

PARTS III-IV (Nos. 265-266).

(Issued 15th September, 1936.)

Notes on Sarcophaginae in India and Australia. By G. H. Hardy	89- 97
Australian Coleoptera. Notes and New Species. No. x. By H. J. Carter, B.A., F.R.E.S.	98-110
A Check List of the New South Wales Pteridophytes. By Alma T. Melvaine	111-121
Contribution to a Knowledge of Papuan Tipulidae (Diptera). By Charles P. Alexander. (Communicated by Frank H. Taylor, F.R.E.S., F.Z.S.) (Seven Text-figures.)	122-127
A Redescription of <i>Solomys</i> ("Mus") <i>salamonis</i> Ramsay. By Ellis Le G. Troughton, C.M.Z.S.	128-130
The Structural Geology and Petrology of an Area near Yass, New South Wales. By Kathleen Sherrard, M.Sc. (Plates vi-vii and nine Text- figures.)	131-150

CONTENTS.

iii

	Pages.
A Comparison of the Rydal and Hartley Exogenous Contact-zones. By Germaine A. Joplin, B.Sc., Ph.D. (One Text-figure.)	151-154
The Upper Palaeozoic Rocks in the Neighbourhood of Boorook and Drake, N.S.W. By A. H. Voisey, M.Sc. (Plate viii and one Text-figure.) ..	155-168
The Diptera of the Territory of New Guinea. iv. Family Tipulidae. Part ii. By Charles P. Alexander. (Communicated by Frank H. Taylor, F.R.E.S., F.Z.S.) (Seventeen Text-figures.)	169-183
Two New Australian Fleas. By Karl Jordan, Ph.D., F.R.S. (Communi- cated by Frank H. Taylor, F.R.E.S., F.Z.S.) (Two Text-figures.) ..	184-185
Introductory Account of the Geology and Petrology of the Lake George District. Part i. General Geology. By M. D. Garretty, B.Sc. (Plate ix and one Text-figure.)	186-207
Charles Hedley (Memorial Series, No. 5.) (With Portrait.)	209-220

THE DIPTERA OF THE TERRITORY OF NEW GUINEA. IV.

FAMILY TIPULIDAE. PART II.*

By CHARLES P. ALEXANDER, Massachusetts State College, Amherst, Mass., U.S.A.

(Communicated by Frank H. Taylor, F.R.E.S., F.Z.S.)

(Seventeen Text-figures.)

[Read 26th August, 1936.]

The materials included in this instalment are chiefly from the mountains of north-eastern New Guinea, the majority from Edie Creek, where they were collected by Mr. Frank H. Taylor. Additional materials were sent to me by Mr. Taylor and Professor Harvey Sutton, collected by Mr. Norman Ferguson and Dr. E. A. Holland, and forming a valuable addition to our knowledge of the Tipulidae of this little-known area. All types and uniques are preserved in the collection of the School of Public Health and Tropical Medicine, the University of Sydney. As before, I express my very sincere thanks to the Director of the School of Public Health, Professor Harvey Sutton, and to my very good friend and co-worker, Mr. Frank H. Taylor, for this continued co-operation in studying the Tipulidae of the Territory of New Guinea.

The rich collections studied herewith add no fewer than nine generic and subgeneric groups to those hitherto known from the Territory, of which *Dolichopeza*, s.s., *Helius*, s.s., and *Eurhamphidia*, are included here. A number of the large and conspicuous autochthonous Australian genera of the subfamily Tipulinae that might reasonably be expected to extend their range into New Guinea remain undetected and, in the light of the collecting done by Mr. Taylor, it may be expected that most of these, at least, do not occur within the Territory. Such genera, as *Clytocosmus*, *Platyphasia*, *Plusiomyia* and *Ptilogyna*, with branched antennae, and *Leptotarsus* and *Semnotes*, with the antennae simple and reduced, include the largest and most conspicuous crane-flies within the Australian faunal limits.

TIPULINAE.

TIPULA (PAPUATIPULA) LEUCOSTICTA Alexander.

Tipula leucosticta Alexander, *Philippine Journ. Sci.*, liv., 1934, 444-446.—
Tipula (Papatipula) leucosticta Alexander, *ibid.*, lvii, 1935, 114-115.

Known hitherto only from Bogadjim (Stephansort), Astrolabe Bay, north-eastern New Guinea, collected 30th March, 1900, by Biró. Two females, Kavieng, New Ireland, 31 January-14 February, 1934 (F. H. Taylor).

NEPHROTOMA FLAVOPOSTICATA, n. sp. Text-figs. 1, 7.

Mesonotal praescutum yellow, with velvety-black stripes, the median one plumbeous on central portion; scutellum black; pleura orange, unmarked; legs black, the posterior tibiae (♂) or middle and hind tibiae (♀) broadly yellow on

* Continued from These PROCEEDINGS, lx, 1935, 51.

central portion; wings strongly tinged with blackish, cell Sc and stigma darker; abdomen (♂), including terminalia, almost uniformly blue-black.

♂.—Length, 12–13 mm.; wing, 10–11 mm. ♀.—Length, 13.5–14 mm.; wing, 11.5–12 mm.

Sexes feebly dimorphic in colour.

♂. Frontal prolongation of head orange, the dorsal surface and conspicuous nasus black. Antennae black, the apex of scape a little reddened; antennae of moderate length, if bent backward extending to just beyond root of halteres; flagellar segments moderately incised. Head orange, without occipital brand.

Pronotum orange. Mesonotal praescutum yellow, with three velvety-black stripes, the median one with posterior half and central portion of anterior half more plumbeous in colour; lateral stripes straight; scutum yellow, the lobes chiefly velvety-black; scutellum blackish-plumbeous, margined laterally with more velvety-black, the parascutella yellow; mediotergite yellow, on posterior third with a plumbeous area that is narrowly bordered with black. Pleura orange, the pleurotergite more yellowish-orange. Halteres black. Legs with the coxae orange; trochanters yellow; femora black; fore tibiae black; mid-tibiae light brown, the base and apex blackened; posterior tibiae bright yellow, blackened at both ends; all tarsi black. Wings (Fig. 1) with a strong blackish tinge, cell Sc and stigma darker brown; veins brown. Stigma with only five or six trichia. Venation: Sc₂ ending shortly beyond origin of Rs; cell M₁ very short-petiolate to narrowly sessile.

Abdomen uniformly black, with bluish reflexions; the paratype from Maini shows restricted yellowish areas on bases of tergites two to four. Male terminalia (Fig. 7) relatively small. Ninth tergite, 9t, produced medially into two flattened divergent ear-like points; a blackened stub at each outer lateral portion of tergite. Both dististyles darkened; inner style, id, with a very low dorsal crest; apical beak unusually slender. Gonapophyses appearing as tiny oval pale plates, subtending the base of aedeagus.

♀. Similar to male, differing as follows: Antennae shorter; scape and pedicel brown. Halteres somewhat paler in colour. Legs with both middle and hind tibiae yellow on central portions. Abdomen with basal two tergites and basal four sternites obscure yellow, the outer segments more blackened. In the Maini paratypes, the amount of pale colour is somewhat more restricted.

Holotype, ♂, Edie Creek, New Guinea, altitude 6,550 feet, February, 1935 (F. H. Taylor). Allotopotype, ♀, in copulation and carded with type. Paratopotypes, 1 ♂, 1 ♀; paratypes, 1 ♂, 2 ♀, Maini, altitude about 6,300 feet, July, 1935 (K. J. Clinton).

Nephrotoma flavoposticata is readily distinguished from the other described regional species of the genus by the coloration of the posterior tibiae. The nearest allies are various members of the *melanura* group, especially *N. dimidiata* (de Meijere) and *N. fumiscutellata* Alexander.

NEPHROTOMA KAVIENGENSIS, n. sp. Text-fig. 8.

General coloration yellow; occipital brand not indicated; pronotum orange-yellow; mesonotal praescutum with three black stripes that are confluent or virtually so, the median stripe velvety-black on cephalic portion, the posterior three-fourths nacreous, polished; lateral stripes velvety-black, extended laterad to margin of sclerite; scutellum black; wings greyish; stigma small, dark brown; abdomen with basal six segments orange, the posterior borders of the segments narrowly and evenly darkened; subterminal segments black; male terminalia with beak of inner dististyle slender, spinous; gonapophyses bispinous at tips;

caudal margin of eighth sternite produced medially into a narrow compressed point.

♂. Length about 12 mm.; wing, 10.5 mm.

Frontal prolongation of head fulvous, unmarked; palpi pale brown. Antennae (♂) of moderate length, if bent backward extending to the wing-root or approximately so; scape and pedicel orange; flagellum brownish-black; flagellar segments moderately incised, with verticils that are shorter than the segments. Head fulvous-orange, the occipital brand not differentiated; a vague dusky cloud on anterior vertex adjoining the inner margin of eye; vertical tubercle entire or virtually so.

Pronotum orange-yellow. Mesonotal praescutum with three black stripes, the polished black laterals virtually confluent with the broad median vitta, the latter velvety-black on anterior fourth, the remainder of stripe polished nacreous; outer stripes continued laterad to margin, restricting the yellow ground-colour to humeral triangles and narrow lines adjoining the suture; scutum yellow, each lobe with a velvety-black area; scutellum velvety-black, parascutella yellow; mediotergite yellow, with an oval nacreous area at posterior border. Pleura and pleurotergite yellow, the anepisternum and sternopleurite vaguely marked with pale reddish-yellow. Halteres yellow, the base of knob infumed. Legs with the coxae and trochanters yellow; femora obscure brownish-yellow; tibiae brown; tarsi black. Wings with a greyish tinge; prearcular region and cells C and Sc more yellow, the latter cell slightly deeper in colour; stigma small, oval, dark brown; veins dark. Stigmal trichia about fifteen in number. Venation: Cell M_1 very short-petiolate.

Abdomen with basal six segments orange, the posterior borders very narrowly ringed with brownish-black, the bands uniform in width or virtually so; outer segments black; terminalia more brownish at tip. Male terminalia (Fig. 8) with the tergite, *9t*, extended caudad into two submedian spinous points. Outer dististyle, *od*, with the apical point relatively short. Inner dististyle, *id*, with the terminal beak a slender sclerotized spine; a low dorsal crest. Gonapophyses, *g*, terminating in two acute spinous points. Eighth sternite, *8s*, sheathing, the median portion produced caudad into a narrow point, on ventral portion strongly compressed; surface of sternite with long coarse black setae.

Holotype, ♂, Kavieng, New Ireland, 4 February, 1934 (F. H. Taylor). Paratopotype, ♂, 11 February, 1934.

This fly is allied to species such as *Nephrotoma dimidiata* (de Meijere), *N. melanura* (Osten Sacken) and *N. speculata* (de Meijere). It differs from all described forms in the pattern of the praescutum and the structure of the male terminalia, notably of the inner dististyles, gonapophyses and eighth sternite.

DOLICHOPEZA (DOLICHOPEZA) TAYLORIANA, n. sp. Text-figs. 2, 9.

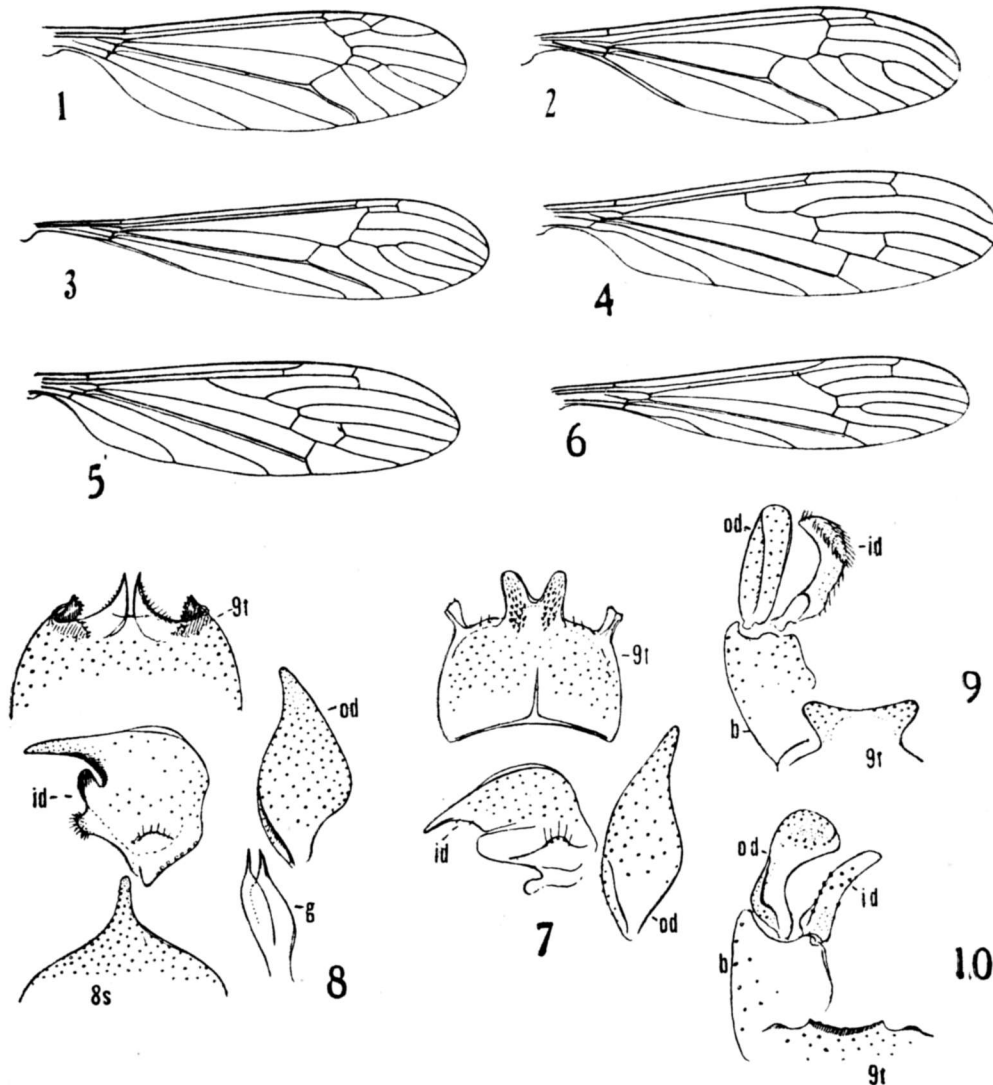
General coloration of mesonotal praescutum dark brown, the humeral region yellow; a transverse, dark brown girdle on mesepisternum; legs with genua, tips of tibiae, and all but proximal portions of basitarsi, white; wings with a weak brown tinge, conspicuously patterned with darker brown on cord and outer longitudinal veins; anterior cord oblique, with Rs lying most distad; Sc_2 opposite Rs; cell 2nd A narrow; male terminalia with the tergite produced laterad into triangular darkened lobes.

♂.—Length, 9.5–10 mm.; wing, 11–11.5 mm. ♀.—Length, 11–12 mm.; wing, 12–12.5 mm.

Frontal prolongation of head yellow above, darkened laterally; palpi dark brown. Antennae with the scape yellow, pedicel white; flagellum black; antennae

(♂) of moderate length, if bent backward extending about to base of abdomen; flagellar segments long-cylindrical, gradually decreasing in length outwardly, the terminal segment oval, about one-third the penultimate; verticils of intermediate segments much shorter than the segments themselves. Front yellow; vertex light brown.

Pronotum darkened medially, paling to yellow on sides. Mesonotal praescutum with an intermediate pair of stripes that become darker and nearly confluent behind, similarly fusing with the very extensive lateral darkenings; humeral region extensively light yellow; scutal lobes extensively dark brown, the



Text-figs. 1-10.

1. *Nephrotoma flavoposticata*, n. sp., venation.
2. *Dolichozeza (Dolichozeza) tayloriana*, n. sp., venation.
3. *Dolichozeza (Dolichozeza) percuneata*, n. sp., venation.
4. *Limonia (Libnotes) hollandi*, n. sp., venation.
5. *Limonia (Libnotes) consona*, n. sp., venation.
6. *Limonia (Pseudoglochina) procella*, n. sp., venation.
7. *Nephrotoma flavoposticata*, n. sp., male terminalia, details.
8. *Nephrotoma kaviengensis*, n. sp., male terminalia, details.
9. *Dolichozeza (Dolichozeza) tayloriana*, n. sp., male terminalia.
10. *Dolichozeza (Dolichozeza) percuneata*, n. sp., male terminalia.

(Symbols: b, basistyle; g, gonapophysis; id, inner dististyle; od, outer dististyle; s, sternite; t, tergite.)

cephalic portion, adjoining the suture, paler; scutellum testaceous-yellow in middle, darker posteriorly and on sides; mediotergite infuscated. Pleura yellow, with a transverse dark brown girdle occupying the anepisternum and sternopleurite, being a continuous extension of the lateral praescutal stripes; pleurotergite similarly darkened. Halteres moderately long, the stem dusky, the extreme base more greenish; knobs blackened. Legs with the coxae and trochanters yellow; femora brown to brownish-black, the tips narrowly white to greenish-white, preceded by a more intensely blackened area; tibiae black, the bases narrowly white, the amount subequal to the femoral brightening, the tips more extensively whitened, very narrowly so on fore tibiae, more extensive on posterior tibiae where nearly the distal sixth is involved; fore and middle basitarsi blackened on proximal portion, the outer half or more yellowish-white; posterior basitarsi almost entirely white, the proximal fourth or fifth infuscated; outer tarsal segments white or greenish-white. Wings (Fig. 2) with a weak brown tinge, patterned with darker brown, more conspicuously so at the stigma and as broad seams on both anterior and posterior cords; outer radial and medial veins more narrowly seamed with brown; veins brownish-black. Holotype with a series of about thirty macrotrichia in cell R_5 , not evident in the remainder of type series. Venation: Anterior cord oblique, but not as markedly so as in *percuneata*, n. sp.; Sc_2 ending opposite R_s ; outer medial forks of moderate depth; m-cu gently arcuated, about one and one-half times its length before the fork of M; cell 2nd A narrow.

Abdominal tergites obscure yellow, the bases and apices of the segments dark brown, the latter more broadly so; sixth tergite more uniformly darkened; sternites and terminalia more uniformly obscure yellow. Male terminalia (Fig. 9) with the tergite, *9t*, produced laterad into triangular darkened lobes, the caudal margin entire, gently emarginate. Both dististyles only feebly sclerotized, the apex of inner style, *id*, densely hairy.

Holotype, ♂, Edie Creek, New Guinea, altitude 6,550 feet, February, 1935 (F. H. Taylor). Allotopotype, ♀. Paratopotypes, 1 ♂, 1 ♀.

I take very great pleasure in dedicating this handsome crane-fly to Mr. Frank H. Taylor, who collected the majority of the new and rare Tipulidae discussed in the present report. The nearest ally is *Dolichozepeza* (*Dolichozepeza*) *percuneata*, n. sp., which differs conspicuously in the venation and pattern of the wings, and in the structure of the male terminalia. Both species find their only near described allies in the eastern Australian fauna, since no member of the typical subgenus had been discovered west of Papua in the Austro-Malayan islands, their place being taken by other subgeneric groups of *Dolichozepeza* that have evidently been derived from the Oriental faunal region, as *Eunesopeza* Alexander, *Mitopeza* Edwards and *Nesopeza* Alexander. The presence of macrotrichia in cell R_5 of the wing of the holotype specimen of the present fly and not in the remainder of the type-series is distinctly puzzling, since macrotrichia in the wing-cells of other species have been found to be relatively constant both in number and distribution.

DOLICHOPEZA (*DOLICHOPEZA*) *PERCUNEATA*, n. sp. Text-figs. 3, 10.

General coloration of mesonotum brownish-black; pleura yellow, with a transverse brownish-black girdle covering the anepisternum and sternopleurite; legs black, the genua very narrowly white, the tips of all tibiae somewhat more broadly so; tips of basitarsi and succeeding tarsal segments snowy-white; wings unusually narrowed at base; R_s very short, lying far distad of the other elements of the anterior cord; medial forks deep; cell 2nd A very long and narrow; male

hypopygium with the outer dististyle expanded at apex into an obtuse spatulate head.

♂.—Length about 8 mm.; wing, 9 mm.

Frontal prolongation of head brownish-yellow; palpi brownish-black. Antennae black, the scape and pedicel a trifle paler; flagellar segments cylindrical, the verticils shorter than the segments. Head with the front yellow, the vertex more castaneous, the posterior orbits darker.

Pronotum brownish-black above, yellow on sides. Mesonotal praescutum brownish-black, the humeral region of the yellow ground-colour; median region of praescutum a little paler behind; scutal lobes brownish-black posteriorly, much paler in front, adjoining the suture; posterior sclerites of notum brownish-black, the scutellum paler on anterior portion. Pleura yellow, the anepisternum and sternopleurite brownish-black, a direct continuation of the lateral portions of the praescutum, forming a conspicuous transverse girdle; pleurotergite dark brown. Halteres very long and slender, black. Legs with the coxae yellow; trochanters testaceous; femora black, the tips very narrowly snowy-white; tibiae black, the extreme bases white, the tips more broadly so, the amount subequal on all legs or somewhat narrower on the mid-tibiae, including one-eighth or less of the segment; tarsi dusky, the outer ends of basi-tarsi and the remaining tarsal segments snowy-white. Wings (Fig. 3) unusually narrowed at base into a petiole; strongly tinged with brown, the prearcular field and cells C and Sc more yellowish-brown; stigma small, darker brown; a very narrow and restricted brown seam on anterior cord; veins brownish-black. Venation: Rs unusually short, transverse, lying far distad, some distance beyond Sc₂, delimiting the proximal end of stigma; cord unusually oblique, the fork of M lying most basad; outer medial forks deep; m-cu about one-half its length before fork of M; cell 2nd A long but reduced to a narrow strip.

Abdominal tergites black, with a yellow ring at near midlength of the individual segments, this subequal to or a trifle narrower than the blackened base and apex of the segment; subterminal sclerites and terminalia more uniformly blackened; sternites more extensively light yellow, the incisures narrowly darkened. Male terminalia (Fig. 10) small and with few distinctive features, other than the dististyles. Ninth tergite, *9t*, with the caudal margin narrowly blackened. Outer dististyle, *od*, expanded at apex into an obtuse spatulate head. Inner style, *id*, shorter, more narrowed outwardly, the tip obtuse, the basal three-fourths with long, coarse setae.

Holotype, ♂, Edie Creek, New Guinea, altitude 6,550 feet, February, 1935 (F. H. Taylor).

By Skuse's table to the Australian species of *Dolichozepe* (PROC. LINN. SOC. N.S.W., (2) 5, 1890, 60), this fly runs to *Dolichozepe* (*Dolichozepe*) *annulipes* Skuse. It is somewhat more closely allied to *D. (D.) dorrigenensis* Alexander and *D. (D.) kurandensis* Alexander, of eastern Australia. The nearest ally is undoubtedly *D. (D.) tayloriana*, n. sp., as discussed under that species. The venation, with Rs lying far distad, and with the cord unusually oblique, is somewhat suggestive of that found in the genus *Scamboneura* Osten Sacken, and marks the extreme condition in this venational peculiarity so far discovered in the genus *Dolichozepe*.

MEGISTOCERA FUSCANA (Wiedemann).

Nematocera fuscana Wiedemann, *Dipt. Exot.*, 1, 1821, 29. 1 ♂, Salamaua, New Guinea, 16 December, 1933 (F. H. Taylor).

LIMONIINAE.

LIMONIINI.

LIMONIA (LIMONIA) EXPEDITA, n. sp. Text-fig. 11.

General coloration of mesonotal praescutum reddish-brown, with a dark brown median stripe; pleura reddish-brown, with a narrow blackish longitudinal stripe; halteres chiefly blackened; legs black, the femoral bases brightened; wings with a brownish tinge; stigma oval, darker brown; costal fringe (♂) long and conspicuous; cell M_2 open by the atrophy of m ; abdominal tergites black; male terminalia deeply notched medially; dististyle single, produced into a curved blackened spinous point.

♂. Length about 4.2 mm.; wing, 5 mm.

Rostrum obscure yellow; palpi black. Antennae black throughout; flagellar segments oval, with short glabrous apical pedicels. Head grey, lighter on front.

Pronotum dark brown above, paler laterally. Mesonotal praescutum high and gibbous, reddish-brown, with a dark brown median stripe, the lateral stripes paler and ill-defined; scutum reddish-brown, the centres of the lobes darkened; scutellum brown, darker posteriorly; mediotergite dark brown. Pleura reddish-brown, with a narrow blackish longitudinal stripe extending from the fore coxae to the abdomen, passing beneath the root of halteres. Halteres pale basally, the distal portion of stem and the knobs blackened. Legs with the fore coxae blackened, the remaining coxae and all trochanters reddish-yellow; femora obscure yellow basally, passing into black at near midlength; tibiae and tarsi black. Wings with a brownish tinge; stigma oval, darker brown; veins black. Costal fringe (♂) long and conspicuous, though sparse. Venation: Sc long, Sc_1 ending about opposite three-fourths the length of Rs , Sc_2 some distance from the tip of Sc_1 , the latter about one-half longer than $r-m$; free tip of Sc_2 and R_2 both pale and in transverse alignment; basal section of R_{4+5} long, exceeding one-half the length of Rs ; cell M_2 open by the atrophy of m ; $m-cu$ just before fork of M ; anal veins gently convergent at bases.

Abdomen with tergites and terminalia black; sternites obscure yellow, the incisures dusky; terminal segments more uniformly darkened. Male terminalia (Fig. 11) with the tergite, $9t$, profoundly notched medially, the lateral lobes glabrous, darkened, their tips obtuse. Basistyle, b , with the ventro-mesal lobe very low and stout. A single dististyle, d , from a swollen pale base, the distal half narrowed into a curved blackened spine, the tip acute, the surface with scattered setae and setulae, including one spinous bristle at near one-fourth the length that may be homologous with the usual spines of the rostral prolongation found throughout the genus. Gonapophyses, g , with the mesal-apical lobe very broad and flat, pale, the apex irregularly obtuse.

Holotype, ♂, Edie Creek, New Guinea, altitude 6,550 feet, February, 1935 (F. H. Taylor).

The type-specimen is in very indifferent condition, both wings being badly torn. The species is so distinct that its recognition will be simple. It is the only species of the subgenus *Limonia* so far described from the Australasian region in which cell M_2 of the wings is open by the atrophy of m , rather than by that of the basal section of vein M_3 . In the Oriental fauna, various members of the *pacata* group, such as *pacata* Alexander, *pacatella* Alexander, and others, possess this character.

LIMONIA (LIBNOTES) HOLLANDI, n. sp. Text-figs. 4, 12.

General coloration obscure yellow, conspicuously patterned with brownish-black and black; antennae black throughout; tips of femora narrowly blackened;

wings weakly tinged with brown, sparsely patterned with darker brown; Rs very strongly arcuated, perpendicular at origin or nearly so; cell 1st M_2 elongate, with m-cu at near midlength; m and basal section of M_3 subequal; anal veins convergent at bases; male terminalia with the dorsal dististyle present as an acute rod; rostral prolongation of ventral dististyle broadly flattened, produced into a slender apical point; gonapophyses with mesal-apical lobe slender, the margin with microscopic denticles.

♂.—Length about 6.5–6.7 mm.; wing, 6–6.5 mm. ♀.—Length about 7 mm.; wing, 7 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments (♂) short-oval, the first subglobular, the outermost more elongate; terminal segment a little exceeding the penultimate, pointed at tip; apices of flagellar segments glabrous but not constricted into necks; longest verticils subequal in length to the intermediate segments. Head dark grey, the occiput and posterior vertex with a velvety-black area; anterior vertex reduced to a linear strip in both sexes.

Pronotum dark brown, more or less pruinose. Mesonotal praescutum brownish-yellow, with a broken brownish-black pattern, the usual three stripes narrow, especially the median one, the laterals confluent at their anterior ends with the median vitta, isolating two linear strips of the ground-colour on posterior half of sclerite before the suture; lateral and humeral portions of praescutum similarly darkened; scutum pale medially, the lobes darker, more intensely blackened along their mesal edges; scutellum black, the parascutella a little paler; postnotum almost uniformly darkened. Pleura brownish-yellow, striped longitudinally with blackish, including a more dorsal area across propleura and anepisternum, and a scarcely separated line across the dorsal sternopleurite and ventral meron; ventral sternopleurite clearer yellow. Halteres obscure yellow at base, the outer portion dusky, the extreme tip more yellowish. Legs with the coxae pale, the fore coxae a trifle darkened; trochanters yellow; femora obscure brownish-yellow, the tips narrowly but conspicuously blackened, the amount subequal on all the legs, the dark apex preceded by a very narrow, scarcely evident, clearer yellow ring; tibiae brownish-yellow, the tips very narrowly darkened; tarsi brownish-yellow, passing into black. Wings (Fig. 4) weakly tinged with brown, restrictedly patterned with slightly darker brown; cells C and Sc more brownish-yellow; the dark areas include arculus, origin of Rs, cord, outer end of cell 1st M_2 , and the small stigma; wing-tip and longitudinal veins very narrowly and insensibly seamed with brown; veins dark, paler in costal region. Venation: Sc moderately long, Sc_1 ending opposite r-m, Sc_2 at tip; Rs short and very strongly arcuated at origin, being perpendicular or virtually so; free tip of Sc_2 and R_2 in transverse alignment; m-cu at near midlength of the long cell 1st M_2 ; m and outer deflection of M_3 subequal; anal veins slightly convergent at origin.

Abdomen bicolorous, the tergites brownish-black, the bases of the individual segments narrowly yellow; sternites obscure yellow, the dark colour vaguely shown on the outer segments; pleura variegated with darker; eighth segment (♂) obscure yellow; terminalia brownish-yellow. Male terminalia (Fig. 12) with the caudal margin of tergite, *9t*, gently emarginate, the lateral lobes low and obtuse, with strong setae. Ventromesal lobe of basistyle, *b*, simple. Dorsal dististyle, *dd*, a strong chitinized rod, the tip acute. Ventral dististyle, *vd*, deeply bilobed, the outer lobe dusky, with conspicuous setae; inner lobe consisting of the broadly flattened rostral prolongation which is extended into a long slender point, the entire prolongation pale yellow. Gonapophyses, *g*, with mesal-apical angle long

and straight, the inner edge with very acute microscopic denticles. Ovipositor with cerci very slender, the tips acute.

Holotype, ♂, Kavieng, New Ireland, 16 February, 1934 (Dr. E. A. Holland). Allotopotype, ♀, carded with type. Paratopotype, ♂.

This very distinct crane-fly is named in honour of the collector of the type series, Dr. E. A. Holland. The species is most generally similar to *Limonia* (*Libnotes*) *perkinsi* (Grimshaw), widely distributed in the Pacific Islands, differing notably in the coloration, venation, and structure of the male terminalia.

LIMONIA (LIBNOTES) OBLIQUA (Alexander), var.

Libnotes obliqua Alexander, *Rec. South Australian Mus.*, ii, 1922, 232.

1 ♂, 1 ♀, Bulolo, New Guinea, altitude 2,200 feet, 26 December, 1933 (F. H. Taylor).

The problem of specific distinction is well shown in the present pair of individuals (vide papers by the writer: *Proc. Linn. Soc. N.S.W.*, lx, 1935, 60-61; *Revue Suisse de Zoologie*, 43, 1936, 89).

LIMONIA (LIBNOTES) SOLOMONIS (Alexander).

Libnotes solomonis Alexander, *Ann. Mag. Nat. Hist.*, (9) xiii, 1924, 39.

Recorded from several Pacific Islands (Solomons, New Britain, Santa Cruz, Reef Islands). Pondo, New Britain, 28 November, 1933 (F. H. Taylor).

LIMONIA (LIBNOTES) CONSONA, n. sp. * Text-figs. 5, 13.

General coloration of thorax brownish-black, the humeral region of praescutum obscure yellow; femora black, the tips narrowly and abruptly yellow; tarsi paling to light brown; wings greyish-yellow, the ground almost concealed by an extensive brown pattern that appears as crossbands and seams to the veins; basal section of R_{4+5} about one-half R_s ; cell 1st M_2 relatively small, about one-half the length of cell 2nd M_2 ; m-cu beyond midlength of cell 1st M_2 ; male hypopygium with the ventral dististyle large and fleshy, the rostral prolongation with two very unequal spines, the inner one reduced to a seta.

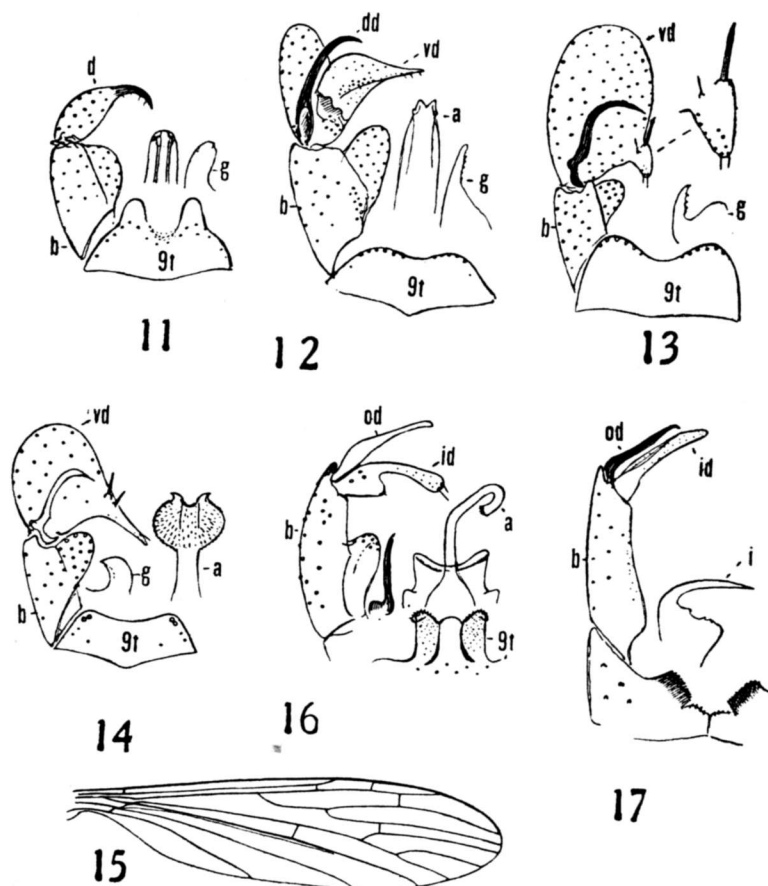
♂.—Length about 9.5 mm.; wing, 11 mm.

Rostrum dark brown; palpi brownish-black. Antennae black; flagellar segments long-oval; verticils shorter than the segments. Front dusky; posterior portions of head grey; anterior vertex reduced to a linear strip.

Pronotum brownish-black. Mesonotum brownish-black, the humeral region of praescutum obscure yellow, the remainder of the sclerite entirely occupied by a dorsal black shield; median region of scutum and scutellum obscure yellow. Pleura brownish-black, including the dorso-pleural membrane. Halteres dusky, the knobs more infuscated. Legs with the coxae dark brown; trochanters obscure testaceous yellow; femora black, the tips narrowly and abruptly yellow, the amount subequal on all legs; tibiae black; tarsi paling to light brown; claws with a long slender spine at near midlength. Wings (Fig. 5) with the ground-colour greyish-yellow, almost covered by extensive brownish clouds and cross-bands, including a broad area crossing the basal cells beyond arculus; a second band at level of origin of R_s , not involving cells C or Sc; broad areas along cord and outer end of cell 1st M_2 ; most of cells beyond cord suffused, variegated only by small diffuse areas of the ground; cells C and Sc chiefly yellow; stigma small, short-oval, darker brown; veins brown. Venation: Sc_1 ending opposite or just beyond r-m, Sc_1 a short distance from tip; free tip of Sc_2 in virtual alignment with R_2 ; basal section of R_{4+5} about one-half R_s ; cell 1st M_2 relatively small, about one-half cell

2nd M_2 ; m-cu beyond midlength of cell 1st M_2 , longer than distal section of Cu_1 ; anal veins gently divergent.

Abdominal tergites, including terminalia, brownish-black, the extreme bases of the intermediate segments pale; sternites a little brightened. Male terminalia (Fig. 13) with the tergite, *9t*, moderately notched, the setae of the lateral lobes



Text-figs. 11-17.

11. *Limonia (Limonia) expedita*, n. sp., male terminalia.
12. *Limonia (Libnotes) hollandi*, n. sp., male terminalia.
13. *Limonia (Libnotes) consona*, n. sp., male terminalia.
14. *Limonia (Thrypticomylia) spathulifera*, n. sp., male terminalia.
15. *Orimarga (Orimarga) papuicola*, n. sp., venation.
16. *Helius (Eurhamphidia) auranticolor*, n. sp., male terminalia.
17. *Helius (Eurhamphidia) melanosoma*, n. sp., male terminalia.

(Symbols: *a*, aedeagus; *b*, basistyle; *d*, dististyle; *dd*, dorsal dististyle; *g*, gonapophysis; *i*, interbase; *id*, inner dististyle; *od*, outer dististyle; *t*, tergite; *vd*, ventral dististyle.)

almost all marginal. Basistyle, *b*, much smaller than the ventral dististyle, with normal small ventromesal lobe. Ventral dististyle, *vd*, large and fleshy, its rostral prolongation stout, with two spines of very unequal size, the outer one a strong black spike, the inner spine basal in position, reduced to a mere seta. Gonapophyses, *g*, with the inner margin of the mesal-apical lobe irregularly serrulate.

Holotype, ♂, Edie Creek, New Guinea, altitude 6,550 feet, February, 1935 (F. H. Taylor).

Limonia (Libnotes) consona is a large, striking species that requires no comparison with any of the numerous regional forms so far described. By

Edwards' key to the species of *Libnotes* (*Journ. Fed. Malay St. Mus.*, 14, 1928, 74-80), the fly runs to *L. (L.) montivagans* (Alexander), of Java, an entirely different species.

LIMONIA (DICRANOMYIA) SORDIDA (Brunetti).

Dicranomyia sordida Brunetti, *Fauna Brit. India, Dipt. Nematocera*, 1912, pp. 382-383.

Widespread throughout the Oriental Region. The present material is definitely referable to *sordida* rather than to the allied *illinqworthi* (Alexander), characteristic of the Pacific Islands.

Eddie Creek, New Guinea, altitude 6,550 feet, February, 1935 (F. H. Taylor). Maini, Papua, altitude about 6,300 feet, July, 1935 (K. J. Clinton).

LIMONIA (THRYPTICOMYIA) ARACHNOPHILA (Alexander).

Dicranomyia (Thrypticomyyia) arachnophila Alexander, *Philippine Journ. Sci.*, xxxiii, 1927, 301.

Recorded from the Philippines and New Britain. Numerous specimens of both sexes, Salamaua, New Guinea, 21 August, 1935 (Norman Ferguson).

Mr. Ferguson furnished notes of unusual interest relating to the habit of these flies of resting and dancing on spiders' webs and long strands of spiders' silk. Similar habits in this same species had been discussed by the writer in an earlier paper (l.c., xxxiii, 1927, 299), but in the present instance, instead of only a few individuals being involved, Mr. Ferguson states that many hundreds of individuals were encountered.

In this material of *arachnophila*, the wing-tips are slightly infumed, but not so markedly so as in *apicalis* (Wiedemann), *fumidapicalis* (Alexander) and *spathulifera*, n. sp. The male terminalia lacks the two especially modified elongate setae at the outer lateral angle of the ninth tergite, and the conformation of the rostral prolongation and its spines is distinctive of the present fly.

LIMONIA (THRYPTICOMYIA) SPATHULIFERA, n. sp. Text-fig. 14.

General coloration dark plumbeous-grey; proximal fifth of basitarsi blackened; wings hyaline, the cells beyond cord very strongly infumed; Sc_1 ending a short distance before origin of R_s ; m-cu at near three-fifths the length of cell 1st M_2 ; abdomen black, the basal segment brown; male terminalia with the aedeagus expanded at apex into a subcircular oval spatula, the surface provided with numerous setae.

♂.—Length, 5-5.5 mm.; wing, 6-6.3 mm. ♀.—Length, 5-5.5 mm.; wing, 6-6.2 mm.

Rostrum and palpi black. Antennae relatively elongate, black; flagellar segments long-oval, with short pedicels and very long verticils. Head dark grey.

Pronotum and mesonotum almost uniformly dark plumbeous-grey. Pleura heavily grey pruinose, the sternites more testaceous. Halteres with base of stem yellow, the outer end and knob blackened. Legs with the coxae and trochanters testaceous-yellow; femora black, the bases restrictedly paler; tibiae black; tarsi snowy-white, the proximal fifth of basitarsi black, the amount of the latter subequal on all legs. Wings hyaline, the cells beyond cord very strongly infumed; stigma long-oval, even darker brown; veins black. Venation: Sc relatively long, Sc_1 ending a short distance before origin of R_s , the distance on costa about as long as the basal section of vein M_{1+2} ; free tip of Sc_2 far before R_2 , R_1 alone exceeding m-cu; m-cu at near three-fifths the length of cell 1st M_2 .

Abdomen black, only the basal tergite and sternite brown. Male terminalia (Fig. 14) with the tergite, *9t*, transverse, the caudal margin gently emarginate, each side with five setae, of which two are much stronger and placed close together. Basistyle, *b*, with ventro-mesal lobe unmodified. Ventral dististyle, *vd*, with the spines separated, the more basal from a low tubercle, the outer sessile. Aedeagus, *a*, at apex expanded into a subcircular to transversely oval spatula of thin membrane, this set with numerous setae, all of which are directed mesad and caudad.

Holotype, ♂, Admiralty Group, Lombrum, Manus Island, 19 February, 1934 (F. H. Taylor). Allotopotype, ♀, carded with type. Paratopotypes, 2 ♂, 2 ♀, on cards.

The most similar described species is *Limonia (Thrypticomylia) fumidapicalis* (Alexander), of north-eastern Australia. This has the wing-tip much less strongly darkened, *Sc* longer, with *Sc*₁ ending opposite the origin of *Rs*, and with the details of structure of the male terminalia quite distinct. The peculiarly dilated apex of the aedeagus is different from that of all other species of the subgenus so far discovered.

LIMONIA (PSEUDOGLOCHINA) PROCELLA, n. sp. Text-fig. 6.

General coloration of mesonotum dark brown, with a more brownish-yellow median line; a broad, pale yellow, longitudinal stripe across pleura, the ventral sternopleurite and meral region dark; tibiae white, with a single, relatively narrow, dark ring at near midlength; wings whitish subhyaline, the stigma conspicuous; *Sc* relatively long, *Sc*₁ ending distinctly beyond fork of *Rs*; medial fork deep; *m-cu* approximately its own length beyond fork of *M*; cell 2nd A narrow; abdominal segments bicoloured.

♂.—Length, 5.5–6.5 mm.; wing, 5.8–6.8 mm. ♀.—Length, 6–6.5 mm.; wing, 6–6.5 mm.

Rostrum and palpi brownish-black. Antennae black; flagellar segments oval, with very short, glabrous, apical pedicels; verticils about as long as the segments. Head light brown.

Pronotum pale brownish-yellow. Mesonotum brownish-yellow down the central portion, the sides darker, the praescutum a little more intensely coloured in front and laterally. Pleura chiefly pale brownish-yellow, the ventral sternopleurite and meral region brownish-black. Halteres dusky, the knobs even darker. Legs with the coxae darkened; trochanters obscure yellow, the fore pair darkened; fore femora yellow, very narrowly darkened at base, the tip a little more extensively so; middle femora dusky on basal half, outwardly paling to whitish, the tips narrowly blackened; posterior femora almost uniformly blackened, the tip a little more intense; all tibiae snowy-white, with a single, relatively narrow, darkened ring at near midlength; tarsi white. Wings (Fig. 6) whitish subhyaline, unmarked except for the oval, dark brown stigma; veins brown. Venation: *Sc* relatively long, *Sc*₁ ending some distance beyond fork of *Rs*, in cases extending to just before the level of *r-m*; *Sc*₂ opposite origin of *Rs* or nearly so; medial fork deep; *m-cu* beyond the fork of *M*, the distance variable, usually approximately equal to the length of the vein itself; distal section of *Cu*₁ a little longer than *m-cu*; cell 2nd A narrow.

Abdominal tergites bicolorous, dark brown, the caudal portions of the segments obscure yellow; lateral borders of second tergite darkened; sternites obscure yellow, the outer segments restrictedly darkened subapically; terminalia small, dusky.

Holotype, ♂, Kavieng, New Ireland, 14 February, 1934 (F. H. Taylor). Allotopotype, ♀, carded with type. Paratopotypes, 12 ♂, ♀, 10-16 February, 1934 (Taylor and Holland).

The nearest ally is *Limonia (Pseudoglochina) kobusi* (de Meijere) of Java and Sumatra, which differs in the coloration of the thorax and in the wing-venation, especially the less oblique cord, longer Sc, and slightly narrower cell 2nd A. Both species agree in having a single narrow tibial ring and with m-cu some distance beyond the fork of M.

LIMONIA (PSEUDOGLOCHINA) EVANESCENS, n. sp.

Antennae (♂) relatively long; flagellar segments with glabrous apical necks, the main body of the segments with long dark pubescence; tibiae white, with a single, nearly evanescent, dark ring at near midlength; wings with Sc₁ ending shortly before the fork of M; m-cu at or close to the fork of M; abdominal tergites bicolorous; sternites and terminalia uniformly yellow.

♂.—Length about 5.5 mm.; wing, 5 mm.

Rostrum and palpi testaceous brown. Antennae relatively elongate, much longer than in *procella*, n. sp.; flagellar segments oval to long-oval, with long conspicuous glabrous apical pedicels; surface of segments with a dense conspicuous erect pubescence that is only a little shorter than the verticils; in *procella*, the pubescence of the flagellar segments is short and relatively inconspicuous. Head dark.

Pattern of mesonotum not readily discernible in unique type because of method of mounting, but apparently much as in *procella*. Pleura chiefly pale, dark brown on the ventral sternopleurite. Halteres dusky, the knobs darker. Legs with the fore femora white, narrowly dark brown at both ends; mid-femora dusky on basal half, the outer half paling to white, the tips narrowly darkened; posterior femora infumed, the central area somewhat more brightened; tibiae white, with a very narrow, scarcely indicated, pale brown ring at near midlength, this being so faint as to be virtually evanescent; tarsi white. Wings subhyaline, unmarked except for the small, oval, dark brown stigma; veins brown. Venation: Sc relatively short, Sc₁ ending just before the level of the fork of M; medial fork of moderate depth; m-cu at or very close to fork of M, shorter than the distal section of vein Cu₁; cell 2nd A relatively narrow but long.

Abdominal tergites dark brown, the caudal borders narrowly brownish-yellow; sternites and terminalia uniformly yellow.

Holotype, ♂, Admiralty Group, Lombrum, Manus Island, 19 February, 1934 (F. H. Taylor).

The nearest regional ally is the type of the subgenus, *Limonia (Pseudoglochina) pulchripes* (Alexander) of northern Queensland, distinguished by the leg-pattern and details of venation. In the present fly, the dark tibial ring is so pale and narrow as to be nearly lacking.

ORIMARGA (ORIMARGA) PAPUICOLA, n. sp. Text-fig. 15.

General coloration light grey, the praescutum and scutum scarcely variegated by darker grey; knobs of halteres moderately infuscated; wings subhyaline, unmarked; macrotrichia of outer radial and medial veins abundant; free tip of Sc₂ far before R₂; Rs and R₂₊₃ subequal; R₁₊₂ about twice R₂ alone; abdomen brownish-black.

♀.—Length about 7 mm.; wing, 5.8 mm.

Rostrum grey; palpi brownish-black. Antennae black, the scape pruinose; flagellar segments oval, gradually decreasing in length outwardly. Head grey.

Pronotum and mesonotum uniformly light grey, the praescutum and scutum scarcely variegated by darker grey. Pleura dark grey. Halteres white, the knobs moderately infuscated. Legs with the coxae dark, heavily pruinose; trochanters pale brown; remainder of legs broken. Wings (Fig. 15) subhyaline, unmarked; veins pale. Macrotrichia of veins relatively abundant, including complete series on outer radial and medial veins, with about 25 on R_3 ; 30 on distal section of R_{4+5} ; 40 on distal section of M_{1+2} ; and 35 on distal section of M_3 ; no trichia on Rs, main stems of M or Cu, or either anal vein. Venation: Free tip of Sc_2 far before R_2 , the distance approximately one-half longer than the latter vein; Rs and R_{2+3} subequal; R_{1+2} about twice R_2 alone; M_{3+4} a little shorter than M_1 ; m-cu about opposite two-thirds to three-fourths the length of Rs; cell 2nd A relatively long and wide.

Abdomen brownish-black, including the bases of the ovipositor; cerci dark brown.

Holotype, ♀, Edie Creek, New Guinea, altitude 6,550 feet, February, 1935 (F. H. Taylor).

The only described regional species of *Orimarga* with which this fly may be profitably compared is *Orimarga (Orimarga) hypopygialis* Alexander (Celebes). The latter differs in coloration and, especially, in the details of venation, including the strongly angulated Rs, loss of the free tip of Sc_2 , longer R_{1+2} , deeper cell M_3 and position of m-cu.

HELIUS (HELIUS) ANAEMICUS Alexander.

Helius (Helius) anaemicus Alexander, *Philippine Journ. Sci.*, xlix, 1932, 254-255.

Hitherto known from the Loochoo Islands, Formosa, Luzon and Mindanao, in all cases at low altitudes. Two male specimens, Kavieng, New Ireland, 16 February, 1934 (Dr. E. A. Holland). A wing of one of the specimens shows abnormal venation. By existing keys, the fly runs to *Helius (Helius) unicolor* (Brunetti), a very different species.

HELIUS (EURHAMPHIDIA) AURANTICOLOR, n. sp. Text-fig. 16.

General coloration light orange, the terminal abdominal segments black; head grey; halteres pale throughout; legs obscure yellow, the outer ends of the tibiae and tarsi paling to white; wings tinged with yellow, the veins very pale; a conspicuous pale brown cloud extends from the stigma along the anterior cord to the fork of M; male terminalia with the dististyles apical in position.

♂.—Length about 4 mm.; wing, 4.6 mm.

Rostrum about equal in length to remainder of head, brown; palpi darker brown. Antennae short, pale brown throughout; flagellar segments long-oval; verticils much exceeding the segments. Head light grey; anterior vertex about as wide as the rostrum.

Pronotum and mesonotum entirely light orange, unmarked. Halteres pale throughout. Legs with the coxae and trochanters pale orange-yellow; femora obscure yellow; tibiae a trifle darker, especially the posterior legs, the outer ends and tarsi paling to white; genua not brightened. Wings with a yellowish tinge, variegated only by an oblique, pale brown cloud extending from the stigma along the anterior cord to the fork of M; veins very pale yellow, a trifle darker in the clouded area. A few macrotrichia on outer ends of veins R_{4+5} , M_{1+2} and M_3 . Venation: r-m a little less than its own length before the fork of Rs; cell 1st M_2 large, its inner end lying proximad of other elements of cord; m shortened; m-cu about its own length beyond fork of M.

Abdomen obscure yellow, the seventh to ninth segments, inclusive, black; more basal tergites vaguely darkened medially on basal ring. Male terminalia (Fig. 16) with the basistyle, *b*, slender, terminating in a small glabrous blackened point; dististyles apical in position; outer style, *od*, extended into a long point; inner style, *id*, with a conspicuous incision at near midlength, delimiting a conspicuous basal lobe.

Holotype, ♂, Edie Creek, New Guinea, altitude 6,550 feet, February, 1935 (F. H. Taylor).

Helius (Eurhamphidia) auranticolor is very different from the other described species of the subgenus in the light orange colour of the thorax, in conjunction with the patterned wings.

HELIUS (EURHAMPHIDIA) MELANOSOMA, n. sp. Text-fig. 17.

General coloration polished black; mesonotal praescutum strongly arched; knobs of halteres darkened; legs dirty white, the tarsi clearer; snowy-white; wings strongly tinged with grey, the stigma dark brown, conspicuous; abdomen bicoloured, black, the posterior borders of the intermediate segments broadly pale.

♂.—Length, 4.8–5 mm.; wing, 5–5.2 mm.

Rostrum longer than remainder of head, black; palpi black. Antennae black throughout, about one-half longer than the rostrum. Head black, sparsely pruinose.

Pronotum and mesonotum polished black, the praescutum very strongly arched. Pleura polished black, the dorso-pleural membrane pale. Halteres white, the knobs infuscated. Legs with the fore coxae blackened, mid-coxae infuscated, posterior coxae yellow; trochanters obscure yellow; remainder of legs chiefly dirty white, the femora and tibiae somewhat more obscure than the snowy-white tarsi; terminal tarsal segments darkened; genua vaguely brighter than the adjoining parts of the femora and tibiae. Wings rather strongly tinged with grey, cells C and Sc weakly infumed; prearcular region whitish; stigma oval, darker brown, conspicuous; veins brown. Costal fringe relatively long and conspicuous. Venation: Sc₁ ending just before level of r-m, Sc₂ at its tip; r-m variable, from about its own length to nearly twice this distance before the fork of Rs; m-cu beyond midlength of cell 1st M₂.

Abdomen conspicuously bicoloured, black, the caudal borders of segments two to six, inclusive, broadly pale; subterminal segments and terminalia black. Male terminalia (Fig. 17) with the sternite bearing blackened cushions on either side of midline, these densely set with microscopic setulae. Basistyle, *b*, slender. Outer dististyle, *od*, terminating in a simple, gently curved point; inner style, *id*, longer. Interbasal plates, *i*, produced into long straight spines.

Holotype, ♂, Edie Creek, New Guinea, altitude 6,550 feet, February, 1935 (F. H. Taylor). Paratopotype, ♂.

Helius (Eurhamphidia) melanosoma is readily distinguished from all other described regional allies by the polished black colour of the body and by the wing-pattern.
