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CHARACTERISTICS AND COMPONENTS OF LEDRINAE AND SOME NEW GENERA AND NEW SPECIES FROM AUSTRALIA AND NEW GUINEA

(Homoptera: Cicadellidae)[1]

By **J. W. Evans**[2]

Abstract: Four new genera and 26 new species of leafhoppers of the tribes Ledrini and Thymbrini of the subfamily Ledrinae are described. Of these, 17 species belong to the Ledrini and 9 to the Thymbrini; 10 species are from Australia and 16 from New Guinea. Of particular interest is the prolific speciation of the genus *Petalocephala* Stål which has taken place in New Guinea, and 13 new species are described. Also of interest is the occurrence in New Guinea, of a new annectant genus *Microledrella*, more closely related to a Western Australian genus, *Ledrella* Evans, than to any of the thymbrid genera known from Eastern Australia. The characteristics and components of the Ledrinae are discussed and reasons given for regarding the Nearctic genus *Koebelia* Baker as belonging to this subfamily but not the Neotropical genus *Clinonana* Osborn.

Subfamily LEDRINAE

Tribe Ledrini

Genus **Ezrana** Distant

Ezrana Dist., 1907, *Faun. Brit. Ind. Rhyn.* 4: 177.

Type species: *Ezrana pygmaea* Distant (Bombay).

Ezrana primitiva Evans, new species Fig. 1 A, B.

Length: ♀, 18 mm. General coloration, brown. Face of head concave with sparse, fine, white hairs. Labium short, not reaching to base of middle coxae. Maxillary plates with marginal ridge partly enfolding anteclypeus laterally. Postclypeus shining brown, anteriorly convex, medially concave; posteriorly depressed in center and laterally raised. Lora unusually broad, extending posteriorly, as channel-like depressions to narrowly elongated anterior tentorial pits. Crown of head rugose with irregularly pitted surface. Pronotum posteriorly elevated, posteromedially carinate. Tegmen proximally punctate, distally hyaline; veins brown, in relief, venation reticulate; anal margin of clavus proximally carinate.

Holotype ♀ (Australian Mus. K68744), Cairns, N. Queensland.

1. Part of the specimens examined are results of fieldwork supported by grants to Bishop Museum from the U. S. National Science Foundation (G-2127, G-4774, G-10734), and to Dr. J. L. Gressitt from the J. S. Guggenheim Foundation (1955-56).

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Ezrana primitiva differs from the type species in having both the crown of the head and the pronotum longer in relation to their width and in having the pronotum posteriorly carinate.

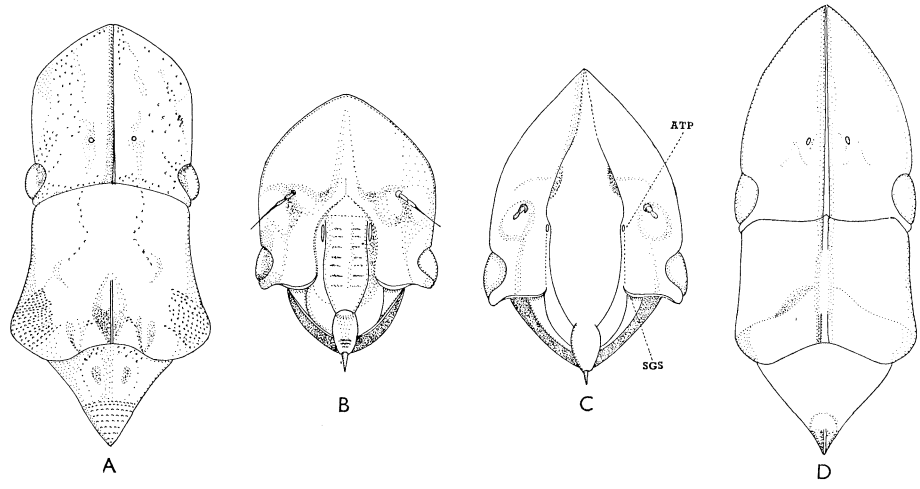

Fig. 1. A, *Ezrana primitiva*, head and thorax, dorsal aspect; B, *E. primitiva*, face of head; C, *Platyledra caldida*, face of head; D, *P. caldida*, head and thorax. ATP, anterior tentorial pit; SGS, subgenal suture.

Genus **Platyledra** Evans

Platyledra Evans, 1937, *Pap. R. Soc. Tasm.* **1936**: 39.

Type species: *Platyledra hirsuta* Evans (S. Australia).

Platyledra caldida Evans, new species Fig. 1 C, D.

Length: ♀, 10.8 mm. General coloration, dark brown. Face of head with sparse, white hairs, partly pale, partly dark brown; mottled brown adjacent to eyes; subgenal suture prominent, ridge-like; lora terminating narrowly at anterior tentorial pits slightly anterior to antennae. Antennae closer to apex of head than to labrum-epipharynx; sides of head not extending laterally beyond antennae. Crown of head helmet-shaped with prominent median carina. Pronotum anteriorly and posteriorly carinate. Tegmen broadest distally; venation profusely reticulate.

Holotype ♀ (Australian Mus. K68745), Perisher Valley, Mt. Kosciuscko, New South Wales, III.1962, J. W. Evans.

Platyledra caldida differs from the type species in the position of the antennae relative to the apex of the face of the head and from *P. acuminata* (Distant) in not having the sides of the head extending beyond the eyes.

In the General Catalogue of the Homoptera 57 species of leafhoppers are listed as belonging to the genus *Petalocephala* Stål (Metcalf 1962). Of this number 47 are from

the Oriental Region, 8 from Africa, 1 from New Caledonia and 1 from New Guinea. It has previously been noted that *Petalocephala aurescens* Distant, from New Caledonia, is not a ledrid but belongs to the nirvanid genus *Macroceratogonia* Kirkaldy (Evans 1966).

A collection of New Guinea leafhoppers, made available to me for study by the Bishop Museum, contains numerous ledrids belonging to the genus *Petalocephala* and 13 new species are described below. Although none of these species is represented by very long series and some by single specimens, they have been described to provide an indication of the nature of the prolific speciation which has occurred within this genus in New Guinea. With only three species it has been possible to correlate representatives of the two sexes and this is due as much to sexual dimorphism as to the paucity of the material.

While no *Petalocephala* spp. have yet been recorded from Australia, an allied genus *Rubria* Stål is well represented on the continent. Because of the interest of the locality record a single specimen of a new species of *Rubria* from New Guinea is also described.

While there is close superficial resemblance between leafhoppers in the genera *Petalocephala* and *Rubria*, each genus has several distinctive characters and the principal ones are as follows:

Sides of crown of head (except in type species and possibly in some species from other geographical regions) not forming an even curve from eyes to apex; hind margin of pronotum, adjoining scutellum, roundly arched; venation of tegmen reticulate; ♂ genitalia, 9th sternum small, membranous; parameres and subgenital plates extending beyond apex of pygophores; aedeagus broad. ..... **Petalocephala**

Sides of crown of head forming an even curved surface from eyes to apex; hind margin of pronotum, adjoining scutellum, transverse, or slightly arched; venation of tegmen not reticulate; ♂ genitalia, 9th sternum extensive, sclerotised and completely differentiated; parameres not extending beyond subgenital plates and only slightly beyond pygophores; aedeagus whip-like. ..... **Rubria**

Genus **Petalocephala** Stål

Petalocephala Stål, 1853, *Öfv. Vet. Akad. Förh. Stockh.* **1853**: 266

Type species: *Petalocephala bohemani* Stål (Java).

Petalocephala bohemani Stål Fig. 2 A.

Length: ♀, 13.2 mm; of crown of head, 3 mm; greatest width across eyes, 3.2 mm. General coloration, pale brownish yellow. Crown of head, thorax and tegmen, evenly punctate. Crown convex, spatulate, the sides evenly curved from eyes to apex. Ocelli on disc of crown slightly in front of eyes. Pronotum on same plane as crown, slightly widest posteriorly; posterior angles acute. Tegmen broadest beyond apex of claval suture; venation distally reticulate. Hind tibia slender with 3 spines on prominent bases.

The above description is based on several ♀ specimens of *P. bohemani* contained in the Bishop collection. They were taken from the following localities: NW New Guinea;

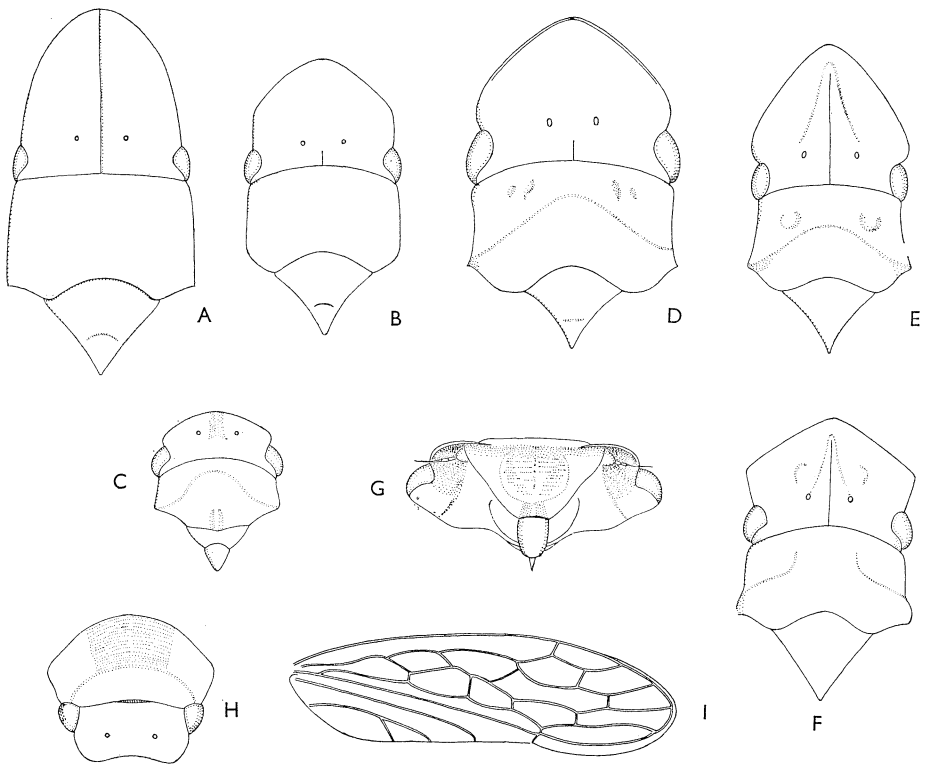

Fig. 2. A, *Petalocephala bohemani,* head and thorax, dorsal aspect; B, *P. armata*; C, *Rubria rugosa*; D, *Petalocephala trispicula*; E, *P. skoba*; F, *P. pilka*; G, *Cololedra declivata,* face of head; H, *C. declivata,* pronotum and face of head in frontal aspect; I, *C. declivata,* tegmen.

Wissel Lakes, Enarotadi, 1850 m, 2.VIII.1962, Sedlacek; NE New Guinea, W. Highlands, Baiyer Riv., 1150 m, 18.X.1958, Gressitt; NE New Guinea, Kumunr, Upper Jimmi Vall., 100 m, 13.VII.1955, Gressitt; SE New Guinea, Brown Riv., 20 km N. of Port Moresby, 29.IV.1960, O'Brien.

Petalocephala declivis Walker, 1870, *J. Linn. Soc. Lond. Zool.* **10**: 308 (New Guinea).

The holotype ♀ of this species, in the British Museum, is the sole recorded representative. The crown of the head, which is 1.5 mm long, resembles that of the species illustrated in fig. 2 B. It differs in having the parallel-sided part of the crown shorter than the curved apical portion.

Petalocephala enigmoides Evans, new species Fig. 3 G.

Length: ♂, 11.5 mm, of crown of head, 2.1 mm; greatest width across eyes, 3.2 mm. Face of head pale brownish yellow, hind margin broadly brown. Crown of head punctate, pale brownish yellow, anterior 1/3 mottled coffee-brown; sides, in front of eyes, straight, diverging slightly

outwards but not beyond eyes. Pronotum punctate with an anterior and posterior median brown spot, anteriorly declivous, sides straight, almost parallel. Scutellum punctate. Tegmen punctate, parallel-sided, pale greenish yellow with dark brown markings on clavus; posterior apical margin brown; a shining brown spot on M and Cul. Hind tibia slender with 3 spines on prominent bases. Male genitalia as in fig. 3 G.

Holotype ♂ (BISHOP 8866), SE New Guinea, Popondetta, 60 m, 26.IX.1963.

Petalocephala armata Evans, new species Fig. 2 B, 3 P.

Length: ♂, 8.2 mm; of crown of head. 1.9 mm; greatest width across eyes, 2.7 mm. Face of head dark brown with a pair of almost circular yellow markings extending from antennae to posterior extension of frontoclypeus; remainder of frontoclypeus and face anteriorly pale brown. Crown of head punctate, brown; margins in front of eyes straight, diverging slightly outwards. Pronotum punctate, brownish yellow, slightly declivous anterolaterally, paralel-sided, laterally carinate. Scutellum rugose, brownish yellow. Tegmen punctate, widest beyond apex of claval suture, hyaline brown; veins proximally pale, distally dark brown. Hind tibia flattened with 3 spines on prominent bases. Male genitalia, aedeagus as in fig. 3 P.

Holotype ♂ (BISHOP 8867), NE New Guinea, Wau, Morobe Dist., 1200 m, 11.X.1961, J. Sedlacek. Paratype: 1 ♂, same locality as holotype, 3.V.1963, Sedlacek.

Petalocephala trispicula Evans, new species Fig. 2 D, 3 S.

Length: ♂, 8 mm, ♀, 12 mm; of crown of head, ♂, 1.6 mm, ♀, 2.8 mm; greatest width across eyes, ♂, 2.2 mm, ♀, 3 mm.

♂. Face of head pale brownish yellow, with a broad, brown, inverted Y-shaped marking; arms of Y extending to sides of head in front of antennae. Crown of head pale brownish yellow slightly mottled with brown, punctate; sides in front of eyes, curving outwards, not as far as margins of eyes. Pronotum punctate, pale brownish yellow with a few dark brown markings anteriorly and a posteromedian brown spot, anterolaterally declivous, laterally carinate, posterior corners angulate. Scutellum pale, yellowish brown, laterally dark brown. Tegmen punctate, parallel-sided; clavus brown, remainder, proximal 2/3 pale brown, apex vitreous; veins in relief, brown, with white markings on anal veins. Hind tibia flattened with 5 spines on prominent bases. Male genitalia, aedeagus as in fig. 3 S.

♀. Resembling ♂, differing in having head, thorax and tegmen, coarsely rugose; 2 lateral yellowish markings on scutellum; tegmen, including veins, with an overall mottled pattern of pale and dark brown, widest distal of apex of claval suture, venation more profusely reticulate.

Holotype ♂ (BISHOP 8868), SE New Guinea, Mt Giluwe, 2500 m, 30.V.1963, J. Sedlacek. Allotype ♀ (BISHOP), NW New Guinea, Vogelkop, Kebar Vall., W. of Manokwori, 4.I.1962, L.W. Quate. Paratypes (♂♂): SE New Guinea: Kokoda, Gressitt; Daradae Plantation, nr. Port Moresby, Maa; Otomata Plantation, nr Port Moresby, Gressitt. NE New Guinea: Tsenga, 1200 m, Jimmi Vall., Gressitt; Ahl Vall., Nondugl, 1750 m, Gressitt. NW New Guinea: Wissel Lakes, Moanemani, Kamo Valley, 1500 m, Sedlacek; Waris, S. of Hollandia, 450-500 m, Maa.

Petalocephala skoba Evans, new species Fig. 2 E, 3 M.

Length: ♂, 8 mm, ♀ 12.5 mm; of crown of head, ♂, 2 mm, ♀, 3mm; greatest width across eyes, ♂, 2.5 mm, ♀, 3.2 mm.

♂. Face of head pale yellowish with a broad, brown, inverted Y-shaped marking of which the arms are continuous with a broad, apical, marginal band. Crown of head part brown, part yellowish brown, punctate and rugose; sides in front of eyes curving outwards and inwards. Pronotum rugose, part brown, part yellowish brown with a posteromedian brown spot, anterolaterally declivous, laterally carinate, widest posteriorly. Scutellum rugose. Tegmen parallel-sided, proximal 1/3 brown, punctate, remainder vitreous with an oblique brown fascia; apical margin narrowly white; veins brown with a few white markings. Hind tibia flattened with 6 spines on prominent bases. Male genitalia, aedeagus as in fig. 3 M.

♀. Face of head pale brownish yellow, frontoclypeus dark brown. Crown of head rugose, yellowishbrown, sides in front of eyes curving slightly outwards, thence straight and apically convergent. Pronotum rugose yellowish brown with a median anterior and posterior brown spot, laterally carinate, slightly declivous, widest posteriorly. Scutellum rugose. Tegmen widest at apex of claval suture, proximal 3/4 punctate, mottled with light and dark brown, apex vitreous; veins brown. Hind tibial armature, as for ♂.

Holotype ♂ (BISHOP 8869), NW New Guinea, Wissel Lakes, Enarotadi, 1900 m, 19.VIII. 1955, J. L. Gressitt. Allotype ♀ (BISHOP), Papua, Bisianumu, E. of Port Moresby, 500 m, 8.VI.1955, J. L. Gressitt. Paratypes: NE New Guinea: 1 ♂, Lake Sirunki, 2550 m, Sedlacek; 8 ♀♀, 1 ♂, Lake Sirunki, 2550 m, Sedlacek; 2, Wau, Morobe Dist., 1090-1200 m, Sedlacek. SE New Guinea: Popondetta, 60 m, Sedlacek; Papua, SE Mendi, 1660 m, Gressitt; Daradae Plantation, 500 m, near Port Moresby, Maa. SW New Guinea: Vogelkop, Fak Fak, S. coast of Bomberai, 100-700 m, Maa. NW New Guinea: Waris, S. of Hollandia, 450-500 m.

Petalocephala pilka Evans, new species Fig. 2 F, 3 Q.

Length: ♂, 11.5 mm; of crown of head, 2 mm; greatest width of crown, 3 mm. Face of head dark brown, anterior 1/3 and extensive areas posteriorly, pale yellow. Crown of head rugose, part brown, part yellowish; sides in front of eyes straight, divergent, angulate. Pronotum rugose, yellowish brown, anterolaterally declivous, widest posteriorly, not laterally carinate. Scutellum rugose. Tegmen parallel-sided, proximal 1/3 punctate, brown; central 1/3 punctate, yellowish hyaline; apical 1/3 vitreous; veins brown. Hind tibia flattened with 4 spines on prominent bases. Male genitalia as in fig. 3 Q.

Holotype ♂ (BISHOP 8870), SE New Guinea, Mt Giluwe, N side, Malgi, 2500 m, 25.V. 1961, J. L. Gressitt. 1 Paratype ♂, NE New Guinea, Kepilam, 2450-2600 m, Sedlacek.

Petalocephala planata Evans, new species Fig. 3N.

Length: ♂, 10 mm; of crown of head, 1.8 mm; greatest width across eyes, 3.2 mm. Face of head pale yellow with a broad, dark brown T-shaped marking extending laterally to eyes; lateral and hind margins broadly dark brown with a narrow, paler brown band. Crown of head punctate, coffee and yellowish brown; sides in front of eyes straight, parallel. Pronotum punctate, brownish yellow with an anterior and posteromedian brown spot, anterolaterally declivous, laterally carinate, parallel-sided, except posteriorly, Scutellum punctate, yellowish. Tegmen parallel-sided, proximal 2/3 punctate, brown, distally hyaline-testaceous; veins dark brown. Hind tibia slender, with 3 spines on prominent bases. ♂ genitalia, aedeagus as in fig. 3 N.

Holotype ♂ (BISHOP 8871), NE New Guinea, Wum, Upper Jimmi Vall., 840 m, 16.VII. 1955, J. L. Gressitt. 1 Paratype ♂, Papua, Bisianumu, 500 m, Gressitt.

Petalocephala pullata Evans, new species Fig. 3 O.

Length: ♂, 10.5 mm; of crown head, 2 mm; greatest width across eyes, 3 mm. Face of head pale yellowish, broadly brown posteriorly. Crown of head pale yellowish, anteriorly light brown; sides in front of eyes straight, parallel-sided. Pronotum punctate anteriorly, rugose posteriorly, pale brownish yellow, slightly declivous anterolaterally and slightly widest posteriorly. Scutellum rugose. Tegmen punctate, widest beyond apex of claval suture, pale yellowish; clavus with brown and whitish markings. Hind tibia slender with 5 spines on prominent bases. Male genitalia, aedeagus as in fig. 30.

Holotype ♂ (BISHOP 8872), NW New Guinea, Star Mts., Sibil Vall., 18.X.1961, L. W. Quate.

Petalocephala spicata Evans, new species Fig. 3 H.

Length: ♂, 9 mm; of crown of head, 1.8 mm; greatest width across eyes, 2.8 mm. Face of head pale yellowish, posteriorly broadly brown; a sinuate broad, brown, band between eyes. Crown of head finely rugose, yellowish, broadly brown anteriorly; sides in front of eyes curving outwards and inwards. Pronotum punctate, anteriorly yellowish, posteriorly narrowly brown, parallel sided, steeply declivous anterolaterally. Tegmen parallel-sided, proximal 1/2 punctate, pale brown, distally hyaline-testaceous; veins brown. Hind tibia, flattened with 4 spines on prominent bases. Male genitalia as in fig. 3 H.

Holotype ♂ (BISHOP 8873), New Britain, Keravat, 135 m, 20.XI.1959, T. C. Maa.

Petalocephala pulsata Evans, new species Fig. 3 J.

Length: ♂, 8 mm; of crown of head, 1.8 mm; greatest width across eyes, 2.5 mm. General coloration evenly pale yellowish-brown. Face of head yellow with a median longitudinal pale brown stripe. Crown of head punctate, sides in front of eyes straight. Pronotum punctate, convex, not anterolaterally declivous, slightly widest posteriorly. Tegmen parallel-sided, proximal 1/2 and costal margin punctate, distally hyaline. Hind tibia slender with 4 spines on prominent bases. ♂ genitalia, aedeagus as Fig. 3 J.

Holotype ♂ (BISHOP 8874), SE New Guinea, Papua, Kiunga, Fly River, 26.X.1957, W. W. Brandt. 1 Paratype, Larat, XII.1907, Muir.

Petalocephala stellata Evans, new species fig. 3 I.

Length: ♂, 8 mm; of crown of head, 1.8 mm; greatest width of crown, 2 mm. Face of head pale yellow, posterior and lateral margin and extending in front of eyes, broadly dark brown to black. Crown of head yellow, broadly margined with brown. Pronotum punctate, yellow, laterally dark brown, slightly declivous anterolaterally, widest posteriorly. Scutellum punctate, yellow, laterally brown. Tegmen punctate, widest beyond apex of claval suture, shining dark brown. Hind tibia slender with 3 spines on prominent bases. Male genitalia, aedeagus as in fig. 3 I.

Holotype ♂ (BISHOP 8875), NE New Guinea, Mt Missim, 1600 m, 5.V.1966, J. L. Gressitt.

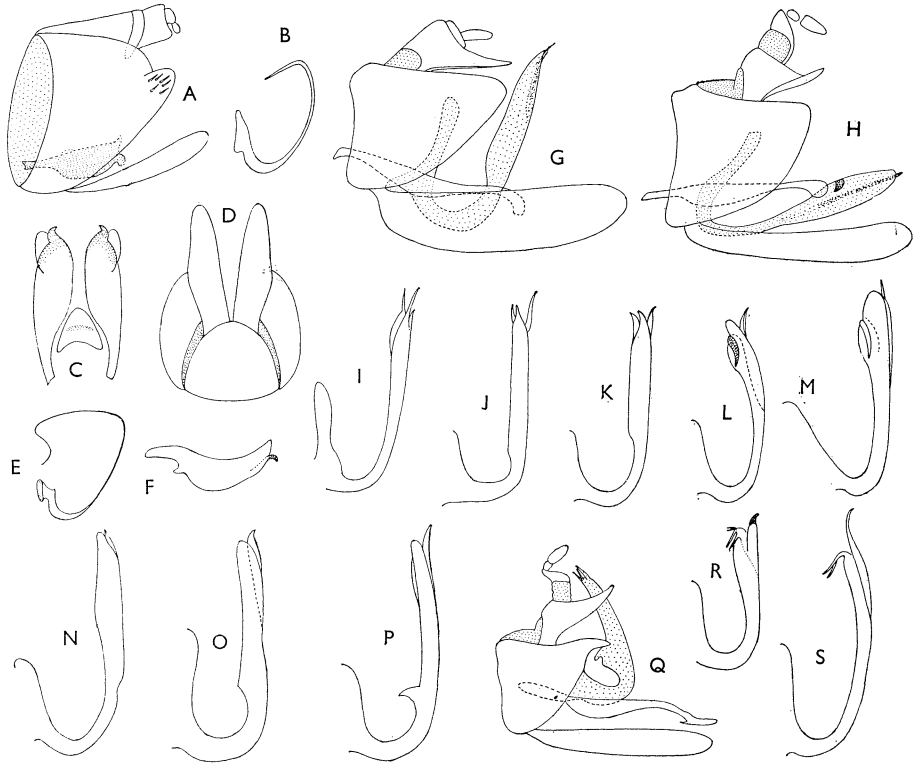

Fig. 3. A, *Rubria sanguinosa*, ♂ genitalia; B, same, aedeagus; C, same, parameres and basal plate; D, same, ♂ genitalia, ventral aspect; E, *Rubria rugosa*, aedeagus; F, same, paramere; G, *Petalocephala enigmoides*, ♂ genitalia; H, *P. spicata*, ♂ genitalia; I, *P. stellata*, aedeagus; J, *P. pulsata*, aedeagus; K, *P. nigrella*, aedeagus; L, *P. alata*, aedeagus; M, *P. skoba*, aedeagus; N, *P. planata*, aedeagus; O, *P. pullata*, aedeagus; P, *P. armata*, aedeagus; Q, *P. pilka*, ♂ genitalia; R, *P. limbata*, aedeagus; S, *P. trispicula*, aedeagus.

Petalocephala limbata Evans, new species Fig. 3 R.

Length: ♂, 10 mm, ♀, 11.2 m; of crown of head, ♂, 1.5 mm, ♀, 3.6 mm; greatest width of crown, ♂, mm, ♀, 3.2 mm.

♂. Face of head pale yellowish, posteriorly pale brown. Crown of head punctate, pale yellowish brown, parallel-sided in front of eyes. Pronotum punctate, pale yellowish brown, anterolaterally declivous, slightly widest posteriorly. Scutellum pale yellowish brown. Tegmen, except apical 1/5, punctate, brown, apically hyaline brown with whitish markings; widest beyond apex of claval suture; a pair of prominent dark brown markings at distal apices of anal veins; hind tibia flattened with 6 spines on prominent bases.

♀. Similar to ♂, except face of head entirely yellow and sides of crown in front of eyes outwardly and inwardly curved.

Holotype ♂ (Bishop 8876), NW New Guinea, Sentani, Cyclops Mts., 150-250m, 17.VI. 1959, T. C. Maa. Allotype ♀, NE New Guinea, Wewak, 13.X.1957, J. L. Gressitt.

Petalocephala alata Evans, new species Fig. 3 L.

Length: ♂, 8.6 mm; of crown of head, 1.3 mm; greatest width across eyes, 2.3 mm. General coloration pale brownish yellow. Face of head pale yellowish brown with a broad, transverse, brown band arching from eyes to hind margin of post clypeus. Crown of head punctate, sides in front of eyes slightly convergent. Pronotum punctate, laterally carinate anterolaterally declivous, parallel-sided anteriorly, slightly widest posteriorly. Scutellum punctate. Tegmen parallel-sided, proximal 1/2 and costal border punctate, remainder vitreous; veins pale brown. Hind tibia flattened with 5 spines on prominent bases. Male genitalia, aedeagus as in fig. 3 L.

Holotype ♂ (BISHOP 8877), SE New Guinea, Papua, Kiunga, Fly River, 5.VIII.1957, W. W. Brandt.

Petalocephala nigrella Evans, new species Fig. 3 K.

Length: ♂, 11.8 mm; of crown of head, 2.5 mm; greatest width, 3.2 mm. Face of head brown, darkest posteriorly. Crown of head punctate, brownish yellow; anteriorly and laterally dark brown; sides in front of eyes strongly divergent, thence angulate. Pronotum punctate, brownish yellow, very slightly declivous anteriorly, sides, except posterior angles, parallel. Scutellum punctate, conclorous with crown. Tegmen punctate, parallel-sided, evenly dark shining-brown, except for pale areas between anal veins; veins dark brown. Hind tibia slender with 3 spines on prominent bases. Male genitalia, aedeagus as in fig. 3 K.

Holotype ♂ (BISHOP 8878), SE New Guinea, Papua, C. Dist., Otomata Plantation, 1 mi, E. of Port Moresby, 2.XI.1950, J. L. Gressitt. 1 Paratype ♂, NW New Guinea, Wissel Lakes, Enarotadi, 1900–2000 m, Gressitt.

Genus **Rubria** Stål

Rubria Stål, *Öfv. Vet. Akad. Förh. Stockh.* **22**: 158.

Type species: *Rubria sanguinosa* Stål.

Rubria sanguinosa Stål Fig. 3 A–D.

As previously mentioned there is a close superficial resemblance between ledrids belonging to the genera *Petalocephala* and *Rubria*, and the principal characteristics in which species in the two genera differ from each other have been listed on p. 737. As a further aid to recognition of the two genera, the genitalia of the type species of *Rubria* are illustrated, and placed alongside those of the species in the genus *Petalocephala*.

Rubria rugosa Evans, new species Fig. 3 E, F.

Length: ♂, 7 mm; greatest width across eyes, 2.7 mm. General coloration pale brown patterned with dark brown. Face of head very dark brown, pale brown posterolaterally. Crown of head punctate, rugose, pale brown, sparsely mottled with dark brown; eyes prominent; ocelli nearer to anterior than to posterior margin of head. Pronotum concolorous with crown, rugose, widest posteriorly, declivous anteriorly with a small, posterior median crest. Scutellum coarsely punctate, apex convex. Tegmen, proximal 2/3 coarsely punctate, pale yellowish, apically grayish

with irregular dark brown markings; veins apically, marginally punctate. Male genitalia, aedeagus as in fig. 3 E, paramere, fig. 3 F; pygophore lacking spines.

Holotype ♂ (BISHOP 8879), NE New Guinea, Kassam, 1350 m, 48 km E of Kainantu, 11.VII.1959, T. C. Maa.

Rubria rugosa differs from other species in the genus in the shortness of the crown, so that the ocelli are closer to the anterior than the posterior margin, the more prominent eyes, declivous pronotum and in characteristics furnished by the male genitalia.

Genus **Cololedra** Evans, n. gen.

The head is in 2 sharply differentiated planes, which are at an acute angle to each other. The labium extends to between the middle coxae and the face of the head, which is considerably wider than long, is margined posterolaterally by the antennal ledges. The anteclypeus is U-shaped and the postclypeus, of which the sides diverge laterally towards the antennae, flat. The crown of the head is steeply declivous and more than 2 × the length of the eyes; the anterior margin is medially transverse and laterally curved. The ocelli, which are on the crown, are nearer to the eyes on each side than to each other. The pronotum is wide laterally and the anterior 4/5 steeply declivous and there is a small median posterior carina. The scutellum is roundly elevated posteriorly. The tegmina, which are tectiform, overlap considerably posteriorly and the appendix is wide. The veins are raised in relief and there are some crossveins additional to the basic cicadellid number. The external margins of the hind tibiae, which are almost parallel-sided, are flattened, and each edge has a few widely spaced spines mounted on prominent bases. There are 2 spines at the apex of each hind femur.

Type species: *Cololedra declivata*, new species.

Cololedra resembles other genera in the Ledrini in the position of the ocelli, the shape of the hind tibiae and in other characteristics of the tribe. It differs in having the head flexed across the axis of the antennae and prominent antennal ledges.

Cololedra declivata Evans, new species

Length, from the posterior 1/5 of the declivous pronotum to the apex of the folded tegmina, 8.8 mm. General coloration, brown. Face of head with long dense hairs, pale yellowish brown, the ante- and postclypeus medially, dark brown; antennal depressions black. Crown rugose with fine hairs, brown. Pronotum rugose, transversely ridged medially, brown with dark brown to black markings centrally and posteriorly. Scutellum with fine hairs, rugose, brown. Tegmen proximally punctate, distally vitreous; veins and margins of veins, brown.

Holotype (BISHOP 8880), sex unknown, SE New Guinea, Mt Giluwe, 2550 m, 27.V.1963, J. Sedlacek.

The above description of *Cololedra declivata* is based, not only on a single specimen, but on one lacking an abdomen, hence of unknown sex. The reason for this unusual action is because this insect is of particular interest, since while having undoubted ledrine characteristics it also, especially in the shape of the head, resembles certain ulopids in the genus *Coloborrhis* Germar. In fig. 6 F, G, are illustrated a nymph of a ledrid from

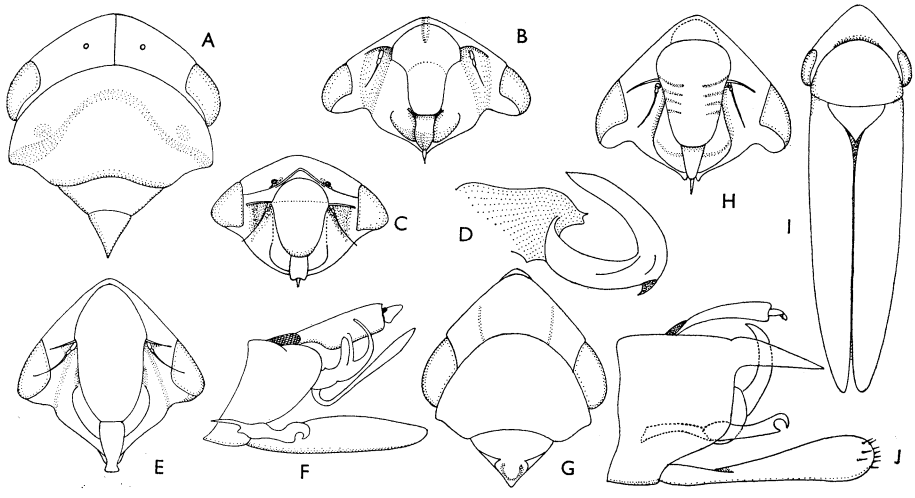

Fig. 4. A, *Microledrella minuta*, head and thorax, dorsal aspect; B, *M. minuta*, face of head; C, *Macroceps moorei*, face of head; D, same, aedeagus; E, *Putoniessiella sagitta*, face of head; F, same, ♂ genitalia; G, *P. sagitta*, head and thorax, dorsal aspect; H, *Thymbrella tamminensis*, face of head; I, *T. tamminensis*; J, *T. tamminensis*, ♂ genitalia.

Mt. Kosciuscko in New South Wales, which would seem to belong to the same genus.

Tribe Thymbrini

Genus **Microledrella** Evans, new genus

The face of the head is wider than long and coarsely rugose and the labium terminates between the middle coxae. The anteclypeus and the swollen lora are anteriorly declivous. The postclypeus is oval and considerably narrower than the frons, which widens towards the antennae. The arched antennal ledges are close to the hind margin of the face and well defined. The crown of the head is equal in length to the width of the eyes, and the ocelli are closer to each other than to the eyes. The pronotum is punctate, laterally wide, and anteriorly and posteriorly declivous. The scutellum has a well-defined transverse sulcus. The tegmina, which are punctate, lack an appendix, and are widest distal of the apex of the claval suture. One row of spines on the hind tibiae are on prominent bases.

Type species: *Microledrella minuta* n. sp.

Microledrella resembles *Ledrella* Evans in size and coloration, in the shape and extent of the crown and the position of the ocelli. It differs in shape of the frontoclypeus, in having a steeply declivous pronotum and in being punctate and rugose.

Microledrella minuta Evans, new species Fig. 4 A, B.

Length: ♀, 5.8 mm. General coloration brown. Pronotum mottled with white. Tegmen, hyaline brown, in part mottled with white; veins brown. Hind margin of 7th abdominal sternum with a U-shaped indentation.

Holotype ♀ (BISHOP 8881), NW New Guinea, Wissel Lakes, Enarotadi, 1900 m, 1. VIII. 1955, J. L. Gressitt. 1 Paratype ♀, same data as holotype.

The species described above is of outstanding interest from the point of view of its geographical occurrence and because, like *Cololedra declivata*, it has certain ulopid characteristics. While it lacks close affinity with any thymbrids represented in northern Australia, it closely resembles *Ledrella brunnea* Evans, the smallest recorded representative of the tribe, which is known only from south Western Australia and from Kiata, in Victoria, where an outlier of the Western Australian fauna and flora occurs. As, apart from a single genus in New Zealand, *Novothymbris* Evans, and the species listed below, which form part of the eucalypt fauna of the Port Moresby district, no thymbrids have been recorded from New Guinea, it is surprising that an annectant form should occur in the high mountains of the island.

Specimens of the following 2 Australian thymbrids from New Guinea are contained in the Bishop Collection:

Thymbris convivus (Stål): Variarata, Astrolabe Range, near Port Moresby, Gressitt; Boroko, Port Moresby, Sedlacek.

Rhotidoides punctivena (Walker): Port Moresby, Sedlacek.

Genus **Macroceps** Signoret

Macroceps Signoret, 1879, *Ann. Soc. Ent. Fr.* **9**: 53; **10**: 363.

Type species: *M. fascietus* Signoret.

Macroceps moorei Evans, new species Fig. 4 C, D.

Length: ♂, 5.5 mm, ♀, 6 mm. General coloration mottled brown or gray with a prominent semicircular black, or dark brown marking. Face of head pale or dark brown, mottled with black. Crown of head narrowly developed, widest adjacent to the prominent eyes. Pronotum anteriorly declivous with an anterior bold, brown, or black semicircular marking extending laterally to the eyes. Remainder of pronotum pale brown or whitish, sometimes mottled with light or dark brown. Tegmen variable in color, either, except for clavus, vitreous, with irregular dark markings, or with an oblique white fascia; veins sometimes with black and white bars. Male genitalia, aedeagus as in fig. 4 D.

Holotype ♂ (Australian Mus. K 68746), Yanchep, Western Australia, 1966, K. Moore. Allotype ♀ (Australian Mus.), same data as holotype.

Macroceps moorei differs from other species in the genus in its smaller size and in the characteristic shape of the aedeagus.

Genus **Putoniessiella** Evans, new genus

The face of the head, which is as wide as long, is convex. The anteclypeus, which extends narrowly beyond the inner apices of the maxillary plates is not declivous. The antennal ledges are oblique and do not extend as far as the eyes on each side. The ocelli, which are marginal in position, are visible neither in ventral nor dorsal aspect and are nearer to the apex of the head than to the eyes. The crown of the head, which is flat is considerably longer in the

center than against the eyes. The pronotum is almost flat. The tegmina are long and narrow, have complete venation and small appendices. On the heavily armed hind tibiae there are 7 spines in the row of strongest spines and 6 spines on the outer edge on prominent bases, increasing in size from the base to the apex. The male genitalia have a bilobed aedeagus and sword-like pygophore processes.

Type species: *Putoniessiella sagitta* n. sp.

Putoniessiella superficially resembles *Putoniessa* Kirkaldy. It differs from *Putoniessa* in the shape of the face and the crown of the head and in the position of the ocelli. While the aedeagi of some *Putoniessa* spp. are also bilobed, the proximal processes are longer than the distal ones, unlike with *Putoniessiella* where the reverse situation obtains.

Putoniessiella sagitta Evans, new species Fig. 4 E-G.

Length: ♂, 6.8 mm; greatest width across eyes, 2.2 mm. General coloration gray mottled with dark brown. Face of head pale brown mottled with dark brown; anteclypeus anteriorly transversely corrugated; posteriorly, and the vertex laterally, corrugated with a cellular pattern. Crown pale brown with dark brown markings, longitudinally and obliquely rugose. Pronotum and scutellum rugose gray with dark brown markings. Tegmen hyaline-gray, veins whitish, narrowly and broadly bordered with brown. Male genitalia as in fig. 4 F.

Holotype ♂ (BMNH), Tammin, Western Australia, 1.XI.1935, R. E. Turner.

Genus **Thymbrella** Evans, new genus

Slender insects with narrow-shaped heads. The face of the head, which is slightly wider than long, has the anteclypeus narrowing anteriorly and sloping towards the base of the labrum. The lora, which are striated, extend posteriorly almost as far as the antennal bases. The convex postclypeus is widest posteriorly. The antennal ledges are oblique and the wide antennal depressions slope steeply towards the sides of the lora. The ocelli, which are on the thickened apex of the head, are visible neither in ventral nor dorsal aspect. The crown of the head, which is considerably longer medially than against the eyes, is laterally declivous. The pronotum which is slightly convex is not declivous and anteriorly is at a lower level than the hind margin of the head. The tegmina which are long and narrow have a basic pattern of cicadellid venation. The spinose hind tibiae have 7 spines in the row of strongest spines and these decrease in size from the apex to the base.

Type species: *Thymbrella tamminensis* n. sp.

Thymbrella resembles *Rhotidus* Walker in the shape of the the crown of the head but differs in having the ocelli marginal instead of dorsally situated and in having the apex of the head thickened and not acute. It differs from *Thymbris* Kirkaldy with which it shares certain characteristics, in having an almost flat, instead of a declivous pronotum.

Thymbrella tamminensis Evans, new species Fig. 4 H-J.

Length: ♂, 7 mm, ♀, 8 mm; greatest width of head across 2 mm. General coloration grayish

with brown markings. Head pale brownish yellow with dark brown markings. Pronotum grayish with brown markings, which may form 3 longitudinal stripes. Tegmen hyaline, almost vitreous; veins brown with white bars. Male genitalia as in fig. 4 J.

Holotype ♂ (BMNH), Tammin, Western Australia, 11. XII. 1935, R. E. Turner. Allotype ♀ (BMNH), Merriden, Western Australia, 12. XII. 1935, R. E. Turner. 1 Paratype ♀, Denari, Western Australia.

Genus **Thymbris** Kirkaldy

Thymbris Kirkaldy, 1907, *Bull. Hawaii Sug. Plant. Ass. Exp. Sta.* 3: 49.

Type species: *Thymbris inachis* Kirkaldy.

Thymbris pulcherrima Evans, new species Fig. 5 A.

Length: ♂, ♀, 9 mm. General coloration, boldly mottled with light and dark brown. Face of head pale buff, irregularly mottled with light and dark brown. Anth-clypeus projecting anteriorly beyond maxillary plates; ocelli marginal, visible neither in facial nor in dorsal aspect. Crown of head very slightly wider in center. Pronotum strawcolored mottled with light and dark brown. Scutellum conclorous with pronotum, transversely ridged apically. Tegmen hyaline, irregularly mottled with light and dark brown and with 2 irregular, vitreous fasciae; veins barred with white and brown except in the areas of the fasciae where they are entirely white. Male genitalia as in fig. 5 A.

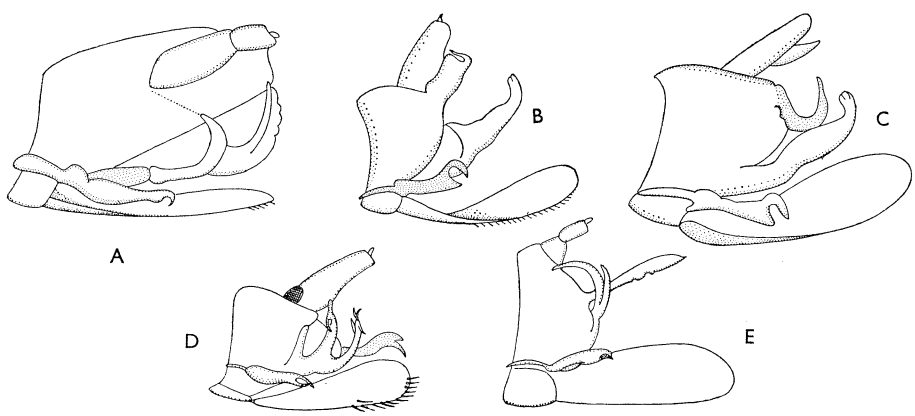

Fig. 5. ♂ genitalia of A, *Thymbris pulcherrima*; B, *Epipychidion fides*; C, *E. whitteni*; D, *Putoniessa turneri*; E, *Hackeriana elegantula.*

Holotype ♂ (Australian Mus. K 68747), Larrima, Northern Territory, VI.1966, K. Moore. Allotype ♀ (Australian Mus.) same data as holotype.

In its striking color pattern, as well as in characters of the male genitalia, *Thymbris pulcherrima*, differs from all species formally ascribed to this genus.

Genus **Epipsychidion** Kirkaldy

Epipsychidion Kirkaldy, 1906, *Bull. Hawaii Sug. Plant. Ass. Exp. Sta.* 1(9): 345

Type species: *Epipsychidion epipyropis* Kirkaldy.

Epipsychidion fides Evans, new species Fig. 5 B.

Length: ♂, 5 mm; greatest width, 2 mm. General coloration brown. Face of head mottled with yellowish and brown; antennal channels yellow; ocelli anteriorly directed. Pronotum brown, only slightly declivous anteriorly. Tegmen hyaline, in part brown; veins brown with white spots. Male genitalia as in fig. 5 B.

Holotype ♂ (Australian Mus. K 68749), Berowa Waters, New South Wales, XII. 1966, F. Evans.

Epipsychidion fides differs from the type species in size and in the shape of the crown of the head.

Epipsychidion whitteni Evans, new species Fig. 5 C.

Length: ♂, 4 mm, ♀, 5.2 mm; greatest width, ♂, ♀, 1.8 mm. General coloration pale brown. Face of head, maxillary plates, genae and antennal ledges, pale yellowish brown; remainder of face dark yellowish brown. Post clypeus transversely ridged, frontal region punctate, ocelli facing forwards, neither facial nor on crown. Crown of head between eyes of even length throughout, pale mottled brown. Pronotum slightly declivous anteriorly, sometimes with 4 obscure longitudinal pale stripes margined with brown. Tegmen vitreous, veins dark brown with raised spots. Male genitalia as in fig. 5 C.

Holotype ♂ (Australian Mus. K 68748), Bruni I., Tasmania, I. 1966, M. Whitten.

Epipsychidion whitteni differs from the type species in being considerably smaller and in having the crown of the head of even length, instead of widest in the center. It differs from *E. fides* in the structure of the male genitalia, in particular the shape of the pygophore process.

Putoniessa turneri Evans, new species Fig. 5 D.

Length: ♂, 7 mm, ♀, 8 mm; greatest width across eyes, 3 mm. General coloration pale yellowish brown mottled with pale and dark brown. Face of head pale yellowish brown mottled with pale and dark brown, frontoclypeus with transverse black muscle impressions, or almost entirely black. Crown of head, and thorax, pale yellowish brown mottled with dark brown. Tegmen hyaline whitish yellow and brown, with a partial pattern of pale oval markings, of which a line of 3 such markings lie along the hind margin of the tegmen; veins brown with white markings. Male genitalia as in fig. 5 D.

Holotype ♂ (BMNH), Yanchep, Western Australia, 8. III. 1936, R. E. Turner. Allotype ♀ (Queensland Mus. T 6690), Gatton, Queensland, 7. I. 1933, G. L. Wilson.

Hackeriana elegantula Evans, new species Fig. 5 E.

Length: ♂, ♀, 6 mm; greatest width across eyes, 2 mm. General coloration evenly pale yellowish with, or without, pale maculations. Crown of head narrowly acute in ♀, less so

in ♂. Ocelli in ♂ equidistant between eyes and apex of head; in ♀ nearer to eyes than to apex of head. Tegminal veins with small, raised, marginal spots. Ovipositor in ♀ not extending as far as apex of folded tegmina. Male genitalia as in fig. 5E.

Holotype ♂ (BMNH), King George's Sound, Western Australia, 6-14. III. 1836, Charles Darwin. Allotype ♀ (BMNH), same data as for holotype.

Hackeriana elegantula differs from all previously described species of *Hackeriana* in its smaller size and slender appearance, from species other than *H. translucens* Evans in lacking a white marginal cephalic stripe, in the shortness of the ovipositor in relation to the tegmina and in the shape of the various parts of the ♂ genitalia.

The characteristics and components of the Ledrinae

The first ledrid to be described, the Palaearctic species, *Ledra aurita* (L.) is a large and distinct insect, totally unlike any of the other representatives of the Palaearctic leafhopper fauna. Because it is well known, and its generic name is incorporated in a group name, there has been a tendency to suppose that, in general, all ledrids have similar characteristics. That is to say, spatulate heads with dorsal ocelli, a large declivous pronotum that may bear lateral processes, tegmina with reticulate venation and foliaceous hind tibia.

In the General Catalogue of the Homoptera (Metcalf 1962), the group, which is given family status, is described as follows:

> "The species vary in length from 5 mm to 30 mm. The head is usually somewhat flattened and is often spatulate. The ocelli are located on, or near, the disc of the crown, not near the eyes nor the anterior margin of the crown. The clypeus is elongate and the transclypeal sulcus distinct. The clypellus is very small, not much broader basally than at the apex. The genae are not strongly expanded laterally. The forewings often have a reticulate venation and may, or may not, have an appendix. The pronotum is usually declivous anteriorly. The hind tibiae bear paired apical macrosetae and a preapical macroseta. The hind tibiae have at least some of their macrosetae occurring on protuberant bases."

While the above definition serves to describe the characteristics of insects ascribed in the Catalogue to the 3 tribes of the Ledrinae (Ledrini, Xerophloeini, Petalocephalini) it fails to define those of the Stenocotinae and also the 2 tribes ascribed to the Koebeliinae, the Koebeliini and the Thymbrini.

Because *Koebelia* Baker has facial ocelli, and hence does not conform to the above definition of Metcalf's Ledridae, Kramer (1966) has removed this genus from the Ledrinae and following Oman (1949) has ascribed it to a separate subfamily, the Koebeliinae.

It is not always easy to define the characteristics of a large group of insects so as to include all the true components and at the same time to exclude unrelated forms and this is especially so within the Cicadellidae. For this reason there can be a danger in interpreting definitions too precisely as it may lead to failure to recognize real affinities between groups of genera. If every distinctive genus, or group of genera, is accorded subfamily status, then information of evolutionary and zoogeographical significance may come to be obscured.

In Part 3 of my "Natural Classification of Leafhoppers" (Evans 1947) in which the Ledrinae were divided into 4 tribes, the Ledrini, Stenocotini, Koebeliini and Thymbrini, the suggestion was made that insects in all 4 tribes were early derivatives from a ulopine stem. In the interval since this suggestion was made additional supporting evidence has become available (Evans 1959).

It has already been suggested that there is a tendency to regard the principal characteristics of the Ledrinae as those of *Ledra aurita*, or closely related species and it is this selection of a highly specialized insect as the prototype of a group which is responsible for many of the difficulties associated with ledrid classification.

It is claimed that the Ledrinae, like the Ulopinae, comprise species which retain, or have lost a subgenal suture; have facial, marginal, or dorsally situated, ocelli; narrow, extensive, or spatulate, crowns; pronotums and scutellums with or lacking, elevated processes; tegmina with simple or reticulate venation, and slender or foliaceous hind tibiae.

It might, because of the apparent inter-relationships and parallelisms of the Ulopinae and Ledrinae seem desirable for purposes of classification, to regard them as a single subfamily or as a family unit. There is, however, one feature of wide occurrence, even if not universal, associated with the Ulopinae which is not duplicated in the Ledrinae. This is the alary polymorphism which occurs in representatives of all the 5 tribes of the former subfamily.

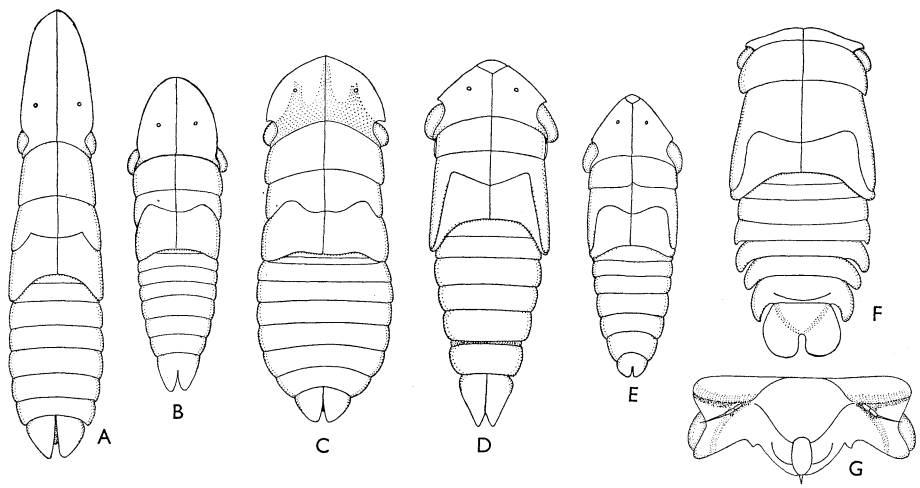

Fig. 6. Nymph of A, *Ledropsis crocina* Distant; B, *Rubria* sp.; C, *Stenocotis depressa* (Walker); D, *Rhotidoides* sp.; E, *Novothymbris* sp.; F, unidentified ledrid; face of head of species illustrated in F.

The characteristics of the nymphs of cicadellids are seldom referred to in systematic papers but sometimes they can provide helpful information. In fig. 6 the nymphs of 6 ledrids of which 5 have dorsal ocelli are illustrated. While adults of 3 of these likewise have ocelli on the crown of their heads (A, B, E), in those of *Stenocotis depressa* (Walker), (C), the ocelli are in marginal depressions while the adults of *Rhotidoides* spp. (D) have facial ocelli.

Previously I have suggested that as the Australian species, *Ledromorpha planirostris* Donovan has characteristics both of the Ledrini and Stenocotini it could be referred to with equal justification to either tribe (Evans 1947). In the same work reasons were given for grouping together in a subfamily, the Ledrini, Stenocotini and Thymbrini. These reasons need not be repeated except to draw attention once more to the transverse ridge which is situated close to the hind margin of the face of many stenocotids and thymbrids. Previously I suggested that this ridge, which is shown on the heads of *Khyphocotis parva* Evans and *Rhotidoides montana* Evans (fig. 7 C, D) might indicate descent from forms in which the ocelli had been situated in marginal depressions. An alternative, and more probable explanation, is that it denotes the preceding nymphs had dorsal ocelli so that the ventrally situated ocelli of the adult insects is a secondary condition.

The nymphs of ledrids need not necessarily have extensive, flattened crowns, as may be seen from fig. 6 F, G, in which the nymph of a presumed ledrid from Mt. Kosciuscko, in New South Wales, is illustrated. It has (p. 744) already been suggested that this nymph may be of a leafhopper belonging to the genus *Cololedra*.

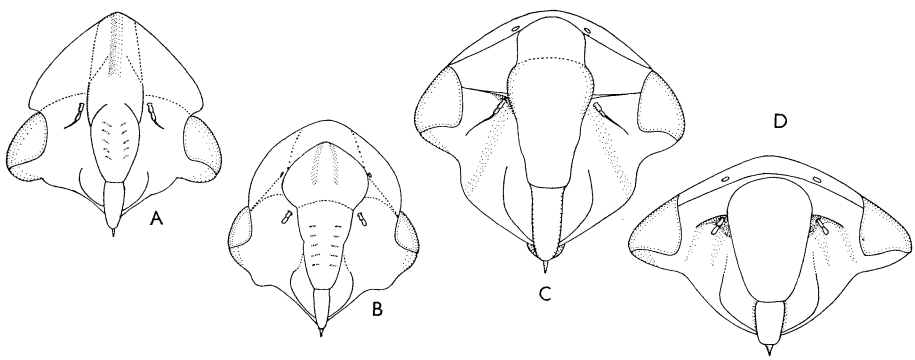

Fig. 7. Face of head of A, nymph of *Novothymbris* sp.; B, adult *Koebelia californica* (Baker); C, adult *Khyphocotis parva* Distant; D, adult *Rhotidoides montana* Evans.

In 1947 I drew attention also to the resemblance which exists between the heads of *Koebelia californica* Baker and *Stenocotis depressa*. There is likewise a close resemblance between the head of *K. californica* and certain thymbrids, as may be seen from fig. 7 A, B, where the head of an adult specimen of *K. californica* is shown beside that of a nymph of a *Novothymbris* sp.

The genus *Novothymbris* Evans is confined to New Zealand and previously I have stated that the comprised species are not only not closely related to any Australian thymbrids, but also, that they retain certain more generalised characteristics, than are to be found in any of the Australian representatives of the tribe. If sufficient justification exists for removing *Koebelia* from the Ledrinae, and regarding it as a representative of a separate subfamily, then, there would seem to be equal reasons for treating *Novothymbris* in the same way; also for regarding the Stenocotini and Thymbrini as subfamilies rather than as tribes. Such action however would be undesirable since it would tend to obscure knowledge of the existence of a group of ancient leafhoppers which,

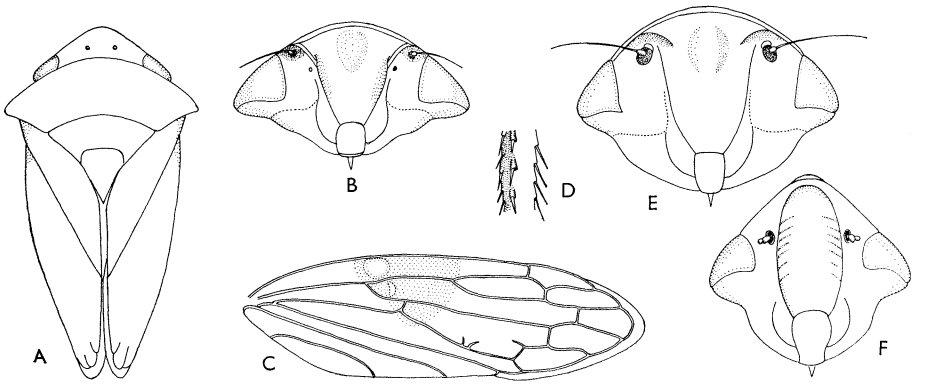

Fig. 8. A, *Clinonana mirabilis*; B, same, face of head; C, same, tegmen; D, same, part of hind tibia; E, *Gypona* sp., face of head; F, *Proranus* sp., face of head.

while including diverse components, at the same time share common and direct descent from the Ulopinae.

As already mentioned the reason Kramer (1965) has rejected *Koebelia* from the Ledrinae is that *K. californica* has ventral ocelli. If reference is made to fig. 18 and 19 of my Memoir on Australian leafhoppers (Evans 1966), in which the heads of many stenocotids and thymbrids are illustrated, it will be seen how in well defined natural groups the shape of the head and the position of the ocelli may be very variable. In the same paper by Kramer, the neotropical genus, *Clinonana* Osborn, which formerly had been regarded as belonging to the Gyponinae, is transferred to the Ledrinae. The reason given for this change in subfamily position is the spinulation of the hind femur of *Clinonana mirabilis* (Spanberg) which is similar to those of most ledrines, even although in tegminal venation and genitalia structure it resembles species in some gyponid genera.

In fig. 8 the face of the head of *C. mirabilis* is placed beside that of an unidentified gyponid and a ledrid, *Proranus* sp., from the Western Hemisphere and the tegmen and part of the hind tibiae of the first named species are also illustrated. It is suggested that in spite of having dorsal ocelli, a laterally expanded pronotum, such as occurs in species in the ledrid genus *Tituria* Stål and ledrid-like hind femoral spinulation, *Clinonana mirabilis* is undoubtedly a gyponid because of the shape and structure of the face of its head; the thickened posterior marginal rim on the face; the shape of the tegmina; the armature of the hind tibiae and the abundance of spines on the 9th sternum of the male.

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