and the prominent coloration of the hemelytra.—W. L. Distant.

EXPLANATION OF PLATE X.

Fig. 1. *Homalopteryx scotti*, sp. n. (Shelford), ♂. × 1½.
Fig. 2. Ditto. Apex of abdomen from beneath, showing subgenital lamina, cerci, and styles. × 8.
Fig. 3. *Aglymbus bromeliarum*, sp. n. (Scott), ♂. × 10.
Fig. 4. *Microvelia insignis*, sp. n. (Distant), winged form. × 15.
Fig. 5. Ditto, apterous form. × 15.

LVI.—*Descriptions of some new Homoptera.*

By W. L. Distant.

Fam. Cicadidæ.

Macrotristria occidentalis, sp. n.

♀. Head and pronotum piceous, more or less ochraceously pilose, ocelli red; pronotum with the basal margin and an elongate spot on lateral margins behind eyes pale ochraceous; mesonotum castaneous, the disk more or less piceous, two central obconical piceous spots, margined with castaneous on anterior margin, extending over about half the disk, lateral margins longly greyishly pilose and also greyishly pilose between the anterior angles of the basal cruciform elevation; abdomen above black, greyishly pilose, the posterior segmental margins ochraceous; body beneath ochraceous, greyishly pilose and pubescent, a small castaneous spot on each side of the last ventral segment; face with the central sulcation and transverse ridges castaneous; tegmina and wings hyaline; tegmina with the venation black, the costal and greater part of the postcostal membranes and the claval vein ochraceous, basal cell and a basal longitudinal streak above it black, the whole venation of the apical areas broadly infuscated, posterior margin of the clavus mostly black; wings with the venation either ochraceous or black; front of head with the lateral areas obliquely carinate, the lateral areas of vertex also carinate; pronotum with a central, longitudinal, subcruciform carination; rostrum reaching the bases of the posterior coxæ; face moderately globose, the transverse carinations strong and distinct.

Long., excl. tegm., ♀, 30 mm.; exp. tegm. 92 mm.

Hab. West Australia, Southern Cross (*H. Brown*, Brit. Mus.).

I have only seen the female sex of this species, which may be placed near *M. hillieri*, Dist.

Terpnosia crowfooti, sp. n.

Head, pronotum, and mesonotum pale olivaceous green; head with anterior marginal lines to front, lateral margins to vertex, and the area of the ocelli black; pronotum with two central curved longitudinal lines, the outer fissure, a transverse spot near lateral angles, and, two small, central, contiguous spots near base black; mesonotum with a central straight longitudinal line, on each side of which is a short inwardly curved line, a curved fasciate line on each lateral area, two spots in front of the basal cruciform elevation, and the anterior angles of the same black; abdomen pale brownish ochraceous, shortly palely pilose, the central area darker, with a series of large segmental spots on each lateral area and smaller spots on lateral margins piceous, apical segment covered with greyish-white pile; head beneath, sternum, legs, and opercula pale greenish ochraceous; tibiæ, tarsi, and rostrum brownish ochraceous; abdomen beneath thickly covered with greyish pile; tegmina and wings hyaline, unspotted, both with the venation and the first with the costal membrane piceous; opercula in ♂ not extending beyond base of abdomen, their lateral and apical margins convex; tympanal coverings less than half the length of tympanal orifices, small and rudimentary.

Long., excl. tegm., ♂, 24 mm.; exp. tegm. 58 mm.

Hab. Badamtam, near Darjeeling (*A. R. Crowfoot*, Brit. Mus.).

By the completely unspotted tegmina and the rudimentary tympanal coverings this species is allied to *T. madhava*, Dist., from which it differs by the more elongate tegmina and totally different markings &c.

Gudaba maculata, sp. n.

Head, pronotum, and mesonotum ochraceous; head with the apex and two longitudinal fasciæ to front, area of the ocelli, and an oblique fascia before each eye black; pronotum with two central longitudinal fasciæ, a spot behind each eye, and the lateral fissure black; mesonotum with a central longitudinal line, on each side of which is a short oblique

linear fascia, a sublateral fascia (sometimes much broken), two small spots in front of the cruciform elevation, and the anterior angles of same black; abdomen brownish ochraceous, in ♂ a small black basal spot and the apical area castaneous, in ♀ a central black spot on the first three segments and a series of small lateral marginal spots; body beneath and legs brownish ochraceous in ♂, the apices of the femora distinctly black, and the apical area of the abdomen piceous or black; in the ♀ the underside of the body and legs is virescent; tegmina and wings hyaline, venation brownish ochraceous or fuscous; tegmina with a sublateral series of marginal fuscous spots placed on the lateral veins to apical areas; head as long as breadth between eyes; pronotum with the lateral angles angulated; abdomen considerably longer than space between head and base of cruciform elevation, second and third ventral segments furnished with a tubercle near each lateral margin, the posterior tubercle very small; tympanal coverings very much shorter and narrower than the tympanal orifices; opercula short, oblique, not passing the base of abdomen; rostrum reaching the posterior coxæ; wings with five apical areas.

Long., excl. tegm., ♂ ♀, 13 mm.; exp. tegm. 33–34 mm.

Hab. ♂, Sikhim (*Bingham*); ♀, Dehra Dun (*N. C. Chatterjee*, Brit. Mus.).

Allied to the Burmese species *G. marginata*, Dist., and constituting the first species described from India proper.

Urabunana verna, sp. n.

♀. Body virescent or greenish ochraceous; head with a black line on each side of front and a large irregular black spot on each side of vertex before the eyes; pronotum more ochraceous in hue, with the anterior and posterior margins and a central longitudinal fascia, widened posteriorly, pale virescent, near base this fascia contains a small quadrate black spot; mesonotum with four anterior black obconical spots, the two central smallest; abdomen above with a central black macular fascia reaching the penultimate segment, where it is narrowest; face centrally black; apex of rostrum black; tegmina and wings hyaline; tegmina with the veins infuscated, the costal and postcostal membranes pale virescent; lateral margins of the pronotum nearly straight, slightly ampliated at posterior angles; tegmina a little arched towards apex of radial area and sinuate at the junction of costal and postcostal membranes; wings with four apical areas; tegmina with eight apical areas.

Long., excl. tegm., ♀, 14 mm.; exp. tegm. 30 mm.

Hab. Australia; Byron Bay, N. S. Wales (*Ross*, Brit. Mus.).

Fam. **Jassidæ**.

Petalocephala bombayensis, sp. n.

Head, pronotum, scutellum, body beneath, and legs very pale virescent or greenish ochraceous; tegmina subhyaline, tale-like, the clavus and basal third of costal area pale virescent or greenish ochraceous, inner area of clavus more or less castaneous; lateral margins of vertex and pronotum, and a small central spot on anterior and posterior margins of pronotum, castaneous; vertex about as long as breadth between eyes, lateral margins almost straight for a little before eyes and then subangularly rounded to apex, centrally medially carinate; pronotum centrally, finely, longitudinally impressed, more or less distinctly transversely wrinkled; face strongly flattened from in front of eyes to anterior margin; posterior tibiæ outwardly strongly spinose.

Long., ♀, 9 mm.

Hab. Bombay (Brit. Mus.).

In general coloration allied to *P. nigrilinea*, Walk., but differing in the larger vertex of head, which is about as long as breadth between eyes.

Petalocephala perakensis, sp. n.

Head, pronotum, scutellum, body beneath, and legs greenish ochraceous; lateral and anterior margins and a slightly curved transverse fascia near basal margin of vertex, and lateral margins (narrowly) and basal margin (broadly) to pronotum castaneous; tegmina castaneous; face with the anterior margin and two short angulate fasciæ on anterior area castaneous; lateral margins of sternum castaneous; vertex distinctly shorter than breadth between eyes, the lateral margins perpendicularly continued for a short space in front of eyes, and then obliquely continued to apex, centrally very finely longitudinally carinate; pronotum with the lateral margins nearly straight; clavus and costal membrane to tegmina very finely granulose, the venation on apical third very coarse and distinct; posterior tibiæ outwardly strongly spinose.

Long. 9 mm.

Hab. Malay Peninsula; Perak (*Doherty*, Brit. Mus.).

Allied to *P. conspicua*, Dist., but differing by the shorter vertex, the lateral margins of which are perpendicular for a short distance in front of eyes, different markings to face, &c.

LEDROTYPA, gen. nov.

Vertex of head flat, the margins moderately laminately reflexed, about as long as pronotum and scutellum together, the anterior margin broadly rounded, the lateral margins slightly sinuate before eyes, ocelli near base, nearer to eyes than to each other, eyes posteriorly elongate; face concave, moderately convex on the apical area; pronotum short, deflected from base, scarcely longer than scutellum, distinctly foveate before each lateral margin, anterior margin centrally truncate, posterior margin angularly concave before base of scutellum; scutellum broader than long, posteriorly deflected from base, the apex acute; tegmina with the veins prominent; posterior tibiæ four-cornered, curved, armed with numerous spines, the outer edge slightly expanded, and strongly spinous.

Type, *L. spatulata*, Dist.

In the enumeration of the Indian species this genus may follow *Petalocephala*.

Ledrotypa spatulata, sp. n.

♀. Somewhat uniformly dull ochraceous; a short black fascia between and outside the anterior and intermediate coxæ; vertex of head very finely and obscurely punctate, its posterior margin levigate; pronotum with the disk very finely transversely striate, foveate on each side a little behind anterior margin, very obscurely centrally longitudinally impressed; scutellum with a transverse impressed line before apex; posterior tibiæ a little curved, with numerous somewhat remote fine spines on outer margin.

Long., incl. tegm., 11 mm.

Hab. "Himalayas" (Brit. Mus.); Bhogaon, Purneah Distr., N. Bengal (*Paiva*, Ind. and Brit. Muss.).

Ledrotypa greeni, sp. n.

Body and legs brownish ochraceous; (abdomen mutilated); tegmina pale ochraceous, the veins darker and with piceous markings which consist of two long subcostal linear streaks, four similar streaks (three short and one long) on subapical area, the lowermost streak followed by one or two

small rounded piceous spots; vertex of head very finely and obscurely punctate, the apex a little more angulate than in the preceding species, traversed by two central, longitudinal, somewhat obscure impressions; pronotum very obscurely transversely striate; tegmina with the veins subprominent; wings hyaline, with the veins ochraceous.

Length, incl. tegm., 11 mm.

Hab. Ceylon (*Green*).

This description is based on a somewhat mutilated specimen sent to me by Mr. Green. It is to be readily separated from *L. spatulata* by the less concavely sinuate lateral margins of the vertex and by the piceous markings to the tegmina.

AMBERBAKIA, gen. nov.

Vertex of head not so long as pronotum and scutellum together, but a little longer than pronotum, the lateral margins gradually narrowed from in front of eyes to apex, which is subangulate; ocelli near lateral margins a little in front of eyes; head beneath very foliaceous, face widened and thickened between the antennæ, thence anteriorly elongately much narrowed and centrally sulcate, and posteriorly less narrowed to clypeus; pronotum a little shorter than vertex, its lateral margins straight, anterior margin straight but obliquely recurved behind eyes, posterior margin concavely sinuate; scutellum almost as long as pronotum; legs moderately slender, posterior tibiæ moderately curved, very long, and outwardly somewhat closely longly spinose; tegmina broad, costal and apical margins rounded, clavus broad, with transverse veins on its basal area, two elongate discoidal areas, and a series of transverse veins before apical area defining longitudinal apical cellular areas.

Type, *A. specularia*, Walk.

Amberbakia specularia.

Petalocephala specularia, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 307 (1869).

Lateral areas of face at region of antennæ distinctly foveate.

Hab. New Guinea.

Amberbakia bispecularis.

Petalocephala bispecularis, Walk. Journ. Linn. Soc. Lond., Zool. x. p. 307 (1869).

Lateral areas of face at region of antennæ entire, not foveate.

Hab. Mysol.

Penthimia mudonensis, sp. n.

Body above castaneous; vertex of head with the anterior and basal margins, a central longitudinal line, and the eyes black; scutellum with three ochraceous spots, one near middle of each lateral margin and the third apical; margins of clavus narrowly black; more than apical third of tegmen dull ochraceous, tessellated with black cellular rings varying in size, prominent of which are spots in frontal margin of the apical area continued up the lateral margin of tegmen; at extreme apex the colour is greyish, semiopaque, with a blackish spot in the apical cells; body beneath castaneous; face, cheeks, clypeus, disk of sternum, suffusions to femora, and transverse central basal spots to abdomen beneath black; vertex of head convexly rounded in front, in length nearly half the breadth between eyes; pronotum convex, wrinkled transversely; posterior tibiæ longly strongly pilose.

Long. 5½ mm.

Hab. Tenasserim; Mudon-Amherst Distr. (*Annandale*, Ind. Mus.).

A distinct species by the three pale spots to the scutellum, the large tessellate apical area to the tegmina, the short vertex, &c.

Penthimia nitida, sp. n.

Head, pronotum, scutellum, and tegmina (excluding apical area) shining black, apical area of tegmen greyishly subhyaline, outwardly and inwardly ochraceous, more or less extending upward to the opaque black area; body beneath black, the legs ochraceous, anterior femora basally suffused with black; head rounded in front, the anterior margin somewhat acutely reflexed; pronotum moderately convex, slightly wrinkled, and sparingly coarsely punctate; scutellum opaquely black, thickly finely punctate; tegmina (excluding apical area) coarsely punctate; posterior legs suffused with black, posterior tibiæ strongly spinose, the tarsi ochraceous.

Long. 4 mm.

Hab. Burma; Moulmein (Brit. Mus.).

A species to be recognized by the strongly punctured upper surface; it may be placed near *P. erebus*, Dist.

Vulturnus ornatus, sp. n.

Vertex pale ochraceous, finely speckled with brownish; pronotum very pale castaneous, thickly blackly reticulate, the posterior margin and a central transverse fascia greyish white; scutellum ochraceous, with black reticulations, which are more dense near basal margin and less so on lateral areas; body beneath (including face) and legs black; basal margin of head beneath between eyes, anterior and intermediate tibiæ and tarsi, minute spots to posterior tibiæ, bases and apices of posterior tarsi, and a lateral marginal spot to metasternum ochraceous; tegmina ochraceous, finely blackly reticulate, clavus with a discal black patch enclosing about four small white spots, its apex also whitish; a large central, longitudinal, costal white spot, which contains two small black spots and is followed by a larger black spot, and a cluster of subapical white spots; vertex a little broader than long, with an indistinct central longitudinal carination.

Long., incl. tegm., 4 mm.

Hab. Ceylon; Peradeniya (*Green*).

Vulturnus speciosus, sp. n.

Vertex ochraceous; a black submarginal apical line not reaching eyes, and with three testaceous discal spots, the central one transverse, the other two shorter and oblique; eyes black; pronotum ochraceous or very pale castaneous, thickly blackly reticulate, the posterior margin and a central transverse fascia greyish white; scutellum piceous, with four greyish-white spots, two before apex and two near basal margin; body beneath (including face) and legs black; basal margin of head beneath containing a few minute dark spots and anterior and intermediate tibiæ and tarsi ochraceous; tegmina ochraceous, finely, thickly, blackly reticulate, a small black patch in clavus containing about three white spots, some white spots on claval suture, a small white spot on disk of tegmen, three whitish spots on costal margin, and a small cluster of subapical white spots; vertex slightly longer and a little more narrowed anteriorly than in *V. ornatus*, with a central dark incised line extending from base about halfway to apex.

Long., incl. tegm., 3½ mm.

Hab. Ceylon; Peradeniya (*Green*).

Haranga borneensis, sp. n.

Black, more or less finely punctate; membrane bronzy

brown, with the apex and some obscure spots greyish; body beneath and legs black or piceous; eyes piceous; pronotum distinctly transversely wrinkled; scutellum reaching apex of clavus, somewhat obliquely depressed at basal area, punctate, wrinkled, the apical area longitudinally ridged; corium somewhat thickly punctate; face strongly compressed behind eyes; spinules to the posterior tibiæ long and prominent.

Long. 9 mm.

Hab. Borneo; Kuching (*Hewitt*, Brit. Mus.).

Allied to the Indian species *H. orientalis*, Walk., from which it differs by the considerably more acute apex of the face, more strongly wrinkled pronotum, &c.

Vangama? tuberculata.

Prolepta? tuberculata, Walk. List Hom., Suppl. p. 315 (1858).

This species, described by Walker in the Fulgoridæ, really belongs to the Jassidæ, and can apparently be included in my genus *Vangama* (Faun. B. I., Rhynch. iv. p. 260).

Hab. N. China.

Ledropsis singalensis, n. nom.

Ledropsis maculata, Dist. Faun. B. Ind., Rhynch. iv. p. 181 (1907), nom. præocc.

LVII.—*On the Structure of Stromatoporoids and of* Eozoon.

By R. Kirkpatrick.

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[Plates XI. & XII.]

In last month's 'Annals' I published a paper proving that Stromatoporoids and *Eozoon* were Foraminifera. It was there pointed out that they had a calcareous chambered skeleton, with the walls of the chambers penetrated by tubuli, and that there were present in the canals hoops and rings similar to those of recent Perforate Foraminifera. Further, I figured a coiled Foraminiferan shell in one of the chambers of *Eozoon*. So far my evidence was not much in advance of that already given by Dawson and Carpenter. I had done nothing to unravel the bewildering complexity and confusion presented by the skeletal arrangement nor to explain how

these Eozoic and Palæozoic Foraminifera were related to those of later ages. I hope in this brief preliminary communication to show that a great advance has been made and that it is now possible clearly to recognize the plan of growth and organization, and to indicate with some degree of probability the relationships existing between the ancient and modern forms.

In my last paper I had stated that the stellate patterns or "astrorhizæ" so often found on the surface of Stromatoporoids could be accounted for by assuming that the outer ends of several mural tubuli became united to form one large orifice; but I soon discovered the incorrectness of this view, and at the same time suspected that the clue to the Stromatoporoid problem was to be sought in the astrorhizæ.

While examining a broken fragment of *Stromatopora* I carefully mapped out the exposed chambers as seen on a tangential surface, and here and there made out several series showing a concentric arrangement in relation to an astrorhiza. Then it occurred to me that we had hitherto viewed Stromatoporoids from a wrong aspect, viz. the vertical, whereas the horizontal or tangential aspect was the one which revealed the mode of growth. The coiled series of alternating chambers reminded me of *Orbitolites*, and soon it became clear that astrorhizæ were the central and circumambient chambers of a spiral system, and that the multiple systems must have arisen by budding in some way.

Prof. F. Rœmer* had spoken of certain Stromatoporas from the Eifel with surface tubercles each having a hole at its summit leading down to the orifice of a small specimen of *Spirorbis omphalodes*. He surmised that the little creature prevented the growth of the *Stromatopora* layers, and so kept up its communication with the outside world. The *Spirorbis* was probably nothing but the central and circumambient chamber of a Foraminiferan. This particular ὀμφαλὸς might in a sense be compared with that of the temple of Apollo at Delphi in being the centre of the Stromatoporoid and the hub of its universe.

Curiously enough, G. Lindström makes a similar observation about a *Spirorbis* saving itself from death by keeping open a passage of communication †.

The whole plan of Stromatoporoid organization now became delightfully obvious. A polished slab of any *Stromatopora* revealed clearly the numerous systems of spirally arranged

* Geol. Mag. 1880, vol. vii. p. 345.

† K. Svenska Vetensk.-Akad. Handl. 1870, vol. ix. no. 6, p. 8.