

THE HIGHER CLASSIFICATION OF THE FAMILY ISSIDAE
(HOMOPTERA : FULGOROIDEA) WITH DESCRIPTIONS
OF NEW SPECIES.

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With 15 Text-figures.

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1. INTRODUCTION AND HISTORICAL RÉSUMÉ.

THE classification of Issidae followed by all recent students is based on groupings proposed by Melichar in his *Monographie der Issiden* (1906). On the characters of general body form, relative size of tegmina, presence or absence of a claval suture, and occurrence of foliate protibiae in the male he divided the family into three main groups which he named Caliscelidae, Hemisphaeriidae and Issidae: he then subdivided the last of these, according to degree of wing development, into three lower groups, Hysteropterinae, Issinae and Thioniinae. The higher groups, notwithstanding the terminology used, have never been recognised as families: they have usually been accorded subfamily rank, but where Issidae have themselves been regarded as a subfamily of Fulgoridae they have been relegated to the status of tribes.

This system of dividing the Issidae, which has been in use for nearly half a century, has never been revised or even directly questioned. Baker (1915: 141) proposed a new subfamily, Augilinae, for the reception of *Augila* Stål and *Augilina* Mel., but *Augila* was correctly removed to Lophopidae by Muir (1930: 476), where *Augilina* also belongs. A more significant contribution was made by Baker in 1927 (1927: 406) in the following comment on *Glyphotonga acuminata* Schmidt: "The relationship of the genus appears to be with *Tonga*, and to the Tonginae; apparently here should be referred also *Forculus* Distant, *Forculusoides* Distant, *Orthophana* Melichar, *Paratonga* Schmidt, *Oryzana* Distant and *Hemitonga* Schmidt. They all have one or two subapical teeth on hind tibiae but this character is variable. In more stable characters they appear to be

Issidae." (Shortly before this appeared Melichar (1924:11) had placed *Orthophana* in the Acanaloniidae). Baker does not appear to have defined his Tonginae, or even to have mentioned such a group elsewhere.

In 1929 Kuznetzov described *Ahomocnemiella*, based on a single species, and for its reception proposed a new subfamily Ahomocnemiellinae, which was described as coming between the Issinae and Eurybrachydinae of Stål. Material of *Ahomocnemiella* examined by the writer in the British Museum was not found to differ in any major character from *Caliscelis* and its allies.

Muir apparently overlooked these last two references, as in his second review of the classification of Fulgoroidea in 1930 he merely presented Melichar's table of subfamilies. Nevertheless, he made two comments (*loc. cit.*) which showed an appreciation of certain weaknesses in the existing classification. "This family (Acanaloniidae) . . . may eventually be sunk into the Issidae, unless other forms are segregated out of Issidae (e.g., *Tonga*); but the difficulty at present is to find one or more characters which will characterise such a group." "The genus *Ivinga* Distant is interesting and its position not very clear . . . It is placed in the Issidae."

During the past few years the writer has taken opportunities to examine material of most of the genera currently placed in the Issidae or Acanaloniidae, and has given particular attention to the shape of the antennae, the proportions of the rostrum, the arrangement of the post-tibial and post-tarsal spines, the structure of the post-tarsus, the form of the female genitalia, and, where possible, that of the male genitalia. As a result it has become evident that Melichar's major groups include two that are natural, though of totally unequal value ("Caliscelidae" "Hemisphaeriidae") and one ("Issidae") that is composed of a heterogeneous assemblage of genera which is not resolved into major natural components by the subgeneric characterisation which he gives.

2. SUBFAMILIES.

The data now available disclose the existence of five major natural groups in the family, each of which is here recognised as a subfamily. They are Caliscelinae, Issinae, Acanaloniinae, Tonginae and Trienopinae, and are defined as follows:

Trienopinae subfam. n.

Ocelli absent. Post-tibiae each with two spines laterally; basal metatarsal joint with more than two spines apically. Tegulae distinct. Tegmina with basal cell small or indistinct, costal margin with a projecting reflected loop basally. Ovipositor with third valvulae long, strongly spinose along short apical margin.

Type genus, *Trienopa* Signoret, 1860, *Ann. Soc. ent. Fr.* (8) 3: 188.

Type species of genus *Trienopa flavida* Sign., 1860, *loc. cit.*, pl. 5. fig. 4.

Tonginae.

Tonginae Baker, 1927: 407.

Ocellar scars present. Post-tibiae each with one or two spines laterally; basal metatarsal joint with more than two spines apically. Tegulae not distinct. Tegmina with basal cell moderately distinct, costal vein distinctly submarginal. Ovipositor with third valvulae minutely denticulate along distal dorsal margin, upper apical margin, and to a slight extent even on external dorsal surface. Aedeagus with a pair of prominent lobes dorsolaterally at base.

Type genus, *Tonga* Kirkaldy, 1900, *Entomologist* 33: 242.

Type species of genus, *Tonga guttulata* Westwood, 1845, *Arc. Ent.* 2: 57, fig. 2, 3a.

Issinae.

Issites Spinola, 1839, *Ann. Soc. ent. Fr.* 8: 204.

Issiden Melichar, 1906, *Abh. zool.-bot. Ges. Wien* 3: 100.

Ocelli present or absent. Mesonotum usually broader than long, never more than 1.5 times as long as broad. Post-tibiae with a variable number of spines, basal metatarsal joint with more than two spines apically. Tegulae not distinct. Tegmina with basal cell obsolete, very feebly demarcated. Third valvulae of ovipositor never furnished with spines and rarely minutely denticulate.

Type genus, *Issus* Fabricius, 1903, *Syst. Rhyng.*: 99.

Type species of genus, *Cercopis coleopratus* Geoffroy, 1764, *Hist. Ins.* 1: 418; Fabricius, 1775, *Ent. Syst.* 4: 53.

Acanaloniinae.

Acanonides Amyot and Serville, 1843, *Hist. nat. Ins., Hémipt.*: 58, 520.

Acanaloniidae Stål, 1862, *Handl. Vetensk. Akad., Stockh.* 3 (6): 68.

Ocelli or ocellar scars present. Rostrum with apical joint longer than broad. Mesonotum usually longer than broad. Post-tibiae almost invariably laterally unarmed, basal metatarsal joint with more than two spines apically. Tegulae narrow, more or less concealed. Tegmina with basal cell usually clearly demarcated, costal vein normally at margin throughout, or margin thickened and flanged below, venation irregularly reticulate. Ovipositor with third valvulae either relatively large, securiform, laterally compressed, with apical margins minutely denticulate along inner surface, or subquadrate with apical margins smooth.

Aedeagus of characteristic pattern as shown in figures below.

Type genus, *Acanalonia* Spinola, 1839, *Ann. Soc. ent. Fr.* 8: 447.

Type species of genus, *Acanalonia servillei* Spinola, 1839, *ibid.*: 448.

Caliscelinae.

Caloscélides Amyot and Serville, 1843, *Hist. nat. Ins., Hémipt.*: 57, 509.

Caliscelidae Melichar, 1906, *Abh. zool.-bot. Ges. Wien* 3: 3, 4.

Ahomocnemiellinae Kuznetzov, 1929, *Zool. Anz.* 79: 329.

Ocelli absent. Rostrum with apical joint very short, little, if at all, longer than broad. Mesonotum broader than long. Protibiae occasionally foliate, post-tibiae usually armed laterally with a single spine, basal metatarsal joint with not more than two spines. Tegulae not distinct. Tegmina often brachypterous, occasionally elongate and very narrow, basal cell very small or feebly demarcated. Third valvulae of ovipositor not at all denticulate, strongly rounded.

Type genus, *Caliscelis* Laporte, 1833, *Ann. Soc. ent. Fr.* 2: 251.

Type species of genus, *Fulgora bonelli* Latreille, 1807, *Gen. Crust. Ins.* 3: 166.

3. DESCRIPTIONS OF GENERA AND SPECIES.

(i) Subfamily Trienopinae.

Four genera, two of which were placed by Melichar in his group "Issidae", and one which is described below as new, are referred to this subfamily. *Ivinga*

Distant, notwithstanding its combination of aberrant characters, can be derived so easily from typical *Trienopa* from East Africa and Madagascar, that it cannot justifiably be retained on an equal footing with the other genera, and is accordingly here regarded as a subgenus of *Trienopa*.

Key to Genera of Subfamily Trienopinae.

- (1) (2) Vertex not longer than broad, head not produced before eyes for more than length of an eye 3
 (2) (1) Vertex longer than broad, head produced before eyes for much more than length of an eye 7
 (3) (4) Costal area wide, its cells three times as long as broad *Neotylana* Distant
 (4) (3) Costal area very narrow, its cells broader than long 5
 (5) (6) Vertex with a transverse carina at apex, margin of wing entire *Trienopa* subg. *Ivinga* Distant
 (6) (5) Vertex without a transverse carina at apex, margin of wing trilobate *Trienopa* subg. *Trienopa* Signoret
 (7) (8) Genae in side view of head subrectangulate; antennae inserted distad of eyes. Tegmina with clavus extending for two-thirds of total length of tegmen, Sc + R six-branched, M about 14-branched at subapical line *Togoda* Melichar
 (8) (7) Genae in side view of head triangular; antennae inserted below eyes. Tegmina with clavus reaching almost to apex; Sc + R and M with fewer branches at subapical line *Ingoma*¹

Ingoma gen. n.

Vertex quadrate, horizontal, much produced before eyes, lateral margins parallel, anterior and posterior margins truncate; frons narrow, lateral margins feebly diverging distad to clypeus, disc devoid of longitudinal carinae, but traversed near base by a carina which cuts off a quadrate cell; clypeus ecarinate medially, about half as long as frons; ocelli absent. Pronotum with disc longer than broad, anteriorly deeply convex, subtruncate across middle; mesonotum rather shorter than broad. Post-tibiae laterally three-spined, apically eight-spined, basal metatarsal joint seven-spined. Tegmina relatively narrow, costal and apical margins forming a single shallowly convex curve; costal area narrow, sutural angle forming most distad point of tegmen, venation rather sparse adjoining subapical line.

Type species, *Ingoma triquetra* sp. n.

Ingoma triquetra sp. n. (fig. 1, A-D)

Stramineous; frons except distally and near lateral margins, vertex, genae except for a broad oblique band, distal portion of clypeus, both pronotum and mesonotum except in middle line, mesepisternum, coxae, femora except at apex, pro- and mesotibiae at apex, pro- and mesotarsi, and abdominal sclerites suffusedly, fuscous-piceous. Tegmina hyaline, tinged stramineous, veins, a broad fascia overlying submarginal line, and another from Sc at basal third of tegmen obliquely across to Cu, thence to sutural angle, base of clavus slightly and apical half of clavus, fuscous-piccous.

Female: length, 7.0 mm.; tegmen, 5.4 mm.

¹ Described below.

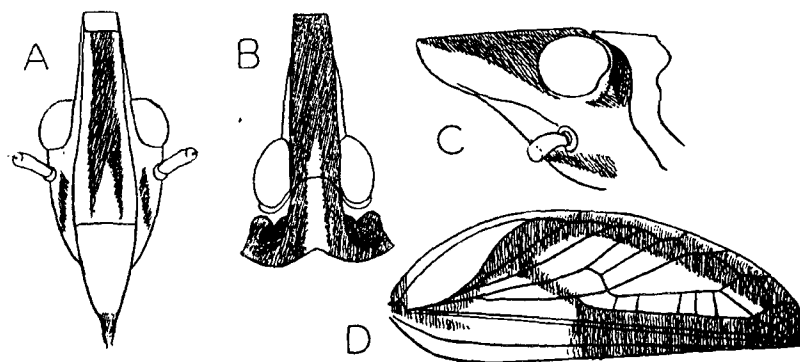


FIG. 1.—*Ingoma triquetra* sp. n. A, frons and clypeus; B, vertex and pronotum; C, head in profile; D, tegmen.

Holotype ♀ KENYA: Kwali forest, 20 miles west of Mombasa, 1.vi.1948 (*Miss M. Steele*) B.M. 1948-347. Type in British Museum (Natural History).

Ingoma is well distinguished by the elongate head, which is not declivous or of the same shape as in *Togoda* Mel., and by the shape of the tegmina. It is here assumed that the spine arrangement on the hind legs is of generic and not merely specific value, but it may prove necessary to modify this interpretation when more data are available.

(ii) Subfamily Tonginae.

The subfamily Tonginae includes twenty genera, separated by the characters given in the following key. The shape of the female genitalia and the basic pattern of the male genitalia are remarkably constant, so much so, indeed, that the latter appear to be of limited value in separating genera. There is a complex of forms centred on *Lollius* Stål which shows much variation in the shape of the head, but less in that of the tegmina. The treatment of this group below has been based principally on use of tegminal characters: this has enabled most existing names to be preserved with only one or two additions. One alternative course, based on the assumed paramountcy of head characters, would have resulted in the erection of numerous monotypic genera. Another course, attractive on account of its apparent taxonomic soundness, would have been to sink all such forms under *Lollius* Stål: the gaps in the available material, however, appear too large to justify such a drastic step. The best course may prove to be the recognition of a number of subgenera of *Lollius*—a treatment virtually the same as that used by Melichar for *Tylana*—but until further material comes to hand the writer prefers to treat genera in this group as being on an equal footing.

Key to Genera of the Subfamily Tonginae.

- (1) (2) Apex of clavus terminating in a short but distinct spine² (3)
 (2) (1) Apex of clavus not terminating in a spine, even if sometimes narrow (5)

² See fig. 6H.

- (3) (4) Vertex elongate, triangular **Tonga** Kirkaldy
 (4) (3) Vertex subquadrate **Hemitonga** Schmidt
 (5) (6) Tegmina broadest near middle, very strongly tapering distad (7)
 (6) (5) Tegmina quadrate or subtriangular, not strongly tapering distad, frequently widening (13)
 (7) (8) Vertex anteriorly broadly rounded, disc domed transversely, disc of frons ecarinate, hollowed **Forculus** Distant
 (8) (7) Vertex pentagonal or quadrate or head conical in dorsal view (9)
 (9) (10) Vertex strongly produced before eyes, in dorsal view elongate, triangular **Glyphotonga** Schmidt
 (10) (9) Vertex short, quadrate or pentagonal (11)
 (11) (12) Vertex pentagonal; tegmina with clavus not reaching apical margin **Forculusoides** Distant
 (12) (11) Vertex quadrate, but margins raised; tegmina apically acute, clavus reaching to apical angle **Orthophana** Melichar
 (13) (14) Apex of clavus reaching apical margin of tegmen (15)
 (14) (13) Apex of clavus not reaching apical margin of tegmen (19)
 (15) (16) Tegmina distinctly tuberculate between veins (17)
 (16) (15) Tegmina not tuberculate between veins, often with veins prominently raised (23)
 (17) (18) Intervenal tuberculation on tegmina very dense; veins almost immersed in corium, apical angle of tegmen obtuse, tegmina widest near middle **Distiana** Metcalf
 (18) (17) Intervenal tuberculation on tegmina not dense; veins distinct, apical angle of tegmen rectangulate, tegmina widest near apex **Andrewsiella** Izzard
 (19) (20) Vertex square or broader than long or, if slightly longer than broad, then anterior margin transverse, margins not deeply foliate even if raised; sutural angle of tegmina abruptly subrectangulate or acute (21)
 (20) (19) Vertex longer than broad, margins foliate; sutural angle of tegmina rounded-rectangulate **Epitonga**³
 (21) (22) Vertex square or practically so, margins raised; post-tibiae laterally bispinose; frons more than 1.5 times as long as broad, tegmina about 1.5 times as long as broad; species 6 mm. long **Cotylana**³
 (22) (21) Vertex much broader than long, margins not raised; post-tibiae laterally unispinose; frons not much longer than broad; tegmina twice as long as broad; species 11 mm. long **Paratonga** Schmidt
 (23) (24) Tegmina with apical margin truncate, vertical or practically so, sutural angle subacute or abruptly rectangulate, not rounded (25)
 (24) (23) Tegmina with apical margin convex-truncate, not vertical, sutural angle rounded (27)
 (25) (26) Costal area broad, broader than costal cell, traversed by oblique veins, frons as long as broad **Oryxana** Distant
 (26) (25) Costal area narrow, not broader than costal cell, frons longer than broad **Capelopterum** Melichar
 (27) (28) Clavus in profile sellate, posteriorly vertical, not tapering until very near apex **Scalabis** Stål
 (28) (27) Clavus in profile not sellate, sometimes elevated near base, tapering evenly distally (29)

³ Described below as new.

- (29) (30) Tegmina with twelve to eighteen branches of R and M reaching subapical line (31)
 (30) (29) Tegmina with much fewer branches of R and M at subapical line (33)
 (31) (32) Frons in profile much produced, sub-tricarinate, strongly projected beyond base of clypeus **Paratylana** Distant
 (32) (31) Frons only slightly projecting beyond clypeus, tumid, ecarinate; venation swollen as if blistered, veins numerous and parallel **Pseudotylana** Melichar
 (33) (34) Tegmina twice as long as broad, vertex angularly produced at middle of anterior margin **Lollius** Stål
 (34) (33) Tegmina much less than twice as long as broad (35)
 (35) (36) Vertex broader than long, frons transversely convex, margins not raised, strongly tricarinate **Issarius** Metcalf
 (36) (35) Vertex square, frons flat or transversely triconcave (37)
 (37) (38) Frons 1.2 times as long as broad, triconcave, with two very distinct carinae and sometimes a feeble median carina **Atylana** Melichar
 (38) (37) Frons in middle line 1.3 times as long as broad, flat, very feebly carinate, lateral margins foliately raised, especially at base and side of vertex **Tylana** Stål

Hemitonga Schmidt.

Hemitonga Schmidt, 1911, *Stettin. ent. Ztg* 72: 217.

Orthotype, *Hemitonga viridipennis* Schmidt, 1911, *loc. cit.*: 219.

No material of this genus has been examined by the writer. The Bornean type appears to combine the head characters of *Lollius furcifer* Stål with the tegminal characters of *Tylana dyakana* Kirk. (= *T. acutipennis* Mel. (1906: 200)) also from Borneo. The latter species is provisionally—and with hesitation—referred to *Hemitonga* under the new combination *Hemitonga dyakana* (Kirkaldy).

Distiana Metcalf.

Moniana Distant, 1909, *Ann. Mag. nat. Hist.* (8) 4: 76. *nom. praecoc.*

Distiana Metcalf, 1952, *J. Wash. Acad. Sci.* 42: 227.

Orthotype, *Distiana andrewsi* (Kirby).

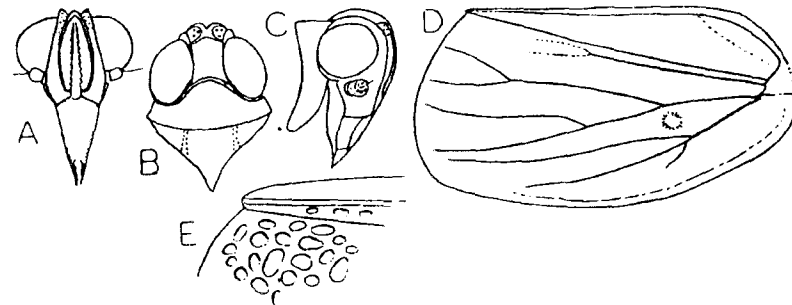


FIG. 2.—*Distiana andrewsi* (Kirby). A, frons and clypeus; B, vertex, pronotum and mesonotum; C, head and pronotum, side view; D, tegmen. E, apex of clavus (All figures kindly supplied by Dr. W. E. China.)

Distiana andrewsi (Kirby) (fig. 2, A-E).

Kirby, 1900, *Monograph of Christmas Island*: 13, pl. 15.

The writer is indebted to Dr. W. E. China for supplementing his notes on this species, and for providing the illustrations given above of the holotype in the British Museum.

Epitonga gen. n.

Vertex quadrate, longer than broad, margins elevated, frons about 1.1:1 times as long as broad, lateral margins diverging to below level of antennae, thence angulately bent mesad to frontoclypeal suture, lateral margins foliate, disc hollowed out, tricarinate, median carina weaker than sublateral carinae, latter not attaining suture, subacutely united basally; clypeus ecarinate, rostrum reaching post-coxae, apical joint as long as subapical. Pronotum about as long as vertex and longer than mesonotum. Post-tibiae laterally two-spined, apically eight or nine-spined, basal metatarsal joint with two large and six minute spines. Tegmina elongately subtriangular, widening to apex, costal margin weakly convex, apical angle strongly rounded, apical margin convex-truncate, sutural angle rounded-rectangulate; corium shallowly hollowed between the prominent veins, C, Sc and R simple to subapical line, M with about 4 branches at subapical line; claval veins united much basad of middle of clavus, clavus very definitely not reaching to apical margin. Wings with R simple or minutely forked at apex, M 2-branched, Cu₁ 3-branched.

Type species *Epitonga ferox* sp. n.

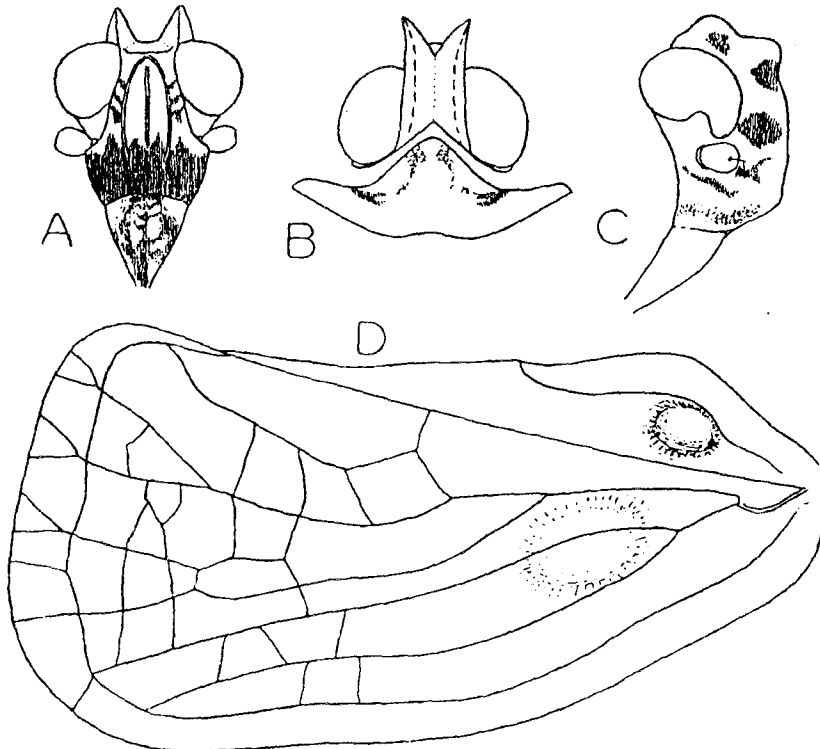


FIG. 3.—*Epitonga ferox* sp. n. A, frons and clypeus; B, vertex and pronotum; C, head in profile; D, tegmen.

Epitonga ferox sp. n. (fig. 3, A-D).

Head in profile subquadrate. Vertex with lateral margins 1.7 times maximum width, lateral margins deeply foliate, anterior and posterior margins angulately excavate; sublateral carinae of frons meeting dorsally a short distance below anterior margin of vertex, the intervening space medially hollowed; tegmina with humeral callus and a small callus near base of clavus prominent.

Stramineous; three obscure bands on frons extending over genae, clypeus, procoxae basally, pronotum behind antennae (except for a short ivory-white bar), mesonotum laterally (except for a raised ivory-white spot), fore and middle legs, post-tibiae, post-femora heavily, sprinkled fuscous-piceous. Tegmina polished, translucent, suffused pale greenish-yellow, a few spots on costal and apical margin and a larger spot between M and Cu at middle of tegmen fuscous-piceous; transverse veins pallid green.

Female: length, 8.5 mm.; tegmen, 10.7 mm.

Holotype ♀, SOLOMON Is.: New Georgia, Munda, ii.1945 (*L. A. Conwell*). Holotype in U.S. National Museum.

Cotylana gen. n.

Vertex quadrate, nearly square, anterior margin transverse with an indication of a small triangular projection at middle, lateral margins elevated but not foliate, frons longer than broad (1.6:1), lateral margins gradually diverging to below level of antennae then incurved, disc concave, strongly tricarinate with lateral carinae meeting acutely in middle line basally a very short distance before anterior margin of vertex, frontoclypeal suture impressed, rostrum just attaining post-trochanters, apical joint slightly shorter than subapical, ocellar scars present, post-tibiae laterally bispinose, apically 8-spined, basal metatarsal joint ten-spined. Tegmina not twice as long as broad, costal margin convex, deeply rounding into apical margin, sutural angle rectangulate or acute, clavus not reaching as far as apical margin. Wings with R simple for most of length, M and Cu₁ forked at middle, all these veins forked abruptly and subreticulately very close to apical margin, forming an irregular subapical line of veins and with about 12 branchlets reaching margin.

Type species, *Lollius acutipennis* Kirkaldy, 1906, *Bull. Hawaii Sug. Ass. ent. Ser. 1* (9): 439.

This concept is separated from *Tylana* by the distinctly tricarinate frons and the relative length of the clavus, which does not reach as far as the apical margin. The number of post-tibial and post-tarsal spines, and the submarginal venation of the wings are as in *Tylana*.

Cotylana acutipennis (Kirkaldy) (fig. 4, F-H).

Lollius acutipennis Kirkaldy, 1906, *loc. cit.*

The figures are of a specimen in the U.S. National Museum.

In addition to the type species, *Lollius angustifrons* (fig. 4, C-E) Kirkaldy (1906: 439) is placed here. The two species are readily separated by the shape of the sutural angle of the tegmina. *Hemitonga dyakana* (Kirk.) differs from these species in the relative length of the clavus and in size, as well as in basal carination of frons. If it should ultimately prove that this species is in fact close to those of *Cotylana* then it will become a matter of great difficulty to keep genera of the *Lollius* complex apart.

Paratonga Schmidt.

Paratonga Schmidt, 1910, *Stettin. ent. Ztg* 71: 181. Orthotype, *Paratonga truncaticeps* Schmidt.

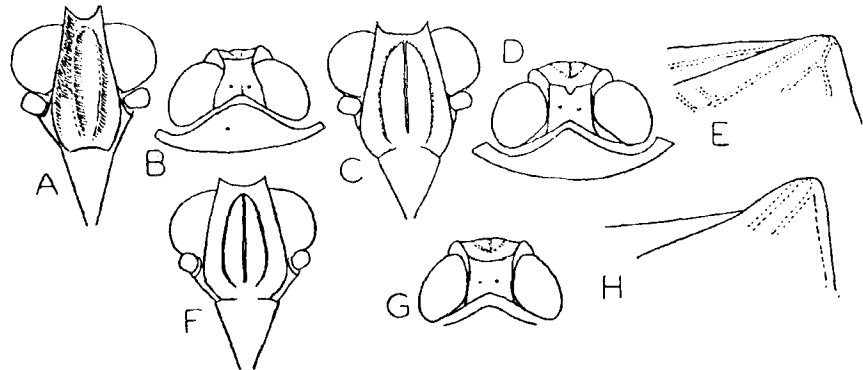


FIG. 4.—*Paratylna herbida* (Wlk.). A, frons and clypeus; B, vertex and pronotum. *Cotylana augustifrons* (Kirk.). C, frons and clypeus; D, vertex and pronotum; E, anal angle of tegmen. *Cotylana acutipennis* (Kirk.). F, frons and clypeus; G, vertex; H, anal angle of tegmen.

Paratonga truncaticeps Schmidt (fig. 5, A-D).

Schmidt 1910, *loc. cit.*: 182.

The figures are of a female specimen from the Fly River, New Guinea, in the British Museum. A female from Mt. Cameron, Tasmania, Aug.-Sept. 1896 (Anthony) coll. Rosenberg is in the collection of the U.S. National Museum.

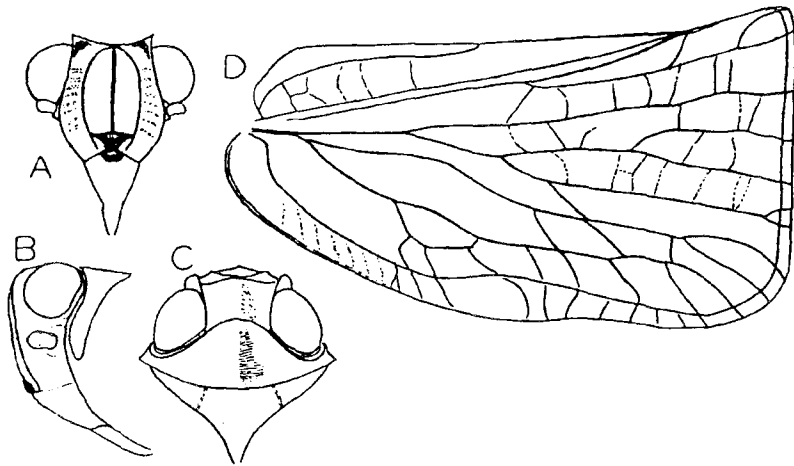


FIG. 5.—*Paratonga truncaticeps* sp. n. A, frons and clypeus; B, head and pronotum in profile; C, vertex, pronotum and mesonotum; D, tegmen.

Capelopterum Melichar.

Capelopterum Melichar, *Abh. zool.-bot. Ges. Wien* 3 (4): 210.

Logotype, *Capelopterum dohrni* Melichar, *loc. cit.*: 211, designated by Schmidt, 1910, *Stettin. ent. Ztg* 71: 167.

The type species stands apart from all others which Melichar assigned to this genus, and the genus at present must be considered as including only one

species. The remainder of those placed here by Melichar appear to belong to *Scalabis*. The specimen figured (fig. 6, c-g) is in the collection of the U.S. National Museum.

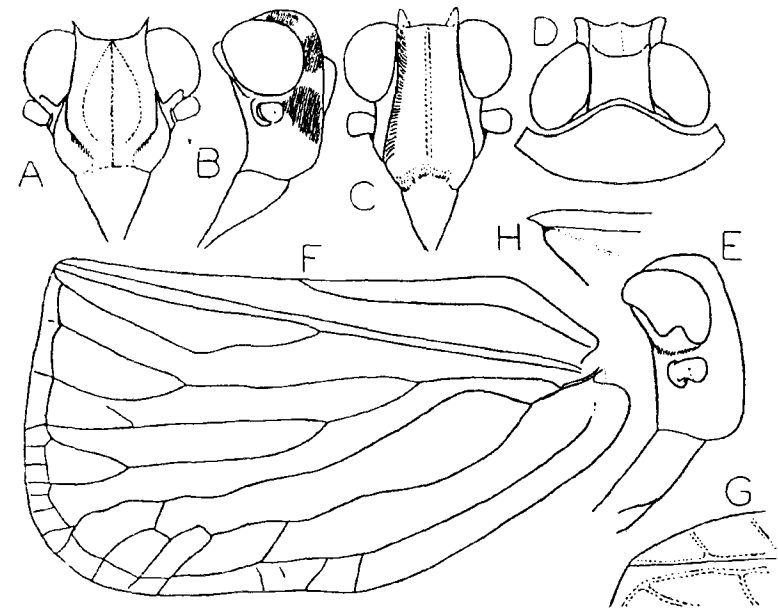


FIG. 6.—*Scalabis hebe* sp. n. A, frons and clypeus; B, head in profile. *Capelopterum dohrni* Mel. C, frons and clypeus; D, vertex and pronotum; E, head in profile; F, tegmen; G, apex of clavus. *Tonga* sp. H, apex of clavus.

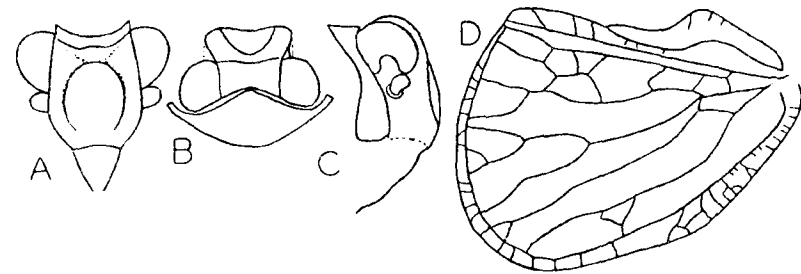


FIG. 7.—*Scalabis philippina* Stål. A, frons and clypeus; B, head and pronotum; C, head and pronotum, side view; D, tegmen.

Scalabis Stål.

Scalabis Stål, 1870. *Öfr. K. Vet. Akad. Förh.* 27: 762. Logotype, *Tylana* (*Scalabis*) *philippina* Stål.

Scalabis philippina Stål (fig. 7, A-D).

Stål, 1870, loc. cit.: 762.

The material seen included the male and female types from the Naturhistoriska Riksmuseet, kindly lent by Dr. René Malaise, and a series in the Baker collection in the U.S. National Museum. Figures were kindly provided by Dr. China of material in the British Museum. Those given here are based on Stål's material. The Fijian species which have been referred to *Capelopterum* (Fennah, 1950, *Bull. Bishop Mus., Honolulu*, 202: 88-94) are better placed in *Scalabis*.

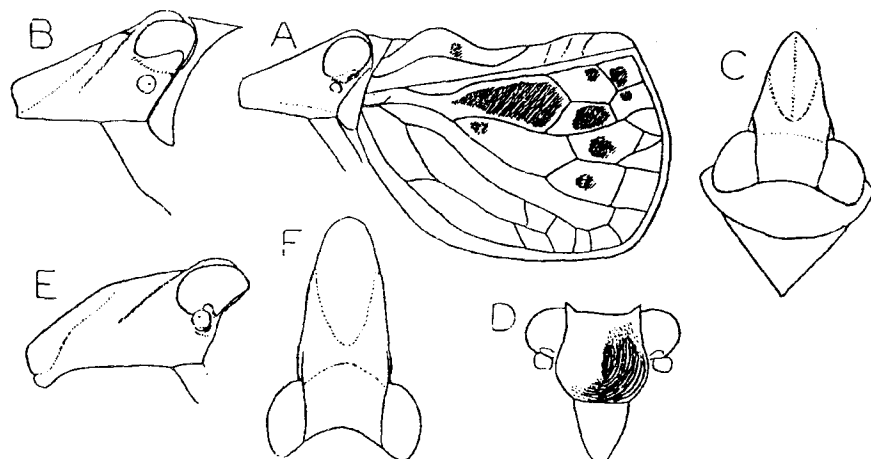


FIG. 8.—*Scalabis nasuta* sp. n. A, side view, legs omitted; B, head in profile; C, vertex, pronotum and mesonotum; D, head, anterior view. *Scalabis nasuta proboscidea* subsp. n. E, head in profile; F, vertex, dorsal view.

Scalabis nasuta sp. n. (fig. 8, A-D; 9, A-C).

Vertex broader than long with anterior margin very feebly indicated, frons much produced anteriorly, in profile with its upper half weakly declivous, dorsal and ventral margins converging distally, apical margin weakly sinuate, disc feebly tricarinate or carinae obsolete.

Testaceous; frons and legs a little darker, clypeus light castaneous. Tegmina testaceous, shining; intervenal spots of velvety texture in M and Cu distally, russet.

Anal segment of moderate length. Pygofer with laterodorsal angles moderately produced, subangulately rounded. Aedeagus U-shaped, with basal laterodorsal lobes not prominent, sinuate on their upper margin; distally 3 pairs of spines and a single median spine, all of moderate length, directed dorsad and curved cephalad at tip, the innermost pair also curved mesad; no processes developed laterally at middle of aedeagus. Genital styles of normal Tongine pattern, as figured.

Male: length, 6.2 mm.; tegmen, 5.0 mm. Female: length, 7.2 mm.; tegmen, 5.6 mm.

Holotype ♂, allotype and three ♀, PHILIPPINE IS.: Sibuyan Id. (Baker).

The head of this species in lateral view is superficially like that of *Paratylna*, but the proportions and carination of the frons are very different. Type in U.S. National Museum.

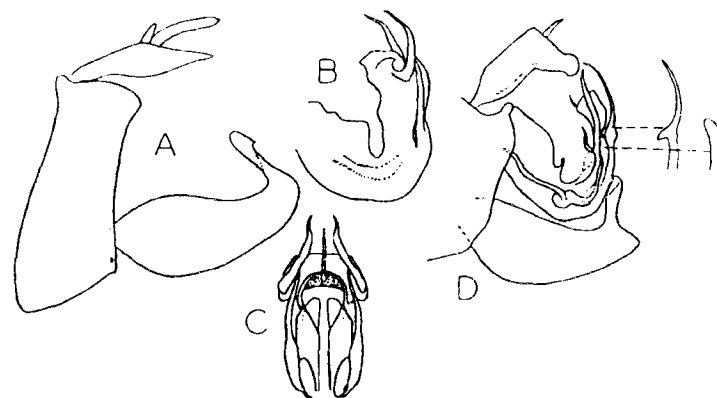


FIG. 9.—*Scalabis nasuta* sp. n. A, anal segment, pygofer and genital style; B, aedeagus, left side; C, aedeagus, posterior view. *Tylna cristata* (F.). D, male genitalia, left side.

Scalabis nasuta proboscidea subsp. n. (fig. 8, E, F).

Frons more produced than in typical subspecies (about 3.5 times the length of an eye), and very distinctly decurved; the pro- and mesotibiae definitely, though not broadly, oiliate. Tegmina with apex of clavus relatively more narrowly tapered. Ground coloration fuscous-piceous, tegmina with the veins and their granules distinctly picked out in ordid yellow.

Female: length, 8.0 mm.; tegmen, 6.2 mm.

Holotype ♀ of subspecies from PHILIPPINE IS.: Malinao, Tayabas (Baker).

This subspecies is very easily distinguished by the more elongate head. It may prove to represent a new species when a male is examined. Type in U.S. National Museum.

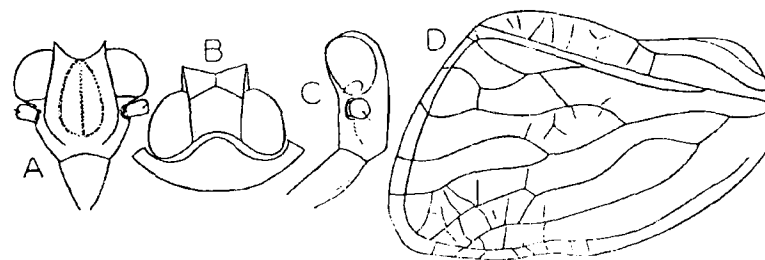


FIG. 10.—*Scalabis juvenas* sp. n. A, frons and clypeus; B, vertex and pronotum; C, head in profile; D, tegmen.

Scalabis juvenas sp. n. (fig. 10, A-D; fig. 11, A-C).

Frons with median carina more distinct than lateral carinae, but only feebly projecting at base. Clavus in side view as high, two-thirds from base, as height from bottom to top of eye similarly viewed.

Testaceous, sprinkled unevenly fuscous; three spots on head at sides, two indistinct bands on profemora and mesofemora, and three more distinct bands on protibiae and mesotibiae, fuscous. Tegmina greenish-testaceous, translucent, polished, transverse veinlets indistinct, dendroid, greenish-yellow, longitudinal veins reddish-brown interrupted testaceous.

Anal segment of male short, in lateral view with lower margin almost semicircularly lobate in basal half, dorsal and ventral margins distally narrowly tapering. Aedeagus U-shaped in side view, dorsal margin with an unequal pair of vertical lobes on each side near base; lateroventrally a horizontal spinose process attached near its middle; a pair of curved sickle-shaped processes arising laterally near the foregoing pair, curved dorsad and slightly laterad; a second pair of processes distad of these, tapering, shallowly curved, acuminate apically, slightly incurved distally but recurved near apex; distad of these processes a third pair, markedly S-shaped, acuminate at apex. Pygofer and genital styles as figured.

Male: length, 7.1 mm.; tegmen, 9.5 mm.

Holotype ♂, PHILIPPINE IS.: Malinao, Tayahao (*Baker*). Holotype in U.S. National Museum.

To this species are also referred one female from Davao, Mindanao; three females from Zamboanga, Mindanao, and one male from Id. Sibuyan, all taken by Baker. This material differs in the elevation of the lateral carinae of the vertex and in the degree of prominence of the median frontal carina, and probably forms another subspecies. The species is distinguished from others of the genus by the shape of the head, the carination of the frons, the shape of the anal segment of the male and the spinose armature of the aedeagus.

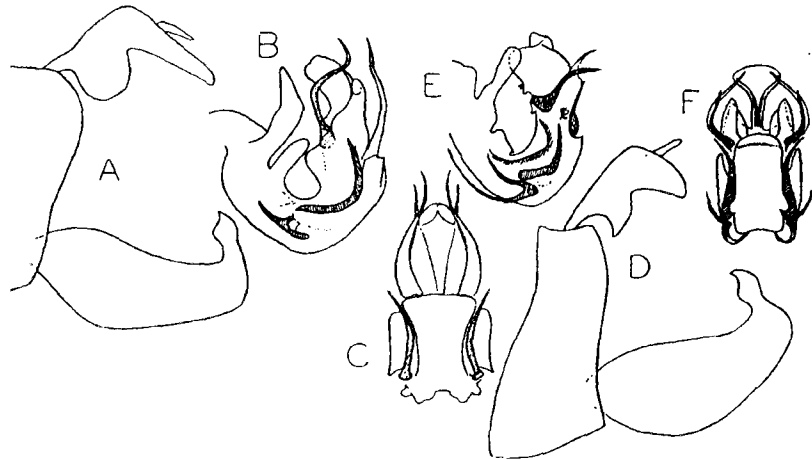


FIG. 11.—*Scalabis juvenis* sp. n. A, anal segment, pygofer and genital style, left side; B, aedeagus, left side; C, aedeagus, posterior view. *Scalabis hebe* sp. n. D, anal segment, pygofer and genital style, left side; E, aedeagus, left side; F, aedeagus, posterior view.

Scalabis hebe sp. n. (fig. 6, A, B; fig. 11, D-F).

Frons with median carina distinctly projecting at base.

Testaceous, sprinkled fuscous, sometimes heavily so on frons. Fore and middle legs with femora two-banded and tibiae three-banded. Tegmina sub-translucent, pallid grey, with

spots along costal margin and regular interruption along apical margin fuscous; veins and humeral callus yellowish-brown interrupted with stramineous; sometimes a brown suffusion over posterior half of corium and middle half of clavus.

Frons, vertex and sides of head of holotype fuscous-piceous; tegmina with an ivory spot close to base of claval suture and another distally in M, veins distally reddish-brown.

Anal segment of male short, in lateral view with lower margin produced in basal half in a subtriangulate lobe with its apex directed cephalad; dorsal and ventral margins broadly tapering. Aedeagus U-shaped in side view, dorsal margin with a short, broad subquadrate lobe and a rather long club-like lobe on each side near base; lateroventrally an asymmetrically U-shaped spinose process lying close against aedeagus and with both limbs directed cephalad; a pair of short curved spines arising laterally near middle of aedeagus directed caudad then dorsad; mesad and distad of these a second pair of spines, shorter than the first, directed laterocaudad below aedeagus; a third pair of spines arising on dorsal surface of aedeagus, each spine sinuately curved round aedeagus to point mesocaudad at apex, apical portion of aedeagus strongly sclerotised, with a pair of short peg-like denticles.

Pygofer and genital styles as figured.

Male: length, 6.8 mm.; tegmen, 8.4 mm.

Holotype ♂ and one ♂, PHILIPPINE IS. Mindanao: Colobato (*Taylor*). Holotype in U.S. National Museum.

This species differs from the preceding in details of head structure as figured, in the shape of the anal segment of the male and in the spinose armature of the aedeagus.

Paratylna Distant.

Paratylna Distant, 1909, *Ann. Mag. nat. Hist.* (8) 4: 78. Orthotype, *Issus herboides* Walker.

Paratylna herbida (Walker) (fig. 4, A-B).

Issus herboides Walker, 1868, *J. Linn. Soc. Lond. (Zool.)* 10: 121.

The characteristic features of this member of the *Tylana* complex are the elongate tricarinate head and the dense longitudinal distal venation of the tegmina. The figures are of a specimen in the U.S. National Museum.

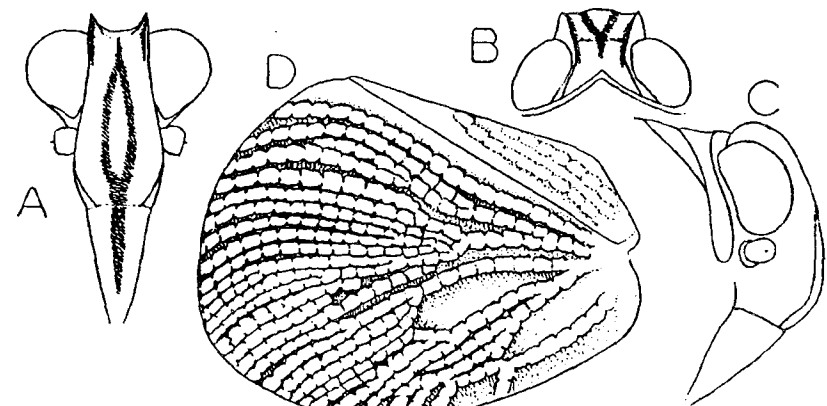


FIG. 12.—*Pseudotylana insculpta* Mel. A, frons and clypeus; B, vertex; C, head and thorax in profile; D, tegmen.

Pseudotylana Melichar.

Pseudotylana Melichar, 1906, *Abh. zool.-bot. Ges. Wien* (4) 3: 198. Logotype by present designation, *Pseudotylana insculpta* Mel.

Pseudotylana insculpta Melichar (fig. 12, A-D).

Melichar, 1906, *loc. cit.*: 208.

Atylana Melichar.

Atylana Melichar, 1906, *Abh. zool.-bot. Ges. Wien* (4) 3: 198. Logotype, *Atylana intrusa* Mel., *loc. cit.*: 207.

Melichar gives "Stirne mit zwei Kielen" as the characteristic of *Atylana*, but the median carina is sometimes weakly present.

Lollius Stål.

Lollius Stål, 1866, *Hemiptera Africana*, 4: 209. Orthotype, *Lollius australicus* Stål.

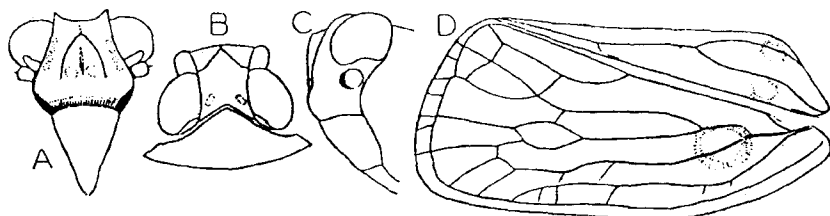


FIG. 13.—*Lollius australicus* Stål. A, frons and clypeus; B, vertex and pronotum; C, head, side view; D, tegmen.

Lollius australicus Stål (fig. 13, A-D).

Stål, 1870, *Öfv. K. Sven. Vet. Akad., Förh.* 27: 763.

The figures are of a female from a series of two males and four females from Bribies Id., near Brisbane, Australia, January 1925, in the U.S. National Museum.

Lollius is well represented from Australia to the Philippines, and examination of male genitalia has shown beyond doubt that several distinct species are involved. In external characters they differ in relatively minor details from the type species, and the limited extent of their variation strongly suggests that in this group of Issidae the natural species groups are compact and distinct, even if not by a very wide margin.

Tylana Stål.

Tylana Stål, 1862, *Rio Jan. Hemipt.* 2: 67. Logotype, *Issus cristatus* F. designated by Schmidt 1910, *Stettin. ent. Ztg* 71: 165.

Tylana cristata (Fabricius) (fig. 9, D; 14, A-E).

Issus cristatus Fabricius, 1803, *Syst. Rhyng.* 2: 100.

The figures are of a specimen from Réunion (Ile Bourbon) in the collection of the U.S. National Museum. Unless the broad interpretation of this genus used

by Stål and Melichar is followed, *Tylana* must at present be considered as including only *cristata* Fab. and *carinata* Fab. (if these are two species). *Tylana ustulipunctata* Uhl. belongs in *Thionia* Stål.

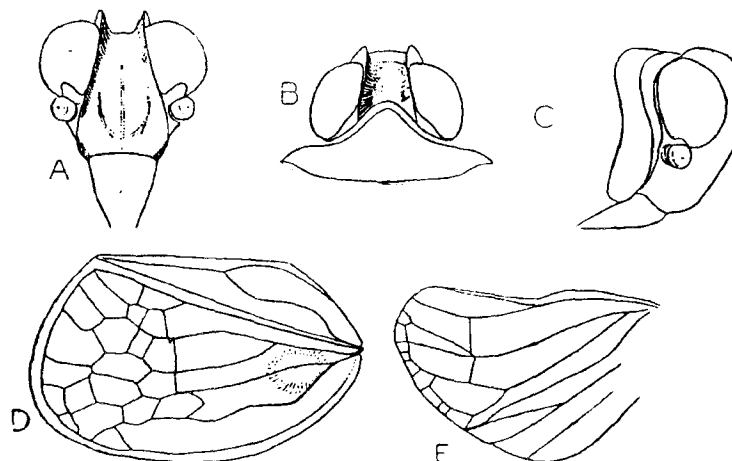


FIG. 14.—*Tylana cristata* (F.). A, frons and clypeus; B, vertex and pronotum; C, head and pronotum, side view; D, tegmen; E, wing.

(iii) Subfamily Acanaloniinae.

The characters which have served in the past to define the group at family level (Melichar, 1924; Muir 1925, 1930) comprise the following: posterior margin of pronotum shallowly concave, mesonotum large and long, post-tibiae devoid of spines, tegmina steeply tectiform, devoid of a precostal area and with venation reticulate.

These characters in combination do not apply to all the genera here recognised as natural members of the group. In *Euthiscia tuberculata* V. D. the hind margin of the pronotum and the proportions of the mesonotum, and its size relative to the rest of the body, are as in many Issine genera (e.g., *Thionia*): laterally unarmed post-tibiae occur in species of the Issine *Colpoptera*, while steeply tectiform tegmina are not rare in Issinae (e.g., *Ugoa*). In *Euthiscia* the costal vein is distinctly submarginal, and is distally connected to the margin by a few cross veinlets: in Issinae the costa is usually marginal, but sometimes submarginal, while in some species of *Pterilia* the precostal area which is developed is relatively as large as that found anywhere in Fulgoroidea. Reticulate venation of the tegmina occurs widely in Issinae. The green coloration so commonly found in Acanaloniinae is not taxonomically characteristic: green forms are common in Issinae (e.g., *Ugoa glauca*, *Issarius* spp.), while in *Euthiscia* one species is pallid testaceous and another is mottled dark brown.

On the characterisation hitherto accepted there is no place at which a dividing line can be drawn to separate off the Acanaloniine group. The form of the ovipositor is of considerable interest, and shows at once that the New World group is a natural unit quite distinct from the Old World group. The case for the two groups being of common origin is not yet proven, but the evidence

so far available from the structure of the male genitalia supports the view that the group is a natural one. The feature which appears so far to be characteristic of Acanaloniinae is the occurrence in the aedeagus of two pairs of processes directed caudad, the shorter underlying the longer. But the gap between typical Issinae and *Acanalonia* is very nearly bridged by the condition in *Euthiscia tuberculata* V. D. and *E. signata* V. D. (which were placed by Van Duzee and Doering in Issidae), and accordingly, in the absence of any abrupt change between Issinae, *Euthiscia* and *Acanalonia*, it is scarcely justifiable to regard *Acanalonia* and its allies as constituting a separate family and as more fundamentally distinct than Tonginae or Trienopinae.

Key to Genera of Subfamily Acanaloniinae.

- (1) (2) Post-tibiae with six to eight spines at apex; lateral margins of pronotum not carinate. Ovipositor with third valvulae minutely denticulate along distal margin. New World . . . (3)
- (2) (1) Post-tibiae with less than six spines at apex; lateral margins of pronotum more or less distinctly carinate. Ovipositor with third valvulae not at all denticulate. Old World . . . (9)
- (3) (4) Tegmina very distinctly widest at one third from base; claval suture reaching to apical margin . . . (5)
- (4) (3) Tegmina widest at or distad of middle; claval suture not reaching apical margin . . . (7)
- (5) (6) Lateral margins of frons produced laterad; tegmina with costal vein at margin; second post-tarsal joint with a spine at each side and three small teeth on distal margin **Galapagosana** Distant
- (6) (5) Lateral margins of frons produced antero-laterally, costa distinctly submarginal, second post-tarsal joint with a spine on each side and a row of eight small teeth along distal margin **Euthiscia** Van Duzee
- (7) (8) Tegmina widest at middle, vertex twice as long as broad, genae angulately produced . . . **Thiscia** Stål
- (8) (7) Tegmina widest distad of middle, vertex relatively shorter, genae not produced laterad . . . **Acanalonia** Spinola
- (9) (10) Vertex, pronotum and mesonotum convex; vertex or pronotum with a fine median line or distant longitudinal carina . . . (11)
- (10) (9) Vertex, disc of pronotum and disc of mesonotum flat, not at all convex, vertex and pronotum not obviously carinate in middle; disc of frons twice as long as broad, slightly narrowed towards clypeus and towards basal margin, with a prominent median carina throughout . . . **Hemithiscia** Schmidt
- (11) (12) Frons convex throughout, devoid of long setae . . . (13)
- (12) (11) Frons in middle with a shallow longitudinal impression, broadening towards the clypeus, and a distinct median carina from basal margin to slightly distad of middle, disc rather sparsely beset with long hair-like setae . . . **Pseudothiscia** Schmidt
- (13) (14) Frons strongly convex with three longitudinal carinae, the median more distinct than the lateral . . . **Parathiscia** Melichar
- (14) (13) Frons with a fine median carina only . . . **Paraphilatis** Melichar

Euthiscia Van Duzee.

Euthiscia Van Duzee, 1923, *Proc. Calif. Acad. Sci.* 12: 193. Orthotype, *Euthiscia signata* Van Duzee.

Euthiscia signata Van Duzee (fig. 15, A-D).

Van Duzee, 1923, *loc. cit.*: 193.

The short lateral appendages of the aedeagus are the counterpart of the latero-ventral appendages in *Acanalonia*. The figures are of a specimen in the U.S. National Museum.

The genus *Galapagosana* Distant is extremely close to *Euthiscia*, and must be referred to Acanaloniinae. In *Galapagosana* the lateral margins of the frons are strongly produced laterad, the costa in the tegmina is marginal, and the second post-tarsal joint has a spine at each side and three small teeth along the distal margin, while in *Euthiscia* the lateral margins of the frons are produced

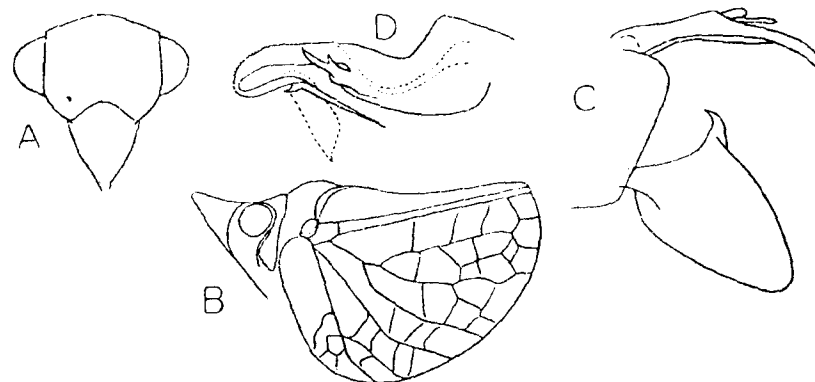


FIG. 15.—*Euthiscia signata* Van Duzee. A, frons and clypeus; B, lateral view, legs omitted; C, posterior margin of pygofer, anal segment and genital style, left side; D, aedeagus, right side.

anterolaterally, the costa is distinctly submarginal, and the second post-tarsal joint bears, in addition to the two latero-apical spines, an even row of about eight small teeth along the distal margin.

Hemithiscia Schmidt.

Schmidt, 1912, *Stettin. ent. Ztg* 73: 95. Orthotype, *Hemithiscia taeniatifrons* Schmidt, *loc. cit.*
Thinea Melichar, 1912, *Ergebn. zweite dtsch. zentr. Afr. Exped.* 1: 130. Haplotype, *Thinea devota* Mel., *loc. cit.*

The writer has examined African material which agrees satisfactorily with the definitions of both the above genera, and considers that they are better regarded as synonymous.

Consideration of the subfamilies Caliscelinae and Issinae is left for a further report: the former of these groups appears to present no taxonomic problem above generic level, whereas the latter presents so many that separate treatment is advisable.

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