my 1942 paper I have given a brief characterization of the type, studied by me in 1938 at Brussels. Unfortunately, no drawings could then be made of the anal appendages of the Tahiti specimen. (The accessory genitalia of the type are distorted.)

The two females from Buin, now before me, are the first to be described from the Solomon Islands. In the absence of a ♂ their identification must remain doubtful.

These females may be described as follows:

F e m a l e (ad., spirit specimens). — Labium ochraceous-buff; face and about the lower two-thirds of the vertical surface of frons, yellow ochre; frons above brilliant metallic-green, this colour extending less than half-way down and replaced by yellow-ochre on each side against the margin of the eyes, the boundary-line situated about the level of the antennae. Vertex reddish-brown, with slight metallic green lustre. Occiput large and globular, more or less cordate, its surface smooth and shining, shallowly excavated posteriorly, orange to dark brown in colour.

Prothorax not metallic. Synthorax above yellow-brown, upper half of mesepisterna with very slight metallic green lustre. Sides with two ill-defined, brilliant metallic-green bands, one occupying about the anterior two-thirds of the mesepimeron, and a second much narrower band along the second suture, covering the anterior one-third of the metepimeron. A metallic-green off-shoot of the first band extends upwards along the first lateral suture as far as the spiracle. The juxtahumeral band is widest dorsally, encroaching a little on the mesepisterna across the humeral suture, but below the middle it is invaded posteriorly by the brown ground-colour. Under surface of thorax yellow-brown, as are also the coxae and trochanters of the legs.

Femora and tibiae of anterior legs yellow-brown, the tarsi darker; posterior two pairs of femora dark brown, but the tibiae noticeably lighter, yellow-brown, while the tarsal joints again are somewhat obscured. Posterior femur 5.7 mm long, when adpressed to the body not reaching the posterior border of 2nd segment of abdomen.

Wings in one example (a) strongly tinged with brownish-yellow all over the membrane, with small, cloudy, subhyaline spots irregularly distributed all over the surface; bases in addition suffused with dirty orange-yellow, ill-defined and about as far out as the arculus in posterior

wing. In the second specimen (b), the wing-bases at extreme base are almost hyaline, the membrane from near base as far out as about $Px_2$ in fore wing and $Px_{1-5}$ in hinder wing being evenly tinged with light yellow; remainder of all wings hyaline. Nodal index (a) $\frac{6.8.8.6}{8.5.5.7}$, (b) $\frac{5.8.8.5}{7.5.5.7}$. Pterostigma very small, brownish-black. Membranula dark grey.

Abdomen of the usual shape, intermediate segments hardly noticeably (a), or rather strongly (b) expanded and flattened dorso-ventrally; metallic bronzy-black with slight green lustre, and marked with orange, as follows: 1 and 2 orange-brown, unmarked, except that 2 carries a blackish-brown basal ring that occupies about one-third of the segment's length, the posterior border being also slightly obscured along margin. Segm. 3-8 with a pair of very large, oval, dorso-lateral orange marks placed in the long axis of the body, and continued broadly on the ventral surface of the tergites; on 3 and 4 these marks occupy most (about 3/4 — 2/3) of the dorsum and under surfaces, only diffuse, subtriangular mid-basal spots and much larger apical rings remaining black, the light spots being separated in the median line by a rather narrow and diffuse longitudinal stripe. On the succeeding segments the yellow spots diminish gradually in size, each pair becoming more widely separated and on 8 occupy only little more than the basal half on either side along margin. Segm. 9-10 wholly black. Valvula vulvae brownish-yellow or yellow, shaped as shown in the figure. Anal appendages long and lanceolate, black (fig. 11).

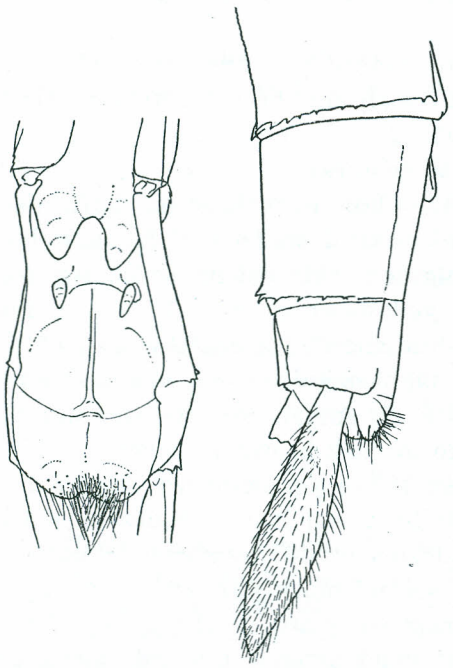

Fig. 11. *Hemicordulia oceanica* SELYS, ♀ Bougainville. Terminal segments of abdomen, ventral view (apps omitted), and right side view.

Length: abd. 28.0-29.5+2.5 for the appendages, hw. 28.5-30.0, pt. fw. 1.5-1.6, pt. hw. 1.3-1.4 mm.

This little species is chiefly characterized by the preponderance of the orangish or brown markings on the thorax and abdominal segments, by the broad and pointed wings, the small size of the pterostigma, and the definitely yellowish-brown tibiae.

I am not satisfied that the present specimens are correctly associated with *oceanica*. The type is a much darker insect, but equals the females in size and has the legs also brown instead of black. The small size of

the pterostigma corresponds with that of the type. However, our females have 8 instead of 7 antenodal cross-nerves in the fore wings.

So much is certain that the examples of the Solomons belong to the same species as the ♀ described by RIS from Matupi (New Britain), also referred to *oceanica* with some misgivings.

Apparently, the only author who has also seen a species of *Hemicordulia* from the Solomon Islands, was MARTIN, who referred them to *assimilis*, which is doubtlessly incorrect. These specimens have never been described, and I have failed to trace them (1938) in the Paris Museum. As to the localities quoted by MARTIN, it may be noted that Alu is the principal island of the Shortlands, and Rubiana that of the New Georgia group.

**Eusynthemis frontalis**, sp. n. (fig. 12).

Solomons: 1 ♀ (juv.), Guadalcanal I., Dec. 1921, J. A. KUSCHE. The specimen is the holotype (CAS).

Female. — Head clothed rather densely with black hairs, especially on top of frons. Frons wide. Labium yellow, unmarked. Mandible-bases brown. Labrum deep black, rather shiny. Anteclypeus yellow, postclypeus and genae brownish-black. Frons dark metallic blue-black, its surface coarsely punctured, adorned with a pair of very large, more or less cordate bright lemon-yellow spots, placed on each side of the middle and occupying the anterior half on either side; laterally, these spots are separated from the eye-margin by a very fine black line, and, posteriorly are indented by a tooth-like projection of the black ground-colour. Vertex trapezoidal, densely and coarsely punctured, metallic blue-black. Occipital triangle of large size, brown in colour, densely hairy.

Thorax rather small, chocolate brown above with very slight metallic lustre; no pale antehumeral stripes or spots. Median carina citron-yellow, its upper end blackish. Ante-alar triangles brown, each with a clear yellow posterior spot. Thoracic sides below the humeral suture dark brown with metallic blue reflections; on each side an uninterrupted creamy-yellow mesepimeral stripe of moderate width, situated just anterior to the spiracle, and widest slightly above its middle. A much broader yellow patch covering the postero-ventral two-thirds of the metepimeron, invaded antero-ventrally by a roundish blue-black off-shoot, one on either side, behind the coxae of the posterior pair of legs. Lower half of metinfraepisternite also yellow. Ventral surface pale yellow.

Legs: coxae and trochanters of first pair yellow; anterior legs black with the basal half of the femora yellow (rest of the legs missing).

Wings broad, neuration fairly open. An incomplete basal antenodal cross-nerve in all wings. Nodal index $\frac{9.15.17.10}{11.11.11.11}$. Arculus straight, situated at the third antenodal. Cross-veins in *m* $\frac{3\text{-}4}{3}$; *Cux* $\frac{7}{6}$ (including *ti*-vein).

Triangles with a single cross-vein; *ht* also traversed once; *ti* $\frac{1.0}{0.0}$ ; *Bxs* 4 in all wings. Discoidal field of fore wing commencing with two rows, at level of last antenodal cross-vein expanding and with three and more rows of cells. Anal loop containing 15 cells. Membranula large, dark grey. Wing-membrane hyaline, but the bases suffused with saffron as far as the arculus in both pairs of wings. Pterostigma small, brown, not braced.

Abdomen completely flattened, almost entirely metallic black, with yellowish spots on 2-7, as follows: 2 with a pair of crescent-shaped dots situated just in front of and parallel to the transverse carina; 3-5 each with a pair of transverse baso-dorsal spots, ending more or less in a point before reaching the mid-dorsal carina, and a pair of squarish or diamond-shaped dots on either side just in front of the transverse carina; 6 and 7 only with the ante-median yellow spots at the carina. Remaining segments unmarked, except for the 9th sternite, which is pale yellow.

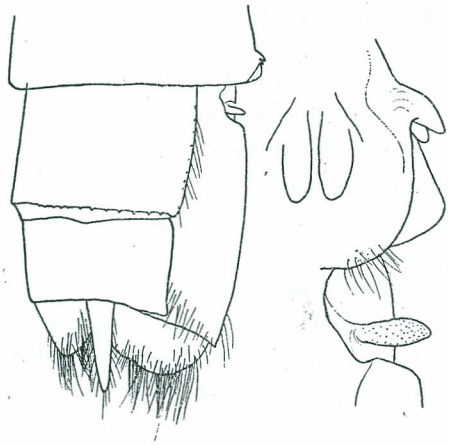

Fig. 12. *Eusynthemis frontalis*, sp. n. ♀ Guadalcanal. Terminal segm. of abdomen, right side, genital organs more highly magnified, and (inset) vulvar laminae, ventral view.

Ovipositor absent. Valvula vulvae in the form of two vestigial, shiny black, roundish protuberances. Anal appendages equal in length to the 10th segment (fig. 12).

Length: abd. 39.5, hw. 38.0 greatest width of same 12.5, pt. hw. 2.7 mm.

This interesting new species, the first Synthemine to be reported from the Solomon Islands, has no near allies.

The genus *Eusynthemis* FÖRST. (= *Metathemis* TILL.) was created for the reception of a small number of Australian species, which are characterized by the complete absence of an ovipositor and the unmodified terminal abdominal segments in the ♀, as also by the short anal appendages of the ♂. In these respects the known species differ widely from most *Synthemis* and *Choristhemis*, two genera which have their headquarters also in Australia.

As has been pointed out by CAMPION [1]), all the extra-Australian species of the *Syntheminae* belong to the genus *Synthemis* as restricted by TILLYARD [2]). These are 5 species from New Guinea, 1 from Fiji, and 4 from New Caledonia. It is also interesting to note that the species of greatest dimensions within the genus *Synthemis* have an extra-Australian

[1]) *Ann. Mag. Nat. Hist.* (9) 8 : 47-64, figs, 1921.
[2]) *Proc. Linn. Soc. N.S. Wales*, 35 : 336-337, 1910.

distribution. Three of the four New Caledonian species are insects of large size, characterized by having the fore wing triangles regularly divided into two cells, a feature which stamps them as the most archaic members of the *Syntheminae.*,

Our new species *frontalis* is the first of the subfamily to be reported from the Solomons and approaches the New Caledonian group in the crossed triangles, the comparatively large dimensions, and in a few other characters. It differs widely from the Papuan group of species, which are true *Synthemis,* being in fact the first member of *Eusynthemis* found outside the Australian continent.

**Macromia terpsichore** FÖRSTER.

1942. LIEFTINCK, Treubia, 18 : 562-563.— ♀ New Britain.

## Fam. Libellulidae

**Nannophlebia imitans** RIS.

1900. RIS, Archiv f. Naturgesch., 66 : 189-191, T. IX fig. 8 (wing-bases), 9 (♂ genit.), 10 (♂ apps).— ♂♀ New Britain.

1909. RIS, Cat. Coll. SELYS, Lib. 9 : 59 (key), 60.— Same specimens (*Lorquini imitans*).

The 15 described species in this genus have a restricted range and are very closely related to one another. A list of the known species of *Nannophlebia* and a re-description of the Moluccan *lorquini* (SELYS) have been published by me recently (see *Treubia,* 19: 235-237, figs, and 244, 1948).

**Diplacina fulgens** RIS.

1898. RIS, Entom. Nachrichten, 24 : 323-324.— ♂♀ New Britain.

1900. RIS, Archiv f. Naturgesch., 66 : 188-189.— Same specimens.

1909. RIS, Cat. Coll. SELYS, Lib. 9 : 94-95 (key), 96.— Same specimens (*smaragdina fulgens*).

1919. RIS, Cat. Coll. SELYS, Lib. $16^2$ : 1058 (key & descr.).— ♂♀ New Britain.

1933. LIEFTINCK, Nova Guinea, 17 Zool. 1 : 41.— ♀ New Britain.

Bismarcks: 1 ♀ (ad.), New Britain, S-coast, Mövehafen, March 12, 1930, H. HEDIGER (RML).

**Nesoxenia mysis dahli** RIS.

1898. RIS, Entom. Nachrichten, 24 : 322-323.— ♀ New Britain (*Dahli*).

1900. RIS, Archiv f. Naturgesch., 66 : 180-182.— Same specimen (*Dahli*).

1903. FÖRSTER, Ann. Mus. Nat. Hung., 1 : 531-532.— ♂♀ New Ireland; Nusa islet & Gardner islet (New Ireland) (*Dahli*).

1910. RIS, Cat. Coll. SELYS, Lib. 10 : 122-123 (key), 125, fig. 92 (♀ abd., Duke of York I.).— ♂♀ Duke of York; ♂♀ New Britain.

1919. CAMPION, Entomologist, 52 : 249.— ♂ New Britain.

Admiralty Islands: 1 ♀ (ad.), Manus I., Jan. 1, 1944, EMIL BOGEN (RML).

Bismarcks: 2 ♀ (ad.), New Ireland, 1899, C. WAHNES (AAM). 1 ♀ (ad.), W-coast of New Ireland, Nusa I., STAUDINGER vdt, 1903 (RML). 1 ♂ (ad.), Duke of York I., ex Mus. GODEFFROY, 1886 acq. (RML). 1 ♀ (ad.), New Britain, S-coast, Mövehafen, March 12, 1930, H. HEDIGER (RML).

**Nesoxenia mysis cingulata** KIRBY.

1889. KIRBY, Trans. Zool. Soc. Lond., 12 : 336, tab. 53 fig. 8 (♀ col. insect).— ♂ Alu (Shortland Is.) (*cingulata*).
1898. FÖRSTER, Termész. Füzetek, 21 : 285-286 (descr.).— ♂♀ Shortland Is. (*cingulata*).
1903. FÖRSTER, Ann. Mus. Nat. Hung., 1 : 531, 533 (key) (*cingulata*).
1910. RIS, Cat. Coll. SELYS, Lib. 10 : 123 (key), 126.— ♂♀ Alu (Shortlands) ; ♂ Treasury I. (*mysis cingulata*).

Solomons: 1 ♂, 2 ♀ (ad.), Shortland Is., Lofung, Oct. 9-12, 1936, R. A. LEVER (RML). 1 ♂ (ad.), Bougainville I., Aug. 6, 1944, "in jungle", A. B. GURNEY (USNM).

**Agrionoptera insignis allogenes** TILLYARD.

1942. LIEFTINCK, Treubia, 18 : 468 (key), 471-472 (full references and notes).

Solomons: 1 ♂ (ad.), Guadalcanal I., Dec.-Jan., 1920-21, J. A. KUSCHE (RML).

In a forthcoming paper, to be published in the Bulletin of the American Museum of Natural History, I have pointed out that in North Queensland, the terra typica of *allogenes*, not all populations of this subspecies are quite alike. Our material is rather meagre but yet sufficient to differentiate between two forms which seem to differ in the extent of the dark bands of the thorax, and also a little in respect of the size and shape of the body and wings. The darkest of the two is more stoutly built and about the size of *i. papuensis* SELYS, but paler than this, and does not fully agree with the race named *allogenes* by TILLYARD; it occurs in parts of N. Queensland (Cape York Peninsula). The other is of diminutive size, having the black thoracic pattern and abdominal rings still more reduced than in the above-mentioned form; populations of the latter occur in other parts of N. Australia (Cairns, Cooktown and Redlynch, N.Q.), the Aru Islands and South New Guinea. Lastly, RIS has reported a very similar (though again more stoutly built) insect from New Caledonia, which he referred also to *allogenes*.

The present example is practically identical with the one from Redlynch (N.Q.), with which it could actually be confronted. The thoracic pattern of both is the same and the insects are of the same slender build.

Abd. 26.0, hw. 28.0 mm.

The most noteworthy fact about the capture of this interesting specimen is that it was taken at the same place and in the same month as a small series of *A. similis*, discussed hereafter.

**Agrionoptera similis** SELYS.

1889. KIRBY, Trans. Zool. Soc. Lond., 12 : 336-337.— ♂♀ Alu (Shortlands); ♂ Santa Anna (*insularis*).
1898. FÖRSTER, Termész. Füzetek, 21 : 284.— ♂♀ Shortland Is. (*similis salomonis*).
1900. RIS, Archiv f. Naturgesch., 66 : 182-183.— ♂♀ New Britain (*similis*).
1910. RIS, Cat. Coll. SELYS, Lib. 10 : 135, 140-141 (pars!).— ♂♀ New Britain; ♂♀ Duke of York Is., ♂♀ Solomon Is. (*insignis similis*).
1919. CAMPION, Entomologist, 52 : 249.— ♂ New Britain (*insignis similis*).
1942. LIEFTINCK, Treubia, 18 : 467 (notes), 471.— ♂♀ New Britain; ♂ Lavongai I.; ♂♀ New Ireland (*insignis similis*); Solomon Is. (*insignis insularis*).

Bismarcks: 1 ♂ (ad.), Lavongai I. (New Hanover), 1899, C. WAHNES; many specimens (returned) and 2 ♂, 2 ♀ (ad.), New Ireland, W-coast, opposite Nusa I., 1899, C. WAHNES (AAM & RML). 1 ♂, 9 ♀, New Britain, Arawe, April 18, 1930, H. HEDIGER (NMB & RML). 1 ♂, N. New Britain, Blanche Bay, Herbersthöh, 1899, C. WAHNES (AAM).

Solomons: 1 ♀ (ad.), Shortland I., Lofung, Oct. 9, 1936, R. A. LEVER (RML). 8 ♂, 1 ♀ (ad.), Treasury Is., July 30 and Aug. 2-17, 1944, J. H. PAULLUS (USNM). 5 ♂, 1 ♀ (ad.), Guadalcanal I., Dec.-Jan. 1920/21, J. A. KUSCHE. 1 ♂ (ad.), id., C. H. FOGGITT, E. C. VAN DYKE don. (CAS & RML).

1 ♂ (ad.), Santa Anna Is., 87.3, holotype *insularis* KIRBY (BM). 1 ♂ (ad.), Sikaiana Atoll (E. of Malaita), March 23, 1936, R. A. LEVER (RML).

Although some progress has been made during recent times in the studies of the *insignis* cluster of *Agrionoptera*, we are still far from a satisfactory explanation of the interrelationships of the various forms. As I have shown in a previous paper (*loc. cit.* 1942, key), *papuensis* SELYS and *similis* SELYS are easily held apart on venational characteristics and can be recognized by differences in stature and colour. From the Moluccan islands eastwards no specimens have been found which were not definitely the one or the other (except on Biak). Moreover, in parts where their ranges overlap, their status is different, the one or the other being much more the commoner. Furthermore, what is more important still, both forms change geographically: *papuensis* — of western and northern New Guinea — to *allogenes* in southern areas of the Papuan mainland and N. Australia; *similis* — of the Moluccas — to a slightly modified subspecies inhabiting New Guinea, the Bismarcks and the Solomon Islands. As will be seen from the following table, *papuensis* and *allogenes* (which are considered subspecies of *A. insignis*) are largely mutually exclusive, whereas *similis* at several places may occur together either with *i. papuensis* or with *i. allogenes*.

On these grounds I think it best to treat *similis* as a full species.

The occurrence of *similis* in the Solomons is less surprising than the presence of *allogenes* in these islands: as to the former, it means only

| | Moluccas | Kei | NEW GUINEA | | | | | | | North Australia | Bismarcks | Solomons |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Salawati | Misool | Vogelkop | Astrolabe Bay | Huon Gulf | Southern plains | Aru | | | |
| *A. similis* ..... | + | + | + | — | - | + | + | — | + | — | + | + |
| *A. i. papuensis* ..... | — | — | + | + | + | + | + | — | — | ? | — | — |
| *A. i. allogenes* ..... | — | — | — | — | — | — | — | + | + | + | — | + |

an eastward extension of its known range, whereas the latter has had to cross a wide sea-barrier as it comes evidently from North Queensland.

KIRBY has named the *similis* race *insularis*. The type ♂ is from Santa Anna, a second ♂ and two ♀ being reported from Alu (Shortlands). These examples are n o t entirely alike. In the type the yellow spots on the sides of the thorax posterior to the humeral suture are largely confluent so as to form one broad transverse band, whereas in the Alu ♂ these spots are shaped similarly to typical *similis*.

The present series in our collection are inseparable from those of eastern New Guinea, Lavongai, and New Ireland.

The ♂ from Sikaiana Atoll is again different, corresponding most closely with the Sante Anna type of *insularis* KIRBY. This unique ♂, now before me, is chiefly characterized by the reduction of the yellow spots and lines upon the u p p e r half of the thoracic pleurae, as far back as the second suture; behind this the entire metepimeron is yellow and devoid of a black offshoot traversing the middle of this space. In the left anterior wing the triangle is free, in the right it is traversed by a cross-vein; the subtriangles are both irregular in shape and are made up of only two cells. On these and other small or distant islands the species might be in the progress of subspeciation. For the present, however, I have included all specimen before me with *similis*, pending more material of the interesting *insularis* race; until good series of both forms will become available for study, this procedure seems to be the only one justified.

**Protorthemis coronata** (BRAUER).

1900. RIS, Archiv f. Naturgesch., 66 : 180.— ♂ New Britain.

1910. RIS, Cat. Coll. SELYS, Lib. 10 : 147 (key), 149-151.— ♂ New Britain; ♂ Duke of York I.; ♂ New Ireland.

1942. LIEFTINCK, Treubia, 18 : 474.— New Britain; New Ireland; Duke of York I.

Bismarcks: 1 ♂ (ad.), W-coast of New Ireland, Nusa I., 1899, C. WAHNES (RML). 1 ♂ (ad.), Duke of York I. (MRB).

**Protorthemis woodfordi** (KIRBY).

1889. KIRBY, Trans. Zool. Soc. Lond., 12 : 290-291, 335.— ♂ Alu (Shortland Is.) (*Nesocria Woodfordi*).
1899. FÖRSTER, Wiener Ent. Zeitg., 18 : 170-173 (key, descr.).— ♂ Shortland Is. (*Nesocria Woodfordi*).
1910. RIS, Cat. Coll. SELYS, Lib. 10 : 147 (key), 148-149, fig. 105 (♂ wings, Alu).— ♂♀ Solomon Is. (loc. diff.) (*Woodfordi*).

Solomons: 3 ♂, 2 ♀ (ad.), Buka I., July 1930, H. HEDIGER (NMB & RML). 1 ♂ (ad.), SE Bougainville I., Buin, Sept. 3, 1930, H. HEDIGER & NMB). 3 ♂ (1 juv.), Treasury Is., July 30 and Aug. 14, 1944, J. H. PAULLUS (RML & USNM). 1 ♂ (ad.), New Georgia Is., Munda, Febr. 3, 1945, L. A. CONWELL (USNM). 2 ♂ (ad.), Guadalcanal I., Dec.-Jan. 1920/21, J. A. KUSCHE (CAS & RML). 1 ♂ (ad.), Savo I. (off the N-coast of Guadalcanal), July 1928 (RML).

[*?Orthetrum caledonicum* (BRAUER).

1947. LAIRD, Trans. Roy. Soc. New Zealand, 76 : 461.— New Britain.

This species, which had not before been reported from the Bismarck Archipelago, is stated by LAIRD to be abundant at Jacquinot Bay, New Britain, the nymphal stages being found in the more permanent ground pools. The insect has probably been confounded with *O. sabina* DRURY and for that reason has not been taken into account.]

**Orthetrum s. sabina** (DRURY).

1900. RIS, Archiv f. Naturgesch., 66 : 184.— ♂ New Britain (*sabinum*).
1910. RIS, Cat. Coll. SELYS, Lib. 10 : 224.— ♂ New Britain (*sabina*).

Solomons: 2 ♂, 1 ♀ (ad.), Treasury Is., July 21 & Aug. 14, 1944, J. H. PAULLUS (USNM). 1 ♂, 2 ♀ (ad.), Guadalcanal I., Dec.-Jan. 1920-21, J. A. KUSCHE (CAS & RML). 1 ♀ (ad.), Rennell I., Kungana Bay, June 14, 1933, M. WILLOWS Jr (CAS).

**Orthetrum villosovittatum bismarckianum** RIS.

1898. RIS, Entom. Nachrichten, 24 : 321-322.— ♂♀ New Britain (*Bismarckianum*).
1900. RIS, Archiv f. Naturgesch., 66 : 184-185, T. IX fig. 7 (♂ genit.).— Same specimens (*Bismarckianum*).
1910. Ris. Cat. Coll. SELYS, Lib. 10 : 238 (key), 239.— ♂♀ New Britain; ♂♀ Duke of York; ?Solomon Is. (*v. Bismarckianum*).
1919. CAMPION, Entomologist, 52 : 249.— ♂♀ New Britain.
1947. LAIRD, Trans. Roy. Soc. New Zealand, 76 : 461-463, fig. 3 (larva). Bionomics, New Britain (*villosovittatum*).

Bismarcks: 6 ♂ (ad.), New Britain, Herbertshöh and Blanche Bay, Summer 1900, C. WAHNES (identified by FÖRSTER with "*Fenicheli*" and "*Bismarckianum*"; AAM & RML). 1 ♂, New Britain, Jacquinot Bay, May 21, 1930, H. HEDIGER (NMB).

Solomons: 1 ♂ (ad.), Bougainville I. (NRS). 4 ♂, 1 ♀ (ad.), Treasury Is., July 30 & Aug. 11-17, 1944, J. H. PAULLUS (USNM & RML). 5 ♂, 1 ♀ (ad.), Guadalcanal I., Dec.-Jan. 1920-21, J. A. KUSCHE (CAS & RML). 1 ♂ (ad.), Florida Is. (Nggela), Tulagi, Sept. 18, 1932, R. A. LEVER (RML).

**Brachydiplax denticauda** (BRAUER).

Solomons: 1 ♂ (ad.), Guadalcanal I., Dec.-Jan. 1920-21, J. A. KUSCHE (CAS).

**Brachydiplax duivenbodei** (BRAUER).

Solomons: 2 ♂ (ad.), Guadalcanal I., C. H. FOGGITT, E. C. VAN DYKE don. (CAS & RML).

**Diplacodes bipunctata** (BRAUER).

1911. RIS, Cat. Coll. SELYS, Lib. 12 : 471-472.— ♂ New Britain.

**Diplacodes nebulosa** (FABR.).

Bismarcks: 1 ♂ (semiad.), W-coast of New Ireland, Nusa I., June 14-Aug. 14, 1899, C. WAHNES, identified by FÖRSTER with "*Nannodiplax nusa*" (AAM).

**Diplacodes trivialis** (RAMB.).

1900. RIS, Archiv f. Naturgesch., 66 : 188.— ♂♀ New Britain.
1911. RIS, Cat. Coll. SELYS, Lib. 12 : 462, 470-471, fig. 295 (♀ wings).— ♀ Solomon Is. (*remota*).
1919. RIS, ibid., $16^2$ : 1153 (note, *remota* withdrawn).

Bismarcks: 1 ♂, New Britain, Möwehafen, March 12, 1930, H. HEDIGER; 2 ex. (sex indet.), New Ireland, Fissoa, Oct. 20, 1930, H. HEDIGER (NMB).

Solomons: 1 ♂ (ad.), Guadalcanal I., Lunga, Nov. 1932, R. A. LEVER (RML). 4 ♂, 10 ♀ (ad.), Guadalcanal I., Dec.-Jan. 1920-21, J. A. KUSCHE (CAS & RML). — Also 2 ♂, Sikaiana Isles (E. of Malaita), May 15, 1933, M. WILLOWS Jr (CAS).

**Neurothemis ramburi papuensis** LIEFTINCK.

1911. RIS, Cat. Coll. SELYS, Lib. 13 : 554, 556.— ♂ Duke of York (*palliata palliata*).
1942. LIEFTINCK, Treubia, 18 : 482-484.— ♂♀ New Guinea (loc. diff.); ♂♀ Aru Is.

RIS's specimen from Mioko (Neu Lauenburg), of the Duke of York group, is obviously an example of the Papuan subspecies of *ramburi* (*palliata auct.*) discussed in my previous paper, cited above.

**Neurothemis stigmatizans bramina** (GUÉRIN).

1898. FÖRSTER, Természs. Füzetek, 21 : 275.— ♂ Shortland I. (*oculata*).
1900. RIS, Archiv f. Naturgesch., 66 : 178-180.— ♂♀ New Britain (*oculata*).

1911. RIS, Cat. Coll. SELYS, Lib. 13 : 553 (key), 574-578.— ♂ New Ireland; ♂♀ Duke of York; ♂♀ Nusa; ♂♀ New Britain; ♂ Shortland I.
1919. RIS, Ibid., 16² : 1169.— ♂ Bougainville.
1919. CAMPION, Entomologist, 52 : 249.— ♂ New Britain.
1942. LIEFTINCK, Treubia, 18 : 482.— Bismarck Is.; Solomon Is.
1947. LAIRD, Trans. Roy. Soc. New Zealand, 76 : 461.— New Britain (*stigmatizans*).

Bismarcks: Many specimens from Lavongai (New Hanover), New Ireland, Duke of York, New Britain, and Umboi (Rooke I.); one ♂ of the last mentioned locality is from the Siassi islets, April 5, 1930, H. HEDIGER.

Solomons: Large series from Bougainville I., Shortland Is., Treasury Is., Russell I., and Guadalcanal I., from all sources. Specimens collected by Mr R. A. LEVER are carefully dated: 1 ♂, 3 ♀, Shortland Is., Lofung, Oct. 12, 1936, and 1 ♂, Russell I., Faiami, Febr. 7, 1936.

Individuals from the Solomons average larger in size than those of the Bismarck group, but this is an extremely variable species.

**Crocothemis nigrifrons** KIRBY.

Solomons: 1 ♂ (ad.), Guadalcanal I., Dec.-Jan., 1920-21, J. A. KUSCHE (RML).

**Rhodothemis rufa** (RAMB.).

Solomons: 3 ♂, 5 ♀ (ad.), Guadalcanal I., Dec.-Jan., 1920-21, J. A. KUSCHE (CAS & RML).

Male. — The femora are red-brown, the two anterior pairs striped with black exteriorly, the posterior pair appearing wholly black with a red-brown stripe only on the inner and outer faces.

Golden-brown spots at the wing-bases comparatively large: in fore wing as far as half-way between base and $Ax_1$ in *c-sc*, in *cu* as far as *Cux*, and a spot in the anal field; in hinder wing as far as $Ax_2$ in *c-sc*, somewhat beyond *Arc* in *m*, as far as *t*, and a large triangular area in the anal field.

Length: ♂ abd. + app. 25, hw. 32; ♀ 25, 34 mm.

**Rhyothemis phyllis marginata** RIS.

1900. RIS, Archiv f. Naturgesch., 66 : 177-178.— ♂♀ New Britain (*dispar*).
1913. RIS, Cat. Coll. SELYS, Lib. 15 : 939 (key), 945, Taf. 5 fig. (♂ wings col. pl., Duke of York).— ♂♀ New Britain; ♂ Duke of York; ♂ Alu (Shortland Is.).
1936. KIMMINS, Ann. Mag. Nat. Hist. (10) 18 : 80, pl. III fig. A (♂ insect, type!).

Bismarcks: 1 ♂, Duke of York I., labelled: "Neu Lauenburg, Mioko", probably collected by C. RIBBE, identified by F. RIS (MRB).

Solomons: 1 ♂, SW Bougainville I., W. J. POTTER (AMS). 1 ♀, Shortland Is., Alu (BM). 3 ♂, "Iles Alu, F. FÖRSTER" (MRB). 6 ♂, 1 ♀

(ad.), Guadalcanal I., Dec.-Jan., 1920-21, J. A. KUSCHE (CAS & RML). 1 ♂, Guadalcanal I., Lavoro Plantation, C. E. HART, 1925 (AMS).

It is not clear which of the specimens (from Duke of York, or from the Shortlands) should be considered the type of this subspecies. The ♂ photographed in KIMMINS's paper and stated to be the type does not tally with RIS's description in the monograph after males from the Bismarcks.

Our fine series from Guadalcanal correspond very closely with the examples from the Shortland Islands in the Brussels Museum.

All agree in being of small size and by having narrow wings, the membrane of the latter having acquired a pale brownish- or greyish-yellow tint, not golden-yellow as in typical *phyllis* and several other subspecies. The labium and labrum are very dark brown, almost black, the postclypeus dark brown; only the anteclypeus and a narrow curved stripe in front of frons are dull orangish, the frons being almost wholly brownish bronzy-black. The antenodal cross-veins in the costal and subcostal spaces stand out clearly as they are bordered with dark brown, which colour also fills in the more distal cells of these spaces. All specimens are characterized by a dark brown costal streak in *c* and *sc*, which begins abruptly at about $Px_4$ and ends 1-2 cells before the pterostigma.

The yellow band enclosed between the very dark brown patches in the basal area of the posterior wing varies somewhat in breadth, but in all specimens it is considerably narrower than the brown bands, attaining in the ♂ a maximum width of only 1½ mm at the wing-margin beyond the membranula; further distad it decreases in width, being at times only 0.5 mm wide, and in two males the yellow band is distinctly interrupted by brown in the middle so as to leave only small triangular yellow spots on either side of it.

The anal appendages are shaped much as figured by KIMMINS for *p. aequalis* (New Hebrides), but the tips of the superiors are blunter.

The only ♀ from Guadalcanal agrees with the ♂ in every respect except that the yellow band is relatively larger, 2 mm in width along the inner margin of the posterior wing, narrowed to about 1 mm at the outer border of the basal patch.

The measurements for the Guadalcanal series are: ♂ abd. + app. 21.0-22.5, fw. 31.5-32.5, hw. 29.5-30.5; ♀ 19.0, 33.0, 31.0 mm.

The above discussed *R. p. marginata* (Bismarcks & Solomons) and the related subspecies *dispar* BRAUER (Fiji Islands), and *aequalis* KIMMINS (New Hebrides), form a group of their own, which are chiefly characterized by the dark face-marks and comparatively narrow hind wing bases.

**Rhyothemis phyllis chloe** KIRBY.

1894. KIRBY, Ann. Mag. Nat. Hist. (6) 14 : 16.— ♀ Mackay, Queensland (*chloë*).
1913. RIS, Cat. Coll. SELYS, Lib. 15 : 939 (key), 947, Taf. 5 fig. (♂ wings col. pl., Queensland).— ♂♀ N. Australia (loc. diff.).

1942. LIEFTINCK, Treubia, 18 : 506-507 (♂♀ key), 510-511 (references, descr.), pl. 29 fig. 57-61 (♂♀ wings).— ♀ Aru Is.; ♂♀ N. Australia; ♀ N.S. Wales.

Solomons: 1 ♀ (ad.), Guadalcanal I., Jan. 1921, J. A. KUSCHE (RML).

Female (ad.) — Labium, mandibles, and labrum unicolorous blackish-brown; clypeus light yellow; vertical portion of frons also yellow turning to dull orange dorsally, the dorsal surface basally shining dark metallic-blue, this colour ill-limited on middle above but laterally in the form of a thick short stripe descending along the eye-margin for about $^4/_5$ the length of frons. Vertex dark brown with slight metallic blue reflections. Occipital triangle above reddish-brown; rear of the head entirely bronzy-black.

Prothorax mat black. Synthorax reddish-bronze above and on upper parts of sides, metallic greenish-black laterally and beneath.

Legs black, coxae blackish-brown, trochanters chestnut-coloured.

Wings comparatively broad, the basal portion of hind wing distinctly more expanded than in *p. marginata* and allied subspecies. Membrane of the basal one-third coloured a rich light golden yellow, this colour further outwards acquiring gradually a more greyish-yellow tinge; veins brown, golden yellow in places (*i.e.* in the opaque orange area of posterior wing).

Markings dark purplish-brown, sharply delimited, extent and arrangement of bands and spots exactly intermediate between fig. 60 and 61 on pl. 29 in LIEFTINCK (*l. c.* 1942) for examples from N. Queensland. Anterior wing: bases unmarked; small spot filling in 1-2 anterior (costal) cells in *t;* very large nodal fleck, five cells deep, extending basad 5-6 antenodal cells and distad as far as first postnodal cross-nerve in *c,* and from 3 antenodal cells to a little beyond *Nod* in underlying spaces; apices as far inwards as distal side of *pt.* Posterior wing: very similar to fig. 61 (*loc. cit*), but brown and yellow bands a little more extensive: anterior brown patch extending as far as $Ax_4$, meeting anal margin posteriorly at end of membranula; yellow band deep orange, almost 4 mm in width and only slightly narrowed on middle, extending outwards as far as $Cu_1$, where it is also about 4 mm wide; posterior brown patch extending distad from a little before $Cu_1$ to near $Cu_2$; 4-5 irregular brown marginal cells (1-2 cells deep) mid-way the discoidal field; small elongate spot (about the size of 3 cells) at centre of wing at $M_3$-*Mspl;* 6-7 marginal cells (one cell deep) proximal to the point where $M_3$ enters the wing-margin.

Abdomen normal, greenish bronzy-black; apical margin of 8th sternite straight, vulvar scale not developed. Anal appendages about 1½ times as long as tenth segment.

Abd. + app. 22.0, fw. 36.0, hw. 34.5 : 15.0 mm.

Up to the present, *Rhyothemis phyllis* has been analyzed just as poorly as *R. regia* had been prior to 1942. The last-mentioned composite species was lumped under one name because the diagnostic characters of its two components had not yet been discovered. The specific distinctness of *R. regia* and its double *princeps* now seems to me to be well established. [1])

The discovery of an example of *phyllis chloe* on the same island and at the same locality as *phyllis marginata* (both insects being captured about the same time) provides a strong argument in favour of the supposition that *R. phyllis* is not, as has always been thought, a single species which breaks up into a number of races, but in reality is composed of two sibling species, each of them being polytypic by nature.

A thorough analysis of the morphology and variability of all races and insular populations so far known, is necessary to prove that the common *phyllis* of the taxonomist consist really of two (or even more) species.

Such an analysis should not, however, be attempted in a faunistic paper like this, and cannot be carried out until much more material has been collected and studied.

At present I prefer to follow the usual practice of treating *chloe* as a subspecies of the Malaysian *phyllis*.

The solitary female from Guadalcanal differs in no way from specimens in our collection of Queensland, whence *chloe* was first described. Its occurrence so far away from the Australian continent is surprising and points again to the great colonizing abilities of species in the genus *Rhyothemis*. Migrating populations of *chloe* from the southwest may have reached the Solomons via the Louisiade Archipelago long after the eastern form *marginata* secured a footing in these islands; but for the present any theory about the origin and relationships of the eastern 'races' of *R. phyllis* would seem to be premature.

*R. phyllis chloe* is at once distinguished from *phyllis marginata* by its broader hind wing bases, more vividly and more deeply coloured yellow membrane and opaque bands, and by having the clypeus and anterior surface of frons yellow instead of brown.

**Rhyothemis regia juliana** LIEFTINCK.

1942. LIEFTINCK, Treubia, 18 : 511-519, pls & figs (discussion of affinities and races).
1948. LIEFTINCK, ibid, 19 : 301-304, pl. 10 (notes and distributional data).

Bismarcks: 2 ♂ (ad.), "New Britain" (AMS).

This exceedingly interesting species has not previously been reported from the Bismarck Archipelago, nor yet from the Solomons.

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[1]) See LIEFTINCK, *loc. cit.*, 1942.

The present specimens, which I have been able to examine only cursorily whilst studying the dragonfly collections in the Australian Museum at Sydney, do not, as far as I am aware, differ from a series in our collection from North New Guinea.

Further notes on the range of *regia* and its relation to the allied species *phyllis* (SULZER), will appear in a forthcoming paper to be published in the Proceedings of the 7th Pacific Science Congress held at Auckland and Christchurch.

**Rhyothemis resplendes** SELYS.

1900. RIS, Archiv f. Naturgesch., 66 : 178.— ♂ New Britain.
1913. RIS, Cat. Coll. SELYS, Lib. 15 : 962.— ♂ New Britain; ♂♀ Duke of York I.

Solomons: 1 ♂ (ad.), Bougainville I., "caught at night, Febr. 22, 1945, ss. "Mosigetta", 8 miles from beach" (collector unknown, AMS). 2 ♂ (1 juv., def.), Bougainville I., Oct. 18, 1944, A. B. GURNEY (USNM).

**Pantala flavescens** (FABR.)

1900. RIS, Archiv f. Naturgesch., 66 : 175, 202 (larva).— ♂♀ New Britain.
1913. RIS, Cat. Coll. SELYS, Lib. 16 : 919.— New Britain; Duke of York.
1947. LAIRD, Trans. Roy Soc. New Zealand, 76 : 461.— New Britain.

Bismarcks: 1 ♂, New Britain, Jacquinot Bay, May 21, 1930, H. HEDIGER (NMB).

Solomons: 1 ♂ (ad.), Treasury Is., Aug. 2, 1944, J. H. PAULLUS (USNM). 1 ♂ (ad.), Guadalcanal I., C. H. FOGGITT, E. C. VAN DYKE don. (CAS).

**Hydrobasileus brevistylus** (BRAUER).

Solomons: 5 ♂, 1 ♀ (ad.), Guadalcanal I., Dec.-Jan., 1920-21, J. A. KUSCHE (CAS & RML).

**Tramea liberata,** sp. n.

Solomons: 1 ♂ (ad.), Shortland Is., Lofung, Oct. 12, 1936, R. A. LEVER (RML). 2 ♂ (ad.), Guadalcanal I., Dec. 1920, J. A. KUSCHE (CAS & RML). Holotype ♂, Guadalcanal I., Dec. 1920, J. A. KUSCHE (CAS).

Allied to *eurybia* SELYS.

Male (ad., type). — Labium yellow, the middle lobe and the inner (mesial) borders of the lateral lobes dark brown, this colour not sharply defined on the latter. Labrum and anteclypeus orange-yellow, the labrum with ill-defined brownish-black stripe along anterior border; postclypeus and frons including the dorsal surface carmine to oxblood-red, but the basal half of the latter above purplish bronzy-black, this band laterally descending as a narrow stripe along the margin of compound eye and ceasing a short distance before reaching the clypeal suture. Vertex red.

Thorax morocco-red (discoloured), blackish sutural stripes incomplete and very narrow, not metallic.

Legs black.

Neuration on basal part of wings red, in costal area of fore wing as far as $Px_2$, of hinder wing about as far as $Px_5$. Base of fore wing with minute and diffuse orange spots in *c-sc*, base of *cu*, and first cell in anal area. Opaque basal spot on hind wing of large size, lacking a hyaline marginal area beyond *mb* and also without golden- or amber-coloured areolae; extent of basal spot: in *c-sc* as far as $Ax_2$ (in *c* filling in only the lower half of the two cells), in *m* as far as *Arc* and beyond it half-way in *ht*, in *cu* on into *t* almost filling up that space, almost 3 basal cells of the discoidal field, 3½ cells between $Cu_1$ and $Cu + A$, then 1 cell back between $Cu + A$ and *Cuspl*, on along *Cuspl* as far as its bend, and from there abruptly turning back in a broad curve under an acute angle towards the anal margin, which it reaches somewhat beyond tornal angle. Membranula reddish-grey. Pterostigma dark red.

Abdomen dark red, the latero-ventral and transverse ventral carinae of posterior segments finely blackish; segm. 8-10 with a complete black dorsal mark, that on 8 triangular in outline and pointing towards the base of segment.

Anal appendages obscured, reddish-black, the bases of the superior pair dark red.

Genitalia of 2nd segment shaped similarly to *propinqua* (fig. 90 on pl. 33 in LIEFTINCK, *l.c. postea*), with the hamule slightly more slender than in typical *eurybia* and with the posterior genital lobe also more drawn out than in that species.

Length: ♂ abd. + app. 32.0, hw. 40.0, diam. of head 8.0 mm.

Male (paratype). — Identical with the type except that the basal one-third of the lateral lobes of the labium (in addition to a diffuse dark line along mesial margin) is brown instead of yellow, and that the opaque dark spot at the base of the hind wings is a trifle (about half a cell) less extensive than in the other specimen.

This interesting new species is the first known representative of the *eurybia* group of *Tramea* in the Solomon Islands whence *T. propinqua* only had been reported so far. It comes closest to *eurybia* and can possibly be linked with that species, when more material might come to hand. It can be distinguished from typical *eurybia* of Celebes (and from the slightly different populations of the Papuan mainland as well) by the slenderer genital hamule and longer posterior genital lobe; it differs also in the bronzy-brown stripe at the base of the frons, which is well delimited and quite characteristic.

For a critical survey of the Indo-Australian members of *Tramea* the reader is referred to the writer's account in *Treubia*, 18: 520-541, figs & plates, 1942.

**Tramea propinqua** LIEFTINCK.

1900. RIS, Archiv f. Naturgesch., 66 : 176-177, 202 (larva).— ♂♀ New Britain (*Rosenbergi*).
1913. RIS, Cat. Coll. SELYS, Lib. 16 : 980, 986 (forma $e^3$).— ♂ New Britain (*limbata*).
1942. LIEFTINCK, Treubia, 18 : 539-540.— ♂ New Ireland.

For a discussion of this species the reader is invited to consult the writer's previous account of Oriental *Tramea*. The examples from the Bismarcks described by RIS sub *limbata*, forma $e^2$ are exactly identical with those of New Guinea and undoubtedly specifically distinct from *eurybia* cum subspp.

Structurally, *T. euryale* SELYS and *propinqua* LIEFT. are extremely close to *transmarina* BRAUER, from Fiji and Samoa, and it is not at all precluded that these forms should be linked as races of a single species. In case of their unison *euryale* and *propinqua* should be ranked subspecies of *transmarina*, as this was the first described member of the cluster (see LIEFTINCK, *loc. cit.*).

**Aethriamanta subsignata** SELYS.

1949. LIEFTINCK, Nova Guinea, N.S., 5 : 232, 235 (full references, notes).— ♂♀ "Moluques", types; ♂♀ Buru I., ; ♂ N. Celebes.

Solomons: 2 ♂ (ad.), Guadalcanal I., Jan. 1921, J. A. KUSCHE (CAS & RML).

The present examples are so close to the type, and a few other specimens from Buru and Celebes as well, that I feel little hesitation in referring them to *subsignata*. In a recent paper I have set forth the differences between it and the closely allied *nymphaeae* LIEFT., which is immediately to be distinguished among other characters by its slender abdomen, the absence of dark stripes on the thoracic pleurae, and by the presence (in places) of only one row of cells in the discoidal field of the fore wing.

The only striking point of difference between the Moluccan insect and our two males from Guadalcanal is found in the colour of the ventral surface of the abdominal tergites 2-5, which, in the latter bear a pair of squarish dark brown spots exactly similar in shape to those found on the abdomen of *nymphaeae* and an other close ally, viz the Australian *circumsignata* SELYS. I have recently examined two males of *circumsignata* in the TILLYARD collection at Sydney, one from Atherton (N.Q.), described and figured by RIS in the monograph, and a second from Brisbane (Q.), also collected by TILLYARD (Jan. 22, 1913). Both specimens agree in having the wing-bases much darker than in the allied forms, differing also from *subsignata* and *nymphaeae* in the slightly longer wings and the presence of 6-7 cells between *Rs-Rspl* instead of only 4 (very rarely 5) in *subsignata* and *nymphaeae*.

Curiously enough, our males of the Solomons correspond much more closely with the Moluccan *subsignata* than with *nymphaeae* of New

Guinea. Unfortunately the latter is still only known from a single locality, near Lake Sentani (Humboldt Bay, north coast), where a homogeneous series of both sexes has been collected.

Much more material of this interesting species group of *Aethriamanta* is needed before again linking together the few known representatives to a single polytypic species. This lumping was done for practical reasons by RIS as early as in 1913, but in the writer's opinion too little attention has been paid to differences in colour, neural characters, and 'facies'. As I have pointed out elsewhere (*loc. cit.*), the inclusion of the very distinct Indo-Malayan species *brevipennis* (RAMB.) was based on insufficient knowledge of important morphological characters.