

## NEW SPECIES AND NEW RECORDS OF FULGOROIDEA (Homoptera) FROM SAMOA AND TONGA

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*Abstract*: In this report 1 genus and 27 new species and 4 new subspecies of Fulgoroidea are described from Samoa and Tonga, and new records are listed of the occurrence of known species in these island groups. In some genera a greater degree of single island endemism has been found than hitherto recognised.

This report is based mainly on Fulgoroidea from the collections of the Bishop Museum (BISHOP), and to a lesser extent on series in the British Museum (Nat. Hist.) (BMNH). Thanks are due to Dr J. L. Gressitt, Mr J. P. Doncaster for making available the collections from these Institutions; and to Dr T. E. Woodward for the loan of Australian specimens. I am also deeply indebted to Prof. Dr H. Weidner for the loan of type material of Melichar's species of Samoan Issidae from the Godeffroy Museum, Hamburg.

Most of the Samoan specimens listed below were collected by E. H. Bryan, Jr., W. R. Kellen, O. H. Swezey, G. P. Wilder, and E. C. Zimmerman; the material from Tonga was taken by N. L. H. Krauss.

An account of the Samoan Fulgoroidea was given by Muir (1921) on the basis of series collected in Tutuila by H. C. Kellers and, in 1927, Muir extended his study with additional material from the Bishop Museum (E. H. Bryan Jr. Coll.) and from the British Museum (Nat. Hist.) (P. A. Buxton and G. H. Hopkins Coll.). The latter collection was available for examination in the course of this study. Such series in the present assemblage as merely confirmed the distributional records for species already given by Muir (1927) are not listed here. This account is concerned merely with recording new species and new localities of occurrence of known species.

The broad picture given by Muir's distributional table of Samoan Fulgoroidea (1927: 2) is one of rather high endemism in the island group, but with the endemic species occurring in several of the islands, or even in all. However, Muir was careful to record that some of his species appeared to be variable. Most of the material studied by Muir has not been seen by me, and accordingly it has not been possible to attempt a general revision of the distributional records. It has become apparent during this study that in some genera single-island speciation has occurred in Samoa to a larger extent than hitherto suspected. Moreover, in genera speciating in this manner, the extent of specific divergence, as estimated by the magnitude of the differences between the characters compared, seems to be approximately equal, and to lie between strong subspecies (or possible species) and rather weak but evident species. Where bold differences occur, as, for example, between the two species (or perhaps species-groups) of *Atylana*, there can be little doubt that both

stocks have developed in Samoa from specifically separate immigrants.

The records from Tonga are almost all new, and all elements show a clear relationship with the faunas of Samoa and Fiji.

Although it can be expected that further collecting will show the fulgoroid faunas of Samoa and Tonga to be appreciably richer than suggested by existing records, there are a few forms that have been frequently taken in Fiji, but have not been found in Samoa or Tonga, or in any islands to the east, and it would seem likely that they reach the eastern limit of their distribution in Fiji. Such forms include species of *Nesochlamys* (Cixiidae), *Melanesia*, *Nilaparvata* (Delphacidae), *Nesocore* (Derbidae), *Callichlamys*, *Callinesia*, *Nephelia* (Achilidae), and *Euricania* (Ricaniidae).

Family CIXIIDAE Spinola

Genus **Dystheatias** Kirkaldy

*Dystheatias* Kirk., 1907 (haplotype: *D. beecheyi* Kirkaldy, 1907, *ibid.*: 113).

Muir (1921) placed 2 new Samoan species, *baumanensis* and *wilkesi* in *Australoma* Kirkaldy, which was founded for an Australian species. In 1927, he referred them to *Ptoleria* Stål, which he evidently considered as the senior name for a broad concept embracing some six or seven weakly characterized genera, including *Australoma*. In so doing, however, he was apparently unaware that in this complex there was a genus still older than *Ptoleria*, this being *Eucarpia* Walker. The type species of *Ptoleria*, *P. arcuigera* Stål, was described from Ceylon and occurs in India; that of *Eucarpia*, *E. univittata* Wlk., occurs in Borneo.

The question whether this complex can be divided into distinct genera is still being studied, and for the purpose of this report I propose to use the name *Dystheatias*, a genus erected to receive a Fijian species that is close to those of the Samoan group here concerned. A comparison of the type species of *Epaustraloma*, the Fijian *simois* Fenn. with Samoan species has shown that my statement (1950: 18) that *Australoma baumanensis* Muir and *A. wilkesi* Muir belong in this genus must be considered incorrect on the narrow interpretation of generic limits here followed.

The species of *Dystheatias* in Samoa can be differentiated as follows.

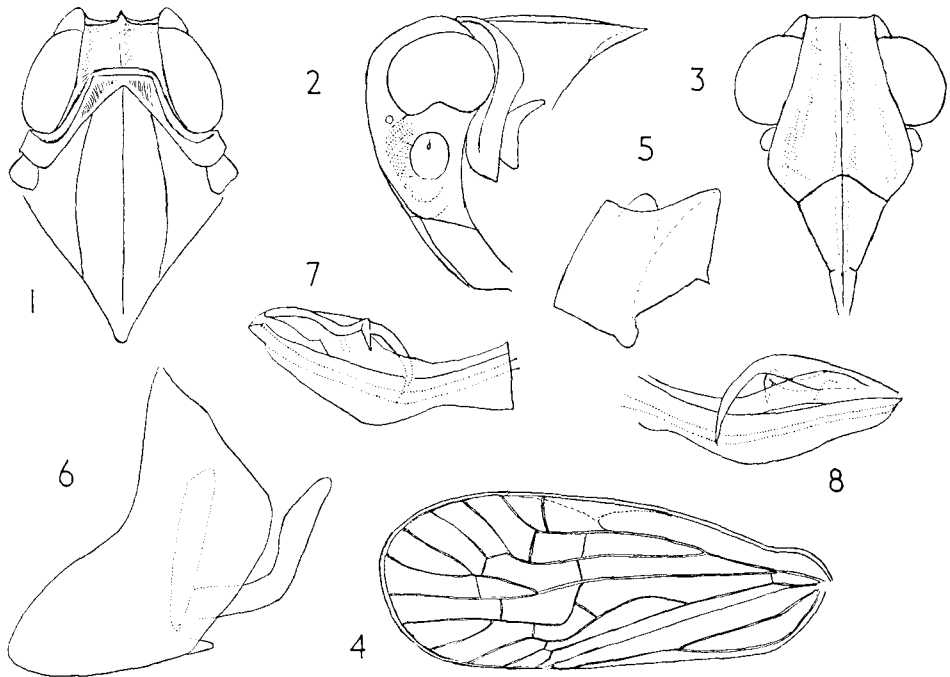
KEY TO SAMOAN SPECIES OF DYSTHEATIAS

- 1. Frons wider at widest part than at base by not less than 2.4 : 1..... 2
- Frons wider at widest part than at base by not more than 2.3 : 1 ..... 5
- 2 (1). Vertex wider at level of base of middle line than long in shortest length by at least 1.9 : 1 ..... 3
- Vertex wider at level of base of middle line than long in shortest length by 1.6 : 1..4
- 3 (2). Tegmina with stigmal cell 2× as long as broad, hyaline, with veins of corium overlain with fuscous ..... 3. **zebrina**
- Tegmina with stigmal cell less than 2× as long as broad, tegmina uniformly suffused reddish brown..... **buxtoni**
- 4 (2). Mesonotum with 2 ovate pale spots anteriorly on disc; tegmina without fuscous markings ..... 2. **bisignata**

- Mesonotum with disc unicolorous, or feebly mottled; tegmina boldly marked with fuscous. Tutuila, Upolu ..... 5. **baumanensis**
- 5 (1). Tegmina with veins of corium boldly studded with fuscous spots, membrane with a more or less distinct arcuate fuscous suffusion ..... 6. **merenda**  
 Tegmina not so marked ..... 6
- 6 (5). Frons longer in middle line than broad ..... 7  
 Frons as broad as long in middle, or broader than long ..... 8
- 7 (6). Vertex fully 2× as broad as long; mesonotal disc wider posteriorly than anteriorly; Savaii ..... 7. **zantheres**  
 Vertex wider at base than shortest length of disc by about 1.8 : 1; mesonotal disc as wide at base as at apex; Tutuila ..... 1. **tafunae**
- 8 (6). Vertex less than 1.5× as broad at base of middle line as long in shortest length; mesonotum dark castaneous-fuscous, anterior portion of carinae of disc stramineous ..... 4. **leucon**  
 Vertex more than 1.5× as broad at base of middle line as long in shortest length; mesonotum reddish brown, carinae of disc uniformly concolorous...**wilkesi**

1. **Dystheantias tafunae** Fennah, new species      Figs. 1-8.

Vertex wider at level of base of middle line than shortest length of disc (slightly more than 1.7 : 1), wider at base than at apex (1.2 : 1), frons longer in middle line than broad



Figs. 1-8. *Dystheantias tafunae*, new species: 1, vertex, pronotum and mesonotum; 2, head in profile; 3, frons and clypeus; 4, tegmen; 5, ♂ anal segment, left side; 6, pygofer and left genital style; 7, aedeagus, right side; 8, aedeagus, left side.

(1.1 : 1), wider at widest part than at base (2.1 : 1). Pale orange-brown, legs a little paler than head and thorax; abdominal terga 4-6 medially, fuscous, abdominal terga 3+4 pale green towards lateral margins. Tegmina dull yellowish hyaline, veins concolorous. Wings hyaline, a little soiled, veins fuscous.

♂. Genitalia as figured. Anal segment with lateral margin produced ventrad at middle in a small triangular lobe. Aedeagus shallowly curved upward distally, 2 long spinose processes arising dorsally at apex, directed cephalad, the process on left side subangulately decurved and apparently forming upper margin of flagellum, that on right side bisinuate, directed lateroventrad at apex. Genital styles simple, upcurved in distal 1/2. Length, 3.0 mm; tegmen, 4.2 mm.

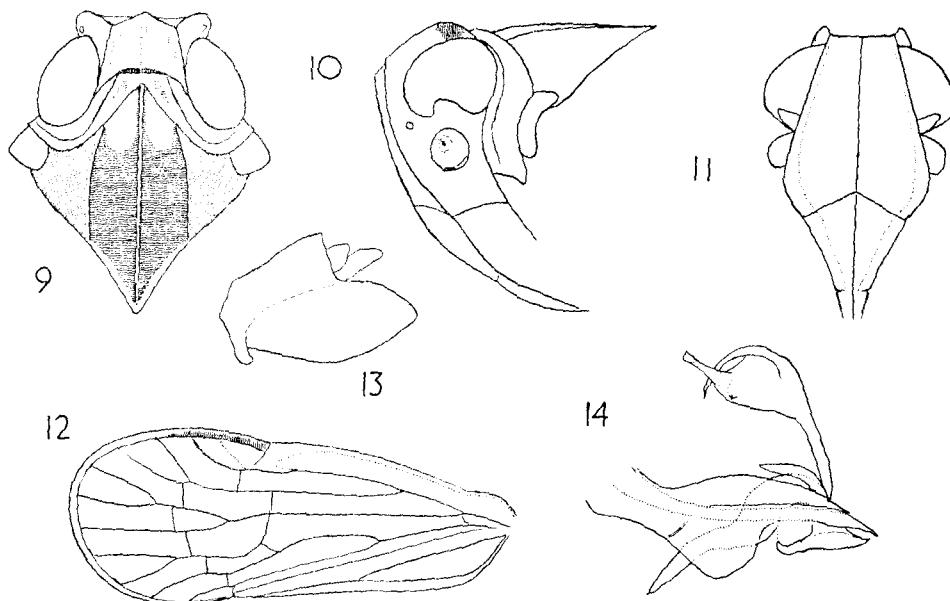
♀. Length, 3.0 mm; tegmen, 4.9 mm.

Holotype ♂ (BISHOP 7067), Samoa: Tutuila, Tafuna, 26.XII.1956, W. R. Kellen. Paratypes: ♀, same data; 2♀♀, Mapusaga, 29.XII.1956, Kellen.

This species appears to be nearest to *P. buxtoni* Muir, but differs in the proportions of the frons, the ornamentation of the aedeagus, the shape of the apical margin of the tegmen, which is more deeply rounded, and in tegminal coloration. Muir (1927) recorded the presence of *P. buxtoni* in Tutuila on the basis of a series of 6 specimens from Pago Pago, but from such details given it would seem that it is to the present species that this series belongs.

2. *Dystheatias bisignata* Fennah, new species Figs. 9-14.

Vertex wider at level of base of middle line than shortest length of disc (1.6 : 1), wider



Figs. 9-14. *Dystheatias bisignata*, new species: 9, vertex, pronotum and mesonotum; 10, head in profile; 11, frons and clypeus; 12, tegmen; 13, ♂ anal segment, left side; 14, aedeagus, left side.

at base than at apex (nearly 1.4 : 1), frons broader than long in middle line (1.1 : 1), wider at widest part than at base (2.6 : 1). Ochraceous or pale testaceous; sides of head above eyes posteriorly, posterior 2/3 of mesonotal disc, excluding hind margins, protibiae, protarsi and mesotarsi, abdomen dorsally and genitalia, fuscous; lateral fields of mesonotum and abdomen ventrally, very dilute fuscous. Tegmina hyaline, faintly infumed, veins reddish brown with evident reddish-brown setae. Wings hyaline, with fuscous veins.

♂. Genitalia as figured. Anal segment with lateral margins rather shallowly convex. Aedeagus weakly ascending caudad, a moderately short slender spinose process on right at middle, 2 unequal processes arising at apex, the lower long, stout, flattened, strongly sinuate, decurved ventrocephalad, the upper short, stout, spinose, shallowly curved; flagellum armed at middle with a rather slender curved spinose process which is directed ventrad. Genital styles simple, slightly widening distally, apical margin oblique, apical angle rounded. Length, 2.9 mm; tegmen, 4.0 mm.

♀. Length, 3.0 mm; tegmen, 5.0 mm.

Holotype ♂ (BMNH), Samoa: Upolu, Malalolelei, 610 m, VI.1924, P. A. Buxton and G. H. Hopkins. Paratypes: 4♀♀, same data; 1♀, Afiamalu, 640 m, 13.VI.1940, O. H. Swezey.

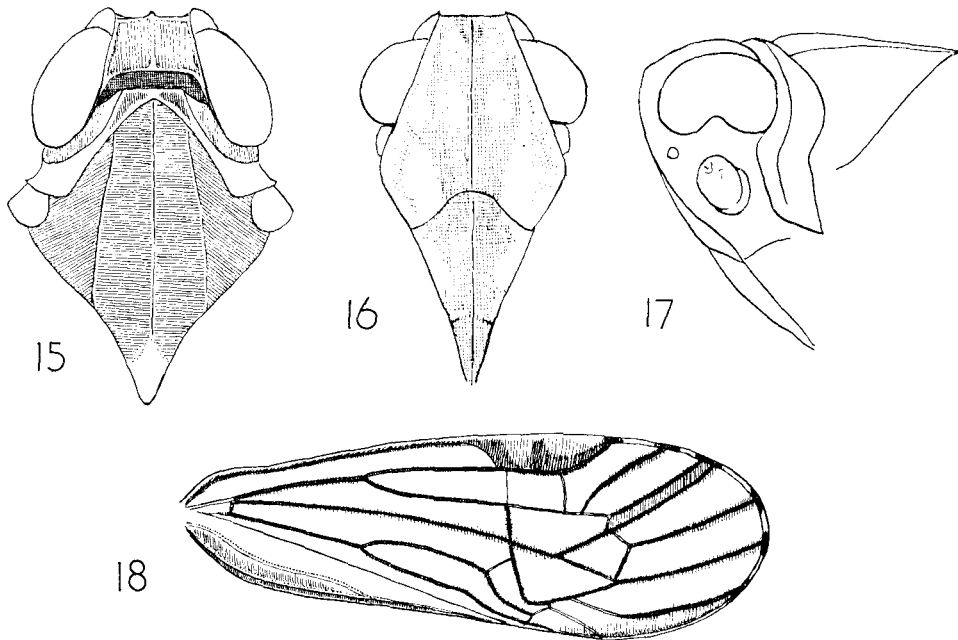
This species is easily recognisable by the proportions of the head and the unusual coloration of the intercarinal areas of the mesonotal disc, which are ochraceous in the anterior 1/3 and fuscous in the posterior 2/3. The male terminalia closely resemble those of *P. wilkesi* Muir, but differ in details of shape, of which the following are the most evident: the lower margin of the anal segment is roundly bent near the middle in *P. bisignata*, but subangulately bent in *P. wilkesi*; the dorsolateral angles of the pygofer are produced caudad more strongly than in *P. wilkesi*; the genital styles of *P. bisignata* are more strongly upcurved distad than in *P. wilkesi*, and, while the apical margin in both is oblique, it is less strongly so in *P. bisignata*, and is straight, whereas in *P. wilkesi* it is shallowly sinuate; in the aedeagus, the dorsal margin is more elevated at the middle in *P. bisignata* than in *P. wilkesi*, and the longest process is more strongly sinuate in the former species than in the latter.

### 3. *Dystheatias zebrina* Fennah, new species      Figs. 15-18.

♀. Vertex wider at level of base of middle line than shortest length of disc (1.9 : 1), wider at base than at apex (1.4 : 1), frons broader than long in middle (nearly 1.1 : 1), wider at widest part than at base (2.4 : 1). Castaneous-fuscous; carinae of head and thorax, frons and clypeus laterally, genae, antenna, lateral fields of pronotum except behind antenna, coxae, tibiae and ventrites laterally and posteriorly, stramineous. Tegmina hyaline, anterior margin and stigma fulvous, veins of corium overlain with fuscous, transverse veinlets pallid; clavus with veins pallid stramineous, cell PCu and cell A1 (submarginal) dilute castaneous fuscous. Length, 4.0 mm; tegmen, 5.2 mm.

Holotype ♀ (BISHOP 7068), Samoa: Upolu, Malalolelei, 490-550 m, 8.VII.1940, beating shrubbery, E. C. Zimmerman.

This species is morphologically distinguished by the proportions of the head and by the deeply rounded apical margin of the tegmina, but its members are most easily recognisable by the striking pattern of tegminal markings.

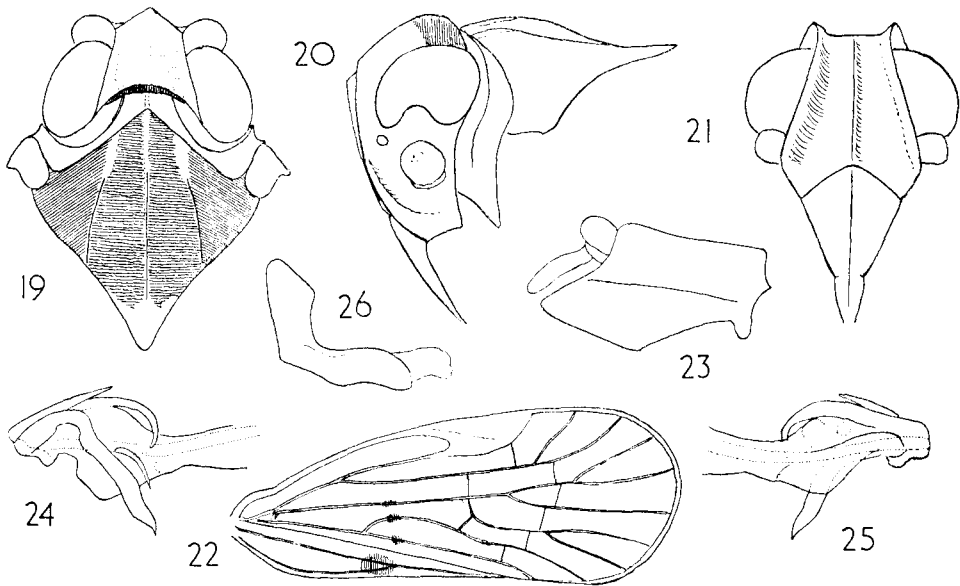


Figs. 15-18. *Dystheatias zebrina*, new species: 15, vertex, pronotum and mesonotum; 16, frons and clypeus; 17, head in profile; 18, tegmen.

4. *Dystheatias leucon* Fennah, new species      Figs. 19-26.

♂. Vertex wider at level of base of middle line than shortest length of disc (nearly 1.5 : 1), wider at base than at apex (1.3 : 1), frons as long in middle line as broad, wider at widest part than at base (2.1 : 1). Mesonotum transversely convex, sinuate in lateral view. Ochraceous or stramineous; sides of head above eyes posteriorly, mesonotum, except for carinae in anterior quarter, and hind margins, castaneous-fuscous; protarsi and mesotarsi, abdomen and genitalia more or less strongly infusate. Tegmina hyaline, distinctly tinged greenish yellow, especially on corium, a trapezoidal spot at union of claval veins, and a linear mark on each branch of Cu 1 just distad of Cu 1 fork, and a trace of a similar mark on M at same level, and apical margin, fuscous, veins otherwise concolorous. Wings hyaline, with veins and margin fuscous. Genitalia as figured. Anal segment with lateral margins shallowly subangulately bent near middle. Pygofer with dorsolateral angles each distinctly produced caudad in a rounded lobe. Aedeagus weakly ascending caudad, dorsal margin produced dorsad in a convex lobe, a short spinose process on right at middle, directed laterad, 2 unequal processes arising dorsally at apex, that on right long, stout, flattened, strongly sinuate and a little twisted, decurved ventrocephalad, that on left moderately long, spinose, almost straight, directed cephalad; flagellum armed at middle with a rather slender curved spinose process which is directed ventrad. Genital styles simple, slightly widening distally, apical margin oblique, ventral apical angle rounded, dorsal apical angle obtuse. Length, 4.0 mm; tegmen, 4.5 mm.

Holotype ♂ (BISHOP 7069), Samoa: Upolu, Afiamalu, 670 m, 30.VI.1940, O. H. Swezey.



Figs. 19-26. *Dystheatias leucon*, new species: 19, vertex, pronotum and mesonotum; 20, head, pronotum and mesonotum, lateral view; 21, frons and clypeus; 22, tegmen; 23, ♂ anal segment, right side; 24, aedeagus, right side; 25, aedeagus, left side; 26, right genital style.

This species is recognisable by its rather strongly domed, polished mesonotum of a general chocolate hue against which the anterior portions of the mesonotal carina stand out boldly in straw yellow. From *P. bisignata*, which also occurs in Afiamalu, it is distinguished by the proportions of the head, by details of male genitalic structure, and markedly by coloration.

5. *Dystheatias baumanensis* (Muir), new combination

*Australoma baumanensis* Muir, 1921 : 568.

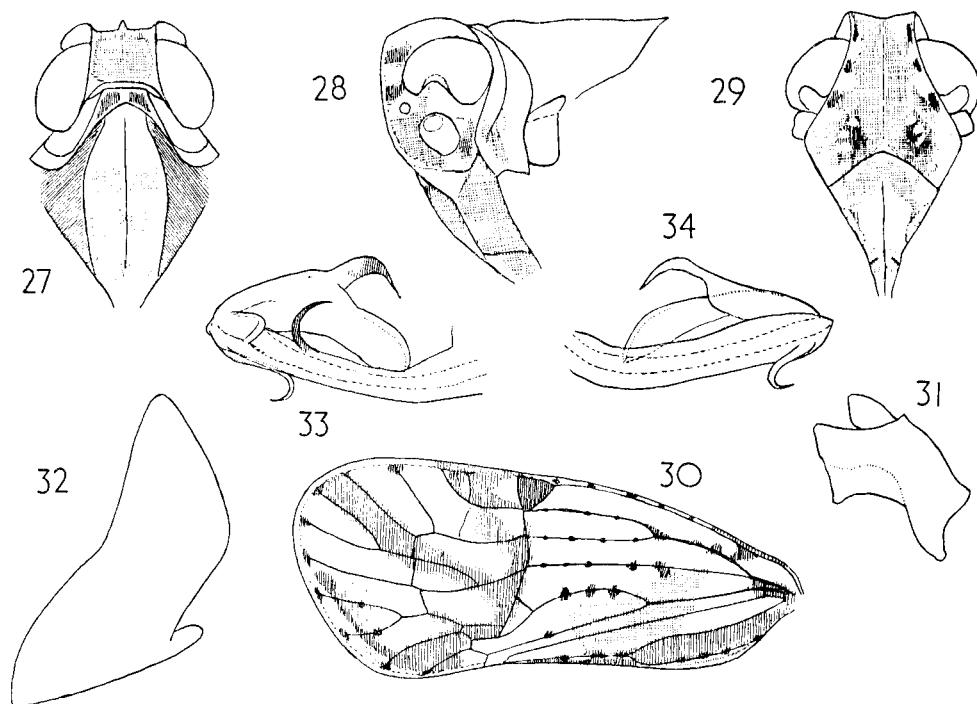
6. *Dystheatias baumanensis odenatus* Fennah, new subspecies Figs. 27-34.

Vertex wider at level of base of middle line than shortest length of disc (nearly 1.4 : 1), frons as broad as long in middle line, wider at widest part than at base (about 2.5 : 1). Coloration as in typical subspecies, with following differences in tegmina: posterior claval vein pallid on intervals between fuscous spots, cell between this vein and hind margin clear hyaline, tegminal margin between fuscous spot at claval apex and that at apex of Cu 1b, pallid.

♂. Genitalia as figured. Similar to those of typical subspecies, but with ventral apical spinose process recurved ventrocaudad near its tip, the lateral spinose process on right side of aedeagus relatively long and slender, and spinose process of flagellum relatively broader than in typical subspecies. Length, 2.9 mm; tegmen, 4.5 mm.

♀. Length, 3.5 mm; tegmen, 4.7 mm.

Holotype ♂ (BMNH) of subspecies, Samoa: Upolu, Malolelei, 610 m, VI.1924, P. A. Buxton and G. H. Hopkins. Paratypes: 2♀♀, same data.



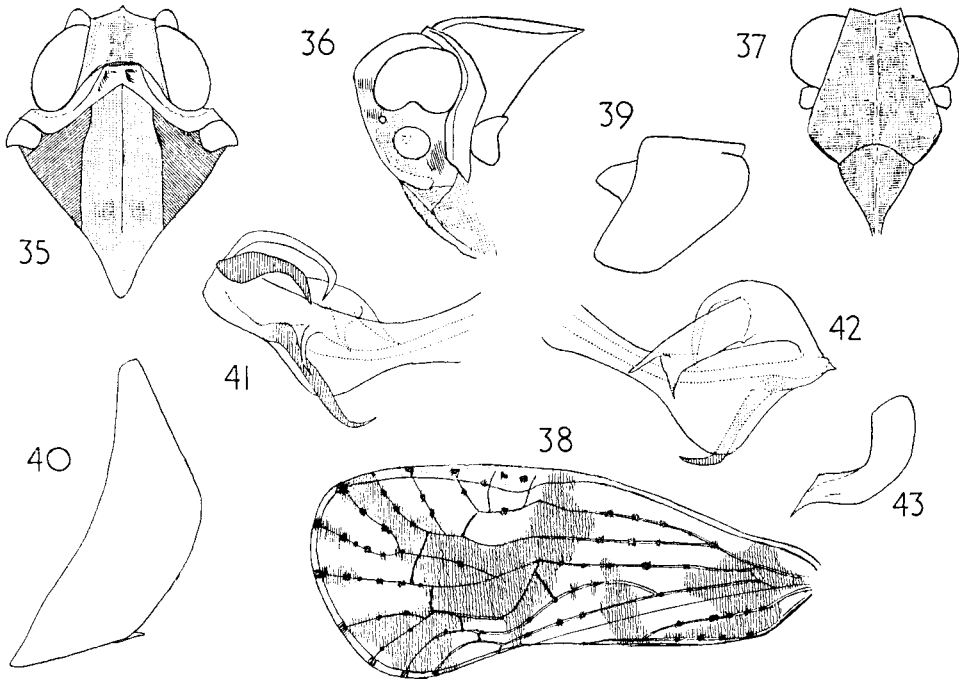
Figs. 27-34. *Dystheatias baumanensis odenatus*, new subspecies: 27, vertex, pronotum and mesonotum; 28, head, pronotum and mesonotum, lateral view; 29, frons and clypeus; 30, tegmen; 31, ♂ anal segment, right side; 32, pygofer, left side; 33, aedeagus, right side; 34, aedeagus, left side.

This subspecies is readily recognisable by the color characters of the tegmina. In the typical subspecies the posterior claval vein is more or less infuscate between the darker fuscous spots, and the narrow area between this vein and the hind margin is fuscous or castaneous-fuscous; the tegminal margin between the fuscous spot at the claval apex and that at apex of Culb is infuscate.

7. *Dystheatias merenda* Fennah, new species      Figs. 35-43.

Vertex wider at base of middle line than shortest length of disc (nearly 1.8 : 1), wider at base than at apex (nearly 1.3 : 1), frons as broad as long in middle line, or nearly so, wider at widest part than at base (2 : 1). Testaceous; disc of frons, clypeus, genae, lateral lobes of pronotum on their inner 1/2, lateral fields of mesonotum, mesopleura, 4 longitudinal bands on posterior 1/2 of abdomen dorsally, and a suffusion on ventrites and valvifers of ovipositor, fuscous; a spot on each side of clypeal disc basally, 2 spots on lateral margins of frons before eyes, 2 transverse bands on procoxa and mesocoxa, and on all femora and tibiae, fuscous-piceous; vertex, disc and posterior margin of lateral lobes of pronotum, and disc of mesonotum, stramineous. Tegmina hyaline, a broad band across base, a narrower band from union of claval veins to middle of tegmen, a broad crescentic band from costal cell at apex to Cu 1b, thence to apical margin in R and M1a, and a





Figs. 35-43. *Dystheatias merenda*, new species: 35, vertex, pronotum and mesonotum; 36, head, pronotum and mesonotum, lateral view; 37, frons and clypeus; 38, tegmen; 39, ♂ anal segment, right side; 40, pygofer, left side; 41, aedeagus, right side; 42, aedeagus, left side; 43, left genital style.

broad suffusion on each side of each apical vein, castaneous-fuscous, veins sparsely and boldly spotted with fuscous, but Sc, R, M, and veins R-M, M-Cu concolorous in infuscate areas basad of distal line of transverse veinlets. Wings anteriorly hyaline, rather infuscate distally and posteriorly, veins concolorous in hyaline area, fuscous in infuscate areas.

♂. Genitalia as figured. Anal segment with lateral margins shallowly convex. Aedeagus weakly ascending distad, with a vertical, deeply rounded lobe ventrally, a rather long slender, weakly curved spinose process on right near middle, directed laterad to right, a long taeniate process arising ventrally on right near apex, directed ventrocephalad, slightly twisted and strongly curved cephalad in its distal 1/5; a shorter stout curved process arising dorsally on right at apex, directed cephalad, decurved distally; flagellum armed at middle with a moderately long, stout spinose process directed to right, and at apex with 2 more slender spinose processes directed to left. Genital styles simple, curved upward distally, apical margin oblique. Length, 3.0 mm; tegmen, 4.3 mm.

♀. Length, 3.0 mm; tegmen, 5.0 mm.

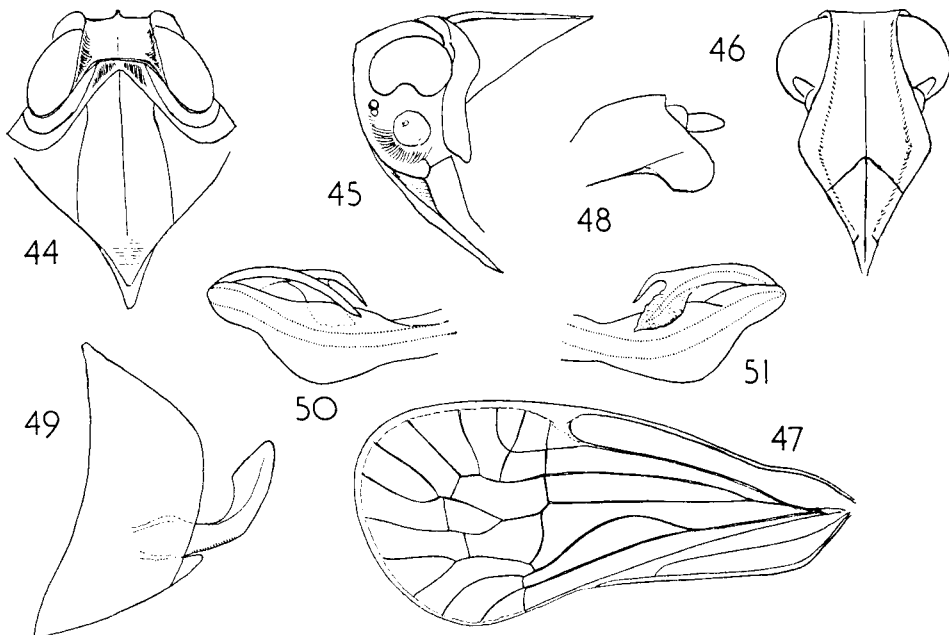
Holotype ♂ (BMNH), Samoa: Upolu, Malalolelei, 610 m, VI.1924, P. A. Buxton and G. H. Hopkins. Paratypes: 1♂, 1♀, same data; 5♀♀, Mafa Pass Rd., II.1955, N. L. H. Krauss.

SPECIMENS EXAMINED: 1♂, 2♀♀, Apia, 29.III.1924, Buxton & Hopkins; 2♂♂, 2♀♀, Vailima, I, XII.1925, Buxton & Hopkins; 1♂, 1♀, Tutuila, 270 320 m, 420 m, 18.IV., 18.XII. 1921, H. C. Kellers.

This species closely resembles heavily pigmented forms of the Upolu population of *D. baumanensis*, but can be distinguished from this species by the stigmal cell (Sc) being clear hyaline, by the bold fuscous stripe from the middle of the clavus to the middle of the corium, and (though less dependably) by the pallid mesonotal disc. This species belongs to the *wilkesi* group, but differs strongly from the other species in coloration, as well as in details of genitalic structure.

8. *Dystheatias zantheres* Fennah, new species      Figs. 44-51.

♂. Vertex wider at level of base of middle line than shortest length of disc (2:1), wider at base than at apex (1.3:1), frons longer in middle line than broad (1.2:1), wider at widest part than at base (2:1). Uniformly pale yellowish brown. Tegmina sordid yellow, hyaline, veins concolorous, overlain at margin with a dilute yellowish-brown suffusion, transverse veinlets dilute yellowish brown. Wings hyaline, veins distally fuscous. Genitalia as figured. Anal segment asymmetrical, with distal margin shallowly produced ventrad on left in a subrectangular lobe. Pygofer with dorsolateral angles obtusely rounded. Aedeagus shallowly curved upward distally, a spinose process arising on right at apex and extending cephalad for half length of aedeagus, flagellum arising on left at apex, armed dorsally at 2/3 from its base with a shallowly decurved spinose process. Genital styles simple, in lateral view curved dorsad at middle, with dorsal margin curved almost through 90°; apical margin oblique. Length, 2.9 mm; tegmen, 3.4 mm.



Figs. 44-51. *Dystheatias zantheres*, new species: 44, vertex, pronotum and mesonotum; 45, head, pronotum and mesonotum, lateral view; 46, frons and clypeus; 47, tegmen; 48, ♂, anal segment, left side; 49, pygofer and left genital style; 50, aedeagus, right side; 51, aedeagus, left side.

Holotype ♂ (BISHOP 7070), Samoa: Savaii, Safune, rain forest, 610-1220 m, 2.V.1924, E. H. Bryan, Jr.

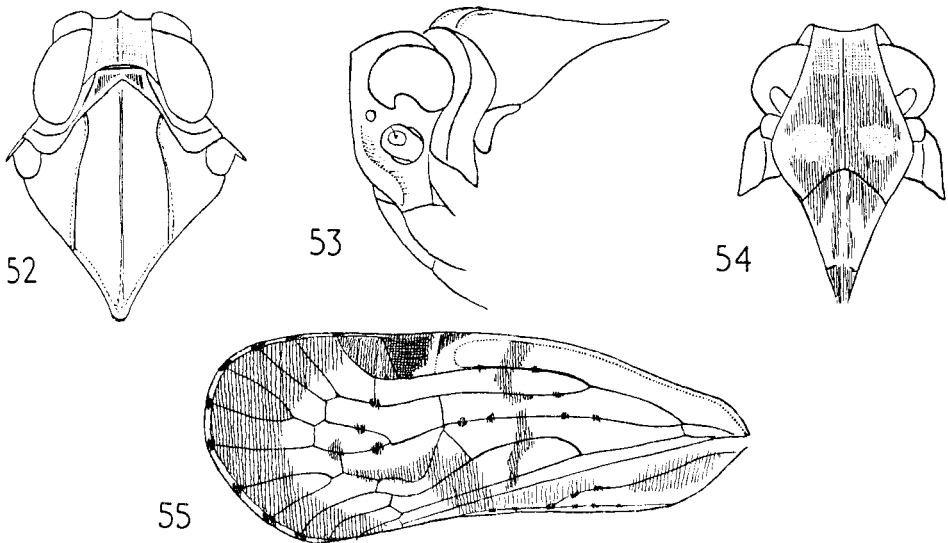
In general appearance this species resembles *D. tafunae*, but is easily separable by the characters given in the key. In the male genitalia the 2 species differ abundantly in the shape of the anal segment and in the shape of the aedeagus, as well as of its processes. In *D. tafunae* the pygofer, in lateral view, is widest at the middle, whereas in *D. zantheres* it is widest a little dorsad of the middle. The genital styles of both species are similar in shape, but those of *D. tafunae* are relatively a little longer.

9. *Dystheatias periander* Fennah, new species Figs. 52-55.

♀. Vertex wider at base of middle line than shortest length of disc (1.5 : 1), a little wider at base than at apex (1.1 : 1), frons as broad as long in middle line, wider at widest part than at base (2.3 : 1). Dilute fuscous; a subquadrate spot in each compartment of frons basally, and a larger spot at level of antenna, pale yellowish brown, legs and pleura testaceous; margins and carinae of vertex, pronotum and mesonotum, stramineous. Tegmina dilute fuscous, darker in apical cells, apical margin between R and Cu 1a, except at point of junction with each apical vein of M, stramineous; veins concolorous with ground, more or less regularly beset with darker brown spots, posterior claval vein stramineous, with 8 small castaneous-fuscous spots; stigmal cell castaneous-fuscous. Length, 3.0 mm; tegmen, 5.0 mm.

Holotype ♀ (BISHOP 7071), Tonga: Eua I., Ohonua, II.1956, N. L. H. Krauss. Paratype: 1♀, same data.

This species is nearest in proportions of the head to *D. merenda*, though there is sufficient difference in these characters to distinguish them. The most obvious differences are in



Figs. 52-55. *Dystheatias periander*, new species: 52, vertex, pronotum and mesonotum; 53, head, pronotum and mesonotum, lateral view; 54, frons and clypeus; 55, tegmen.

the coloration; the legs of *D. periander* are uniformly testaceous, not boldly banded with dark fuscous as in *D. merenda*, and the two small cells distad of the costal cell are castaneous-fuscous, not clear hyaline. It is distinguishable from *D. baumanensis* by the relatively narrower tegmina and by the absence of transverse bands on the legs.

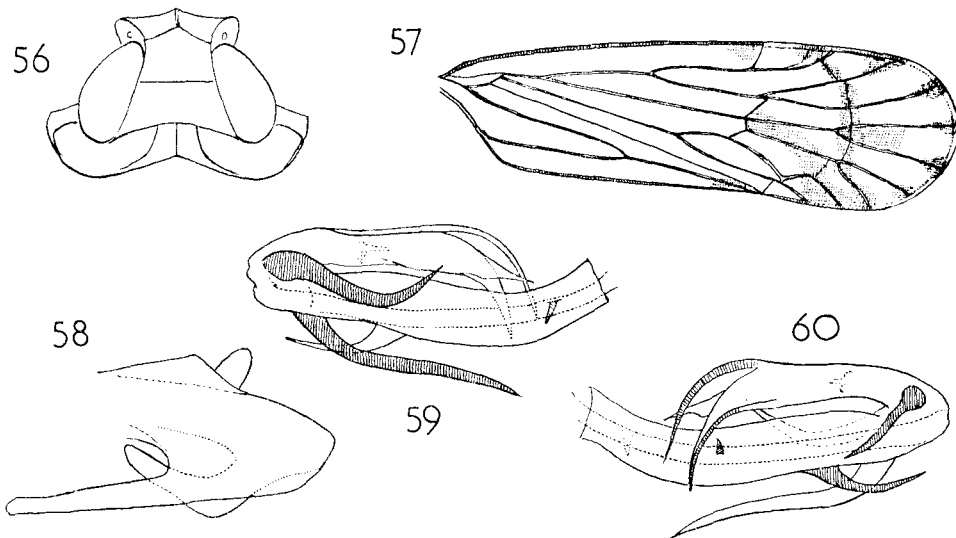
### Genus *Myndus* Stål

*Myndus* Stål, 1862: 307 (logotype: *Flata musiva* Germar, 1825: 21).

#### 10. *Myndus diores* Fennah, new species Figs. 56-60.

Vertex broader at base of middle line than long in middle (1.1 : 1). Frons as broad as long in middle. Testaceous; intercarinal areas of frons, clypeus and vertex except towards margins, antenna anteriorly except for a round spot, pronotum behind eyes, pleura, coxae and femora, abdomen except at margins, and genitalia dorsally, fuscous; mesonotum dark reddish brown. Tegmina hyaline, with dusky suffusion, costal and commissural margins narrowly dark fuscous, apical margin and a suffusion overlying each apical vein, fuscous, veins otherwise concolorous. Wings dilute fuscous, with fuscous veins.

♂. Anal segment moderately long, anal foramen situated at middle, lateral margin of left side distad of middle strongly produced anteroventrad in a long tapering process, lateral margin of right side near apex strongly produced anteriorly in a parallel-sided flattened lobe that curves dorsad near its apex. Pygofer moderately long, with dorsolateral angle of right side produced caudad in a spatulate lobe; dorsolateral angle of left side not at all produced, medioventral process elongate-triangular with sides convex. Aedeagus rather long, tubular, a spinose process ventrally 2/3 from base directed caudad and reaching almost to level of apex, a long spinose process arising ventrally near apex, directed



Figs. 56-60. *Myndus diores*, new species: 56, Vertex and pronotum; 57, tegmen; 58, ♂, anal segment, left side; 59, aedeagus, right side; 60, aedeagus, left side.

anteriorly below aedeagus for  $\frac{3}{4}$  of length of aedeagus, a very small spinose process dorsally on left at  $\frac{1}{3}$  from base, directed dorsad; a larger spinose process on right side dorsally at  $\frac{1}{4}$  from base directed laterad; a shallowly curved spinose process on right at apex extending cephalad for rather less than  $\frac{1}{2}$  of length of aedeagus, and a corresponding but shorter process on left side at apex; flagellum with 2 decurved spinose processes distally on its left side. Genital styles rather long, narrow, with ventral margin shallowly sinuate, dorsal margin shallowly convex in basal  $\frac{2}{3}$ , excavate in distal  $\frac{1}{3}$ , apical margin horizontal, with basal angle rectangulate, distal angle deeply rounded. Length, 3.0 mm; tegmen, 3.5 mm.

♀. Length, 3.1 mm; tegmen, 3.7 mm.

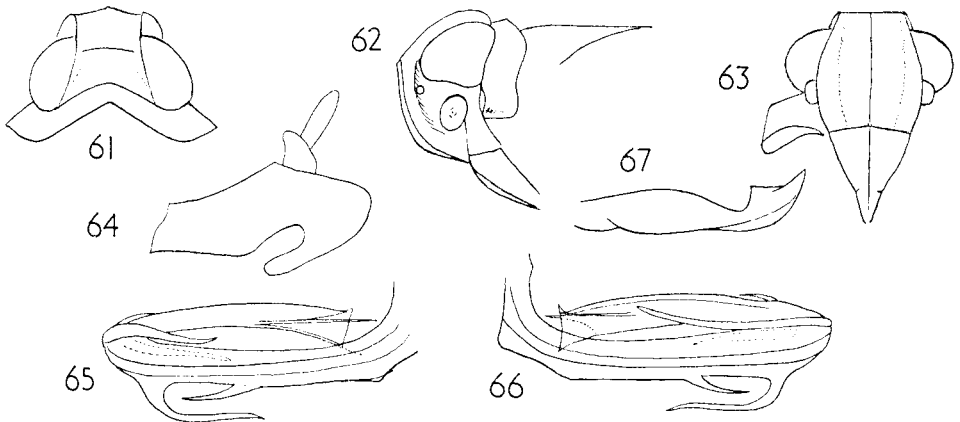
Holotype ♂ (BISHOP 7072), Samoa: Upolu, Afiamalu, 670 m, 30.VI.1940, O. H. Swezey. Paratypes: 2♂♂, 4♀♀, Afiamalu, 640-670 m, 25.VI.4.VII.1940, Zimmerman & Swezey; 2♂♂, Tapatapao, Lanutoo Trail, 370-400 m, 21.VII.1940, Zimmerman & Swezey; 2♂♂, 3♀♀, Sinaele, 430 m, 27.VII.1940, on *Balaka*, Swezey, beating, Zimmerman.

This species is immediately separable from *M. semibrunneus* and *M. seminiger* by the coloration of the tegmina. The genitalic structure and coloration indicate a close relationship with *M. roggeweyni* Muir and *M. sordidus* Muir, species so far known from Tutuila and Savaii, respectively, but in details of structure the genitalia differ appreciably from both, though nearer to the latter than to the former.

11. *Myndus nivalis* Fennah, new species Figs. 61-67.

Vertex broader at base of middle line than long in middle (nearly 1.2 : 1). Frons very slightly longer in middle than broad. Uniformly pallid stramineous; ♀ with protibia, protarsus, and 3rd valvulae of ovipositor, fuscous. Tegmina hyaline, veins concolorous, tubercles visible as white points. Wings hyaline, iridescent, veins concolorous.

♂. Anal segment moderately long, bilaterally symmetrical, anal foramen situated just distad of middle, lateral margins excavate distad of middle, lateroapical angles each strong-



Figs. 61-67. *Myndus nivalis*, new species: 61, vertex and pronotum; 62, head, pronotum and mesonotum; 63, frons, clypeus, and right lateral lobe of pronotum; 64, ♂ anal segment, left side; 65, aedeagus, right side; 66, aedeagus, left side; 67, left genital style.

ly produced ventrocephalad in a laterally-compressed finger-like lobe. Pygofer moderately long with dorsolateral angles moderately produced caudad in an obtusely rounded lobe, medioventral process rather longer than broad at base, subtriangular or turbinate. Aedeagus rather long, tubular, a short spinose process in middle line ventrally at 2/3 from base, directed caudad, distad of this process, and also in middle line ventrally, a longer spinose process directed ventrad then cephalad; a moderately long spinose process on right at apex directed cephalad, a much longer spinose process on left at apex directed cephalad; flagellum 3/4 of length of basal portion of aedeagus, bearing a small spinose process, directed cephalad, on left near base, and a longer spinose process on left 2/3 from base, directed cephalad. Genital styles rather long, narrow, with ventral margin shallowly sinuate, dorsal margin shallowly convex in basal 2/3, strongly excavate in distal 1/3, apical margin almost horizontal, shallowly excavate. Length, 3.5 mm; tegmen, 3.8 mm.

Holotype ♂ (BISHOP 7073), Samoa: Upolu, Afiamalu, 670 m, 27.VI.1940, O. H. Swezey. Paratypes: 2♂♂, 2♀♀, same data; 1♀, Tiavi, 640 m, 21.VI.1940, on *Heliconia*, Swezey.

This species is distinguished from all other Samoan species by the anal segment of the ♂ being bilaterally symmetrical, or practically so, by the broadly produced and symmetrical laterodorsal angles of the pygofer, by the shape of the aedeagal processes, and of the apical portion of the genital styles, and by the pallid coloration.

#### Genus *Oliarus* Stål

*Oliarus* Stål, 1862: 306 (logotype: *Cixius walkeri* Stål, 1859: 272).

#### 12. *Oliarus felis* Kirkaldy

*Oliarus felis* Kirk., 1906: 399.

SAMOA: 1♂, Upolu, Apia, 14.VII.1940, O. H. Swezey.

This species was described from Queensland and has been reported from Fiji.

#### Family DELPHACIDAE Leach

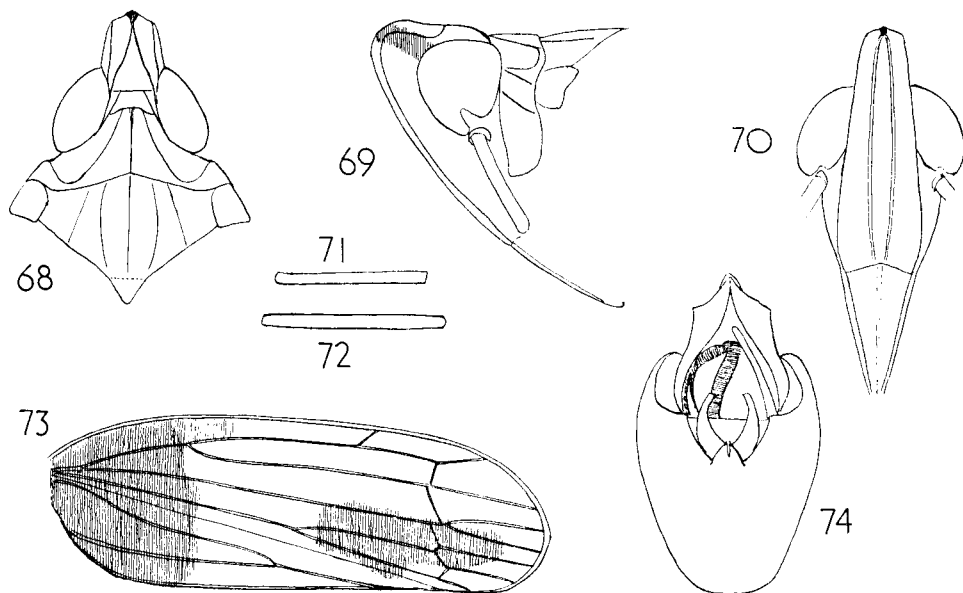
#### Genus *Ugyops* Guérin-Ménéville

*Ugyops* Guérin-Ménéville, 1834: 477 (haplotype: *U. percheronii* Guérin-Ménéville, *op. cit.*).

#### 13. *Ugyops tonganus* Fennah, new species      Figs. 68-74.

Vertex longer in middle line than broad (approximately 1.4:1), apex a little narrower than base measured at level of base of middle line, sublateral carinae meeting at apex in a median callus, transverse carina weak, at level of anterior margin of eyes; frons longer than broad (2.8:1), submedian carinae leaving common basal callus separately and remaining separate to frontoclypeal suture, genae weakly tumid; antenna cylindrical, basal segment longer than broad (about 11:1), segment 2 not quite 1.2× length of 1. Ocelli absent. The 2 carinae at each lateral margin of pronotum sharply defined. Tegmina slightly surpassing abdomen. Wings almost as long as tegmina.

♂. Anal segment bilaterally symmetrical, ventrolateral margins shallowly convex throughout, sides strongly declivous, each very shallowly longitudinally sulcate, apical margin



Figs. 68-74. *Ugyops tonganus*, new species: 68, vertex, pronotum and mesonotum; 69, head, pronotum and mesonotum; lateral view; 70, frons and clypeus; 71, basal segment of antenna; 72, 2nd segment of antenna; 73, tegmen; 74, ♂ genitalia, posterior view.

acute at middle. Pygofer with lateral margins convex, each inflected mesad in lower  $1/2$ , medioventral process moderately large, triangular, deeply and rather widely cleft medially at apex. Genital styles simple, each shallowly curved, narrowed and slightly compressed distally, obliquely truncate or narrowly rounded at apex. (Coelopterous). Length 5.5mm; tegmen 4.5 mm.

♀. Ovipositor with 1st valvifers with a notch on inner margin near base. Pale stramineous; frons between submedian carinae, red; apex of vertex, a suffusion on sides of head above eyes, antennal segment 2, metapleura, postcoxa, post-femur, anal segment and pygofer except laterally, fuscous; foreleg, middle leg, post-tibia and post-tarsus, testaceous. Tegmina hyaline, tinged stramineous, basal  $1/3$  and an elongate ovate suffusion in distal  $1/3$  overlying M and Cu 1a, dark castaneous. (Coelopterous). Length 6.7 mm; tegmen 5.5 mm.

Holotype ♂ (BISHOP 7074), Tonga Is.: Eua I., Ohonua, II.1956, Krauss. Paratypes: 1♂, 5♀♀, 1 nymph, same data.

This species is apparently nearest to *U. rufus* Muir from Samoa, but differs in its relatively broader frons, more distinctly angulate apex of the head in profile, in the anterior margin of the eye being markedly less rounded, so that the eye appears rounded-triangular, in the lateral margins of the pronotum being distinctly bicarinate, whereas no distinct carinae occur laterally in *U. rufus*, in Sc+R forking in the basal  $1/3$  of the tegmina, and in the 1st valvifers being rectangularly notched on their mesal margin near base, the valvifers of *U. rufus* (type specimen) being only shallowly excavate at this point. It differs from *U. kellersi* in the more elongate frons, the shape of the vertex, the pronounced pair of carinae at each lateral margin of the pronotum, the proportions of the antennal segments,

the conformation of the 1st valvulae at their base, and the ♂ genitalia. In the series available the color pattern is reasonably constant, and alone would serve to distinguish the species. It differs from *U. bougainvillei* in the relatively longer frons and in antennal proportions.

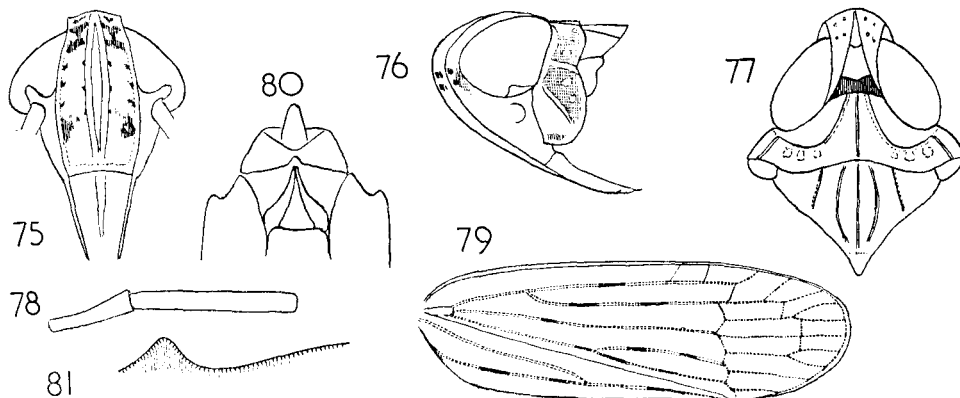
14. *Ugyops andraemon* Fennah, new species      Figs. 75-81.

Head in profile deeply rounded apically. Vertex longer than broad (1.2 : 1), wider at apex than at base, sublateral carinae contiguous at apex, transverse carina weak, a little posterior to level of anterior margin of eyes, frons longer than broad (1.9 : 1), submedian carinae contiguous basally, separated distally and not attaining fronto-clypeal suture, genae markedly tumid; antenna cylindrical, basal segment longer than broad at apex (4 : 1), segment 2 is 2× length of 1; ocelli represented by a scar. Two distinct carinae at each lateral margin of pronotum. Tegmina moderately surpassing apex of abdomen. Wings almost as long as tegmina. Stramineous; 4 pairs of spots on vertex, an interrupted bar across frons at base and a paler and less distinct transverse bar in apical 1/4, castaneous; antennal segment 2 distally, intercarinal areas of pronotum and mesonotum laterally, diffusely marbled with fuscous; 2 pale bands on pro- and mesotibiae, yellowish brown. Tegmina stramineous-hyaline, a small fuscous spot on Sc+R, veins otherwise marked sparsely with pale reddish brown.

♂. Anal segment bilaterally symmetrical, lateral margins weakly convex, almost straight, sides strongly declivous, apical margin shallowly incised medially. Pygofer with lateral margins in side view strongly oblique, in lower 1/2 produced caudad in a subspinose lobe, medioventral process moderately large, scoop-like, apical margin transverse. Length, 5.6 mm; tegmen 5.3 mm.

♀. Ovipositor with 1st valvifers with inner margin produced mesad in a subrectangular lobe near base. Length, 6.5 mm; tegmen, 5.7 mm.

Holotype ♂ (BMNH), Tonga Is., Distant coll., 1911-383. Paratype 1 ♀, same data.



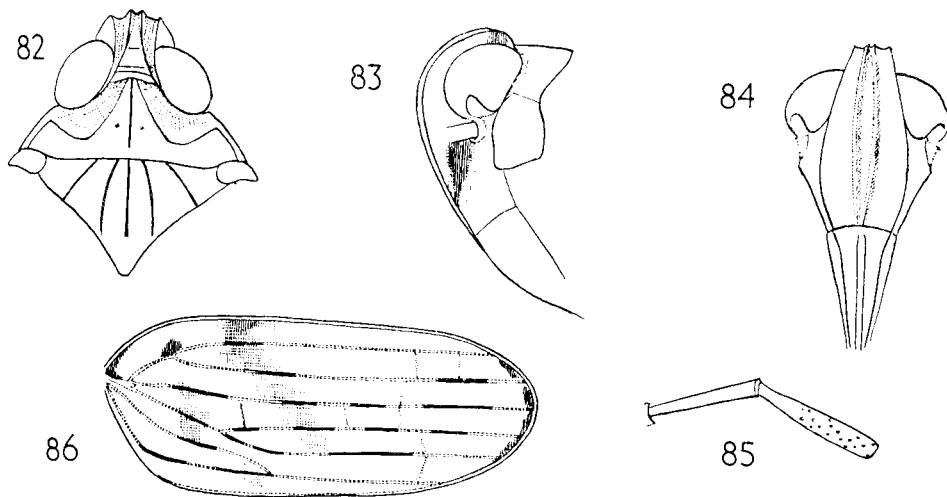
Figs. 75-81. *Ugyops andraemon*, new species: 75, frons and clypeus; 76, head, pronotum and mesonotum, lateral view; 77, vertex, pronotum and mesonotum; 78, antenna; 79, tegmen; 80, ♂ genitalia, posterior view; 81, inner margin of basal portion of valvifer.



This species is close to *U. samoensis* Muir but differs in its larger size, in the more rounded profile of the head, proportions of the antenna, relative length of the tegmina and in the shape of the lateral margin of the pygofer.

15. *Ugyops petina* Fennah, new species Figs. 82-86.

♀. Vertex declivous, as long in middle as broad at base of middle line, apex slightly wider than base, lateral margins shallowly sinuate, sublateral carinae not meeting at apex, but continuing separately on to frons, transverse carina fine, weak, basad of level of anterior margin of eyes; frons longer than broad (2.1 : 1), submedian carinae separate from base to apex, each weakly arcuate, and attaining frontoclypeal suture; genae only very weakly tumid; antenna cylindrical, basal segment gradually expanding distad, longer than broad at apex (5 : 1), segment 2 longer than 1 (1.2 : 1), ocelli represented only by a faint scar; pronotum with a single carina, incomplete anteriorly, at each lateral margin between eye and tegula, lower lateral angles in anterior view subrectangulate. Post-tibia laterally tripinose. Tegmina coelopterous. Wings absent. Ovipositor with first valvifers with inner margin entire throughout, not at all sinuate or notched. Yellowish brown; frons between submedian carinae, a spot above each eye, an oblique stripe across genae, antennal segment 2 except at middle, all coxae, mesopleura and metapleura, and abdomen except at posterior margin of each segment, fuscous; submedian carinae of frons, an oblique suffusion across genae overlying fuscous area, and posterior margin of each abdominal segment, crimson red, pronotum except on anterior 1/2 of lateral lobes and mesonotum except on scutellum, reddish brown. Tegmina translucent, with pale testaceous tinge, a diffuse oblique fascia across middle from costa to commissural margin, fuscous; veins ochraceous, a spot at base of *C*, a quadrate spot near fork of *Sc* and *R*, a transverse spot basad of *Cu 1* fork, and a spot at junction of claval veins, fuscous. (Coelopterous). Length, 5.3 mm; tegmen, 4.0 mm.



Figs. 82-86. *Ugyops petina*, new species: 82, vertex, pronotum and mesonotum; 83, head in profile; 84, frons and clypeus; 85, antenna; 86, tegmen.

Holotype ♀ (BISHOP 7075), Tonga Is: Nukualofa, 8.I.1925, G. P. Wilder.

This species is separable from *U. tonganus* by the proportions of the vertex, and from *U. brevipennis* Muir by the more shallowly convex profile of the head, and from *U. bougainvillei* Muir and *U. rufus* in the more rounded profile of the head. From *U. bougainvillei* it also differs in the outer and lower margins of the lateral lobes of the pronotum meeting almost rectangulately, and from *U. rufus* it differs substantially in antennal proportions.

#### Genus *Sardia* Melichar

*Sardia* Melichar, 1903: 96. (haplotype: *S. rostrata* Melichar).

#### 16. *Sardia rostrata* Melichar

*Sardia rostrata* Mel., 1903: 96.

TONGA IS.: 21♂♂, 11♀♀, Tongatabu I., Nukualofa, II.1956, 5♂♂ Vavau I., Neiafu, II. 1956, 1♂, Falevai, II. 1956, 1♀ Eua I., Ohonua, II.1956, N. L. H. Krauss.

#### Genus *Sogatella* Fennah

*Sogatella* Fennah, 1956: 471 (orthotype: *Delphax furcifera* Horvath, 1899: 372).

#### 17. *Sogatella eupompe* (Kirkaldy)

*Delphax eupompe* Kirk., 1907: 162.

TONGA IS.: 12♂♂ Eua I., Ohonua, II.1956, Krauss.

#### 18. *Sogatella kolophon* (Kirkaldy)

"*Delphax*" *kolophon* Kirk., 1907: 157.

TONGA IS.: 1♀, Tongatabu I., Nukualofa, II.1956, Krauss.

#### 19. *Corbulo dodona* Fennah

*Corbulo dodona* Fenn., 1965: 48.

TONGA IS.: 3♂♂, Tongatabu I., Nukualofa, II.1956, 2♂♂, Eua I., Ohonua, II.1956, 4♂♂, Vavau I., Neiafu, II.1956, Krauss.

#### 20. *Sogatella longifurcifera* Esaki & Ishihara

*Delphacodes longifurcifera* Es. & Ish., 1947: 41.

TONGA IS.: 1♂, Vavau I., Neiafu, II.1956, Krauss.

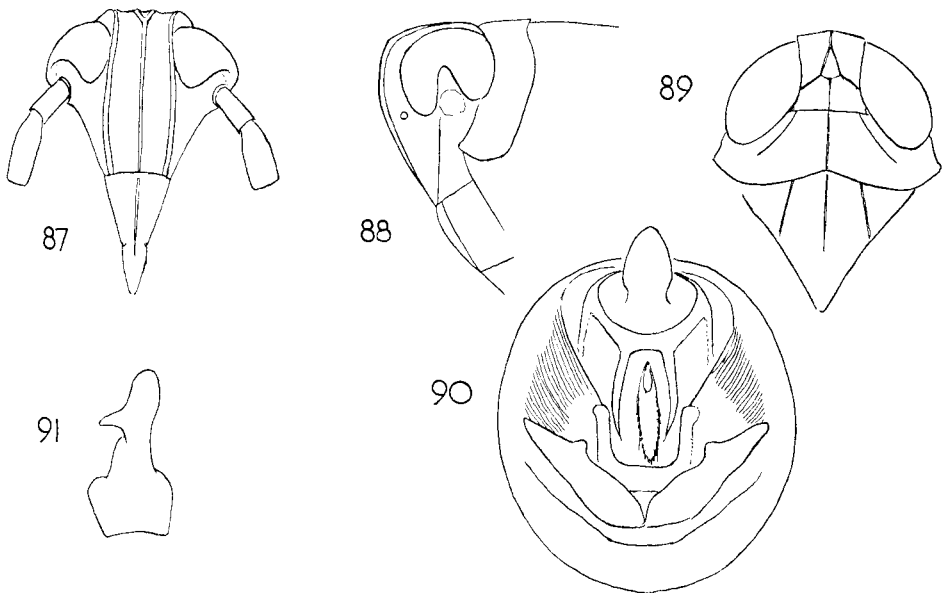
#### Genus *Toya* Distant

*Toya* Distant, 1906: 472 (orthotype: *T. attenuata* Distant, *ibid.*).

#### 21. *Toya trophonius* Fennah, new species      Figs. 87-91.

♂. Vertex as long submedially as broad at base, smoothly rounding into frons, slightly wider at apex than at base, lateral margins almost straight, slightly concave, apical margin weakly subangulately convex, Y-shaped carina feeble, submedian carinae uniting at apex of vertex, or at extreme base of frons, basal compartment of vertex wider at hind

margin than greatest length (1.8 : 1), and than median length (2.0 : 1), frons in middle line longer than wide at widest part, not quite 2.3 : 1, widest at 2/3 from base, lateral margins very shallowly convex, almost straight, median carina simple; clypeus at base very little wider than frons at apex, postclypeal disc as broad at base as long in middle line, in profile shallowly convex, anteclypeus in profile rather strongly curved caudad, so that entire clypeus in profile is rather strongly convex, rostrum with subapical segment attaining mesotrochanter, apical segment just attaining post-trochanter, antenna a little surpassing frontoclypeal suture, basal segment longer than broad (about 1.7 : 1) segment 2 longer than 1 (nearly 1.6 : 1), ocelli distinct; pronotum with anterior margin broader than length in middle line (1.3 : 1), lateral carinae straight, moderately diverging, not attaining hind margin; total length of mesonotum longer than that of scutellum (about 2.7 : 1); post-tibial spur with 14 or 15 teeth. Testaceous; intercarinal areas of frons, anterior compartment of genae, abdomen except at lateral margins and on posterior margins of sternites, pygofer except at dorsolateral angles, castaneous-fuscous. Tegmina hyaline, faintly suffused fuscous, veins concolorous basally, darker in membrane. Wings hyaline, veins dark fuscous. Anal segment moderately long, lateroapical angles not widely separated, each produced strongly ventrocephalad in a short spinose process, strongly laterally compressed. Pygofer moderately long, posterior opening longer than broad, dorsolateral angles distinctly produced caudad, subrectangulate, not inflected, diaphragm with dorsal margin slightly produced in a pair of shallow lobes between which it is strongly subrectangulately excavate; no medioventral process present. Aedeagus moderately short, ascending and weakly tapering distad, orifice terminal, an oblique row of spines on each side, meeting in medial line ventrally. Genital styles rather short, broad at base, tapering distally, inner



Figs. 87-91. *Toya trophonius*, new species: 87, frons and clypeus; 88, head and pronotum, lateral view; 89, vertex, pronotum and mesonotum; 90, ♂ genitalia, posterior view; 91, right genital style, ventrolateral view.

apical angle shortly produced in a blunt spine, outer apical angle more strongly produced, bluntly rounded distally. Length, 2.0 mm; tegmen, 2.8 mm.

Holotype ♂ (BISHOP 7076), Samoa: Malololelei, 18.II.1950, R. Harrison (No. 16).

This species is distinguished by the form of the male genitalia. The generic assignment is provisional.

#### Genus **Euidellana** Metcalf

*Euidellana* Metcalf, 1950: 61 (orthotype: *E. carolinensis* Metcalf *ibid.*).

#### 22. **Euidellana ucalegon** (Fennah)

*Dicranotropis ucalegon* Fenn., 1950: 43.

SAMOA: 1♂, Savaii, Safune, Matavan Crater, 13.V.1924, E. H. Bryan, Jr.

This species was described from Fiji. Apart from differences in the male genitalia, it is distinguishable from *E. carolinensis* by the relatively longer vertex, and the relatively longer posterior compartment of the vertex.

#### Genus **Cemus** Fennah

*Cemus* Fen., 1964: 147 (orthotype: *C. leviculus* Fennah *op. cit.*: 148).

#### 23. **Cemus nigromaculosus** (Muir)

*Phyllodinus nigromaculosus* Muir, 1917: 319.

TONGA IS.: 1♂, Tongatabu I., Nukualofa, II.1956; 1♀, Haamea, II.1956, Krauss.

The genital styles of the male were noted to be appreciably more slender in their apical 1/4 than those of 2 males from Los Baños, Luzon, one of which was evidently of Muir's type series. In addition, the apical portion of the spinose process on the left side of the aedeagal flagellum was rather more elongate and not so definitely curved mesad as in the males from Luzon. Although differences between species in this genus are comparatively small, there is no reason to regard the Tonga population as specifically distinct from *C. nigromaculosus*. The present opportunity is taken of recording the presence of this species in the Fiji Islands also; 1♂, 1♀, Fiji Is., Lautoka, I.III.1919, Greenwood (BMNH). *C. nigromaculosus* is near to *C. kirkaldyi* Metcalf, but differs in the relatively longer posterior compartment of the vertex, in the obtuse dorsolateral angles of the pygofer, and in the more shallowly sinuate genital styles. The differences in the shape of the style is most apparent in the basal half. *Cemus kirkaldyi* Metc., was described under the name *koebelei* in *Phacalastor* by Kirkaldy in 1906 on the basis of material from Queensland. In the following year he ascribed specimens from Fiji to this species and figured the genitalia. Unfortunately, the genitalia figured are not those of the Australian species but of *P. nigromaculosus* Muir. The interpretation of the genitalia *C. kirkaldyi* Metc., given here are based on a male from Moggill (7.V.1955, T. E. Woodward), which was found to agree with other males from Ayr and Brisbane.

#### Family DERBIDAE Spinola

#### Genus **Kamendaka** Distant

*Kamendaka* Dist., 1906: 310 (orthotype: *K. spectra* Distant, 1906: 311).

Subgenus *Eosaccharissa* Kirkaldy

*Eosaccharissa* Kirk., 1907: 126 (haplotype: *E. javana* Kirk., *op. cit.*: 127).

24. *Kamendaka* (*Eosaccharissa*) *spio* Fennah, new species Figs. 92, 93.

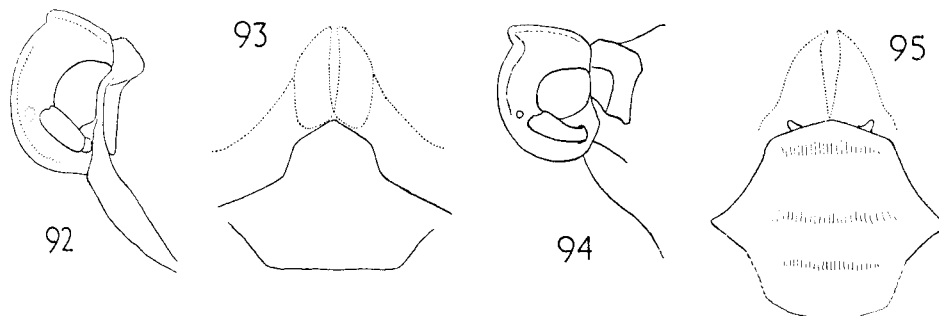
♂. Pale orange-yellow; genae in lower 1/2 faintly suffused fuscous. Tegmina translucent, sordid white, a slightly curved vitta from Cu 1 at base to R at apical margin, dilute fuscous, veins and tegminal margin stramineous or orange yellow. Wings white, veins concolorous.

♂. Vertex in lateral view distinctly ascending; apparent length of frons visible in dorsal view equal to length of lateral margin of vertex. Anal segment moderately long, dorsal margin deflexed through about 45° in apical 1/3. Pygofer with dorsolateral angles moderately produced caudad, obtusely rounded, medioventral process moderately large, not as long as ventral surface of pygofer. Aedeagus tubular, curved upward at basal 1/4, in side view slightly widening distally, acutely rounded at apex, a short flagellum on left apically reflected cephalad, bordered on left by a broad lobe that tapers strongly distad, and in its apical 1/3 is directed to right as a rather slender spine, and underlain by a short broad plate that is a little upcurved distally, and bears 5 stout triangular teeth on its distal margin. Genital styles in side view rather narrow, dorsal margin produced dorsad near middle in a bluntly triangular lobe, and distad of this, bearing a rather short rod-like process terminating in 2 minute spicules, ventral margin of style strongly produced mesad at middle in a rather narrowly subtriangular lobe. Length, 3.0 mm; tegmen, 4.8 mm.

♀. Pregenital sternite strongly produced caudad in its middle 1/3 in a bluntly angulate lobe shaped as shown in figure. Length, 3.2 mm; tegmen, 6.0 mm.

Holotype ♂ (BISHOP 7077), Samoa: Upolu I., Malololei Road, 490 m, 8.VII.1940, on *Heliconia*, O. H. Swezey. Paratypes: 51♂♂, ♀♀, same data; 3♀♀, Tiavi, 670 m, 15-21.VI.1940, on *Alpinia* and *Heliconia*; 1♀, Sinaele, 430 m, 27.VII.1940, on Taro; all Swezey and Zimmerman.

This species resembles *K. nigrospersa* Fenn. (from Fiji) in the shape of the head, but differs entirely in the coloration of the tegmina and in the shape of the pregenital sternite;



Figs. 92-95. *Kamendaka spio*, new species: 92, head in profile; 93, ♀ pregenital sternite, with valvulae indicated in broken line. *Kamendaka doris*, new species: 94, head in profile; 95, ♀ pregenital sternite, with valvulae indicated in broken line.

from the Micronesian *K. polyphemus* it differs in coloration, tegminal venation, and in the armature of the aedeagus, and from *K. longmani* Muir (Queensland), of which I have examined a topotype, it differs in coloration and in the shape of the pregenital sternite. Of the Philippine Island species, only *K. incommoda* Muir resembles the present species in the shape of head, but is colored entirely differently.

25. **Kamendaka** (*Eosaccharissa*) **doris** Fennah, new species      Figs. 94, 95.

Pale stramineous; genae in lower 1/2, and legs, faintly tinged orange yellow. Tegmina translucent, white, veins concolorous; margin at apical angle faintly tinged yellow. Wings white, veins concolorous.

♂. Vertex in lateral view only very weakly ascending, almost horizontal; apparent length of frons visible in dorsal view much less than length of lateral margin of vertex. Anal segment long, subtubular, in side view deflexed through 60° in apical 1/4, ventral margin very shallowly convex. Pygofer with dorsolateral angles moderately produced caudad, rectangulately rounded, medioventral process large, as long as ventral surface of pygofer. Aedeagus tubular, curved upward at basal 1/3, in side view slightly widening distally, acutely rounded at apex, a short flagellum on left apically reflected cephalad, bordered on left by a rather broad subtriangular lobe that tapers abruptly to a slender sinuate process bluntly rounded at its tip, and underlain by a relatively narrow plate that is upcurved distally, with its distal edge serrulate. Genital styles in side view produced dorsad near middle in a bluntly triangular lobe, and distad of this bearing a rather short rod-like process terminating in 2 minute spicules, ventral margin of style strongly produced mesad at middle in a rather narrowly subquadrate lobe. Length 2.7 m; tegmen 4.4 m.

♀. Pregenital sternite strongly produced caudad in middle 2/3 in a broadly subangulately rounded lobe shaped as shown in figure. Length, 2.5 mm; tegmen, 5.0 mm.

Holotype ♂ (BISHOP 7078), Samoa: Upolu I., Tiavi, 670 m, 15.VI.1940, on *Alpinia*, Swezey & Zimmerman. Paratypes: 12♂♂, 10♀♀ and 1 mutilated specimen, same locality, 15,21.VI.1940, on *Alpinia* or *Heliconia*, Swezey & Zimmerman; 1♂, Afiamalu, 670 m, Zimmerman; 3♀♀, Lanutoo, 730 m, 22.VII.40, on *Cyrtandra*, Swezey; 1♀, Vialua, seashore, 28.VII.40, on coconut, Swezey; 1♀, nr. Tapatapao, 300 m, 13.VII.40, Swezey.

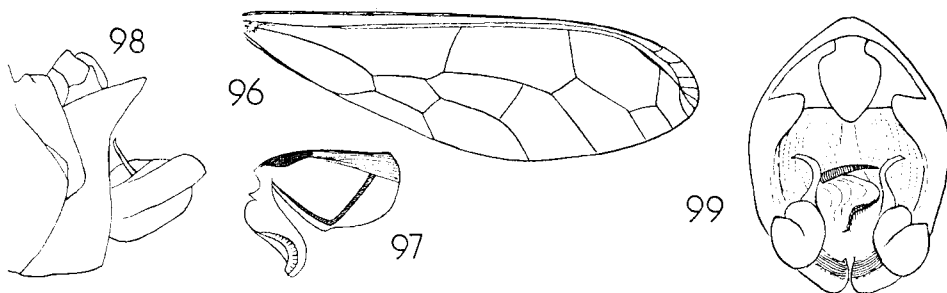
The structure of the aedeagus and of the rod-like process on the dorsal margin of the genital styles show that this species is rather closely related to *K. spio*, but it is readily distinguishable by the shape of the head, of the anal segment, laterodorsal angles of the pygofer, aedeagus, and in the female, of the pregenital sternite, as well as by coloration.

Genus **Muiria** Kirkaldy

*Muiria* Kirk., 1907: 175 (haplotype: *M. stridula* Kirk. *ibid.*).

26. **Muiria glycon** Fennah, new species      Figs. 96-99.

♂. Tegmina with Sc+R and M separated by not more than the width of one of these veins in basal 1/2 of tegmen, venation otherwise as in *M. palauana* Fenn. Wings with anterior portion equal in size and rather similar in shape to anal lobe, with 2 longitudinal



Figs. 96-99. *Muiria glycon*, new species: 96, tegmen; 97, wing; 98, ♂ genitalia, left side; 99, ♂ genitalia, posterior view.

veins and 1 transverse vein, as figured. Stramineous; antennal segment 2, lateral lobes of pronotum in part, tegulae in distal 1/2, and abdominal terga except for pustular ornamentation, pale reddish brown, the last often suffused pink; anterior margins of head narrowly crimson. Tegmina vitreous, costal margin, Sc+R and M, orange-red. Costa at base, an oblique mark in costal cell near base, cell Sc+R distally, and a small suffusion overlying each of the first 2 sectors of M, fuscous; a few pallid spots in cell Sc+R; veins, with the exceptions already noted, and posterior margin, pale orange-brown. Wings vitreous, veins of anterior portion orange-yellow, thickened margin of anal lobe fuscous. Anal segment very short, 2X as broad as long, dorsoventrally flattened, anal style about as broad as long, subtriangular, directed ventrad. Pygofer short, with dorsolateral angles each strongly produced dorsocaudad in a triangular lobe which is acuminate apically. Aedeagus moderately long, reflected cephalad distally in a flagellum that terminates in a shallowly curved spinose process directed anteriorly and to right. Genital styles moderately long, broad, in side view with ventral margin feebly sinuate, apical margin oblique, dorsal margin sinuate, produced dorsad distally in a shallow eminence; a stout ledge exteriorly from base to apex just below dorsal margin, and extending beyond apical margin; a slender sickle-shaped spinose process arising at middle of style dorsally, directed dorsad and laterad. Length 2.2 mm; tegmen 5.1 mm.

♀. Pregenital sternite with posterior margin shallowly produced caudad in a convex lobe. Length, 2.0 mm; tegmen, 5.5 mm.

Holotype ♂ (BISHOP 7079), Samoa: Tutuila, Amouli, 240 m, 2.VIII.1940, on *Heliconia*, E. C. Zimmerman. Paratype: 1♂, 2♀♀, same data.

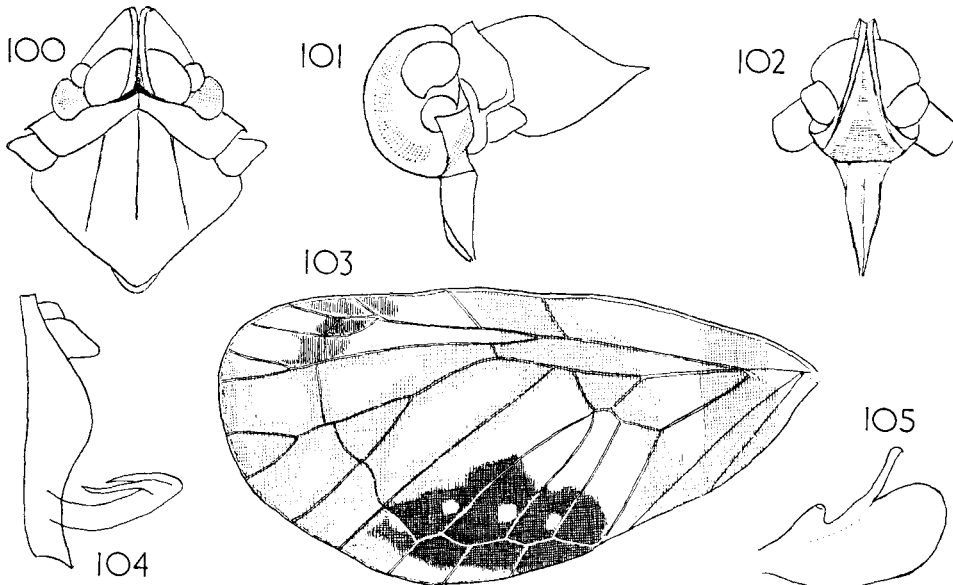
This species differs from *M. stridula* Kirkaldy, *M. iridescens* Muir and *M. palauana* Fenn., in the relatively shorter anal segment and in the strongly produced, porrect and acuminate laterodorsal angles of the pygofer. It differs from *M. stridula* and *M. palauana* also in the ornamentation of the aedeagus. The form of the anterior lobes of the wings and the presence of veins seem also to be characteristic of this species.

#### Genus *Rhotana* Walker

*Rhotana* Walk., 1857: 160 (haplotype: *R. latipennis* Walk., *ibid.*).

27. *Rhotana pellax* Fennah, new species Figs. 100-105.

♂. Frons with lateral carinae contiguous at extreme base; subantennal process slightly twisted in basal 1/2, margin strongly sinuate in dorsal view. Pronotum with lateral carinae produced dorsad in a flange, lateral lobes in side view vertical, not concave. Tegmina with triangular cell at 1st sector of M large, 1st sector itself forking only a little distad of this cell, the veins not diverging strongly distad. Post-tibia with 2 small lateral spines, 4 apical, basal metatarsal segment with 5 apical teeth, segment 2 with 3 or 4. Stramineous; disc of clypeus, margins of frons, sides of head, pronotum, and mesonotum orange or light orange-brown; protibia and protarsus, fuscous. Tegmina hyaline, a fascia from costa to commissural margin at 1/6 from base, an oblique fascia from union of claval veins to costal margin at middle, a suffusion over each of the veins of M distally, over the transverse veinlets, and inside the apical margin, dilute yellowish fuscous, a broad submarginal band from Cu 1b at margin to 2nd sector of M at margin, fuscous-piceous, with a round white spot in each subapical cell of M in this dark area; tegminal margin round apical angle, Sc at fork near transverse veins, and all veins in dark area of tegmen, red. Wings hyaline, wholly powdered white, veins pale stramineous. Anal segment short, depressed, about as broad as long, lateroapical angles not at all produced. Pygofer short, laterodorsal angles weakly produced caudad in an obtusely rounded lobe. Aedeagus moderately short, tubular, moderately curved upward near middle, a compressed sinuate process arising dorsally on left near apex, directed cephalad, obliquely truncate distally; flagellum dorsoventrally depressed, broadly ovate in dorsal view. Genital styles subovate, rather more than 2X as long as broad, in side view with ventral margin shallowly convex, apical margin rounded,



Figs. 100-105. *Rhotana pellax*, new species: 100, vertex, pronotum and mesonotum; 101, head, pronotum and mesonotum, lateral view; 102, frons and clypeus; 103, tegmen; 104, ♂ genitalia, lateral view; 105, genital style.



dorsal margin sinuate with a short broadly-triangular process, incurved at its tip, arising at 1/4 from base, and a longer narrow process, directed dorsocaudad and curved laterad distally, arising at 2/3 from base. Length, 3.0 mm; tegmen, 5.4 mm.

Holotype ♂ (BISHOP 7080), Samoa: Upolu, Siumu, II.1955, N. L. H. Krauss.

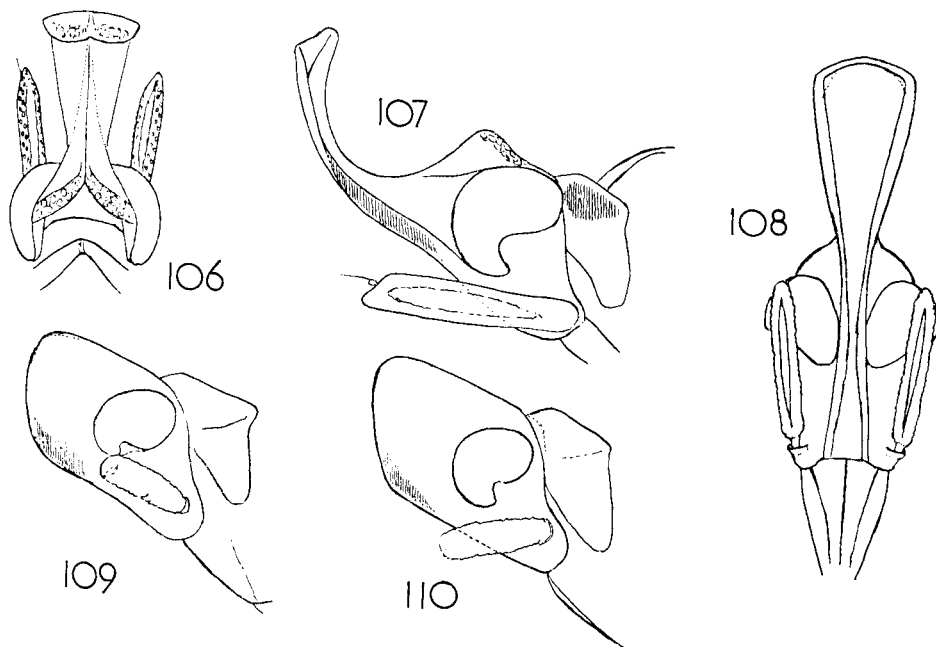
This species is distinguished by its relatively large size, strongly flaring lateral margins of the frons which are contiguous only at the very base, and, in the tegmina, by the triangular cell of M being large, the 1st sector of M forking close to it and the 2 branches lying almost parallel, not widely diverging. The male genitalia are also characteristic. The simplest means of recognition is by the boldly marked tegmina. The shape of the head is like that of *R. semiopalinus* Muir, but the differences in other characters listed, including the male genitalia, are so striking that the two cannot be regarded as closely allied. Of the other known species of *Rhotana*, as well as those of *Decora* and *Levu*, its nearest relative, on genitalic structure and tegminal venation, appears to be *R. ramentosa* Distant, which, however, has the lateral frontal carinae well separated throughout, and a different coloration.

#### Genus *Swezeyia* Kirkaldy

*Swezeyia* Kirk., 1906: 430 (haplotype: *S. lyricen* Kirkaldy, *ibid.*).

28. *Swezeyia lyricen* Kirkaldy Figs. 106-110.

*Swezeyia lyricen* Kirk., 1906: 430.



Figs. 106-110. *Swezeyia lyricen* Kirkaldy: 106, head of ♂, dorsal view (Tonga); 107, head of ♂ in profile (Tonga); 108, frons and clypeus of ♂ (Tonga); 109, head of ♀, in profile (Tonga); 110, head of ♀, in profile (Samoa: Savaii).

TONGA IS.: 1♂, 1♀, Vavau I., Mangia, II.1956; 2♀♀, Neiafu, II.1956; 1♂, Tongatabu I., Nukualofa, II.1956, N. L. H. Krauss

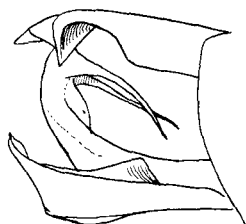
### Genus *Pyrrhoneura* Kirkaldy

*Pyrrhoneura* Kirkaldy, 1906: 434 (haplotype: *P. saccharicida* Kirkaldy).

#### 29. *Pyrrhoneura saccharicida* Kirkaldy

*Pyrrhoneura saccharicida* Kirk., 1906: 435.

TONGA IS.: 1♂, Vavau I., Pangai, II.1956; 2♂♂, Mangia, II.1956; 1♂, Neiafu, II.1956; 7♂♂, 5♀♀, Tongatabu I., Haamonga, II.1956, N. L. H. Krauss.



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Fig. 111. *Pyrrhoneura samoensis* Muir. ♂ genitalia of holotype specimen, right side.

#### 30. *Pyrrhoneura samoensis* Muir Fig. 111.

*Pyrrhoneura samoensis* M., 1927a: 20, fig. 18.

This figure of the genitalia of the undissected holotype is given to correct that of Muir cited above.

### Genus *Lamenia* Stål

*Lamenia* Stål, 1859: 277 (haplotype: *Delphax caliginea* Stål).

#### 31. *Lamenia caliginea* (Stål)

*Delphax caliginea* Stål 1854: 246.

TONGA IS.: 2♀♀, Vavau I., Pangai, II.1956; 1♂, Mangia, II.1956; 1♀, Falevai, II.1956; 1♀, Neiafu, II.1956, Krauss.

### Genus *Phaciocephalus* Kirkaldy

*Phaciocephalus* Kirk., 1906: 426 (haplotype: *P. vitiensis* Kirk., 1906: 428).

#### KEY TO SAMOAN SPECIES OF PHACIOCEPHALUS

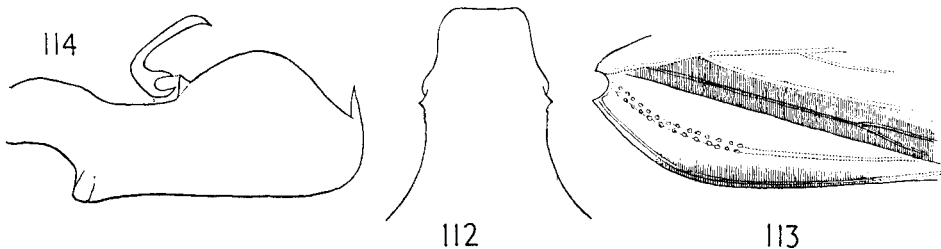
1. Tegmina without a percurrent dark stripe, often orange yellow in posterior 1/2. Medioventral process of pygofer relatively elongate, subtriangular, lateral margins entire; aedeagus with a median ventral flange in distal 1/2; Upolu..... 37. *sigaleon*
- Tegmina with a percurrent dark stripe, not orange yellow in posterior 1/2. Medioventral process of pygofer subquadrate, lateral margins usually with a lobe or process; aedeagus without a median ventral flange in distal 1/2 ..... 2
2. Lateral margins of medioventral process of pygofer each strongly produced laterad at middle in a subrectangulate lobe; Tutuila ..... 33. *danista*
- Lateral margins of medioventral process of pygofer not so produced ..... 3
3. Lateral margins of medioventral process of pygofer each produced caudad at middle in a spinose process fully 1/4 of length of medioventral process; Manua ..... 36. *carbas*

- Lateral margins of medioventral process of pygofer each with a small tooth just distad of middle, directed caudad, or such a tooth vestigial or absent ..... 4
- 4. Lateral margins of medioventral process of pygofer each with a small but evident tooth just distad of middle, directed caudad. Posterior portion of basal 1/2 of clavus extensively infusate; Savaii.....34. **silanio**
- Lateral margins of medioventral process of pygofer each with a minute and obscure tooth just distad of middle, directed caudad. Posterior portion of basal 1/2 of clavus at most infusate only between posterior claval vein and hind margin of clavus ..... 5
- 5. Lateral marginal teeth of medioventral process of pygofer directed caudad; Upolu ..... 35. **croceas**
- Lateral marginal teeth of medioventral process of pygofer directed laterad; Tutuila ..... 32. **tutuilae**

32. **Phaciocephalus tutuila** Muir Figs. 112-113.

*Phaciocephalus tutuila* M., 1921 : 576.

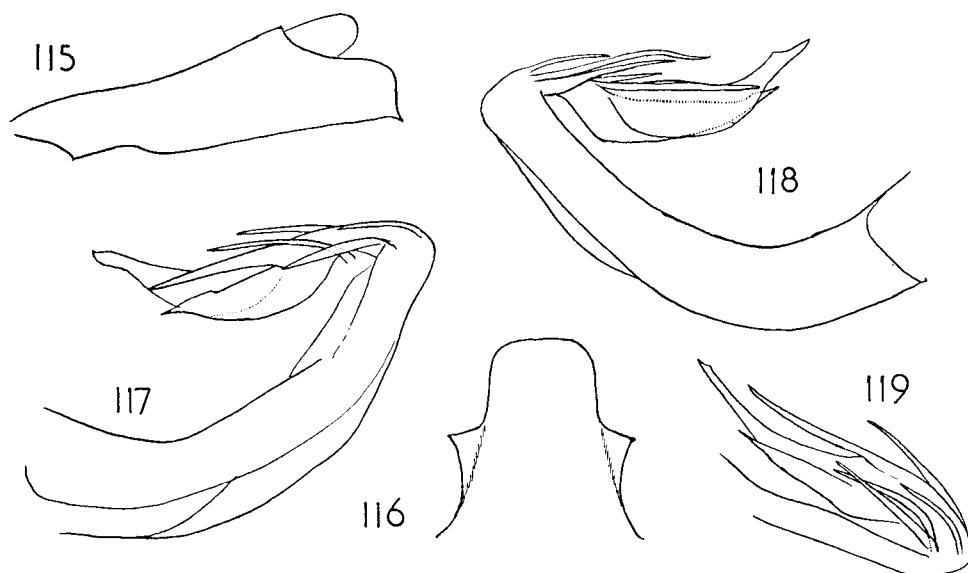
This species was described on the basis of a series taken in Tutuila. The name was subsequently applied by Muir (1927 : 19) to series taken in Upolu, Savaii and Manua. Through the kindness of Dr J. L. Gressitt and Dr P. D. Ashlock, I have been furnished with drawings of characters of the type specimen that I believe to be diagnostic, and these are reproduced here. No specimens of *P. tutuila* have been found by me among the material from other Samoan Is. that I have examined, and I believe that *P. tutuila*, like each of the other species, is confined to a single island.



Figs. 112-114. *Phaciocephalus tutuila* Muir: 112, medioventral process of pygofer; 113, claval area of tegmen (both redrawn from drawings made from the type by P. D. Ashlock); 114, *Phaciocephalus danista*, new species, left genital style.

33. **Phaciocephalus danista** Fennah, new species Figs. 114-119.

Stramineous; head, pronotum and mesonotum pale orange yellow; protibiae and tarsi dilute fuscous; abdomen dorsally, and genitalia, dark fuscous. Tegmina sordid white, with dilute yellow suffusion in anterior 1/2 of corium, and clear orange yellow in basal 1/4 of clavus, a fuscous vitta overlying Cu 1 at base and widening distad to embrace M at level of claval apex, then shallowly curving anteriorly to reach apical margin in R and M, veins concolorous, with exception of claval veins at middle of clavus, which are fuscous. Wings infusate, with darker veins.



Figs. 115-119. *Phaciocephalus danista*, new species: 115, ♂ Anal segment, left side; 116, medioventral process of pygofer; 117, aedeagus, left side; 118, aedeagus, right side; 119, apical portion of aedeagus, viewed posterodorsally on left side.

♂. Anal segment moderately long, in lateral view slightly widening distally, lateroapical angles each triangularly produced and deflexed, bluntly pointed at apex. Pygofer with medioventral process longer than broad at base, directed dorsocaudad, narrower at apex than at base, apical margin rounded truncate, smoothly rounding into lateral margins, lateral margins each strongly produced laterad near middle in a broadly triangular process, acute at its tip. Aedeagus with a longitudinal flange ventrolaterally on left, no median ventral flange present, 4 spinose processes arising dorsally on left near apex, and 3 spinose processes on right dorsally near apex, all directed cephalad as figured. Length, 3.2 mm; tegmen, 4.2 mm.

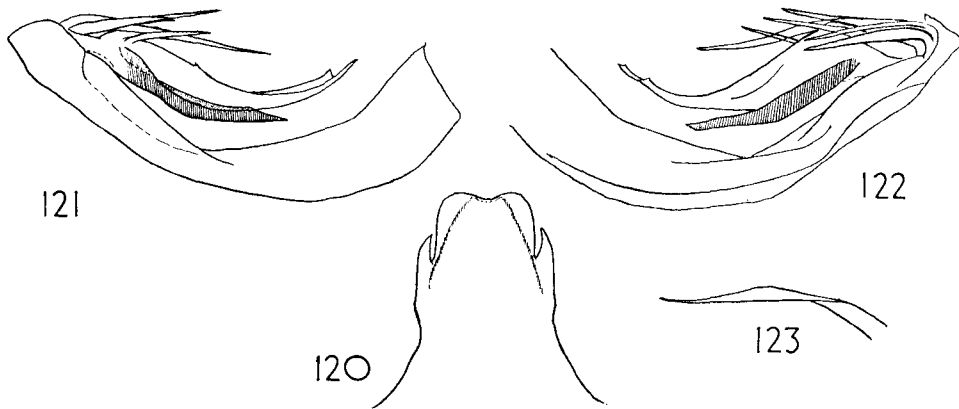
♀. Pregenital sternite produced caudad in a trapezoidal lobe 2× as broad at its base as long in middle line, narrower at apex than at base, distal margin truncate. Length, 3.3 mm; tegmen, 4.7 mm.

Holotype ♂ (BISHOP 7081), Samoa: Tutuila, Tafuna, 26.XII.1956, W. R. Kellen. Paratypes: 1♂, 2♀♀, same data; 2♂♂, 1♀, Mapusaga, 17.XII.1956, Kellen.

In one female specimen the longitudinal dark vitta is extremely dilute, and it is only vein Cu<sub>1</sub>, from the base to its fork, that is dark fuscous. This species is distinguishable from the sympatric *P. tutuilae* Muir by coloration and the form of the male genitalia. The mesonotum is orange-yellow, not brown, and in the tegmen there is no dark suffusion between the posterior claval vein and the commissural margin as in *P. tutuilae*, and the medioventral process of the pygofer is furnished with relatively larger lateral processes.

34. *Phaciocephalus silanio* Fennah, new species      Figs. 120-123.

Orange yellow; labrum, clypeus distally at sides, procoxae, protibiae, mesotibiae, mesopleura



Figs. 120-123. *Phaciocephalus silanio*, new species: 120, Medioventral process of pygofer; 121, aedeagus, right side; 122, aedeagus, left side; 123, longest spine of the dorsal series, showing twist near middle.

post tibia at base, genitalia, and sometimes mesoscutellum fuscous. Tegmina yellowish white, a vitta from costa at base, widening distad and overlying M and Cul to apex of clavus, thence expanding to occupy entire membrane behind R1 and a rather broad band on basal 1/2 of commissural margin of clavus, dark fuscous, veins concolorous. Wings white anteriorly, fuscous posteriorly, so that when they are folded the light and dark areas underlie correspondingly colored areas of the tegmina, veins concolorous in light areas, darker than ground color in dark areas.

♂. Anal segment moderately long, in lateral view slightly widening distally, lateroapical angles each triangularly produced a deflexed, bluntly pointed apically. Pygofer with medioventral process longer than broad at base, directed dorsocaudad, narrower at apex than at base, apical margin shallowly concave, with angles smoothly rounded, lateral margins each produced caudad at 2/3 from base in a small stout spinose process. Aedeagus devoid of a median longitudinal flange ventrally in distal 1/2, a group of 4 spinose processes, arising on left near apex, and 4 spinose processes on right dorsally near apex, all directed cephalad as figured. Genital style as figured. Length 3.3 mm; tegmen 4.3 mm.

♀. Pregenital sternite produced caudad in a trapezoidal lobe about 2× as broad at its base as long in middle, narrower at apex than at base, distal margin truncate. Length 2.6 mm; tegmen, 4.9 mm.

Holotype ♂ (BISHOP 7082), Samoa: Savaii, Palauli, II.1955, N. L. H. Krauss.

Allotype ♀ (BISHOP), Savaii, Patamea, II.1955, Krauss.

This species is perhaps most easily distinguished by the relatively large extent of the infuscate area of the clavus; when the tegmina are folded the contiguous dark areas assume the form of a narrow triangle. In the male, the form of the medioventral process of the pygofer serves to separate this species from *P. tutuilae*.

35. *Phaciocephalus croceas* Fennah, new species      Figs. 124-127.

Pale yellow; clypeus distally, procoxa, mesopleura and genitalia, fuscous; foreleg with



Figs. 124-127. *Phaciocephalus croceas*, new species: 124, ♂ anal segment, left side; 125, medioventral process of pygofer; 126, aedeagus, left side; 127, aedeagus, right side.

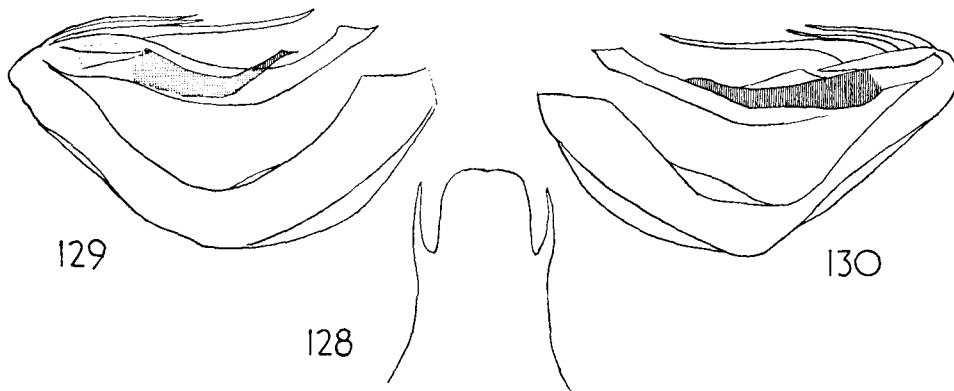
dilute fuscous suffusion. Tegmina yellowish white, a vitta from costa at base overlying M and Cu 1 to apex of clavus, gradually widening distad, then shallowly recurved across membrane to occupy most of apical margin, anterior claval vein distally and a faint narrow submarginal streak at humeral angle, fuscous, veins concolorous. Wings anteriorly, and between M and Cu 1, white or sordid white, elsewhere dilute fuscous, veins fuscous, darker than ground color.

♂. Anal segment moderately long, in lateral view slightly widening distally, latero-apical angles each narrowly triangularly produced and deflexed, aciculate pointed apically. Pygofer with medioventral process longer than broad at base, directed dorsocaudad, narrower at apex than at base, apical margin truncate with lateral angles rounded, lateral margins straight or very weakly convex, converging distad, each with a minute tooth just distad of middle. Aedeagus devoid of a longitudinal median flange ventrally in distal 1/2, 4 spinose processes arising dorsally on left near apex, and 3 spinose processes, one of them extremely short, arising on right dorsally near apex, all directed cephalad. Genital styles as in *P. silanio*. Length 3.2 mm; tegmen 4.0 mm.

♀. Pregenital sternite produced caudad in a trapezoidal lobe, about 2× as broad at base as long in middle, narrower at distal margin than at base, distal margin truncate. Length 4.5 mm; tegmen 4.8 mm.

Holotype ♂ (BISHOP 7083), Samoa: Upolu, Mafa Pass Rd., II.1955, N. L. H. Krauss. Allotype ♀ (BISHOP), same data. Paratypes: 1♂, Vailima, 26.IV.1925, Buxton & Hopkins; 3♀♀, Apia, III, IX.1924, Buxton; 1♀ Malololelei, 610 m, II, VI.1924, Buxton & Hopkins.

This species is most readily recognisable by the boldly marked tegmina in conjunction with a medioventral process of the pygofer that has only an inconspicuous rudiment of a lateral process. The latter character serves to distinguish it from other members of the complex of *P. tutuilae* on other islands. It is nearest in this character to *P. silanio*, but differs from this species in the relative lengths and shapes of the aedeagal processes.



Figs. 128-130. *Phaciocephalus carbas*, new species: 128, medioventral process of pygofer; 129, aedeagus, right side; 130, aedeagus, left side.

36. ***Phaciocephalus carbas*** Fennah, new species. Figs. 128-130.

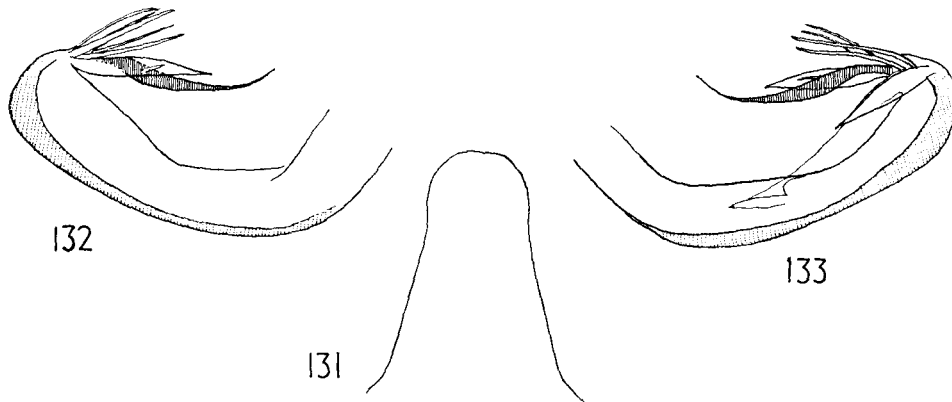
♂. Pale orange yellow; labrum, clypeus distally at sides, mesopleura, and pro- and mesotibiae distally, suffused pale reddish brown; genitalia fuscous. Tegmina yellowish white; a vitta from costa at base, overlying M and Cu 1 to level of apex of clavus, thence extending to apical margin, but not reaching posterior margin distad of claval apex, and a short band along hind margin of clavus in its basal 1/2, dark fuscous. Wings white anteriorly, diffuse grayish fuscous posteriorly, veins darker than ground color. Anal segment moderately long, in lateral view slightly widening distally, lateroapical angles each narrowly produced and deflexed, acutely pointed apically. Pygofer with medioventral process longer than broad at base (about 1.5 : 1), directed dorsocaudad, narrower at apex than at base, apical margin shallowly concave, with angles smoothly rounded, lateral margins each produced caudad at 2/3 from base in a moderately long spinose process which is very distinctly separated from lateral margin and extends almost to level of apical margin of process. Aedeagus devoid of a median longitudinal flange ventrally in distal 1/2, a group of 4 spinose processes arising dorsally on left near apex, and 3 spinose processes on right dorsally near apex, all directed cephalad as figured. Genital styles as figured. Length, 3.5 mm; tegmen, 4.5 mm.

Holotype ♂ (BISHOP 7084), Samoa: Manua, Tau, 20.II.1926, A. F. Judd.

This species is distinguished most readily by the spinose ornamentation of the lateral margins of the medioventral process of the pygofer, and by the slender acuminate lateroapical angles of the male anal segment. The aedeagus is distinctive and differs from that in *P. silanio* in the number of spinose processes, and in the relative lengths and shapes of these processes. In the shape of the anal segment of the male it agrees with *P. tutuilae*, but differs in the form of the lateral margins of the medioventral process of the pygofer and in the color of the mesonotum.

37. ***Phaciocephalus sigaleon*** Fennah, new species Figs. 131-133.

Stramineous to orange-yellow; protibiae, tarsi distally, abdomen dorsally, medioventral



Figs. 131-133. *Phaciocephalus sigaleon*, new species: 131, medioventral process of pygofer; 132, aedeagus, right side; 133, aedeagus, left side.

process of pygofer distally, genital styles, anal segment of ♂, pregenital sternite of ♀ and anal segment, rather dilute fuscous. Tegmina yellowish white or yellow, orange in posterior 1/2, a diffuse band from 1st fork of M to apical margin posterior to R, dilute fuscous. Wings white, dilute fuscous at apical angle, sordid white posteriorly, veins concolorous in white areas, elsewhere fuscous.

♂. Anal segment moderately long, in lateral view slightly widening distally, latero-apical angles each produced and deflexed, bluntly rounded apically. Pygofer with medioventral process longer than broad at base (about 1.5 : 1), directed dorsocaudad, narrower at apex than at base, apical margin shallowly convex with angles smoothly rounded, lateral margins in basal 2/3 converging distad, parallel in apical 1/3, devoid of processes. Aedeagus with a median longitudinal flange ventrally in distal 1/2, a group of 4 spinose processes arising dorsally on left near apex, 1 process bearing a small secondary spine, a group of 4 spinose processes arising on right dorsally near apex, one process bearing a small secondary spine, all directed cephalad. Genital styles as in *P. silanio*. Length, 2.9 mm; tegmen, 4.3 mm.

♀. Pregenital sternite produced caudad at middle in a quadrate lobe about 2× as broad at base as long in middleline, distal margin shallowly rounded. Length, 3.5 mm; tegmen, 5.1 mm.

Holotype ♂ (BISHOP 7085), Samoa: Upolu, Afiamalu, 670 m. 4.VII.1940, beating shrubs. E. C. Zimmerman. Paratypes: 4♂♂, 3♀♀, same data.

Most members of this species are at once distinguishable from other Samoan species by their orange yellow and white coloration, as contrasted with bold fuscous and white. The presence of a median flange ventrally in the distal half of the aedeagus sets this species well apart from those of the *tutuila* complex, and this difference is reinforced by the form of the medioventral process of the pygofer. A distal ventral median keel is found in the aedeagus of the Fijian *P. vitiensis* but *P. sigaleon* differs abundantly from *P. vitiensis* in other details of aedeagal ornamentation.

Two females from Tiavi, taken on *Alpinia* (15.VI.1940, Swezey & Zimmerman), of uniform pearly white hue, are tentatively assigned to this species.



## Family ACHILIDAE Stål

Genus **Tangina** Melichar

*Tangina* Mel., 1903: 44 (haplotype: *Tangina bipunctata* Melichar, 1903: *ibid.*).

*Eurynomeus* Kirkaldy, 1906c: 422 (haplotype: *E. australiae* Kirk., 1906: *ibid.* n. syn.).

Since completing my generic revision of Achilidae (Fennah 1950) I have been able to examine topotypic material of *Tangina bipunctata* Melichar. In this species the vertex is about as long as broad, a little declivous, and there is a well-defined triangular areolet on each side apically. The lateral carinae of the pronotal disc are straight, and each is not twice as long as the median carina, but in *T. quadrilineata* Melichar they are concave and follow the hind margin of the pronotum for a little distance before entering it. By reason of the presence of areolets on the vertex, and of the slightly variable structure of the pronotal disc, species of this genus keys (Fennah 1950: 47) to *Usana* or *Phenelia*, but are readily distinguishable from both by the presence of a piceous spot on the mesopleura and by the tegminal venation in the area of the stigma.

Genus **Eurynomella** Fennah, new genus

*Eurynomeus* Muir, 1921: 571 (nec Kirkaldy, 1906).—Fennah 1950: 120.

The characters of *Eurynomeus* given by me (1950: 120) were based on *E. granulatus* Muir and *E. niger* Muir and with the addition of the following characters serve to define *Eurynomella*.

Tegmina with stigmal cell not nearly 2× as long as broad. Posterior margin of 7th (pregenital) sternite in ♀ broadly concave, at middle almost, or even entirely, overlapped by posterior margin of 6th sternite. First valvifers with ventral margin strongly produced, meeting or even overlapping one another in middle line.

Type species: *Eurynomeus granulatus* Muir, 1921: 571.

This genus, which runs to *Eurynomeus* in my key (1950: 47–54) is distinguished from all others except *Haitiana* and *Paraphypia* by the presence of a carina laterobasally on the frons in addition to the carina that demarcates the lateroapical areolet on each side. From *Haitiana* it is distinguished by the proportions of the frons; from *Paraphypia* it differs in having fewer supernumerary carinae laterobasally on the frons, in having 2 carinae at each side of the pronotum between eye and tegula, in the presence of pustules on the pronotum behind the eyes, in the relatively shorter stigmal cell (which is twice as long as broad in *Paraphypia*), in the concave posterior margin of the pregenital sternite (in contrast to a straight margin in *Paraphypia*), and the mesally produced ventral margins of the first valvifers (which are not at all produced in *Paraphypia*).

## Family TROPIDUCHIDAE Stål

Genus **Vanua** Kirkaldy

*Vanua* Kirk. 1906: 415 (haplotype: *V. vitiensis* Kirk., 1906: 416, = *Cixius respiciendus* Walker, 1858: 322).

38. *Vanua buxtoni* Muir

*Vanua buxtoni* M., 1927b: 90.

TONGA IS.: 3♂♂, 4♀♀, Vavau I., Mangia, II.1956, Krauss; 1♂, Neiafu, II.1956; 1♂, Pangai, II.1956; 1♂, 1♀, Holonga, II.1956, Krauss.

Genus *Macrovanua* Fennah

*Macrovanua* Fen., 1950: 12 (orthotype: *Vanua angusta* Muir, 1921: 579).

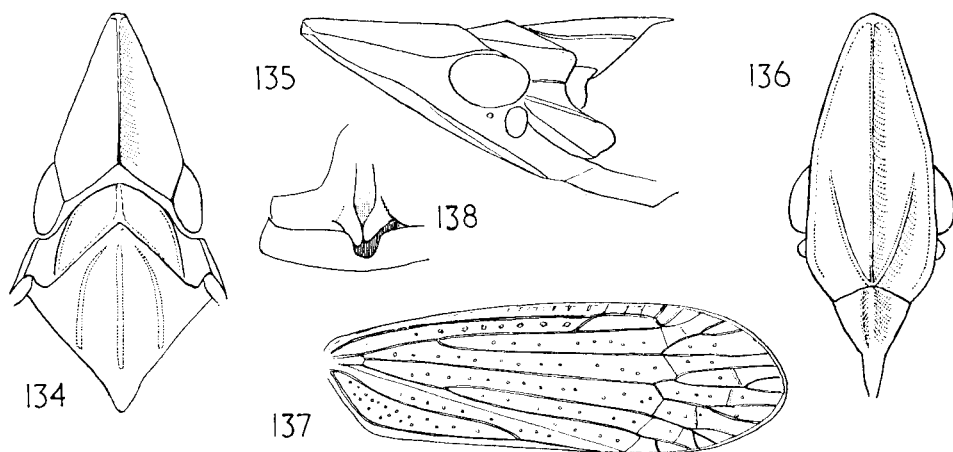
Species of this genus, as in those of allied genera, have the 2nd antennal segment ovoid or cylindrical, ocelli small, rostrum surpassing mesotrochanters but not reaching post-trochanters, and subapical segment longer than apical, post-tibia with 3 lateral spines and 6 apically, and basal metatarsal segment with 5 apical spines.

39. *Macrovanua amicalis* Fennah, new species Figs. 134–138.

♀. Vertex a little longer in middle line than broad at anterior margin of eyes (1.2 : 1), in profile with dorsal margin horizontal; disc shallowly tectiform. Frons 2× as long in middle line as broad at widest part, oblique carinae reaching basad to level of anterior margin of eyes. Tegmina with transverse veinlets of precostal area present only in distal 1/2, Sc+R forking at same level as fork of Cu 1. Green; eyes red, post-tibial and post-tarsal spines black. Seventh (pregenital) sternite with a U-shaped excavation at middle of posterior margin. First valvulae of ovipositor each produced in a subconical lobe at base of its mesal border, lobes of each side not quite symmetrical. Length, 9.1 mm; tegmen, 8.0 mm.

Holotype ♀ (BISHOP 7086), Tonga Is: Eua I., Ohonua, II. 1956, N. L. H. Krauss

This species differs from *M. angusta* Muir (from Niue) in the vertex being relatively longer and, in side view horizontal, not upcurved, in Sc+R forking level with the fork



Figs. 134–138. *Macrovanua amicalis*, new species: 134, vertex, pronotum and mesonotum; 135, head, pronotum and mesonotum, lateral view; 136, frons and clypeus; 137, tegmen; 138, basal portions of 1st valvulae of ovipositor, and greater part of pregenital sternite.

of Cu 1, and not basad of it, and in the common claval vein being relatively shorter, and, in the female, in the posterior margin of the pregenital sternite being excavated in a U-shape medially, as contrasted with an emargination that is twice as broad as deep in *angusta*. From *M. demissa* Fenn. (Taveuni, Fiji Is.) it differs in the horizontal profile of the vertex, in the relatively much narrower precostal area of the tegmina, in the more basad position of the forks of Sc+R and Cu 1, and in the fewer transverse veinlets in the membrane.

Family ISSIDAE Spinola

Genus *Atylana* Melichar

*Atylana* Mel., 1906: 198, 320 (logotype: *Tylana intrusa* Mel., 1906: 200).

The Samoan and Tongan species of this genus fall into two distinct groups, and would seem to have been derived from two immigrant ancestors. The connection between them and species in the New Hebrides is close. They may be separated as follows.

Head in profile with sides of head above eyes extremely short; vertex declivous; frons oblique, markedly extending anteriorly distad; eye with posterior margin strongly oblique. Pygofer with a weak but distinct carina in middle line ventrally .....

..... **maculifrons**

Head in profile with sides of head above eyes not extremely short, and easily seen; vertex little declivous, if at all; frons vertical or nearly so, not oblique or markedly extending distad anteriorly; eye with posterior margin weakly rounded, very little oblique, so that eyes appear round. Pygofer devoid of a median carina ventrally .....

..... **sinis**

40. *Atylana maculifrons* (Muir), new combination

*Capelopterus maculifrons* M., 1921: 581.

Vertex broader at base than long in middle (2.0 : 1); frons longer in middle line than broad (slightly more than 1.1 : 1). Wings with veins of R and M distad of R-M cross-vein not nearly parallel, converging as they approach apical margin, cell R much wider at base than at apex, R-M cross-vein strongly arcuate.

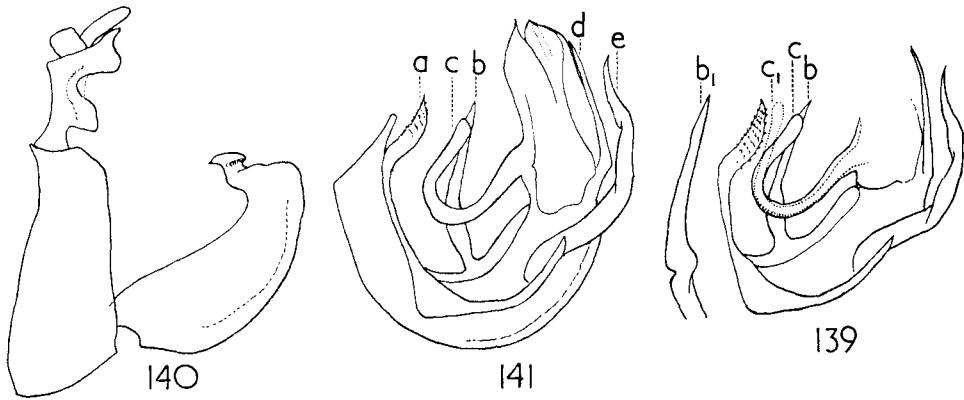
Tegmina with darker portions fuscous.

Genitalia as figured (fig. 139); the pair of processes marked (b) each moderately and abruptly constricted at 1/4 from base, and distinctly swollen just above constriction; the processes marked (c) each slender and widely U-shaped.

SAMOA: 1♂, Tutuila, Mapusaga, 28.V.1953, on 'Mile-a-minute', C. P. Hoyt; 1♀, Pago-pago, 18.IV.1924, E. H. Bryan, Jr.

41. *Atylana maculifrons manuana* Fennah, new subspecies      Figs. 139-141.

♂. Vertex broader at base than long in middle (2.3 : 1); frons longer in middle line than broad (slightly more than 1.1 : 1). Wings with veins of R and M distad of R-M cross-vein not nearly parallel, converging as they approach apical margin, cell R much



Figs. 139-141. *Atylana maculifrons* (Muir): 139, spinose armature of aedeagus (viewed from left side), with processes  $b_1$  and  $c_1$  (broken line) as found in typical subspecies, remainder as found in *A. maculifrons manuana*, new subspecies; 140, *A. maculifrons manuana*, new subspecies: ♂ anal segment, pygofer and left genital style; 141, ditto, aedeagus, left side, (a) lateral processes, (b) mediodorsal process, (c) apicodorsal processes, (d) medioventral processes, (e) lateroventral process.

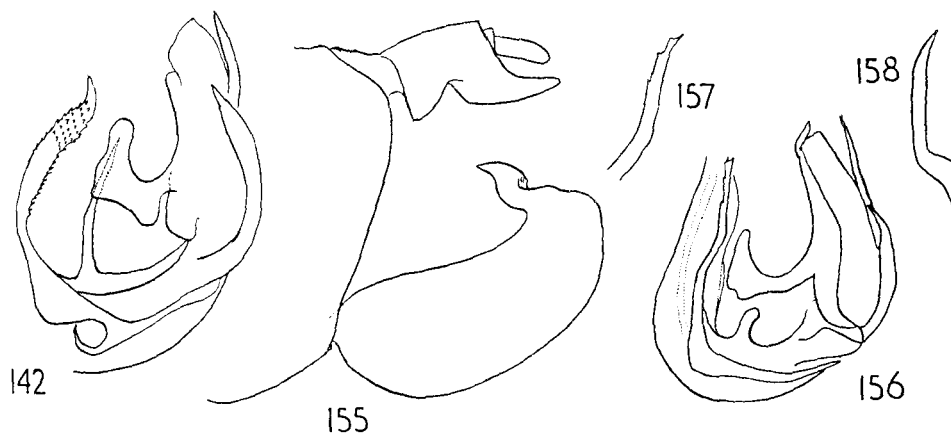
wider at base than apex, R-M cross-vein strongly arcuate. Tegmina marked as in *C. maculifrons* with darker portions greenish-fuscous. Genitalia as figured; aedeagus with the pair of processes marked (b) each slightly and not abruptly constricted at middle, not swollen above constriction; the processes marked (c) each moderately slender and rather narrowly U-shaped. Length 4.6 mm; tegmen, 4.8 mm.

Holotype ♂ (BISHOP 7087), Samoa: Manua, Ofu, 27. II. 1926, A. F. Judd. Paratype: nymph, Manua, Tau, 20. II. 1926, A. F. Judd.

This subspecies is not very close to typical *A. maculifrons*. The proportions of the vertex and the differences between processes of the male genitalia mentioned in the description suffice to distinguish the two subspecies, but a side-by-side comparison of the respective male genitalia show other slight differences that are difficult to convey in a description. It may be that this population represents a distinct species, but its proximity to typical *A. maculifrons* is very evident when its characters are compared with those of the following new species.

42. *Atylana castanea* Fennah, new species      Fig. 142.

Vertex broader at base than long in middle (nearly 2.2 : 1), frons as long in middle line as broad, or a little broader than long. Tegmina with apical margin slightly more oblique than in *A. maculifrons*. Wings with veins of R and M distad of R-M cross-vein parallel or nearly so, not converging as they approach apical margin, cell R about as wide at base as at apex, R-M cross-vein straight, or practically so. Tegmina marked approximately as in *A. maculifrons*, with an ovate hyaline spot extending inward from middle of costal margin, bordered by a broad castaneous band, corium distad of this spot usually lighter castaneous, veins ferruginous.



Figs. 142, 155-158. 142, *Atylana castanea*, new species: aedeagus, left side; 155, *Atylana intrusa* Melichar, ♂ anal segment, pygofer, and left genital style; 156, aedeagus, left side; 157, apical portion of lateral process; 158, posterior view of right lateroventral process.

♂. Genitalia as figured; aedeagus with the pair of processes marked (b) each weakly sinuate, not constricted, the processes marked (c) each broad, and rather short, with dorsal margin U-shaped, ventral margin broadly produced ventrad in a subquadrate lobe. Length, 4.9 mm; tegmen, 5.1 mm.

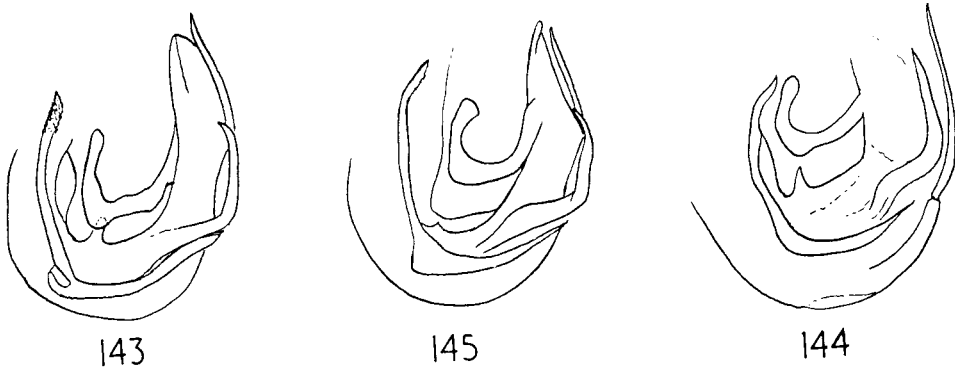
♀: length, 6.8 mm; tegmen, 6.9 mm.

Holotype ♂ (BMNH), Samoa: Upolu, Malololelei, 600 m, VII.1924, P. A. Buxton & G. H. Hopkins. Paratypes: 1♂, 3♀♀, same data; 1 mutilated ♀ specimen, Tapueleele, II.1955, N. L. H. Krauss; 1♂, Vailima, IX.1925, Buxton & Hopkins; 2♀♀, Apia, 29.III.1924, Buxton & Hopkins.

This species can be distinguished from *A. maculifrons* by the dark warm chestnut coloration of the darker parts of the tegmina, and the reddish brown veins. The wing venation sets this species well apart from the other two, and the greater degree of separation is well supported by the features of the aedeagus, which differ not only in the elements described, but also in the pair of posterolateral processes (e) which are blade-like in the present species, but twice constricted on the inner surface in the two sub-species of *A. maculifrons*.

43. *Atylana sinis* Fennah, new species      Figs. 143-145.

Vertex broader at base than long in middle (2.1 : 1), anterior margin sharply obtusely angulate at middle, frons very little longer in middle line than broad (not as much as 1.1 : 1), ♂ with median carina distinctly present at base, between anterior margin of vertex and united sublateral carinae. Light testaceous to ochraceous; frons, except for testaceous sprinkling, median portion of clypeus, a dilute suffusion on vertex, interpustular areas of anterior 1/2 of pronotal disc and mesal 1/2 of lateral fields of pronotum, mesopleura, coxae, femora except at base and at apex, protibiae and mesotibiae in basal 1/2 and at apex, protarsi and mesotarsi at apex, abdominal terga anteriorly and medially, a suffusion laterally on ventrites and on pygofer basally, fuscous. Tegmina semihyaline, tinged ochr-



Figs. 143-145. *Atylana sinis* new species: 143, *A. sinis sinis* ssp. typ., Aedeagus, left side; 144, *A. sinis upoluana*, new subspecies, aedeagus, left side, simplified to show only processes; 145, *A. sinis tutuilana*, new subspecies: aedeagus, left side.

aceous, an irregular ovate band from costa at basal 1/4 extending obliquely to Cu 1 at middle, then deeply rounding again to costa just distad of middle, castaneous fuscous; veins, and intracellular pustules, ochraceous. Wings semihyaline, grayish white with fuscous veins.

♂. Genitalia as figured. Anal segment with lateral margins each produced ventrad base in a trapezoidal lobe; aedeagus with processes marked (a) each not as long distad of point of attachment as basad of it, processes (c) each rather strongly widened near middle. Length, 4.0-4.6 mm; tegmen, 4.1-4.7 mm.

♀. Length, 5.5 mm; tegmen, 5.0 mm.

Holotype ♂ (BISHOP 7088) Samoa: Savaii, Fanga, II.1955, N. L. H. Krauss. Paratypes: 1♀, 2 nymphs, same data; 1♂, Puapua, II.1955, Krauss.

This species is distinguished by the characters given above, and by numerous differences in the conformation of the aedeagal processes, among which one of the most conspicuous is the reduction of the pair of processes marked (b) in *A. maculifrons* to weakly sclerotised and very short stumps in *A. sinis*.

There are three insular forms that are here recognised as subspecies.

44. *Atylana sinis sinis* Fennah, new subspecies Fig. 143.

Vertex broader at base than long in middle (2.1 : 1), anterior margin sharply obtusely angulate at apex, frons a little longer in middle line than broad (scarcely 1.1 : 1), in ♂ with median carina distinctly present at base, between anterior margin of vertex and united sublateral carinae. Male: Anal segment of male with lateral margins each produced ventrad near base in a trapezoidal lobe.

♂. Length, 4.0 mm; tegmen, 4.1 mm.

45. *Atylana sinis upoluana* Fennah, new subspecies Fig. 144.

♂. Vertex broader at base than long in middle (2.2 : 1), anterior margin bluntly obtusely subangulate at apex, frons a little longer in middle line than broad (1.1 : 1), me-

dian carina not present basally. Infuscation of body more extensive than in typical subspecies. Anal segment with lateral margins each produced ventrad near base in a deeply convex lobe. Length, 4.5 mm; tegmen, 4.7 mm.

Holotype ♂ (BMNH) of subspecies, Samoa: Upolu, Aleipata, IV.1924, P. A. Buxton and G. H. Hopkins.

This subspecies is distinguished by proportions of the vertex, the absence of all trace of a median carina at the base of the frons, by size, by the shape of the male anal segment and by slight differences in the shape of the aedeagal processes.

46. *Atylana sinis tutuilana* Fennah, new subspecies      Fig. 145.

Vertex broader at base than long in middle (nearly 2.3 : 1), anterior margin bluntly obtusely subangulate at apex, frons a little longer in middle line than broad (1.1 : 1), ♂ with median carina not present basally. Infuscation of body less than in typical subspecies.

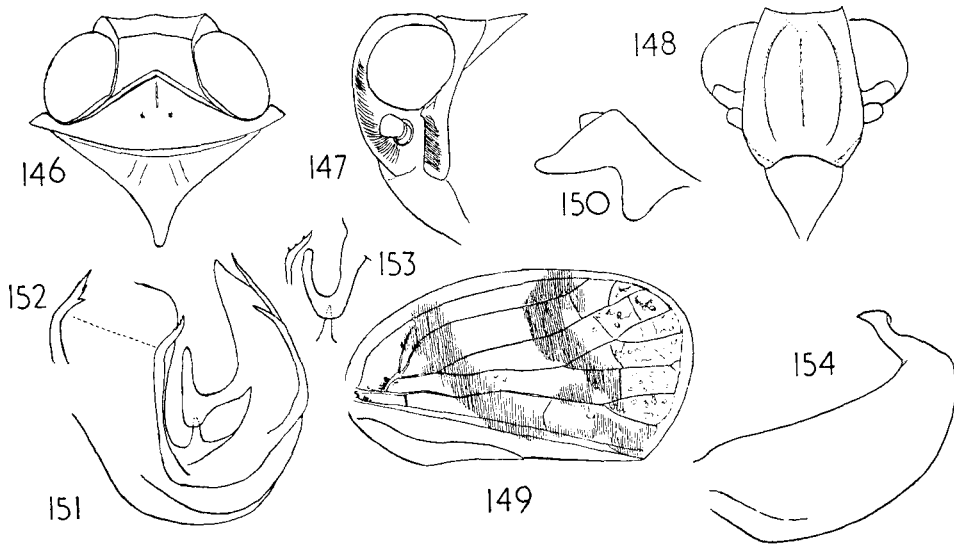
♂. Anal segment with lateral margins each produced ventrad near base in a deeply convex lobe. Length, 4.0 mm; tegmen, 4.2 mm.

♀. Length, 5.0 mm; tegmen, 5.1 mm.

Holotype ♂ (BISHOP 7089) of subspecies, Samoa: Tutuila, Mapusaga, 25.V.1953, on 'Mile-a-minute', C. P. Hoyt. Paratypes: 1♀, same data; 1♀, Fagatoga, 29.III.1926, A. F. Judd; 1♂, Fagaitua, E. H. Bryan, Jr.; 3♂♂, Tafuna, 20.I.1952, J. L. Gressitt. This subspecies is distinguished by the shape of the anterior margin of the vertex, by the absence of a median carina near the base of the frons, by the length of the tegmina, and by the lighter coloration of the body. From the population in Upolu this subspecies is also distinguished by the distinctly greater convexity of the apical angle of the tegmina.

47. *Atylana crataeis* Fennah, new species      Figs. 146-154.

♂. Vertex broader at base than long in middle (2.0 : 1), anterior margin subangulately rounded at middle, frons vertical, not inclined anteriorly distad, longer in middle line than broad (1.1 : 1) median carina present between basal margin and united sub-lateral carinae, and also distinct on middle of disc. Tegmina as in *A. sinis*. Wings with M simple to apex, 1st apical cell (R) quadrate, as in *A. sinis*, second cell quadrate, as broad as first (in type specimen). Light orange brown to ochraceous; frons, except for testaceous sprinkling, median portion of clypeus, interpustular areas of anterior 1/2 of pronotal disc and mesal 1/2 of lateral fields of pronotum, mesopleura, coxae, femora except at base and at apex, protibiae and mesotibiae chiefly in basal 1/2 and at apex, protarsi and mesotarsi at apex, castaneous-fuscous, sometimes very dark. Tegmina semihyaline, tinged ochraceous, in ♂ an irregular ovate band from costa at basal 1/4 extending obliquely to Cul at middle, then deeply rounding again to costa just distad of middle, dark to dilute castaneous-fuscous; in both sexes veins and intracellular pustules, ochraceous. Wings semihyaline, grayish white with fuscous veins. Anal segment with lateral margins each produced ventrad near base in a deeply convex lobe. Aedeagus as figured; lateral processes (a) each with anterior limb oblique, directed latero-dorsad distally, apicodorsal processes (c) moderately widened at middle with lower margin abruptly angulate, mediodorsal processes (b) small, each rather short, not or only weakly sclerotised. Genital styles as in *A. sinis*. Length, 4.0 mm; tegmen, 4.3 mm.



Figs. 146-154. *Atylana crateis*, new species: 146, vertex, pronotum and mesonotum; 147, head in profile; 148, frons and clypeus; 149, tegmen; 150, ♂ anal segment, left side; 151, aedeagus, left side (Haamonga specimen); 152, apex of lateral process (Haamonga); 153, apex of lateral process, mediodorsal process and apicodorsal process of specimen from Tuanikavele; 154, left genital style.

♀. Length, 4.0 mm; tegmen, 5.0 mm.

Holotype ♂ (Mus. Godeffroy, No. 4842), Tonga Is.: Tongatabu.

Paratypes: 2♂♂, 7♀♀, Tongatabu, Haamonga, II.1956, N. L. H. Krauss.

The vertical frons serves to place this species near to *A. sinis*, and it is separated from the latter by the relatively narrower vertex, the distinct, though incomplete, median carina on the frons, and, in the aedeagus, by the angulate shape of the apicodorsal processes in combination with the short but distinct mediodorsal processes.

Three males, Vavau, nr. Tuanikevale, cliff, 45 m, J. F. Hoffmeister, are assigned to this species, but may prove to be subspecifically distinct from the typical population when longer series can be compared.

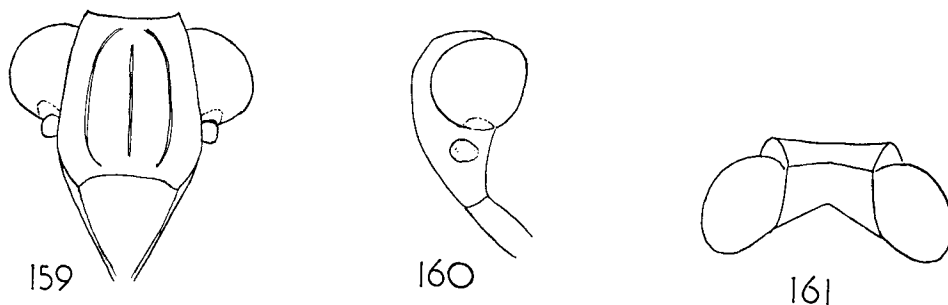
48. *Atylana intrusa* Melichar Figs. 155-158, 159-161.

*Tylana (Atylana) intrusa* Mel., 1906: 207.

This species was founded by Melichar on specimens from Upolu, Ovalau and from unspecified localities in Fiji. As it is likely that this collection contained more than one species, I now designate a male from Ovalau from the collection in the Hamburg Museum, and labelled '*intrusa*' by Melichar, as the lectotype, and supplement the original description with the following data obtained from an examination of this specimen.

♂. Vertex broader at base than long in middle (2.6 : 1) anterior margin almost straight; frons vertical, longer in middle line than broad (1.1 : 1), median carina weakly present between basal margin and united sublateral carinae, and moderately distinct on disc.





Figs. 159-161. *Atylana intrusa* Melichar: 159, Frons and clypeus; 160, head in profile; 161, vertex.

Wings with M simple to apex, apical cell R and apical cell M equal in width. Clypeus infuscate laterally as well as anteriorly. Coloration otherwise as in *A. sinis*. Anal segment with lateral margins each produced ventrad near base in a deeply convex lobe; apical margin acutely rounded. Aedeagus as figured; lateral processes (a) with anterior limb ascending, sinuate, with only 4 or 5 minute spicules distally, apicodorsal processes (c) strongly widened at middle, with lower margin deeply or subrectangulately rounded and upper margin only shallowly concave, mediodorsal processes (b) each finger-like, weakly sclerotised. Length, 4.5 mm; tegmen, 4.6 mm.

Lectotype ♂ (Mus. Godeffroy No. 2862a), Fiji Is.: Ovalau.

The shape of the anal segment and of the aedeagal processes serve to define this species. The vertical frons and weak mediodorsal processes on the aedeagus show it to be closely related to the Samoan *A. sinis*.

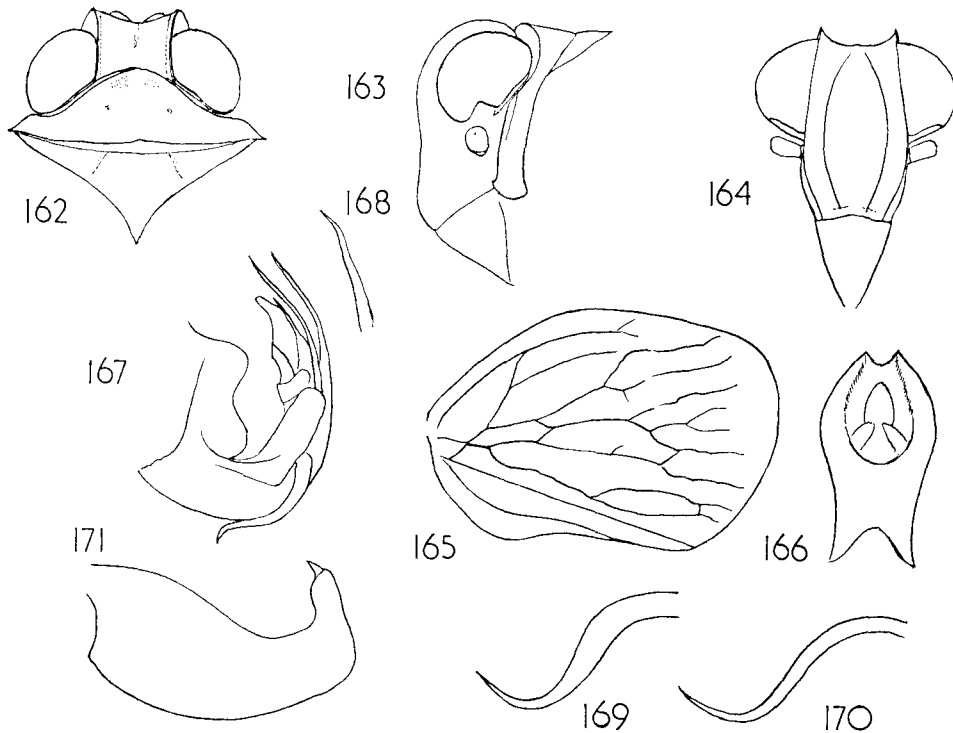
#### Genus *Scalabis* Stål

*Tylana* (*Scalabis*) Stål, 1870: 762 (logotype: *Tylana* (*S.*) *philippina* Stål, 1870: 762).

49. *Scalabis calvena* Fennah, new species Figs. 162-171.

Vertex broader at base than long in middle line (nearly 1.5 : 1), lateral margins moderately elevated above eyes, frons longer than broad (1.7 : 1), in profile strongly oblique, width of gena at apex equal to width of eye in lateral view.

♂. Light reddish brown, so heavily sprinkled with small stramineous or ochraceous spots as to appear light testaceous. Tegmina translucent, light yellowish brown, venation stramineous. Anal segment moderately long, in lateral view only very slightly decurved distad of anal foramen, narrowly sulcate in middle line distally. Aedeagus U-shaped in profile, dorsolateral margins each produced in a broad lobe with its distal margin sinuate, concave at middle; phallobase bifid distally, ventral margin terminating in a pair of porrect, slender spinose processes directed dorsad, each weakly sinuate near apex, 2 pairs of long spinose processes basad of these processes, the inner pair shorter, taeniate in their basal 2/3, abruptly narrowing at 2/3 from base and aciculate in apical 1/3; the outer pair long, moderately curved, feebly sinuate at apex; dorsal margin of aedeagus terminating in a broad crescentic sclerite, flanked laterally by a pair of subspatulate membranous



Figs. 162-171. *Scalabis calvena*, new species: 162, vertex, pronotum and mesonotum; 163, head, pronotum and mesonotum, lateral view; 164, frons and clypeus; 165, tegmen; 166, ♂ anal segment; 167, aedeagus, left side (Neiafu specimen); 168, apex of medioventral process of aedeagus (Nukualofa specimen); 169, lateral process of aedeagus (Nukualofa specimen); 170, lateral process of aedeagus (Neiafu specimen); 171, genital style, left side.

lobes; phallus with a pair of long stout spinose processes ventrolaterally, each curved cephalad below aedeagus then incurved to cross its fellow in middle line. Genital styles as figured. Length, 4.0 mm; tegmen, 4.2 mm.

♀. Ground color darker than in ♂; clypeus and legs mostly fuscous, disc of frons and genae mostly yellowish brown with an orange-red suffusion. Tegmina yellowish brown with paler venation, the oblique depression between R and fork of Cu1, and distal portion of cell between post-claval veins, fuscous; sometimes with a shallowly curved pale band from base to apical margin, mostly along M. Length, 4.5 mm; tegmen, 5.2 mm.

Holotype ♂ (BISHOP 7090), Tonga: Tongatabu I., Nukualofa, II.1956, N. L. H. Krauss. Paratypes: 1♀, same data; 2♀♀, Haamonga, II.1956, Krauss; 2♀♀, Eua I., Ohonua, II.1956, Krauss. 1♂, Vavau I., Neiafu, II.1956, Krauss.

This species comes nearest, in the form of the anal segment and ♂ genitalia to *Scalabis betulus* (Fennah) n. comb. (*Capelopterus betulus* Fennah, 1950: 93) but differs from this, as from all other Fijian species, in the outline of the lateral lobes at the base of the aedeagus and in the distally aciculate inner processes of the phallobase.

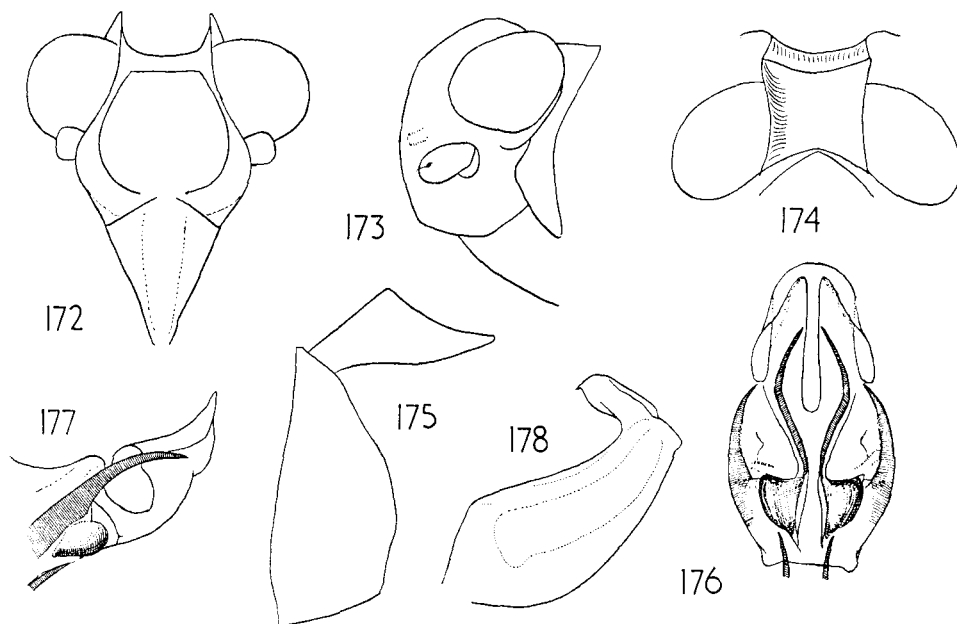
Genus *Neolollius* Muir

*Neolollius* M., 1921: 584 (haplotype: *N. viridis* Muir, 1921, *ibid.*).

50. *Neolollius samoensis* (Melichar), new combination Figs. 172-178.

*Tylana samoensis* Mel., 1906: 206.

Through the kindness of Dr H. Weidner, of the Godeffroy Museum, Hamburg, I have been able to examine the type specimen of *Tylana samoensis* Mel., from which the figures here given have been made. It is not known on which island this specimen was captured. *Neolollius viridis* Muir was described from Tutuila, and may possibly prove to be conspecific. An evaluation of this relationship, however, is likely to be conclusive only when more material becomes available, as it is entirely possible that a population belonging to this genus exists on each island, and that each differs from its neighbours only in the form of the aedeagal processes.



Figs. 172-178. *Neolollius samoensis* (Melichar): 172, frons and clypeus; 173, head and pronotum, lateral view; 174, vertex; 175, ♂ anal segment and pygofer, left side; 176, aedeagus, posteroventral view; 177, aedeagus, left side; 178, left genital style.

## REFERENCES

- Distant, W. L. 1906 Rhynchota. Heteroptera-Homoptera. *The fauna of British India, including Ceylon and Burma* 3: i-xiv, 1-503.
- Esaki, T. & T. Ishihara 1947. Species nova vel minus cognita Araeopidarum Japonicarum (Hemiptera). *Mushi* 17: 39-42.
- Fennah, R. G. 1950a. A generic revision of the Achilidae (Homoptera: Fulgoroidea) with

- descriptions of new species. *Bull. Brit. Mus. (Nat. Hist.)* **1**: 1-170.
- 1950b. Fulgoroidea of Fiji. *Bishop Mus. Bull.* **202**: 1-122.
1956. Fulgoroidea from southern China. *Proc. Calif. Acad. Sci. Ser. 4*, **28**: 441-527.
1964. Delphacidae from Madagascar and the Mascarene Islands (Homoptera: Fulgoroidea). *Trans. R. Ent. Soc. Lond.* **116**: 131-150.
1965. Delphacidae from Australia and New Zealand (Homoptera: Fulgoroidea) *Bull. Br. Mus. nat. Hist.* **17**: 1-59.
- Germar, E. F. 1825. Augusti Ahrensii Fauna Insectorum Europae **11**: pls. 20-22.
- Guérin-Ménéville, F. E. 1834. Essai d'un nouvel arrangement des Hémiptères de la section des Homoptères, et revision de la tribu des Fulgorelles. *In Voyage aux Indes-Orientales .....* *Zoologie Insectes.* **1834**: 445-480.
- Kirkaldy, G. W. 1906. Leafhoppers and their natural enemies. Pt. IX Leafhoppers. Hemiptera. *Bull. Hawaii. Sug. Pl. Ass. Ent. Ser.* **1**: 271-419.
1907. Leafhoppers Supplement. (Hemiptera). *Bull. Hawaii. Sug. Pl. Ass. Ent. Ser.* **3**: 1-186.
1910. Hemiptera. Supplement to Fauna Hawaiiensis, or the Zoology of the Sandwich (Hawaiian) Isles. 1910: 531-599.
- Melichar, L. 1903. Homopteren-Fauna von Ceylon. 1903: i-iv, 1-248.
1906. Monographie der Issiden (Homoptera). *Abh. Zool. bot. Ges. Wien* **3**: 1-327.
- Metcalf, Z. P. 1950. Homoptera from the Caroline Islands *B. P. Bishop Mus. Occ. Papers* **20** (5): 59-76.
- Muir, F. 1917. Homopterous Notes. *Proc. Hawaiian Ent. Soc.* **3**: 311-338.
1921. On some Samoan Fulgorids (Homoptera). *Proc. Hawaiian Ent. Soc.* **4**: 564-584.
- 1927a. Hemiptera: Fulgoroidea. *Insects of Samoa and other Samoan terrestrial Arthropoda* **1** (2): 1-27.
- 1927b. On some Fulgorids from the South Pacific. *Ann. Mag. Nat. Hist. ser. 9*, **20**: 86-91.
- Stål, C. 1854. Nya Hemiptera. *Ofv. Svenska Vet. Akad. Förh.* **11**: 231-255.
1859. Hemiptera. *In Eugénies Resa* **4**: 219-298. Stockholm.
1862. Novae vel minus cognitae Homopterorum formae et species. *Berl. Ent. Zeit.* **6**: 303-315.
- Walker, F. 1857. Catalogue of the Homopterous insects collected at Sarawak, Borneo by Mr. A. R. Wallace with descriptions of new species. *J. Proc. Linn. Soc.* **1**: 141-175.
1858. Addenda. List of the specimens of Homopterous insects in the collection of the British Museum. 1858: 308-369.