

SPECIAL PUBLICATIONS
OF THE
JAPAN
HYMENOPTERISTS ASSOCIATION

NO. 25



M I S H I M A

APRIL 15, 1983

LARRINAE OF NEW GUINEA
IN THE COLLECTION OF
THE HUNGARIAN NATIONAL MUSEUM OF NATURAL HISTORY
BUDAPEST
(HYMENOPTERA, SPHECIDAE)

By K. TSUNEKI

All but a few of the material is collected by Biró during 1896-1901 in the eastern coastal areas of Papua New Guinea and includes 20 species, namely 1 species of the genus Larra, 13 species of Liris s.l., 3 species of Dicranorhina, 1 species of Tachytes, 1 species of Tachysphex and 1 species of Lyroda, of which 9 species of Liris, 3 species of Dicranorhina, 1 species of Tachytes and 1 subspecies of Larra are new to science. It seems noteworthy that as far as examined through the literature there are only a few species among the material that are common to Australia or to the Bismarck and the Solomon Archipelagoes.

The specimens were kindly sent for study by Dr. J. Papp, Budapest, to whom I express my cordial thanks. I am also much indebted to Prof. M. Yamada, Sapporo, and to Dr. A. S. Menke, Washington, in regard to the literature and thank them heartily for their kind help.

Descriptions and records

1. Larra (Cratolarra) polita papuana ssp. nov.

Larra polita: Tsuneki, SPJHA, 19: 5, 1982 (5 ♀ 9 ♂, Bismarck Arch.).

In the Papuan population of Larra (Cratolarra) polita (Smith, 1858) the colour of the legs is intermediate between the nominate race and race, rufipes:

In ♀ fore tibia in front and mid and hind femora red, and fore femur, mid and hind tibiae, rest of fore tibia and all tarsi dark brown; in ♂ all femora and tibiae red, all tarsi dark brown.

In polita polita mid and hind femora and tibiae alone ferruginous, while in p. rufipes all legs except coxae ferruginous red.

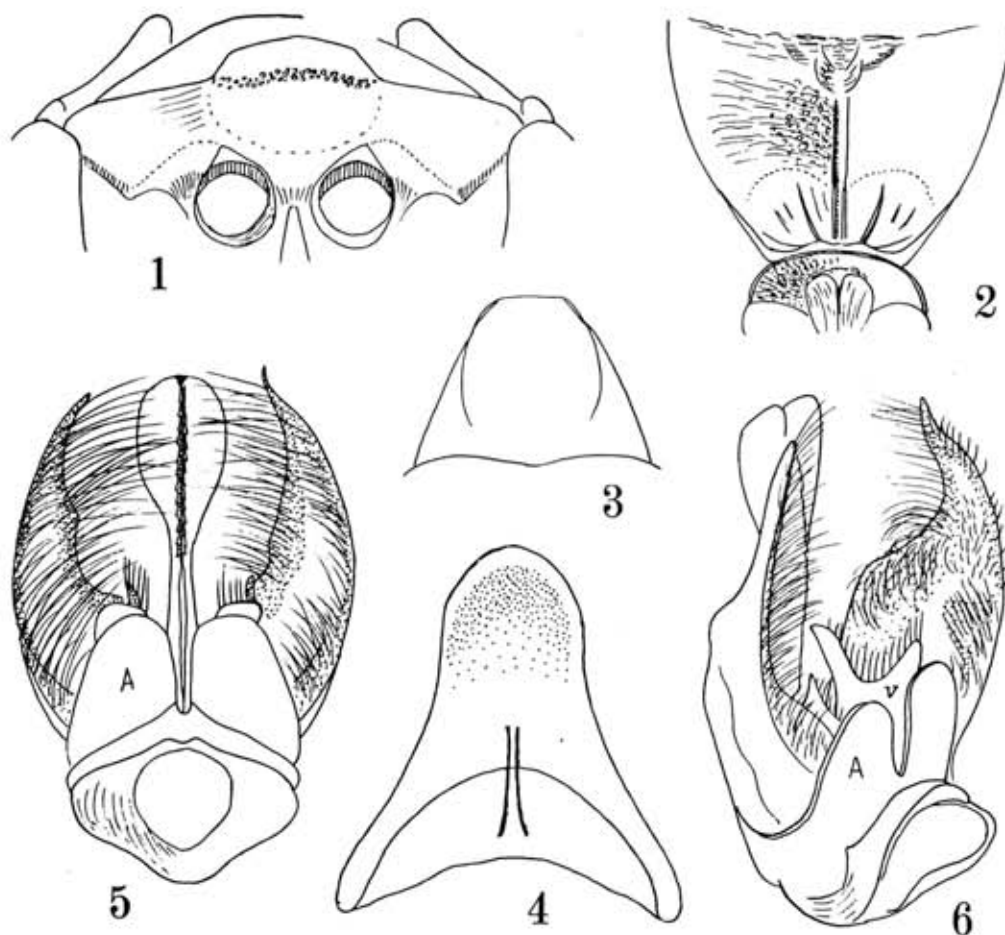
Furthermore, the New Guinean specimens are remarkable in the colour of clypeus and antenna and in the small body size in the male (5.5-9.0 mm, mostly 6-7 mm). As the detailed description of the male of this species is scarce, it is attempted here with this remarkable subspecies.

♂. 5.5-9.0 mm. Black, mandible ferruginous, at apex, outer-ventral margin and rounded apex of baso-ventral tooth dark brown; tegula, basal plate of wing, all femora and tibiae ferruginous; median lobe of clypeus apically, A1 beneath, A2 at apex, humeral tubercle at marginal area and veins of wings brown or pale brown; mid and hind tibial spurs (at base ferruginous), all tarsi and antennae dark brown; wings fairly strongly darkened. Hair silvery, on dorsal part of body not long, not rich, pile bands on gaster at comparatively broad shallow depressions of GT 1-4 not marked, in oblique light only defined, hair on pygidial area not thick, appressed, somewhat brownish.

Measurements (within parentheses ♀): HW, HL, IODv, A3=100, 46, 20, 12 (100, 54, 26, 18). IODv:IODc=10:24 (10:27). AOB, WAS, IAD=8.5, 5, 3 (6, 5, 4). A3, 4, 5=10, 8, 8 (10, 9, 9.5). When A2 is measured from basal constriction A2+3=IODv. Abscissae 1, 2, 3, 4, 5 when Abs. 5=5, =8, 5, 7, 12, 5 and Abs. 1, 2, 3 of cubitus of cubital cell 2 under same scale =6, 4, 12.

Head seen from above with post-ocular area till occipital margin very short, post-ocellar depression deep, bicurved and shining, transverse bottom line crossing inner orbital elevation and reaching inner orbits, from mid point of the furrow a branch furrow runs posteriorly, also bluntly crossing post-vertical elevation. Clypeus: Fig. 1, disc medianly bluntly carinate. Occipital marginal carina low, but reaching buccal carina. Median top of pronotal collar raised to near level of mesoscutum, scutellum and postscutellum medianly impressed. Propodeum long, subcylindric, slightly narrowed posteriorly, longer than wide at base, dorsum broadly flat, median carina distinct, reaching posterior margin, in lateral view relative length of dorsal and posterior aspects about 3:2, forming an angle of about 100°, angled area slightly pro-

duced, posterior aspect (Fig. 2) subtruncate, surface flat, with short lateral carinae and fine medial furrow, GT7: Fig. 3, surface flattened, but only at apical area shortly edged and carinated; GS8: Fig. 4, genitalia in ventral view: Fig. 5, ventrolateral view: Fig. 6, characteristic is that basiparamere at basal ventral end raised into an oval flat plate (A in the figure) in front of volsella (v), paramere densely covered with long curved hair on ventral surface, but baso-medial area glabrous, volsella flat V-shaped plate, located on each side of penis valve, with dorsal margin fringed with hair.



Figs. 1-6. *Larra polita papuana* ssp. nov., ♂

Punctuation and sculpture as in the nominate race.

Holotype: ♂, New Guinea, Berlinhafen, Seleo, 1896, Biró (Coll. Mus. Nat. Hung.)

Paratypes: 1 ♀, Mt. Hanseemann, Astrolabe B., 1901, Biró; 11 ♂, Seleo, 1896; 1 ♂, Satterberg, Huon Golf, 1899; 1 ♂, Friedrich-Wilhelmhafen, 1896, Biró (Coll. Mus. Nat. Hung.).

2. *Liris (Liris) aurulentus* (Fabricius, 1787)

Larrada aurulenta: Smith, J. Proc. Linn. Soc. London, Zool., 5, 1860 (Bachian).

Larrada aurulenta: Smith, Ibid., 7: 34, 1864 (Bouru, with other distribution).

Larrada aurulenta: Smith, J. Proc. Linn. Soc. London, Zool., 4: 16, 1838 (Celebes).

Liris aurata: Yasumatsu, Mushi, 9: 129, 1937 (Saipan, Marianas).

Liris aurata: Yasumatsu, Ibid., 14: 45, 1941 (Marianas).

Liris opulenta: Krombein, Proc. Haw. Ent. Soc., 13(3): 397, 1949 (Marshall, Mariana and Caroline Is.).

Liris (Liris) aurulenta: Bohart & Menke, World Sphecid., p. 244, 1976.

Liris (Liris) aurulentus: Menke & Bohart, Proc. Ent. Soc. Wash., 81(1): 117, 1979.

Liris (Liris) aurulentus: Tsuneki, SPJHA, 19: 10, 1982 (keyed).

Specimen examined: 1 ♀, Friedrich-Wilhelm-Hafen, 1896, Biró.

3. Liris (Liris) mindanaoensis Williams, 1928

Liris mindanaoensis Williams, Bull. Exp. Sta. H.S.P.A., Ent. Ser., 19: 83, 1928 (Philippines).

Liris mindanaoensis: Williams, Ann. Mag. Nat. Hist., (10) 18: 126, 1936 (4 ♀, Solomon Is.).

Liris (Liris) mindanaoensis: Tsuneki, SPJHA, 19: 10, 12, 1982 (keyed).

Liris (Liris) mindanaoensis: Tsuneki, Ibid., 24: 110, 1983 (redescr., figs.).

Specimen examined: 1 ♀, Simbang, Huon Golf, 1899, Biró.

4. Liris (Liris) papuanus sp. nov.

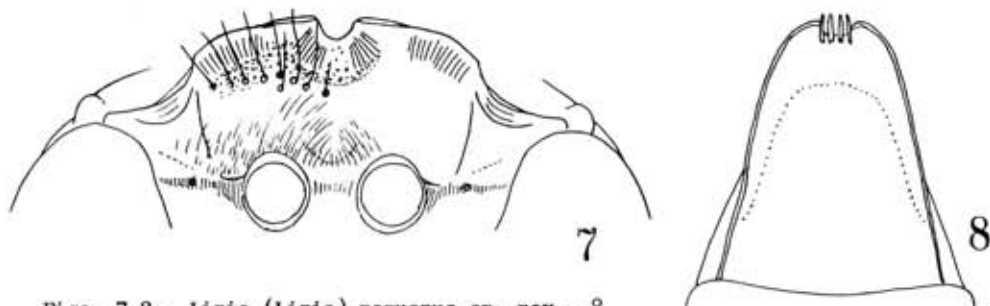
The present species (♀) is most closely allied to Liris (Liris) solomonis Tsuneki, 1983, but somewhat larger, with IODv (as against HW) relatively smaller, A3 (as against IODv) relatively longer and pygidial hair different in colour. It may be a local race of solomonis, but until the comparative study of the male is done it is provisionally dealt with as distinct.

♀. Length 18.0 mm (paratypes 17.5 and 16.0 mm). Black (mandibles completely black), tegula on posterior half, basal plate of wing on anterior part, palpi largely and tarsal claws ferruginous, in some light tarsal spines also pale brownish; wings moderately clouded with pale brownish yellow throughout, costa, subcosta, stigma dark brown, other veins yellowish brown. Hair on lower frons, clypeus, temple, side and dorsal margin of pronotum, epimeral area, side posteriorly of propodeum and fore coxa and femur beneath silvery, appressed, always mixed with longer soft erect hair which is on vertex about half the length of A3, but pile bands on GT 1-3 without longer hair mixed and velvety silvery, while the U-shaped pile band on mesoscutum distinctly brassy and short velvety pile on GT 4-5 castaneous brown, pile on tarsi beneath ferruginous brown, hair fringe of hind T1 beneath and of longer hind tibial spur bright coppery golden (see remarks); hair on pygidial area characteristic, seen in every direction the hair of marginal areas shining coppery golden, while on broad basal and central areas dark brown, with a soft touch of velvety appearance (this is partly due to that pygidium is, except narrow flat marginal areas gently roundly elevated, not flattened as usual), in lateral view mixed sparsely with obliquely erected, somewhat reflected bristles which are pale yellowish brown.

Measurements: HW, HL, IODv, A3=100, 43, 18, 20. HW, HL, IODc (frontal view)=100, 82, 51. IODv: A3=10:11.5. IODv: IODc=10:29. CML: CLL=20:9. AOD, WAS, IAD=7, 5, 3. A2, 3, 4, 5, 10, 11, 12=5, 10, 9.5, 9.5, 6, 5, 5.5. A3=AW×3, A8=AW×1.8. In paratypes HW: IODv=100:17 and 100:16 and IODv: A3=10:11 and 10:12. Abscissae 1, 2, 3, 4, 5 of radial vein (when abs. 5 is 3) = 10, 5, 6, 16, 3; abs. 1, 2, 3 of cubital vein of cubital cell 2 (under the same scale) = 4, 1.5, 14. Relative length between abs. 2 and 3 of radius considerably variable, but between others general length relations are fairly constant in 3 specimens observed.

Head seen from above with postocular area till occipital carina very narrow, slightly less than half as long as A3, the area beginning to incline almost directly from posterior margin of eyes; clypeus: Fig. 7, medio-apical depression larger than in mindanaoensis and semicircular incision also slightly larger (rather similar as a whole to that of ubatama Tsuneki, 1982, known from the New Ireland), apical margin with inner half on both sides of medial incision distinctly carinated, outer non-carinated areas longitudinally, somewhat divergently, closely striate, while the depressed area around the incision convergently striate, setiferous gross punctures sparse,

distinctly separated from each other, mandibular structure, with its lower fringe of curved bristles as in *aurulentus*; occipital carina very low, but distinctly reaching buccal carina. Pronotal collar triangularly raised, with top shortly truncate, dorsal margin acutely edged and carinated and adorned with short silvery pile, mesoscutum medio-anteriorly broadly furrowed, on both sides margined with blunt ridge-shaped notauli; on mesopleuron scrobal and episternal furrows fine, deep and smooth, the former not reaching metapleuron. Propodeal dorsum without lateral carinae, median carina



Figs. 7-8. *Liris (Liris) papuanus* sp. nov., ♀

very weak, in holotype hardly reaching middle, but in paratypes reaching completely or close to posterior margin, median furrow either indistinct or shallow and posteriorly roundly enlarged, posterior aspect medianly broadly flat or slightly concave, medial furrow narrow and deep, arising from about a third from top, reaching apex; pygidial area with ratio of length to basal width appr. 6:5, lateral margins roundly incurved at apical area, with apex fairly deeply, roundly incised and provided with 4 short spines (Fig. 8); baso-median carina or ridge on GS 2 distinct, but before reaching a third from base divergently enlarged and disappeared. Tibial and tarsal spines as in *aurulentus*, hind tibial longitudinal carina also similar.

Frons, vertex, mesoscutum and scutellum very finely and closely punctured (under 50× magn.), while mesopleuron very delicately microcoriaceous; propodeal dorsum transversely, somewhat obliquely, finely, closely but weakly striate, on lateral areas striae stronger and sparse (from near spiracle till apex of short lateral carina of posterior aspect about 17-20 in number) and at postero-lateral areas of dorsum and at dorso-lateral areas of posterior aspect longer where 2 or 3 of them reaching almost middle of the verge, posterior aspect transversely, somewhat strongly and sparsely striate. Punctures on ventral side of gaster generally similar to those of *aurulentus*, but in the present species GS 2-3 more broadly covered with velvety pile and the punctures slightly larger than in this species.

♂, unknown.

Holotype: ♀, Erima, Astrolabe B., 1896, Biró (Coll. Mus. Nat. Hung.).

Paratypes: 1 ♀, Tamara, 10.IX.1896, Biró (left antenna from A4 apically lacking); 1 ♀, Simbang, Huon Golf, 1898, Biró (Coll. Mus. Nat. Hung.).

Remarks. Cameron in his description of *ornatitarsis* particularly mentions that the underside of the basal joint of the hind tarsi densely covered with bright reddish golden pile, as if it were the specific character. In reality, however, such a pile is present almost all the species of the genus.

5. *Liris (Liris) aurarius* sp. nov.

? *Liris melania*: Williams, Ann. Mag. Nat. Hist., (10) 18: 126, 1936 (Solomon race ♂, fig. clypeus).

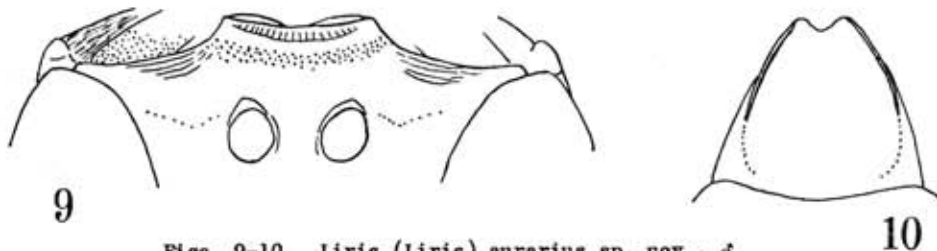
The present specimen agrees fairly well with the simple description and the figure of Williams above cited, as far as it goes. But it is too simple to identify the specimen with confidence. Moreover, the original description of *Liris melania* Turner is made with the female and as to the sex combination by Williams it is not always without doubt. I, therefore, deal with the present specimen as new.

♂. Length 15.5 mm. Black, mandible shining black, with a small dark red patch

before apex, tegula on posterior half except inner area translucent ferruginous, base of fore femur beneath narrowly red, wings brownish yellow, but not strongly dark. Hair on head, thorax-complex and legs till femora dense, appressed and golden, everywhere mixed sparsely with longer erect hair, pile bands on GT 1-3 silvery, with a faint tint of brassy, hair on GT 6 and 7 (epipygium) sparrow brown, with a coppery shine in certain light, mixed with a few short half erected setae.

HW:HL, IODv, A3=100,44,20,18. HW:HL in frontal view =100:72, inner orbits almost straightly divergent below till IODc. IODv, IODc, A3=10,27,9. CML:CLL=20:18. AOD, WAS, IAD=7,5,3. A2,3,4,5,11,12,13=5,10,9,9,7,6,7. A3=AW×3.3 (!), A10=AW×3.5 (!). Rhinaria on A5-11, elongate elliptic in form, comparatively large, on A7 largest. Basal space-length of rhinaria-apical space relatively about: on A5 3-2-1, on A6 1-6-4, on A7 1-4-2, on A8 1-4-3, on A9 1-3-2, on A10 1-3-2.5, on A11 3-2-7. Abscissae 1,2,3,4,5 of radius (when Abs. 5 is 5) =14,8,9,25,5, Abs. 1,2,3 of cubitus of cubital cell 2 (under same scale) =6,4,18.

Clypeus: Fig. 9, apical margin of median lobe gently emarginate and fringed with a narrow lamella which is shortly interrupted in middle, marginal area lunately inclined anteriorly. Head seen from above with post-ocular area narrow, inclined almost directly from posterior margin of eyes, the space till occipital carina about half the length of A3, the carina not high, but reaching below till buccal cavity. Dorsal margin of pronotal collar seen in front triangularly raised, with oblique sides slightly



Figs. 9-10. Liris (Liris) aurarius sp. nov., ♂

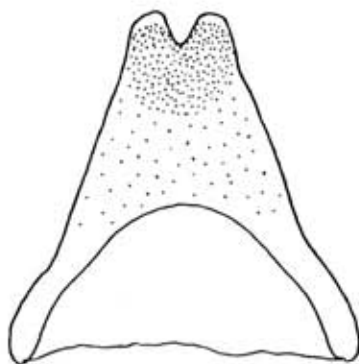
downcurved and with top shortly truncate, not reaching level of mesoscutum, seen from above bearing a slight thickness and densely covered with golden pubescence; mesoscutum medianly comparatively deeply furrowed, the furrow with moderate width, reaching apex, lateral areas also depressed and intervallic areas roundly raised, scutellum roundly, comparatively highly elevated and medianly distinctly depressed, on mesopleuron scrobal and episternal furrows fine and deep, the former reaching metapleuron and anterior margin of the latter acutely edged and carinated. Propodeum (densely covered with golden pubescence and judging from the hairless areas) shallowly furrowed in middle, the furrow enlarged posteriorly, without medial and lateral carinae, but at medio-posterior area distinctly raised, posterior aspect with short lateral carinae at apex. GT 7 with flattened pygidial area, comparatively long margined with carinae on both sides from apex (Fig. 10). GS 2 at base without medial ridge, but medio-basal area depressed and markedly inclined forwards. GS 8: Fig. 11. Genitalia in ventral view: Fig. 12, in oblique lateral view: Fig. 13, in dorsal view: Fig. 14, hair of paramere arisen from two places, one on baso-outer ventral narrow area and one on median ridge of ventral surface (Figs. 12 and 13), the former fine, soft and dense and moderate in length, while the latter long, somewhat thick (but not setaceous), both golden in colour; basiparamere on ventral side provided with an oval and hollowed lamella, pointed on top (L in the figures), volsella twisted, basal part with a swelling that carries a sparse tuft of erect hair, apical part enlarged into a subtriangular flat plate, penis valve with apical area on ventral side raised towards inner margin and strongly serrate there.

Punctuation not visible due to dense vestiture, but on hairless sides of propodeum at antero-ventral areas obliquely striate.

♀. Unknown.

Holotype: ♂, Huon Golf, Satterberg, 1899, Biró (Coll. Mus. Nat. Hung.).

Remarks. The genitalia of the present species closely resembles those of L. (Liris) aurulentus (Fabricius), but differing therefrom mainly in that the basiparameral lamella is much shorter. Externally it differs from this species markedly in the structure of the clypeus and is easily separable from it.



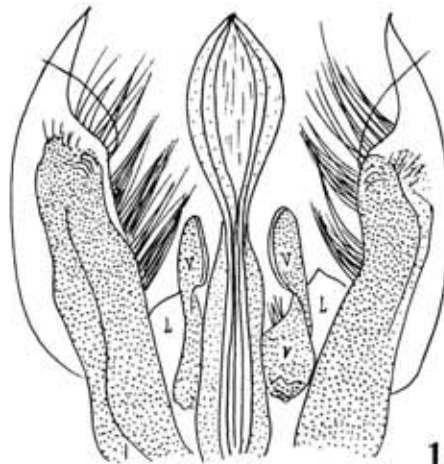
11



12



13



14

Figs. 11-14. Liris (Liris) aurarius sp. nov.

6. Liris (Leptolarra) subtessellatus (Smith, 1856) sens. nov.

Larrada subtessellatus Smith, Cat. Hym. Brit. Mus., IV: 277, 1856 (♀, India, Sumatra, Java).

As mentioned in detail in the preceding paper Liris (Leptolarra) subtessellatus: Auct. is a complex of two different species having similar appearance and with the hind femora red. In reality, however, subtessellatus is one of them and, moreover, includes also a form that has the hind femora black. In the following to make the matter clear the references in which the species treated is/are distinct or presumable will be listed. The reference marked with * shows that it is surely subtessellatus (sens. nov.) (within parenthesis is given the name of the forma), that marked with ? means that it is possibly subtessellatus, while that topped with # means that it

includes two different species, namely, real subtessellatus and difficilis, and that marked with x indicates that it is not subtessellatus, but is difficilis.

- * Larrada exilipes Smith, Cat. Hym. Brit. Mus., IV: 278, 1856 (red-form, ♂, northern India)
- * Larrada docilis Smith, Trans. Ent. Soc. London, 2: 192, 1873 (black-form or forma docilis, ♀, probably ♂ in reality, but not his ♂, Japan).
- * Larrada tisiphone Smith, 1873; * Larra tisiphonoides Dalla Torre, 1897 (black-form, Japan).
- ? Notogonia insularis Cameron, Bijdr. Dierk., 19: 81, 1913 (red-form, ♂, Is. Waigeo).
- * Notogonia laboriosa: Matsumura et Uchida (nec Smith), Ins. Mats., 1(1): 43, 1926 (♀ black-form, Ryukyus).
- # Notogonidea subtessellata: Williams, Bull. Exp. Sta. H.S.P.A., Ent. Ser., 19: 76, 1928 (red- and black-forms, ♀ ♂, Philippines) (partim).
- ? Notogonidea subtessellata: Williams, Ann. Mag. Nat. Hist., (10) 18: 124, 1936 (all black-form, ♀ ♂, Solomons).
- ? Notogonidea subtessellata: Williams, Occ. Pap. Bishop Mus., 18(2): 333, 1947 (? in forma, ♀ ♂, Fijis).
- x Liris (Dociliris) subtessellata: Tsuneki, Etizenia, 20: 32, 1967 (red-form, ♀ ♂, Formosa)
- * Liris (Dociliris) docilis: Tsuneki, Ibid., p. 33, 1967 (black-form, ♀ ♂, Formosa).
- # Liris (Dociliris) subtessellata: Tsuneki, Steenstrupia, 4: 59, 1976 (red-form, ♀ ♂, Philippines) (partim).
- ? Liris (Leptolarra) subtessellata: Tsuneki, SIJHA, 19: 22, 1982 (♂, red-form, New Ireland).
- * Liris (Leptolarra) docilis: Tsuneki, Ibid., p. 22, 1982 (black-form, ♂, Bismarck Arch.).
- x Liris (Leptolarra) subtessellatus: Tsuneki, Ibid., 24: 18, 1983 (red- and black-forms, Philippines)
- * Liris (Leptolarra) docilis: Tsuneki, Ibid., p. 18, 1983 (red- and black forms, Philippines).

Specimens examined: 3 ♀ 9 ♂:

1 ♀, Mt. Hanseemann, Astrolabe B., 1901, Biró; 1 ♀, Friedrich-Wilcher-Hafen, 1891, Frühstorfer; 1 ♀, Erima, Astrolabe B., 1899, Biró; 8 ♂, Seleo, Berlinhafen, 1896, Biró; 1 ♂, Simbang, Muon Golf., 1900, Biró.

Except one male in which all the legs are black, all others have the hind femora bright red, only in one male outer side is dark red.

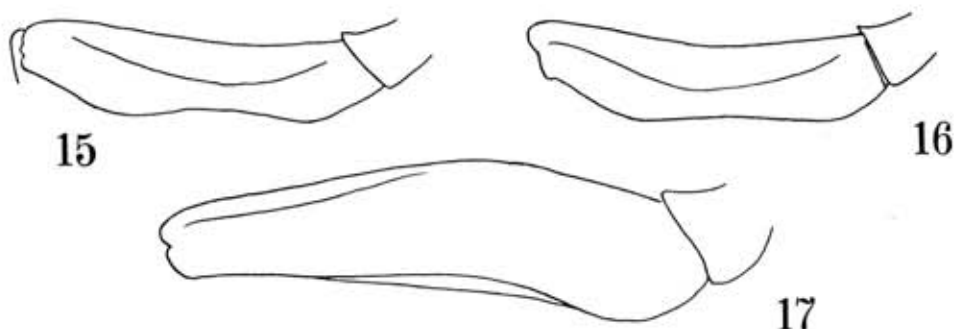
Table 1. Characters of the New Guinean specimens of Liris subtessellatus (Smith, 1856) sens. nov.

No.	Sex	Loco.	Length	F.femur	HW,IODv,A3	CML:CLL	Cly.Inc.	H.femur	Rh-Pl
1	♀	Mt.H.	12.5	---	100,18,17	20:6	weak	red	A7-11
2	♀	Fried.	11.0	---	100,16,18	20:7	deep	red	A7-11
3	♀	Erima	11.0	---	100,17,17	20:7	deep	red	A7-11
4	♂	Simb.	8.0	g.emar.	100,21,12	20:17	feeble	red	A4-13
5	♂	Seleo	8.5	g.emar.	100,20,14	20:16	weak	red	A4-13
* 6	♂	Seleo	8.0	n.str.	100,21,12	20:17	weak	d.red	A4-13
* 7	♂	Seleo	7.5	n.str.	100,21,12	20:17	weak	red	A4-13
8	♂	Seleo	7.0	g.emar.	100,21,12	20:18	weak	red	A4-13
9	♂	Seleo	6.0	g.emar.	100,22,12	20:18	weak	red	A4-13
*10	♂	Seleo	6.0	g.emar.	100,22,12	20:19	feeble	red	A4-13
*11	♂	Seleo	5.5	g.emar.	100,22,12	20:18	feeble	red	A4-13
*12	♂	Seleo	7.5	g.emar.	100,21,12	20:17	not	black	A4-13

Remarks. F.femur = Fore femur. Cly.Inc. = Clypeal median incision. H.femur = Hind femur. Rh-Pl = Rhinaria in ♀ or Placoids in ♂. g.emar. = gently emarginate beneath (Fig. 15). n.str. = nearly straight beneath (Fig. 16). d.red = dark red. No. with asterisk shows that in which the genitalia are examined.

The main characters of the specimens are given in Table 1. Some supplements:
 ♀. Clypeal bevel is in Nos. 1 and 2 smooth and polished, with very fine points sparsely scattered, while in No. 3, besides the sparse points, an incomplete line of sparse minute punctures across middle is present. In all the specimens the medial line of the disc is only bluntly raised and not carinated. $A3,4,5=10,10,10$ in all and $A3=AW \times 2.3-2.5$.

♂. Fore femur is in posterior view in most specimens gently roundly emarginate beneath as given in Fig. 15, but in Nos. 6 and 7 excavation very weak (Fig. 16), nearly straight and rather close to some instance of *difficilis* of the Philippines. In order to confirm the species, therefore, the genitalia of the two specimens were examined together with those of 3 others. All were distinctly the hitherto called *docilis*-type, bearing the robust apical part of the paramere. Hind femur of the male in both the red and black forms is gently roundly excavated beneath and roundly produced near base as given in Fig. 17. $A3,4,5=10,10,11$ or $10,10,10$. $A3=AW \times 1.7-1.8$. Placoids as in Table 1, but on $A13$ always not reaching apex, bearing the round end.



Figs. 15-17. Fore and hind femora of *Liris subtessellatus* of New Guinea

In the propodeal sculpture (♀ ♂) no particular local distinction could be observed, as usual more or less varied within the specific category, but as to the punctures on the mesoscutum in the male they appear somewhat larger in general than in the northern populations.

In SPJHA, No. 19 I separated *docilis* ♂ and *subtessellatus* ♂, both occurring in the Bismarck Archipelago, based upon the knowledge of these species on the Formosan representatives. As to *docilis* the fore femur was surely examined and there is no doubt that it is *subtessellatus* sens. nov., black form, but as to the latter no particular attention was paid, but it seems highly probable that it is the red form of *subtessellatus* sens. nov. (= previous *docilis*). Similarly I presume that the Williams' specimens from the Solomons and the Fijis of *subtessellatus* are also this species, because I do not know the specimen of sure *difficilis* occurring in the southern regions.

For comparison, some of the characters of *Liris difficilis* from the Philippines are presented in Table 2.

Table 2. Characters of the Philippine male specimens of *Liris difficilis* Tsuneki

Forma	HW,HL,IODv,A3	IODv,IODc,CML,A3	CML:CLL	A2, 3, 4, 5,11,12,13	Placoid
Black	100,46, 18,14	10, 26, 14, 8	20:12	7,10,11,12,10, 9,11	A4-13
Black	100,46, 19,14	10, 26, 14, 7	20:13	7,10,11,12, 9, 9,11	A4-13
Red	100,46, 19,14	10, 25, 13, 7	20:14	8,10,11,12,10, 9,11	A4-13
Red	100,46, 19,14	10, 26, 12, 7	20:14	7,10,10,11, 9, 8,11	A4-13

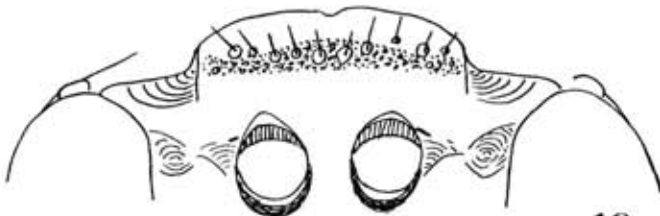
7. Liris (Leptolarra) biroi sp. nov.

In my key to the Philippine species of the subgenus Leptolarra (SRJHA 24, 1983) the present species runs smoothly to robustus Williams, but is inconsistent with this in the characters of the antenna (relative length of the joints, distribution of rhinaria), clypeus, wing colour and venation and can easily be separated from this species. In my key to the South Pacific species of the subgenus the present species runs to couplet 12 and runs out, because in the present species wings moderately clouded with brown, $A3 > A4$ and propodeal dorsum without silky shine.

♀, about 9.5 mm. Black; mandible medianly ferruginous and apically dark reddish brown, $A1$ narrowly dark reddish beneath, tegula except anterior and inner areas translucent brown, fore femur at base beneath dark red, mouth parts and legs apically dark brown; wings pale brownish yellow, basally somewhat paler. Hair on the depression of frons, antenno-ocular areas, lateral lobes of clypeus, temples, sides and underside of thorax, posterior part of propodeal sides and basal parts of legs beneath short, appressed and silvery, everywhere without long hair mixed and only in oblique light marked, on median lobe of clypeus, except short brownish bristles arising from well spaced gross punctures behind bevel, apparently almost glabrous, only in oblique light very short and very fine silvery pile observed at basal and medial areas, pile on depression around fore ocellus and behind ocellar area similarly very short and fine and in oblique light only shining, that on mesoscutum slightly longer (but very short), but indistinct, U-shaped pile band unobserved, only a patch of silvery short pile at postero-lateral areas glitters in some light, pile on mesopleuron and propodeum normally short, shine in oblique light as usual, pile bands on $GT\ 1-3$ very inconspicuous, under oblique light barely shining, hair on pygidium short, close, brassy, mixed sparsely with half erected, comparatively short bristles, apical spines somewhat flattened and ferruginous in colour.

Measurements: $HW:HL:IODv:A3=100:52:18:17$, in frontal view $HW:HL=100:82$. $IODv:IODc:A3=10:29:9.7$. $AOD:WAS:IAD=6:5:3$. $CML:CLL=20:8$. $A2,3,4,5,6,7,8,9=6,10,9,8,8,8,7,7$. $A3=A4 \times 2.2$. (Right antenna from $A10$ apically and the left completely lacking), rhinaria at least on $A6-9$ observed, very small, puncture-like and smaller towards base, on $A6$ and 7 located slightly beyond middle beneath and on $A8-9$ just in middle beneath. Ab-scissae $1,2,3,4,5$ of radius relatively (when $Abs.5=3$) $=10,2,7,12,3$ and those $1,2,3$ of cubitus of cubital cell $2 = 5,3,9$ (under same scale), $abs. 5$ of radius slightly inclined oblique, but this may vary as usual.

Head seen from above post-ocular area very narrow, almost directly inclined from posterior margin of eyes. Clypeus: Fig. 18, median lobe at sides of apical areas abruptly sunken to depressed lateral lobes and apical part of median lobe appears highly raised above lateral lobes, lateral lobe markedly inclined apically on its apical half,



especially stronger on inner area, bevel of median lobe comparatively broad, but inclination rather weak, surface smooth and shining, bearing an incomplete line of fine shallow and sparse punctures across middle and bordered behind from the finely and closely punctured disc with a series of

gross and sparse and short-setiferous punctures (some of the lateral ones are included in the bevel), disc medianly gently raised into a blunt carina. Occipital carina low, but reaching below buccal carina. Pronotum subtriangular, with top much below level of mesoscutum and flatly appressed to this. On mesoscutum parapsidal suture comparatively broad, very deep and very conspicuous, scutellum medianly weakly furrowed, on mesopleuron scrobal and episternal furrows distinct, both foveolate, but the former not reaching metapleuron. Propodeal dorsum with incomplete and partly intermittent lateral carinae, originating at a short distance from spiracle inward and reaching apex of posterior inclination, medial carina weak, but attaining beyond middle, median furrow fine and weak on both sides of medial carina, the segment in lateral view with dorsal face longer than posterior face, length ratio appr. $5:4$, angle formed by the two faces about 120° .

Posterior aspect broadly concave, with a fine deep medial furrow, the furrow not reaching apex and dorsally divided into 2 outcurved fine furrows, each accompanied soon with a transverse carina which is extended towards the sides, the feature is very similar to that of *L. robustus* of the Philippines. Pygidial area with ratio of length to width at base appr. 5:4, width at apex about half at base, with sides gently outcurved and with apex truncate. Medio-basal ridge of GS 2 comparatively thick and broadened apically, basal elevated area lunate in form and medio-posterior top subconical. Legs normal.

Punctures on frons very minute, very close, but distinct, on disc of clypeus somewhat larger than on frons, close, but shallow and weak, on mesoscutum slightly larger, yet minute and close, subreticulate, on mesopleuron surface microcoriaceous and slightly sparsely superimposed with fine punctures, tegula closely distinctly punctured on dark area, but postero-outer brownish polished area without punctures. Propodeal dorsum dull and opaque, transversely, somewhat coarsely striate, on antero-lateral areas mixed with some longitudinal rugulae, appearing subreticulate, striae stronger sideways, extending shortly over sides, crossing over lateral carina at verge to sides, dorsum at posterior margin bordered with a single strong carina that is connected with the V-shaped furrow at medial top of posterior inclination, the inclination transversely, finely, closely, rather weakly striate, intervals of striae filled with obscure fine punctules, not shining, but on lateral margins mixed with some very strong transverse carinae, sides obliquely, finely and closely striate, striae distinct ventrally and indistinct posteriorly.

♂, unknown.

Holotype: ♀, Huon Golf, Satterberg, 1899, Biró leg. (Coll. Mus. Nat. Hung.).

8. *Liris* (*Leptolarra*) *huonensis* sp. nov.

Closely resembles *Liris biroi*, especially in the structure of the clypeus, but the wings are much darker, antennal joints comparatively longer, parapsidal sutures not so deep and not so conspicuous, propodeal dorsum with sculpture much weaker and finer, anywhere without reticulation and the lateral carinae more indistinct. The present species is also closely allied to *L. (Leptolarra) melanoptera* Tsuneki, 1982, described from New Ireland, but can be separated from this species in that the propodeal posterior aspect more strongly convergent posteriorly and without lateral carinae except extreme posterior area, mesoscutum distinctly microcoriaceous on PIS, antennal rhinaria on A7-12 present and IODv much closer in length to A3.

♀, 12.5 mm, comparatively slender insect. Black; apical half of clypeus reddish brown, longitudinal carina on A1 beneath ferruginous red, tegula except anterior half and inner area dusky brown, fore femur at base beneath dark red, fore tibial spur basally light ferruginous, wings strongly darkened throughout, veins black or dark brown. Pilosity just as in *biroi*, hair and bristles on pygidial area also similar, but disc of clypeus, besides the basal short appressed pile, comparatively sparsely covered with long appressed silvery hair, brownish bristles arising from sparsely lined gross punctures behind bevel as in *biroi*.

HW:HL, IODv, A3=100,45,16,18. HW:HL in frontal view =100:84. IODv, IODc, A3=10,30,11. CML:CLL=20:7. AOD:WAS:IAD=6.5:5:3. A2,3,4,5,6,7,8,11,12=6,10,10,10,9,8,8,6,5,8. A3=AW×2.7, A8=AW×2.7. Abscissae 1,2,3,4,5 of radial vein (when Abs.5=3) =12,4,9,15,3. Abs. 1,2,3 of cubital vein of cubital cell 2 (same scale) =5,3,11.

Clypeus almost same in structure and punctuation as in *biroi*, occipital carina and pronotum also similar, propodeal dorsum and posterior aspect in lateral view with relative length 10:7 (in *biroi* 10:8), lateral carinae of dorsum very weakly defined at verge to sides, surface medially broadly and shallowly depressed, completely without medial carina, transverse striae much finer, closer and weaker, not subreticulate on antero lateral areas, but the striae similarly strengthened towards lateral areas, although in general much mildly so. Structure of pygidial area and GS 2 similar, but basal lunate elevation of GS 2 without medial prominence. Legs similar.

In punctuation and sculpture generally similar to *biroi*, but superimposed punctures on mesopleuron much closer.

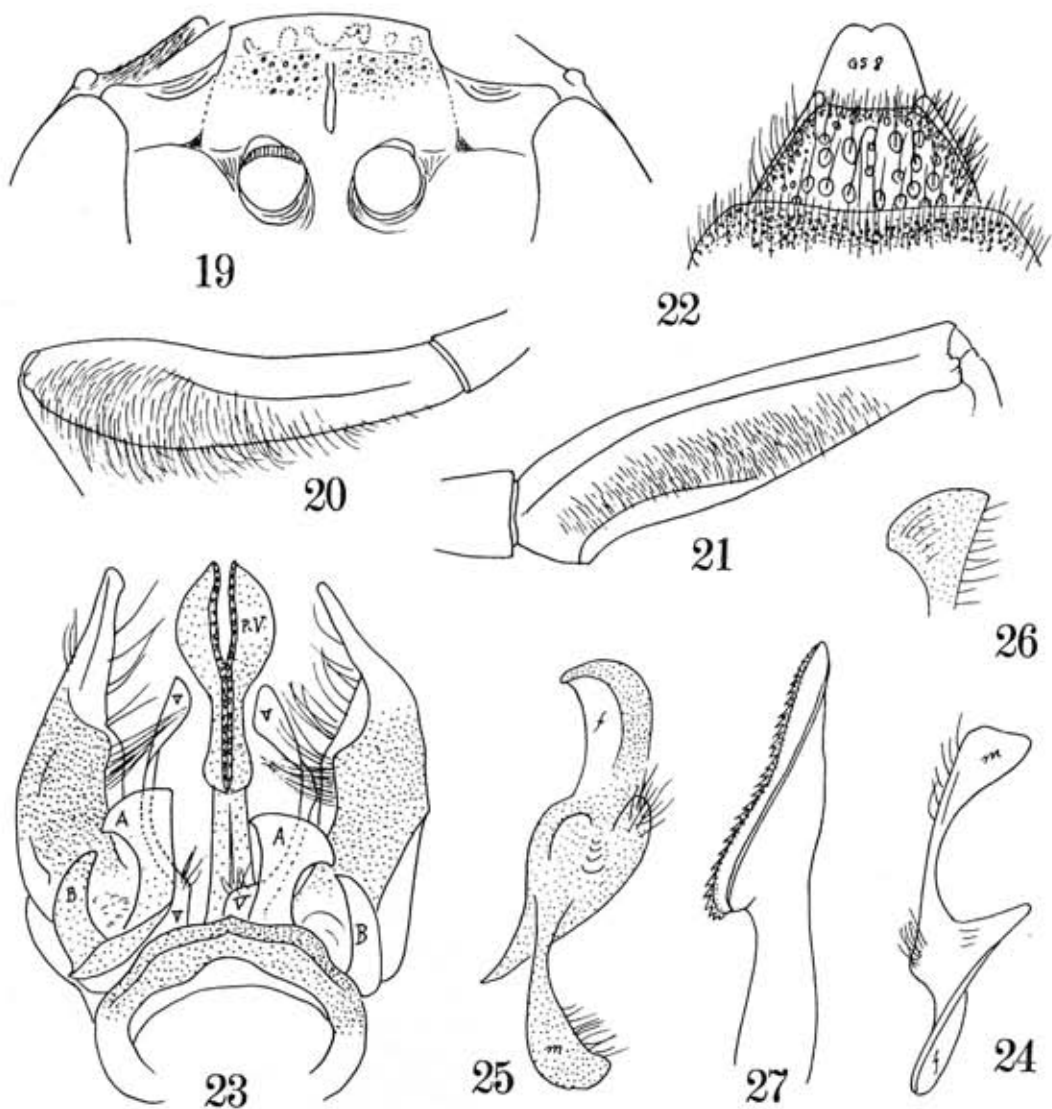
Remarks. *Notogonia ornatitarsis* Cameron, 1911, described from Bivak Is. seems somewhat close to the present species. But, in the Cameron's description length of the specimen is not given, moreover, it differs from the present species at least in the propodeal sculpture, relative length of some abscissae of radial vein (though not im-

portant) and colour of hair of pygidial area.

9. Liris (Leptolarra) novaguineanus sp. nov.

Characteristic in the deeply depressed pronotum, sparse, medium sized punctures on mesoscutum, with PIS microcoriaceous, flattened and long pilosed fore femur and excavated hind femur. In these characters the present species (δ) is similar to L. pygidialis Tsuneki, 1982, known from the Bismarck Archipelago, but differs from this in that the wings are hyaline, only very faintly clouded apically, IODv is much shorter than A 2+3, hair of clypeus brassy, sculpture of propodeal dorsum much finer and closer and apex of GS 8 more broadly rounded and with median incision smaller.

δ , 8 mm. Black; mandible medianly broadly reddish brown, tegula anteriorly and on inner area opaque dark brown, rest and basal plate of fore wing transparent ferruginous, palpi sparrow brown, hair on lower frons and clypeus pale brassy, long, dense and ap-



pressed, but on median lobe sparse, surface punctures well visible, on temples, sides and underside of mesothorax, on propodeum, coxae and femora beneath long, soft, erected and somewhat yellowish, but on mesoscutum slightly short, somewhat stiff, curved and half-apressed; pile bands on gaster on GT 1-3, silvery, medianly indistinct, short and sparse hair on GT 4-6 and slightly longer and close one on epipygium coppery-brassy.

HW:HL:10Dv:A3=100:48,19,13. HW:HL:CML=100:78:24. 10Dv:10Dc:A3=10:37:7. CML:CLL=20:15. A2,3,4,5,11,12,13=8,10,11,11,10,10,13. A3=AW \times 1.7 (dorsal), placoids on A4-13, on A13 not reaching apex. Abscissae 1,2,3,4,5 of radius (when A5=5) =16,5,12,26,5 (in left) or =17,5,12,27,5 (right), abs. 1,2,3 of cubitus of cubital cell 2 (under same scale) 7,5,16 (left), =7,6,18 (right).

Inner orbits on lower portion gently curved out, clypeus: Fig. 19, apical margin broadly, gently bevelled, bevel with some large shallow indistinctly outlined impressions, without a row of gross setiferous punctures behind bevel, instead with a line of varied-sized, very shallow and obscure depressions that are without hair, disc medianly distinctly carinate, but the carina not reaching base. Pronotum deeply depressed below level of mesoscutum, ante-coxal tubercle of prosternum stoutly toothed, mesoscutum medio-anteriorly broadly furrowed, parapsidal suture is a short curved carina, scutellum medio-apically weakly, postscutellum medianly distinctly depressed, episternal furrow strong and foveate, reaching below acetabular carina, scrobal furrow anteriorly strong and foveate, posteriorly weak, not foveate, but reaching metapleuron; propodeum with distinct medial and lateral carinae, the former reaching middle of dorsal surface and the latter begins a short distance behind spiracle and reaching apex, in lateral view dorsal aspect longer than posterior aspect, with relative length about 3:2, both forming an angle of less than 120° between. Fore femur in posterior view: Fig. 20, hind one: Fig. 21, epipygium and apex of GS 8: Fig. 22, genitalia in ventral view: Fig. 23, outer ventral margin of paramere expanded inwards, with its inner apical margin fringed with long curved hairs (in the figure stuck into a bundle), basiparameral ventral lamella consisted of two parts, A and B, as given in Fig. 23, left volsella (V in Fig. 23) in ventro-lateral view: Fig. 24 (m is apical main part and f is basal foot), right one in apical view (from dorsal side, with apical part at base): Fig. 25, apical main part (m) in ventral view: Fig. 26 and penis valve in lateral view: Fig. 27.

Median lobe of clypeus, besides the large shallow depressions above mentioned, finely and somewhat sparsely covered with weak punctures, PIS appear microstriate, vertex fairly closely covered with somewhat large punctures, PIS < PD, but distinctly microcoriaceous, punctures on mesoscutum slightly larger, PIS 0.5-1 times PD and strongly microcoriaceous, episternum of mesopleuron more finely and more sparsely punctured with PIS distinctly microcoriaceous, punctures posteriorly finer and sparser, epimeral area simply microcoriaceous, almost without puncture. Propodeum on dorsal side transversely, finely, moderately closely rugoso-striate, interspaces minutely rugulose, dull and opaque, striae postero-laterally stronger and sparser, at verge to posterior aspect margined with one or two strong, transverse, rugosed carinae, posterior aspect transversely, somewhat arcuately, fairly closely but rather weakly striate, interspaces covered with fine, weak and irregular punctures, but surface fairly shining, sides obliquely, strongly, coarsely striate, striae posteriorly weaker. GT 6 finely, but more largely than on preceding tergites, punctured, epipygium with a shining median carina and somewhat sparsely covered with piliferous gross punctures.

♀, unknown.

Holotype: ♂, Huon Golf, Satterberg, 1899, Biró leg. (Coll. Mus. Nat. Hung.).

Remarks. The present species is also closely allied to *Liris rohweri* (Williams) and resembles this fairly well, not only in the external morphology, but also in the structure of GS 8 and the genital organs. But it differs from this in the punctuation of mesothorax and in the sculpture of propodeum and as to the genitalia in the form of the larger lamella (A in Fig. 23) of basiparamere and these seem to be merit of separation at the species rank.

10. *Liris (Leptolarra) yanonis* sp. nov.

The present species (♂) is similar in appearance to the preceding species, but is different from this in that the hair is silvery and comparatively shorter (but longer than usual), medial lobe of clypeus relatively narrower, antennal placoids only on A5-11 (very exceptional), recurrent vein 2 is received by cubital cell 2 at its middle, mesoscutum punctate-reticulate and with PIS (very narrow, carina-like) distinctly mi-

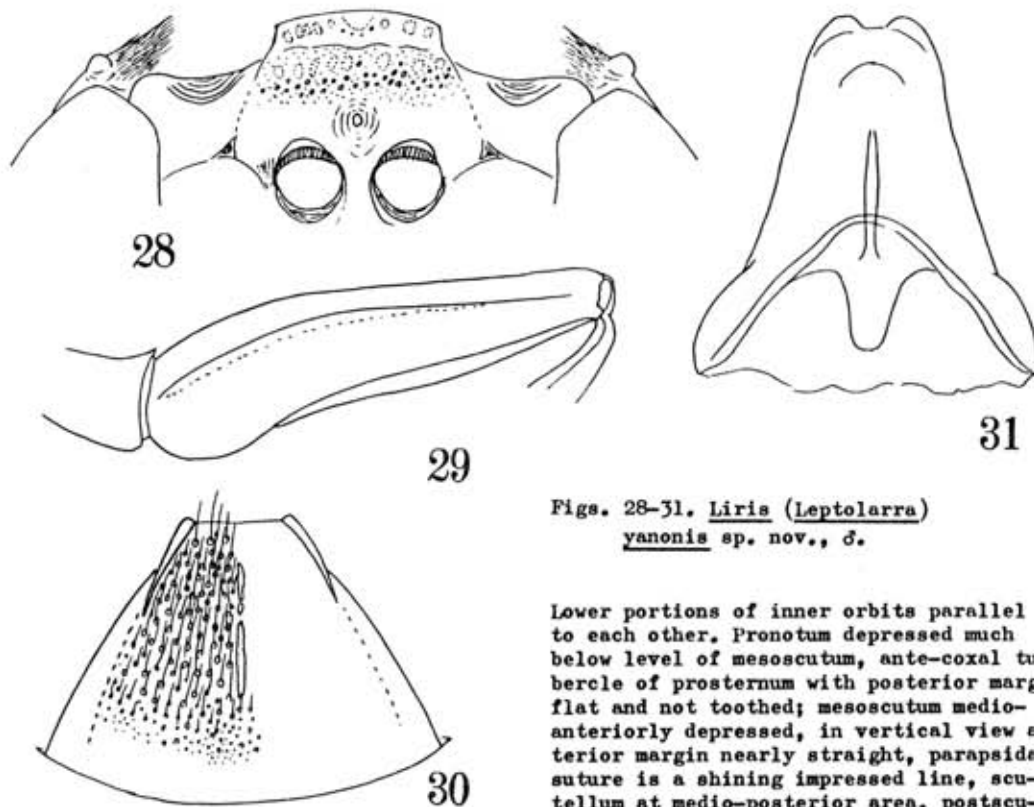
crostriolate, fore femur similar in dorsal view, but in posterior view not flattened beneath, with covering hair short, nearly appressed and hind femur with excavation beneath milder, without basal rounded prominence.

In my key to the species of South Pacific Islands this species runs to couplet 14 and runs out, by the disagreement of antennal rhinaria, punctation on mesoscutum, lateral carinae of posterior aspect of propodeum etc.

♂, 8.5 mm. Black, mandible on apical half reddish ferruginous, palpi dark brown, tegula on anterior half and inner area opaque brown, rest translucent pale brown; wings hyaline, apically (especially at radial cell) pale yellowish brown. Hair silvery comparatively long, but shorter than in the preceding species, fine and soft, on median lobe of clypeus sparse, surface punctures well visible, on mesoscutum short and slightly brownish, on fore femur beneath short, fine, curved, but dense and appressed, gastral pile bands on GT 1-3, each medianly indistinct, hair on GT 6 short, close, slightly strong, coppery in colour, on epipygium long, soft, appressed, greyish in colour, with somewhat a silvery shine and in some light slightly yellowish.

HW:HL:10Dv:A2:A3=100:48:19:9:14. HW:HL:CML=100:82:22. 10Dv:10Dc:A3=10:26:8. CML:CLI=20:19. AOD,WAS,IAD=15,10,4. (IAD remarkably narrow). A2,3,4,5,11,12,13=7,10,9,9,8,7.5,11. Relative width at apex of A3, A5 and at base of A13 =5, 5.5, 3.5 (dorsal). A3=AW×2 (dorsal) or =AW×1.7 (lateral). Placoids on A5-11. Abscissae 1,2,3,4,5 (when Abs. 5 = 5) of radius =14,4,12,32,5. Abs. 1,2,3 of cubitus of cubital cell 2 (same scale) =6.7.14.

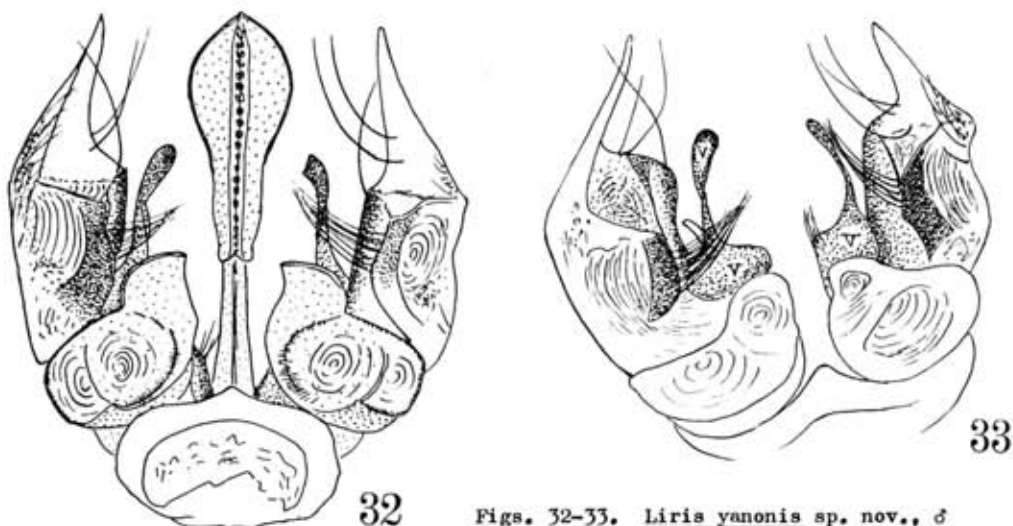
Clypeus: Fig. 28, median lobe very sparsely covered with hair, disc without medial carina, instead with a gentle tubercle behind middle of medial line, bevel distinct, smooth and shining, but with a transverse line of shallow and not well outlined punctures behind apical margin and with grosser, similarly indistinctly outlined shallow punctures behind bevel where surface delicately microcoriaceous and without puncture, behind the row of gross punctures surface finely, very shallowly and somewhat sparsely punctured, but punctures posteriorly finer, weaker and more indistinct in outline.



Figs. 28-31. *Liris (Leptolarra) yanonis* sp. nov., ♂.

Lower portions of inner orbits parallel to each other. Pronotum depressed much below level of mesoscutum, ante-coxal tubercle of prosternum with posterior margin flat and not toothed; mesoscutum medio-anteriorly depressed, in vertical view anterior margin nearly straight, parapsidal suture is a shining impressed line, scutellum at medio-posterior area, postscu-

tellum in middle impressed, two mesopleural furrows as in *novaguineae*, propodeal dorsum with distinct medial carina, reaching near apex, lateral carinae comparatively strong, but incomplete, intermittent, this is also the case on posterior aspect (except at apical area), in lateral view dorsum and inclination showing relative length about 3:2, the former slightly concave and the latter straight, both forming an angle of about 100°. Fore femur in dorsal view curved, partly flattened, in form as in *novaguineae*, but in posterior view underside not flattened, roundly swollen, hind femur in posterior view: Fig. 29, GT 7 at apical sides margined with carinae (Fig. 30), but disc not flattened, gently roundly raised towards medial line where incompletely, finely carinate, surface somewhat coarsely punctured with piliferous, medium-sized punctures. GS 8: Fig. 31.



Figs. 32-33. *Liris yanonis* sp. nov., ♂

Genitalia in ventral view: Fig. 32, in ventro-apical view to show the structure of paramere: Fig. 33 (penis valve omitted). Paramere on ventral side provided with a longitudinal expansion or septum, the top of which is triangular and concave, showing that it is formed of the united two expansions from inner and outer margins of paramere, marginal area of the septum well chitinized, black and fringed with long curved hair, basiparamere pale yellow, lamella strange in structure, consisted of 3 parts, top area membranous and nearly flat, median area deeply hollowed, with walls densely covered with short pubescence and basal area is also hollowed, but not so deep as in the median (Fig. 32), volsella generally as usual, similar to that of the preceding species, penis valve comparatively large, strongly serrate at median keel, in lateral view as in *novaguineae*.

Frons and vertex very minutely, densely punctured, apparently minutely granulate (50× magnification), PIS shining, mesoscutum somewhat more largely and somewhat sparsely (PIS=PD×0.5-1) punctured, with PIS strongly microcoriaceous (50× magnification), as punctures fine and not deep and micronetwork is strong the punctures are not marked, surface half mat, mesopleuron similar, but punctures much sparser, PIS 1-3 times PD, on epimeral area without puncture, simply microcoriaceous. Propodeal dorsum transversely, moderately closely rugoso-striate, striae-interspaces roughly, but not strongly reticulate, with surface dull, striae laterally stronger and sparser and posteriorly at verge to posterior inclination raised into 2 or 3 strong carinae; posterior aspect finely, irregularly reticulate and on lateral areas weakly transversely striate; sides obliquely, strongly and fairly closely striate, with interspaces microcoriaceous, but striae weaker and closer posteriorly. Gaster as usual, GT 6 finely, distinctly punctured, epipygium somewhat sparsely covered with slightly larger piliferous punctures (Fig. 30).

♀, unknown.

Holotype: ♂, Huon Golf, Satterberg, 1899, Biró leg. (Coll. Mus. Nat. Hung.).

11. Liris (Leptolarra) festinans (Smith, 1859)

- Liris (Nigliris) japonica: Tsuneki, Etizenia, 20: 34, 1967 (ref. list, redescr., var., figs.).
Liris (Nigliris) trifasciata Tsuneki, Polsk. Pism. Ent., 44: 607, 1974 (♂, Thailand, SYN. NOV.).
Liris (Nigliris) japonica: Tsuneki, Ibid., p. 612, 1974 (♀, Thailand).
Liris (Leptolarra) festinans: Bohart & Menke, World Sphecid., p. 245, 1976.
Liris (Leptolarra) festinans: Tsuneki, SPJHA, 19: 19, 1982 (ref., ♀ ♂, Bismarck and Solomon Is.).

? Larrada funerea Smith, J. Proc. Linn. Soc., Zool., 7: 34, 1864 (♀, Waigiou Is.).
 ? Notogonia foveiscutis Cameron, Bijd. dierk., 19: 81, 1913 (♂, Waigeu).

Specimens examined: 1 ♀, Friedrichwilhelmhafen, 1896; 7 ♂, Seleo, Berlinhafen, 1896; 1 ♂, Is. Cretin (Tami), 1899; 1 ♂, Satterberg, Huon Golf, 1900; all leg. Biró.

Observation. Apical margin of clypeus in ♀ medianly incised and near lateral angles minutely transversely notched, bevel distinct, shining; in ♂ apical margin broad trigularly produced, bevel distinct, shining, with sparse fine punctures. In ♀ antennal rhinaria on A6-12, comparatively large, oval in form (as usual), in ♂ placoids are variable in distribution. Of 9 ♂, 7 have them on A6-9 and on 9 sometimes not reaching apex, one has them on A6-10 (on 10 not reaching apex) and other one has them only on A6-8. Mesoscutum finely (but not very finely), closely punctured, subreticulate, PIS shining, on mesopleuron episternum somewhat more sparsely punctured, PIS sometimes with very feeble microstriae, but sometimes completely without such, surface always fairly well shining, punctures on epimeral area finer and much sparser, surface shining. Relative length of abscissae of radial vein considerably varied as given in Table 3; recurrent vein 2 is received by cubital cell 2 always before middle, but the interspace of 2 recurrent veins at the tops is fairly variable (Table 3). As to the ventral hair on GS 4-6 in ♂, 7 (not always identical with the above mentioned 7) is Type 1, namely having short, dense, curved pubescence mixed with a few long erect hair, but in one of them (No. 8) long hair is completely lacking, while in one of the remaining two (No. 9) only a few long erect hair present and in the other (No. 10) only sparse short hair is (not curved) present. Main characters of the specimens are given in Table 3.

Table 3. Some characters of the New Guinean specimens of Liris festinans

No.	Sex	Loco	Size	HW	IODv	A3	Rh-P1	VHT	Abs. 1, 2, 3, 4, 5	IRV
1	♀	Fr.	6.3	100	20	14	A6-12	-	10 5 4 11 5	2
2	♂	Se.	4.7	100	26	17	A6-9	T 1	8 4 6 9 5	2
3*	♂	Se.	5.5	100	24	15	A6-9	T 1	8 5 4 9 5	2
4*	♂	Se.	5.3	100	24	15	A6-9	T 1	8 3 5 10 5	3
5	♂	Se.	4.3	100	27	16	A6-9	T 1	6 4 3 9 5	4
6*	♂	Se.	5.0	100	26	15	A6-10	T 1	8 4 5 9 5	3
7	♂	Sa.	5.0	100	24	15	A6-8	T 1	9 6 5 13 5	3
8*	♂	Cr.	5.7	100	24	15	A6-9	T 2	8 4 5 9 5	3
9*	♂	Se.	5.0	100	26	16	A6-9	T 3	9 5 4 12 5	4
10	♂	Se.	4.2	100	28	15	A6-9	T 4	7 6 3 8 5	4

Remarks.

Rh-P1 = Rhinaria (♀) or Placoids (♂). VHT = Ventral hair type.

Abs. = Abscissae of radius (when abs. 5=5). IRV = Interspace of tops of recurrent veins (same scale as in abs.)

Loco. Fr. = Friedrichwilchekmhafen. Se. = Seleo. Sa. = Satterberg.

Cr. = Cretin.

T1 = Short dense curved pubescence + long erect hair.

T2 = Short dense curved pubescence only.

T3 = A few long erect hair only.

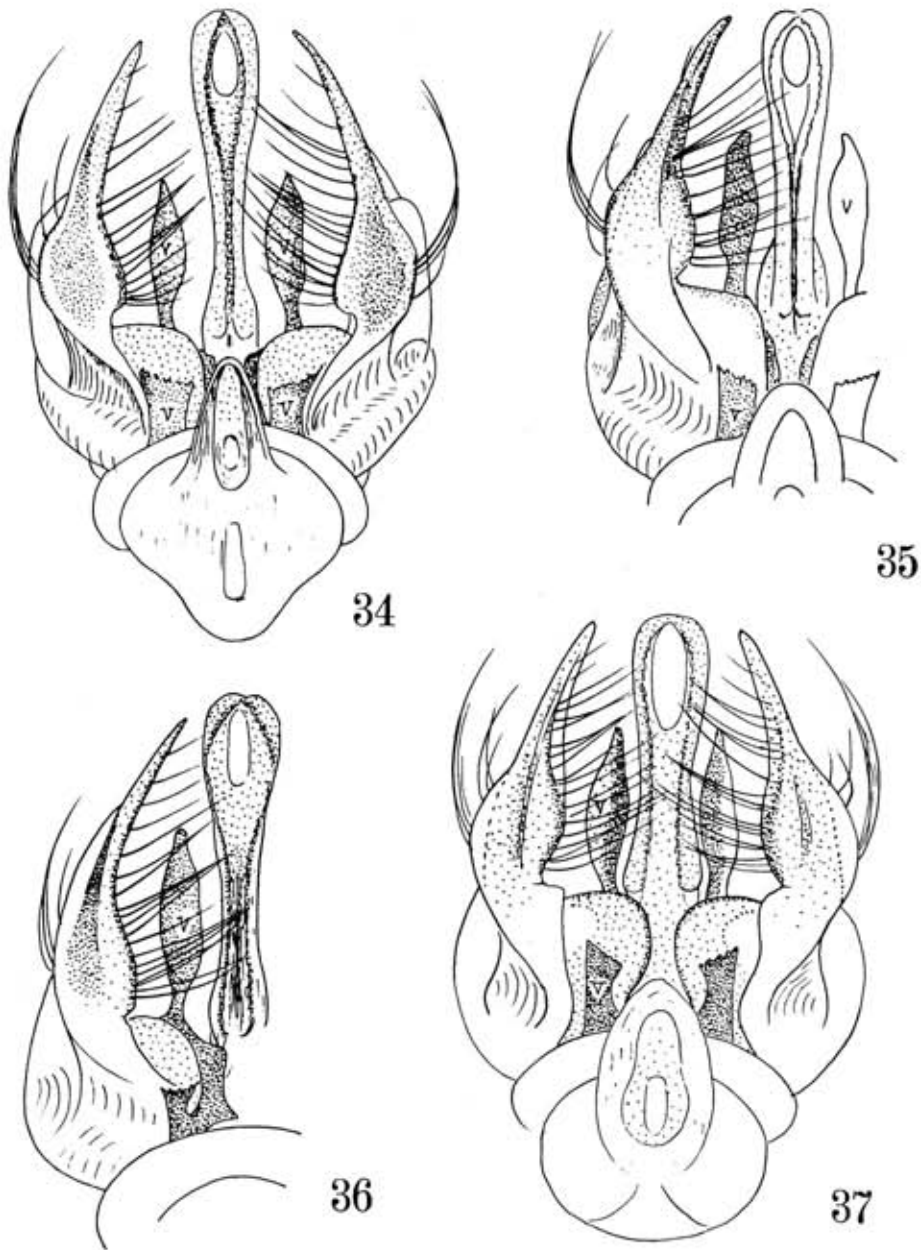
T4 = Short sparse, not curved pubescence only.

No. with * shows that its genitalia are examined.

Size = mm.

Relative length of A2-13 (δ) = 6,10,10,10,11,11,11,10,9,8,7.5,11. A3=AW \times 2, A6=AW \times 2, A10=AW \times 2, A13=BW \times 3.3. Relative width of A6:A12=6:3.5.

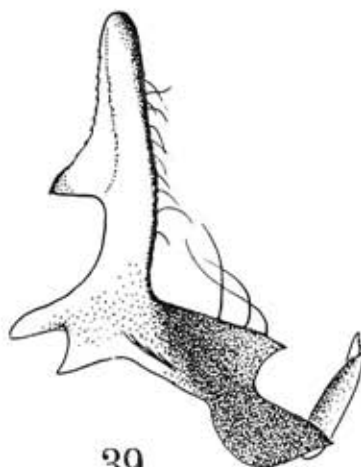
The genitalia of No. 3 are Fig. 34 (ventral), paramere appears somewhat narrower than usual and basal glove-shaped process of volsella is slightly broader. So the organs of Nos. 6 (Fig. 35), 8 (Fig. 36) and 9 (Figs. 37 and 38) are examined. The results show that the genitalia of No. 3 are only a slight variation of this species and that the variations in antennal placoids and in ventral hair and pubescence of the gaster have no bearing upon the genitalial characters.



Figs. 34-37. *Liris festinans* (Smith)



38



39

Figs. 38-39.

Liris festinans (Smith), ♂

Volselfa (Fig. 39, right one from No. 9, seen from inside) and gastral sternite 8 are also typical in form and structure to this species, but the latter is sometimes with apex entire, sometimes minutely and weakly incised in middle.

Remarks. In the Papuan population the male has the clypeus apically ferruginous in colour, with extreme apical margin narrowly dark brown. This is very conspicuous as compared with the male of populations of other regions. Punctures on the bevel are always (♀ ♂) fine and sparse, surface well shining; in the Formosan specimens sometimes and in the Japanese specimens very frequently the punctures on the bevel are fairly strong and close.

The relative length of abscissae of radial vein of fore wing in the 10 Papuan specimens are, when abscissa 5 is standardized as 5, markedly varied as shown in Table 3. It is only sure that abs. 1 and 4 are longer than others, abs. 4 is slightly longer than 1 and the length ratios among abs. 2, 3 and 5 are quite inconstant. Thus the species that are classified mainly upon the basis of this character as done by Cameron are quite undeterminable.

As to the antennal placoids of Liris festinans ♂ a considerable variation is observed among the populations of different localities, as well as within a population, and sometimes it seems worthy of a geographic character. In the following the knowledge acquired up to now will be summarised:

1. In the southern populations (from Formosa southwards) they are always placoids (sens. m.), each occupies a side of whole the span of the segment on which it occurs, only sometimes the apicalmost one or basalmost one is not reaching apex and with the apical end rounded. While in ssp. japonicus occurring in the Ryukyus, Japan excluding Hokkaido, and Korea they are always rhinaria (sens. m.), each is a well outlined oval or elliptic flat-bottomed impression (as in ♀ of other regions), located near middle of the segment beneath, always accompanied with a more or less normal space at base and apex.

2. Distribution of the placoids within the antenna.

Thailand population. As a rule on A6-8 present, sometimes on A6-9, but on A9 not reaching apex.

Philippine population. As a rule on A6-9 present, sometimes on A6-8 or on A6-10, but the latter case is rare and apical most one frequently not reaching apex, with the rounded end.

Formosan population. (i) On A6 and 7 only, observed on 27 specimens out of 65 examined. (ii) On A6,7,8 only, on 6 out of 65. (iii) On A6,7,8,9, on 32 out of 65.

New Guinean population. (i) On A6-9 (7/9), (ii) on A6-8 (1/9), (iii) on A6-10 (1/9).

3. Distribution of the rhinaria within the antenna:

Japan population. Mostly confined to A6 and 7 only, observed on 92 specimens out of 93 examined. While in the remaining one they are on A6, 7, 8. This exceptional specimen is discovered from among the 8 males collected on the southernmost promontory of Kyushu, the nearest area to the Ryukyus.

Ryukyu population. On A6, 7, 8 in all the 3 specimens observed.

Korea population. On A6 and 7 only as in the Japan population (7/7).

The facts above mentioned show that the impressions are smaller in form and reduced in number in the northern populations and vice versa in the southern representatives.

12. Liris (Leptolarra) morobensis sp. nov.

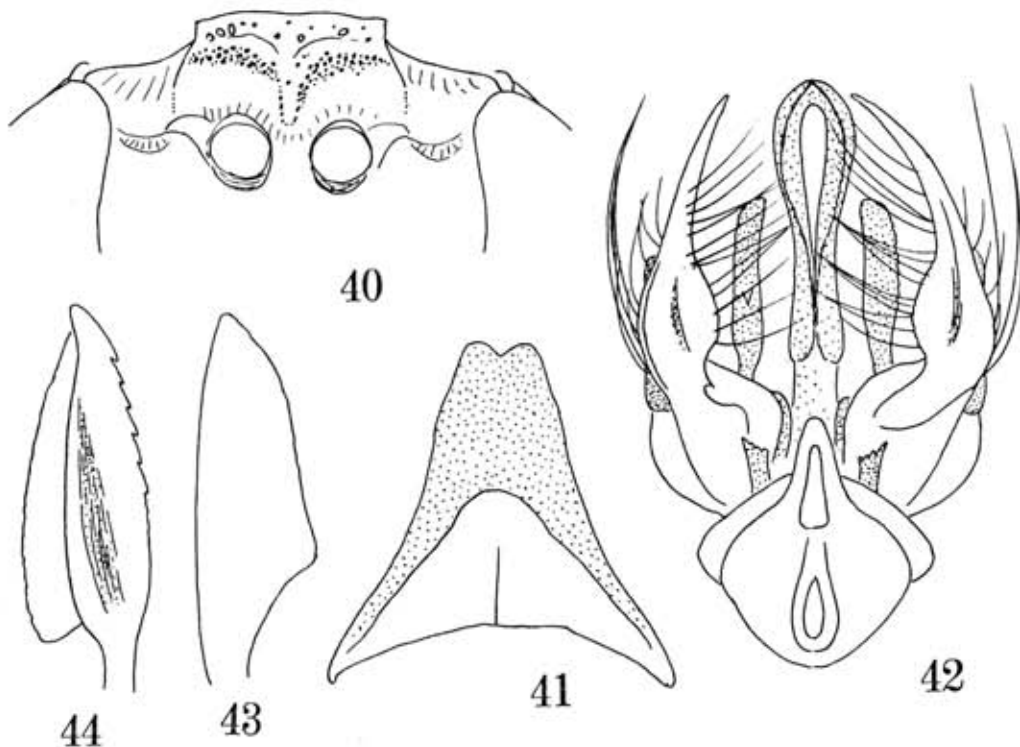
The present species (δ) is similar in appearance to L. festinans (Smith), but differs from it in the following characters: Median lobe of clypeus relatively wider, without distinct bevel at apical area, apical margin nearly truncate, pronotum depressed much below level of mesoscutum, GS 8 more deeply incised at apex and in genitalia volsella relatively slenderer.

δ , length 5.3 mm. Black; mandible at apical half reddish brown, A1 brownish beneath on the keel, tegula translucent brown, except inner area, legs slightly brownish; wings hyaline, apically somewhat clouded. Hair silvery, not dense on propodeal dorsum, but on central area inclining forwards, short, fine, appressed pubescence on mesoscutum slightly brownish, in oblique light defined, pile bands on gaster on GT 1-3, not conspicuous, GS 4,5,6 with sparse short normal hair, without particular set of hair as in L. festinans.

HW, HL, IODv, A2, A3=100, 50, 25, 8, 14. HW:HL in frontal view 100:72, inner orbits on lower portion very gently outcurved. IODv:IODc:A3=10:20:6. CML:CLL=20:13. AOD,WAS,IAD=9,5,4. A3,4,5,6,7,11,12,13=10,9.5,9.5,9.5,9,8,7,9. A3=AW \times 2, A6=AW \times 2, A10=AW \times 2, A13=BW \times 2.2. Placoids on A6,7,8, on A8 not reaching apex, A6 is thickest and thence apically strongly attenuate, much stronger and more marked than in allied species, A12 about half the width of A6. Abcissae 1,2,3,4,5, when Abs.5=5, =8,4,6,11,5 (left) or =8,4,5,11,5 (right), Abs.1,2,3 of cubitus of cubital cell 2, under same scale, =5,1,12 (left) and =3,1,12 (right).

Head seen from above with post-ocular area narrow, almost directly inclined to occipital carina from posterior orbit; shining bottom line of post-ocellar depression reaching inner orbits, each half roundly curved. Clypeus: Fig. 40, apical narrow marginal area gently roundly inclined anteriorly, without distinct bevel; pronotum without dorsal aspect, acutely edged, triangular in frontal view, flatly attached to anterior surface of mesoscutum, with top much below level of the latter as in subtessellatus-gr. Mesoscutum medio-anteriorly broadly, shallowly furrowed, parapsidal suture shining impressed line, more anteriorly located than usual, its posterior end is at the same line across anterior ends of tegulae, scutellum and postscutellum medianly weakly carinated. Structure of subalar area as in festinans, episternal furrow broader than in festinans, more strongly fiveate, scrobal furrow reaching metapleuron, meso- and metasternal structure as in festinans. Dorsum of propodeum with strong lateral carinae, reaching posteriorly the postero-lateral short carinae of posterior aspect, but not connected with them, median carina long, reaching posterior margin, posterior aspect flattened, in lateral view shorter than dorsum (about 2:3), forming with it an angle of about 115°. Gastral structure as in the compared species. GS 8: Fig. 41, genitalia in ventral view: Fig. 42, very similar to those of festinans, but main body of volsella slenderer, right one in postero-lateral view: Fig. 43, in antero-lateral view: Fig. 44 (in this group the volsella is, seen from apex, 3-radial, from middle of ventral face posterior- or dorsal lobe is emitted).

Punctuation on frons and vertex generally similar to that of festinans, δ , but the punctures slightly larger, on frons somewhat sparser and weaker, mostly indistinct in outline, with PIS strongly microcoriaceous, on inner orbital elevations punctures very fine and close, on vertex very close, subcontiguous, sides of pronotum anteriorly finely transversely punctate-striate, posteriorly irregularly punctured, mesoscutum closely punctate, punctures somewhat larger and stronger than in the compared species, tegula on anterior and inner blackish areas alone finely and closely punctured, rest smooth and polished. Epimeral area of mesopleuron weakly punctured, surface shining, episternum below scrobal furrow punctures as large as those on mesoscutum, but shallower and much sparser, with PIS feebly microcoriaceous, punctures posteriorly finer, weaker and spars-



Figs. 40-44. *Liris (Leptolarra) morobensis* sp. nov., ♂

er, surface shining, metapleuron longitudinally, strongly and coarsely striate. Propodeal dorsum irregularly, coarsely rugoso-reticulate, more strongly and more coarsely so than in *festinans*, posterior aspect transversely, coarsely rugoso-striate, sides obliquely, strongly, coarsely striate all over, striae almost not rugosed.
♀, unknown.

Holotype: ♂, Huon Golf, Satterberg, 1899, Biró leg. (Coll. Mus. Nat. Hung.).

Remarks. In the specimen the left antenna is from A2 apically lacking and the right hind leg is dropped off and is mounted on a card paper together with gaster, GS8 and genitalia.

13. *Liris (Leptolarra) simbang* sp. nov.

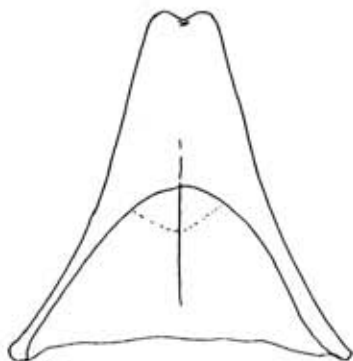
This species (♂) belongs to the group of *nigricans* and closely resembles the preceding *morobensis*, but is different from this mainly in that the pronotum is raised to near level of mesoscutum, antennal placoids are on A6-12 present (but not on A13) and GS 4-6 bear short, dense, curled up pubescence mixed with a few long erect hair as most of the Papuan *festinans* ♂. Further, A3-5 are markedly shorter as compared with A6-8 and in genitalia paramere bears more abundant hair and volsella is longer, without hook-shaped prominence on dorsal lobe. The antennal and genitalial differences mentioned above can separate the present species from *festinans* also.

♂, 6.0 mm. Black, mandible from ventral tooth apically reddish ferruginous, but ventral margin dark, tegula except narrow inner marginal area completely translucent ferruginous, legs more or less brownish (? originally so). Wings slightly clouded with pale brown throughout, basally somewhat paler. Hair silvery, more abundant and much longer than in *morobensis* in general, on mesoscutum besides the short brownish pubescence the long strong silvery hair considerably mixed, on propodeal dorsum not directed

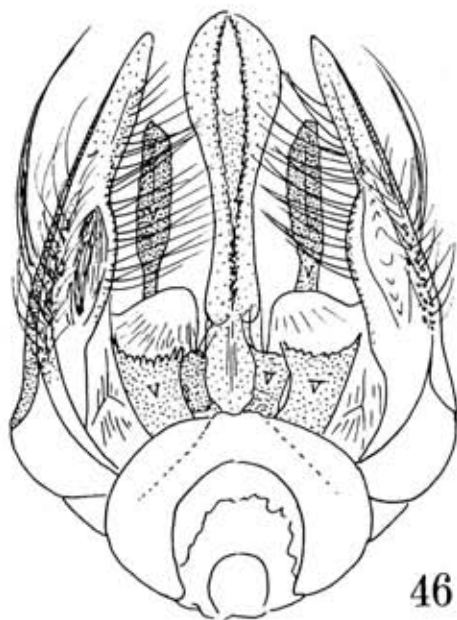
reversely forwards, but mostly inclined postero-laterally, pile bands on gaster on GT1-3 present, broader than usual and more distinct than in morobensis, ventral hair as above given.

HW, HL, IODv, A3=100, 50, 24, 10. HW:HL in frontal view =100:74. CML:CLL=20:13. AOD, WAS, IAD=8, 5, 3. IODv, IODc, A3=10, 22, 4.7. A2, 3, 4, 5, 6, 7, 8, 11, 12, 13=8, 10, 10, 10, 14, 13, 12, 10, 13. A3=AW×1.7, A6=AW×2.2, A10=AW×2, A13=HW×3.3. Placoids on A6-12, each occupying full length of posterior half when stretched laterally, even on A12. Abscissae 1, 2, 3, 4, 5, when Abs.5=5, relatively =8, 5, 4, 12, 5; those 1, 2, 3 of cubital vein of cubital cell 2 = 4, 2, 10 (same scale).

Post-ocellar depression and clypeal punctation generally similar to those of morobensis (but the surface condition of the disc of the latter not so well visible due to dense, thick silvery hair), inner orbits on lower portion apparently gently outcurved, but in reality they are parallel. Pronotum structured as in festinans, but dorsal surface slightly thicker; medio-anterior depression on mesoscutum distinct, scutellum medianly comparatively broadly depressed; mesopleural, mesosternal and metasternal structure as in morobensis. Propodeal dorsum with medial and lateral carinae also as in this species, but medial carina not reaching apical margin, dorsum from about a third from base posteriorly broadly,



45



46



47

Figs. 45-47. Liris (Leptolarra) simbang sp. nov., ♂

markedly depressed, in lateral view the area strongly concave and raised at posterior margin, length ratio of dorsum to posterior inclination about 3:2, angle formed by them broader than in morobensis, about 130°, posterior aspect not truncate, but transversely rounded, with median and posterior areas alone flattened and furrowed in middle; structure of gaster and legs as in festinans.

Punctation and sculpture will be given comparatively with morobensis: On head similar in general, on sides of pronotum more strongly and distinctly striate, puncture on mesoscutum similar in size, but not so dense, not reticulate-punctate, but with more

or less puncture-interspaces (though $PIS < PD$) where feebly microcoriaceous, on scutellum $PIS > PD$, shining, tegula on anterior half finely and closely punctured, on the rest delicately microcoriaceous, mesopleuron more finely and much more sparsely punctured than on scutum, epimeral area bearing delicate pile points only, on episternum PIS very feebly microcoriaceous and well shining. Sculpture on dorsum of propodeum much coarser and stronger than in *morobensis*, anterior raised area coarsely rugoso-reticulate, posterior depressed area mainly transversely, very sparsely and strongly rugoso-striate and at posterior verge margined with strong transverse carina; metapleuron longitudinally and propodeal side obliquely, coarsely striate, the latter weakly, irregularly punctured on the interspaces, but surface fairly shining. $GT 1$ smooth and shining, with sparse micro-points much weaker and more indistinct, on the following tergites micropunctures somewhat more distinct than on $GT 1$.

$GS 8$: Fig. 45, Genitalia in ventral view: Fig. 46, in ventro-lateral view from left side to show the right volsella better: Fig. 47; paramere with more long-hair on outer and inner margins, inner expansion of basiparamere swollen into a hemispherical prominence, with surface smooth and polished, volsella longer, without dorsal triangular lamina and with basoventral glove-shaped appendage much longer (Figs. 46, 47, V).

♀, unknown.

Holotype: ♂, Simbang, Maon Golf, 1900, Biró leg. (Coll. Mus. Nat. Hung.).

14. *Liris (Leptolarra) papuensis* sp. nov.

Belonging to *nigricans*-group, but in the present species (♂ ♀) cubital cell 2 is quadrangular, with transverse cubital veins 1 and 2 meeting at the top at radial vein, thus abscissa 2 of radial vein becomes lacking. Although the relative length of abscissae of wing veins is considerably variable, this instance is exceptional and the occurrence of the same aberrance in both sexes is significant. As to other distinctions:

♂, closely resembles *morobensis* in the form of apical margin of clypeus, in the punctation of mesopleuron and in the sculpture of propodeum, but differs from it in that antenna is not so markedly narrowed apically, with placoids on $A6-10$ only, pronotum not so strongly depressed below level of mesoscutum and punctures on mesoscutum are slightly sparser, with more or less PIS ; ♀, differs from *festinans* in that punctures of mesothorax sparser, antennal rhinaria smaller, pygidial hair brassy in colour and the body is distinctly larger.

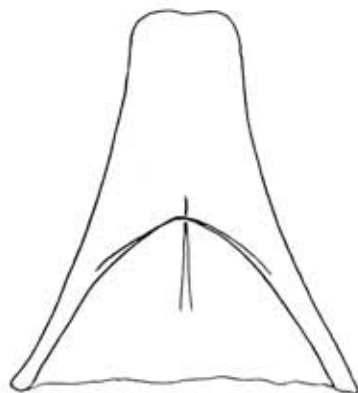
♂, about 6.0 mm. Black, mandible on apical half dark reddish brown, $A1$ beneath dark brown, tegula except inner margin translucent ferruginous, tarsi apically brownish, wings hyaline, weakly brownish except base, and apically slightly more darkened, veins and stigma dark brown. Hair silvery, very fine, even on clypeus, face, vertex, temples, mesothorax and propodeum except postero-lateral tomentosae, not marked, only in oblique light shining, on mesoscutum appressed, from middle posteriorly with a tint of brownish, on propodeal dorsum inclined forwards, pile bands on $GT 1-3$, medianly weak as usual, filling posterior depression, gastral hair on $GS 3-6$ consisted of short, somewhat close curved up pubescence and a few long but fine erect hair, just as in most of the Papuan *festinans* ♂.



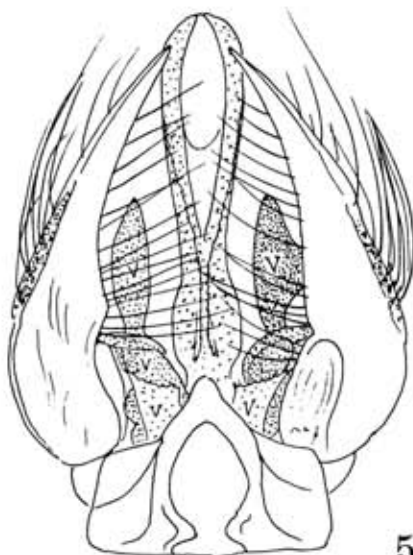
$HW, HL, IODv, A3=100, 52, 24, 13$. HW : HL in frontal view = $100:72$. $IODv$: $IODc:A3=10:23:5.5$. Inner orbits on lower portion slightly rounded out as in *morobensis* (Fig. 40) $CML:CLL=20:12.5$. $AOD, WAS, IAD=9, 5, 3$. $A2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13=7, 10, 10, 10, 11, 11, 11, 10, 9, 8, 8, 11$. $A3=AW \times 1.7$ (dorsal), $A6=AW \times 2$, $A10=AW \times 2$, $A13=HW \times 2.7$. Placoid on $A6-10$, on $A10$ not reaching apex, with end rounded. $Abcissae 1, 2, 3, 4, 5$ of radial vein, when $abs. 5=5, =11, 0, 9, 15, 5$ (in both

wings), those 1, 2, 3 of cubital vein of cubital cell 2 = 5, 4, 12 under same scale. Structure of vertex, post-ocular area and occipital carina as in *festinans* ♂; clypeus similar in form of apical margin generally to *morobensis* or *simbang*, and the transverse excavation at lateral angles of anterior margin of median lobe as in *simbang*, but

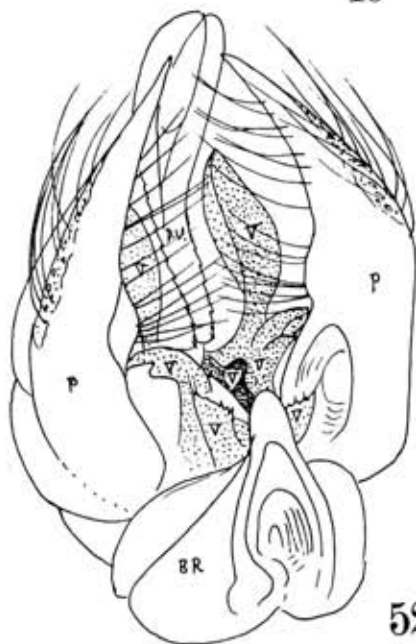
differs from any of them in that the tentorial pits are very large and marked, with the impressed line from antennal socket rim to each of them is deeper and distinct, and moreover, strictly the apical margin of median lobe has a short oblique part at outer side of lateral angle where the margin incrassate and transversely excavated (Fig. 48) and apical margin narrowly bevelled anteriorly, though not marked. Pronotal collar as in simbang, medio-anterior part of mesoscutum fairly strongly depressed, seen from above, therefore, anterior margin of mesoscutum medianly broadly emarginate and the median top of collar appears more closely approaching the mesoscutal level, but in reality top level of mesoscutum located more posteriorly and highly, scutellum without median impression. Structure of subalar area, mesopleuron, meso- and metasterna as in simbang, and propodeum as in morobensis. GS 8: Fig. 49, genitalia in ventral view: Fig. 50, in dorsal



49



50



51



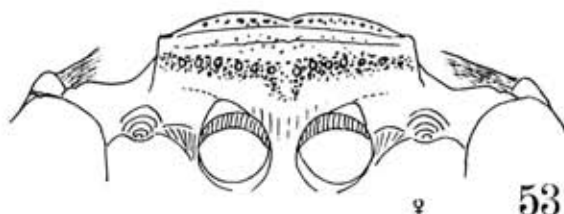
52

Figs. 49-52. Liris papuensis sp. nov., ♂

view: Fig. 51, in ventro-lateral view: Fig. 52. Genitalia are generally the *festinans*-type, but the bristles on outer margin of paramere more abundant, basiparamere lacks the inner medial rounded expansion (hence volsella is well visible from beneath), volsella different in structure (from ventral base of main body a curious appendage produced) and in form of main body from other Papuan allies.

Punctures on frons fine, fairly close, but with more or less PIS where rather strongly microcoriaceous, those on mesoscutum slightly larger, fairly close, partly contiguous to adjacent ones, but at the same time with more or less smooth PIS, epimeral area of mesopleuron very finely, sparsely punctulate, shining, on episternum punctures slightly smaller and much sparser than on scutum, with PIS delicately microcoriaceous, punctures posteriorly finer, sparser and weaker; tegula on anterior half weakly microreticulate and finely, sparsely and rather feebly punctured. Propodeal dorsum moderately largely, coarsely rugoso-reticulate, main course of rugae on anterior area oblique and on central and posterior areas transverse, medial and lateral carinae strong and distinct, the former reaching close to apical margin, the latter connected with the postero-lateral short carinae of posterior aspect, this aspect transversely and coarsely striate, but on medio-dorsal area the striae obliquely curved; sides obliquely, strongly and coarsely striate, but on antero-ventral area striae strongly rugosed and partly turn into reticulation.

♀, when stretched possibly about 10 mm. Black, apical 2/3 of mandible reddish ferruginous, tegula pale brown, with posterior half translucent, A1 beneath on keel, and legs apically brown. Wings weakly yellowish, not particularly darkened at apex, veins brownish black or dark brown. Hair silvery, not dense and not marked as in ♂.



HW:HL, IODv, A3=100, 47, 18, 14.
 HW:HL in frontal view =100:76.
 IODv:IODc:A3=10:26:7.3. Lower portion of inner orbits nearly parallel (slightly convergent upwards). CML:CLI=20:7. AOD, WAS, IAD=12, 10, 5. A2-12=7, 10, 10, 10, 10, 9.5, 9, 8, 7.5, 7, 9. A3=AW×2.2. A6=AW×2.5. A10=AW×2. A12=HW×2.4. Rhinaria small, on A6-12 present, on A8 largest, but less than a third of the length of the

segment, on A6 very small. Abscissae 1, 2, 3, 4, 5 of radius, when abs. 5=5, in left wing =14, 0, 7, 15, 5 and in the right =12, 0, 5, 8, 15, 5, those 1, 2, 3 of cubitus of cubital cell 2 in the left wing =5, 3, 13, in the right 6, 2, 14. Abs. 5 slightly inclined outwards, but this may be variable.

Structure of vertex, post-ocular area in dorsal view, occipital carina and clypeus generally as in *festinans*. Clypeus: Fig. 53, median lobe distinctly bevelled apically, anterior half of bevel thin, with apex gently bilobed and slightly reflected, inside of lateral angle transversely impressed, with contiguous punctures. Collar of pronotum in frontal view rounded triangular, somewhat thick, raised near level of mesoscutum which is, seen vertically from above, medianly broadly roundly emarginate at anterior margin, with medio-anterior area broadly depressed, other parts of mesothorax and whole of propodeum as in ♂, but transverse curvature of posterior aspect of propodeum less strong. Pygidial area as in *festinans*, but the hair is distinctly brassy in colour.

Punctuation and sculpture generally as in ♂, but the propodeal sculpture is much finer and closer, though similar in pattern.

Holotype: ♂, Friedrichwilhelmhafen, 1896, Biró (Coll. Mus. Nat. Hung.).

Paratype: 1 ♀, ditto.

On the species of *Liris* (s. l.) hitherto recorded from New Guinea

Seven species of *Liris* (s. l.) have been recorded or described from New Guinea, including western nearest Islands (Waigeo, Bivak and Saonek), namely:

1. *Liris aurata* (Fabricius): Cameron, 1906 (Humboldt Bay).
2. *Larrada modesta* (Smith, 1859): Smith, 1864 (Waigiou).
3. *Larrada funerea* Smith, 1864 (Waigiou).

4. Notogonia vindex (Smith, 1860): Cameron, 1906 (Kwatoré).
5. Notogonia ornatitarsis Cameron, 1911 (Bivak Is.).
6. Notogonia foveiscutis Cameron, 1913 (Saonek Is.).
7. Notogonia insularis Cameron, 1913 (Saonek Is.).

Of these, except Liris aurata = Liris (Liris) aurentus (Fabricius) and Notogonia insularis = Liris (Leptolarra) subtessellatus (Smith) s. nov. (see preceding paper), none can be identified, because each description is applicable to more than one species. In the following the described main characters of these species are presented only for reference.

2. Larrada modesta Smith (J. Proc. Linn. Soc. Lond., Zool., 3: 159, 1959, Is. Aru)
 ♀, about 13 mm. Hair silvery, mandible black, thorax slightly shining, closely, delicately punctured, propodeum opaque, transversely striate, wings subhyaline, pile bands on gaster GT 1-3, in ♂ on GT 1-4, otherwise similar to ♀.

3. Larrada funerea Smith (Ibid., 7: 34, 1864).
 ♀, about 7 mm. Hair silvery, wings subhyaline, head and thorax subopaque, propodeal dorsum with lateral and apical carinae, disc finely granulate, central longitudinal carina present, gaster shining.

4. Notogonia vindex Smith (Ibid., 5 (Suppl.): 123, 1860).
 ♀, about 18 mm. Head, thorax and outside of hind tibia clothed with golden pubescence, apical margins of gastral segments with fasciae of silvery pile, wings subhyaline, legs black.

Cameron's comment on Waigeo specimen (♀). Hair of head and thorax golden, gastral pile bands silvery, pygidium with dark golden rufous pubescence, propodeum obscurely, transversely striate, abs. of radius 2=3, rec. veins 1 and 2 received at apex of basal third of cubital cell 2.

Remarks. Bohart and Henke (1976) cited the synonym of vindex with modesta by van der Vecht, but according to the marked differences of the body size and the colour of vestiture, the two species seem to belong to different species.

5. Notogonia ornatitarsis Cameron (Nova Guinea, 9(2): 200, 1911)

Sex and size undescribed, but possibly ♀. Hind T1 with reddish golden pile beneath, T4-5 reddish brown, hair silvery, wings uniformly fuscous, with violaceous tinge. In radial vein abs. 1=2+3, abs. 2=3×3/4 and slightly less than Abs 1 of cubital cell 2, recur. v. 2 received by cubital cell 2 slightly before middle, IODv < A3, propodeal dorsum on basal part transversely finely closely striate, median carina reaching slightly beyond middle, posterior face sparsely obliquely striate, pygidial area with L:W=3:2, apex broadly rounded, hair silvery.

Remarks. Golden pile on hind T1 beneath is present in many species of Liris, wing venation usually of little use to identify the species.

6. Notogonia foveiscutis Cameron (Bijdr. t. Nat. Art. Mag., 19:81, 1913).

♂. 5 mm. Hair silvery, wings hyaline, apically fuscous, Abs. 1 of radius Abs. 2, Abs. 3 = Abs. 1 × 0.5, Abs. 2 of cubital vein of cubital cell 2 less than half of Abs. 2 of radius, propodeal dorsum transversely irregularly reticulate, median carina distinct, posterior face regularly obliquely striate, side obliquely striate, striae sparser posteriorly and stronger above. A round fovea on either side of base of scutellum.

Remarks. This may be festinans Smith? Scutellar foveae at inside of axille are always present in the group of nigricans and others.

Key to the Papuan species of Liris (Leptolarra)

♂ ♂		
1	Antennal placoids on A4-13 present (fore and hind femora markedly modified in posterior view, pronotum much below level of mesoscutum)	2
-	At least on A4 placoid absent	3
2	Hair pale brassy, on fore femur beneath long and erected (mesothorax somewhat largely and sparsely punctured, with PIS distinctly microcoriaceous, propodeal side strongly, coarsely striate all over, hind femur always black), 8 mm	
	<u>novaguineanus</u> sp. nov.	

- Hair silky white or silvery, on fore femur very short and appressed (mesothorax very finely and closely punctured, almost without PIS, propodeal side partly finely and closely striate, hind femur sometimes red, sometimes black, fore femur excavated or flattened beneath, genitalia paramere robust), 6.5-9.0 mm
subtessellatus (Smith) sens. nov.
- 3 Antennal placoids on A5-11 present (hind femur roundly produced near base beneath, recurrent vein 2 received by cubital cell 2 at or near its middle, mesothorax finely and sparsely punctured, with PIS strongly, distinctly microcoriaceous, pronotum depressed much below level of mesoscutum), 8.5 mm
yanonis sp. nov.
- At least on A5 placoid absent (recurrent vein 2 received by cubital cell 2 distinctly before middle)
- 4 Transverse cubital veins 1 and 2 united at radial vein (= abscissa 2 of radius absent) (IODv slightly > A2+3, but < A3+4, placoids on A6-10, mesopleuron finely and sparsely punctured, with PIS very delicately microstriate, propodeal dorsum with distinct lateral carinae), 6.0 mm
papuensis sp. nov.
- Abscissa 2 of radius present
- 5 Pronotum depressed much below level of mesoscutum (placoids on A6-8 present, mesoscutum finely punctate-reticulate, scutellum medianly finely raised), 5.3 mm
morobensis sp. nov.
- Pronotum raised to near level of mesoscutum
- 6 Mesoscutum somewhat sparsely punctured, with more or less PIS where under high magnification delicately microstriate (placoids on A6-12, hair of femora slightly long, distinctly erected, scutellum medianly impressed, punctures on episternum of mesopleuron fine and sparse, PIS > PD), 6.0 mm
timbang sp. nov.
- Mesoscutum densely, subreticulately punctate, fine PIS without microstriae, shining (placoids usually on A6-9, rarely on A8 or A10, pubescence on femora short, appressed, scutellum usually without furrow in middle, punctures on episternum somewhat large and fairly close, mostly PIS < PD), 4.5-6.0 mm
festinans (Smith)

♀ ♀

- 1 Transverse cubital veins 1 and 2 united at radial vein (mesoscutum somewhat sparsely - but PIS \leq PD - covered with slightly large punctures, on antero-lateral areas PIS microstriate, punctures on episternum fine, sparse and weak, with PIS delicately microcoriaceous, propodeal dorsum transversely coarsely rugoso-reticulate, lateral carinae distinct, antennal rhinaria on A6-11, oval, not large, pygidial hair brassy), 9-10 mm
papuensis sp. nov.
- Transverse cubital veins 1 and 2 separated at radial vein
- 2 6-7 mm, pronotum raised to near level of mesoscutum, punctures on scutum fairly large and close, propodeal dorsum coarsely rugoso-reticulate (punctures on episternum slightly sparse, with PIS smooth and shining, antennal rhinaria on A6-11, comparatively large, hair on pygidial area silvery, short)
festinans (Smith)
- 9-13 mm, pronotum depressed much below level of mesoscutum, punctures on mesoscutum very fine and close, propodeal dorsum transversely rugoso-striate
- 3 Hair on clypeus and antenno-ocular areas silvery, dense and very distinct, in vertical view well visible, wings yellowish hyaline (hind femur frequently red, posterior inclination of propodeum with medial furrow at the top not distinctly opened into V-shape), 11-13 mm
subtessellatus (Smith) ..
- Hair on clypeus and antenno-ocular areas very fine, sparse and indistinct, in oblique light only defined, wings more or less darkened throughout (hind femur always black, posterior aspect of propodeum with median furrow at the top more or less widely opened into V-shaped, with arms roundly divergent)
- 4 Hind femur red (antennal rhinaria on A7-11, very small and rounded, mesothorax with surface dull smooth, propodeal dorsum dull granulate and transversely finely closely and weakly striate, striae laterally sparser and somewhat stronger, lateral carinae usually lacking, if present very weak and incomplete, pygidial hair silvery, with a tint of brassy in certain light)
red legged form
- Hind femur black (characters same) black-legged form or forma *docilis*
- 5 Wings strongly darkened, IODv: A3=10:11, A3,4,5=10,10,10, antennal rhinaria on A7-12, transverse striae on propodeal dorsum fine and weak (V-shaped furrows on top of median furrow of posterior aspect of propodeum smaller and less distinct), 12.5 mm
luonensis sp. nov.
- Wings brownish hyaline, not so strongly darkened, IODv: A3=10:9.7, A3,4,5=10, 9,8, antennal rhinaria at least on A6-9 (end unknown), transverse rugosed striae

on propodeal dorsum stronger and sparser (V-shaped furrow of propodeal posterior aspect broad and distinct as in *L. robustus*), 9.5 mm *biroi* sp. nov.

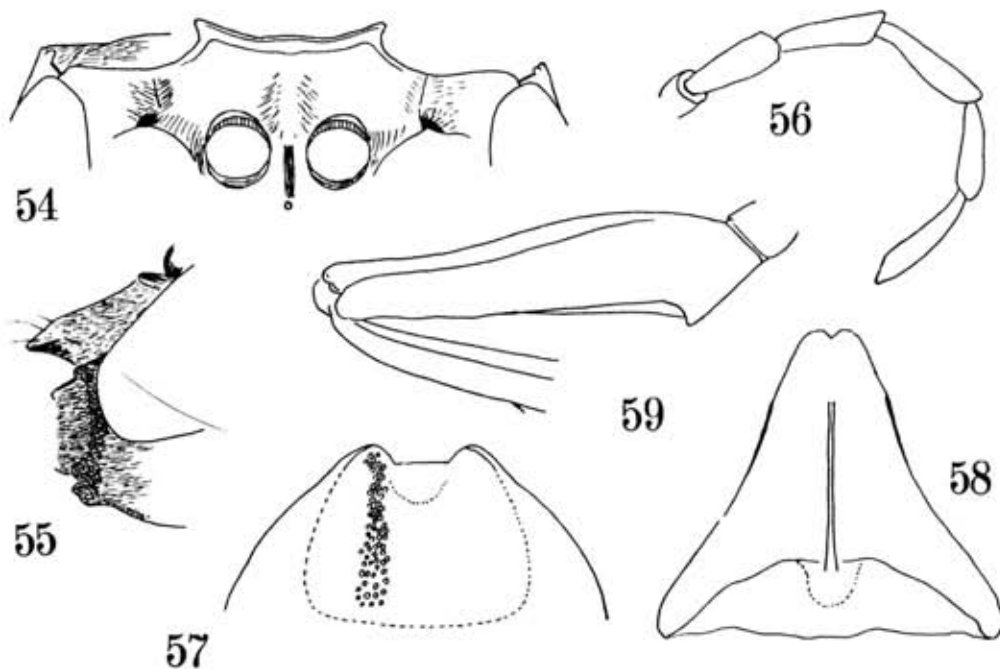
15. *Dicranorhina papuana* sp. nov.

♂. Differs from *Dicranorhina wollastoni* Turner (♀), a sole species of this genus known from New Guinea (Minika River) at least in the colour of the vestiture, (in the relative length of A3 and 4) and in the state of recurrent veins and can not be combined with it. It seems also venturous to combine this species with the single Australian representative, *D. intaminata* Turner (♀), by the differences of some non-sexual characters. The present species is characteristic in the combination of the characters of antenna, maxilla, scutellum, clypeus, GS 7 and genitalia.

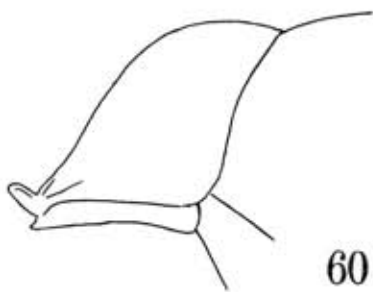
Length 7.5 mm. Black, mandible medianly broadly ferruginous, tegula brown, posteriorly paler, mouth parts dark brown, but palpi apically pale, fore tibia and tarsus castaneous, anteriorly pale brown, mid tarsus somewhat brownish, (hind legs from femora apically lost), wings hyaline, with brownish fascia as usual. Hair short, dense, appressed, in some light silverily shining, at base of propodeal dorsum and on posterior inclination very dense and marked, pile bands on gaster on apical sides of GT1-3, narrow and not conspicuous.

HW, HL, IODv, A2, A3=100, 48, 27, 10, 18. HW:HL:CML in frontal view =100, 74, 26. IODv: IODc: A3=10:20:7. Inner orbits on lower portion subparallel (slightly convergent upwards), CML:CLL=20:15. AOB, WAS, IAD=18, 10, 5. A2, 3, 4, 5, 11, 12, 13=6, 10, 9, 9, 6, 5.5, 7. A3 and A4 in dorsal view at apex rather abruptly widened, in lateral view gradually widened apically (each joint somewhat laterally compressed), A3=AW×3.0 (=AW×4) in dorsal view, in lateral view A3=AW×2.7 (=AW×3.3), no rhinaria nor placoid present. Abscissae 1, 2, 3, 4, 5 of radial vein with relative length (when Abs. 5=5) left: =10, 7, 6, 18, 5, abs. 1, 2, 3 of cubital vein of cubital cell 2 =3, 5, 11 (same scale); right: respectively = 10, 7, 6, 19, 5 and =3, 5, 12.

Clypeus: Fig. 54, in lateral view (from left side): Fig. 55, median lobe markedly raised towards apex, apical margin without distinct bevel, disc medianly bluntly raised, but not carinated, on bordering areas to lateral lobes distinctly depressed, maxillary palpus: Fig. 56, yellowish brown; pronotal collar thick, mesoscutum depress-



ed medio-anteriorly, in dorsal view the area markedly roundly emarginate, scutellum and postscutellum medianly deeply grooved, on the former the groove not reaching basal and apical margins, on mesopleuron scrobal furrow from scrobe distally attenuating and weakening, but reaching episternal furrow and metapleuron; dorsum of propodeum at base gently raised medially and constricted at spiracles, and narrowed posteriorly curving, raised area with medial carina (densely covered with silvery hair, not well visible), without lateral carinae, in lateral view both dorsum and posterior aspect almost straight, with relative length about 2:1, forming an angle of about 120°, posterior aspect with lateral carinae, especially high and strong at apical area, median excavation deep, wedge-shaped and at dorsal end produced from above by a convex wedge (as in *L. robustoides* of the Philippines, the wedge smaller than in *robustus*). Gastral segment 1 marked-

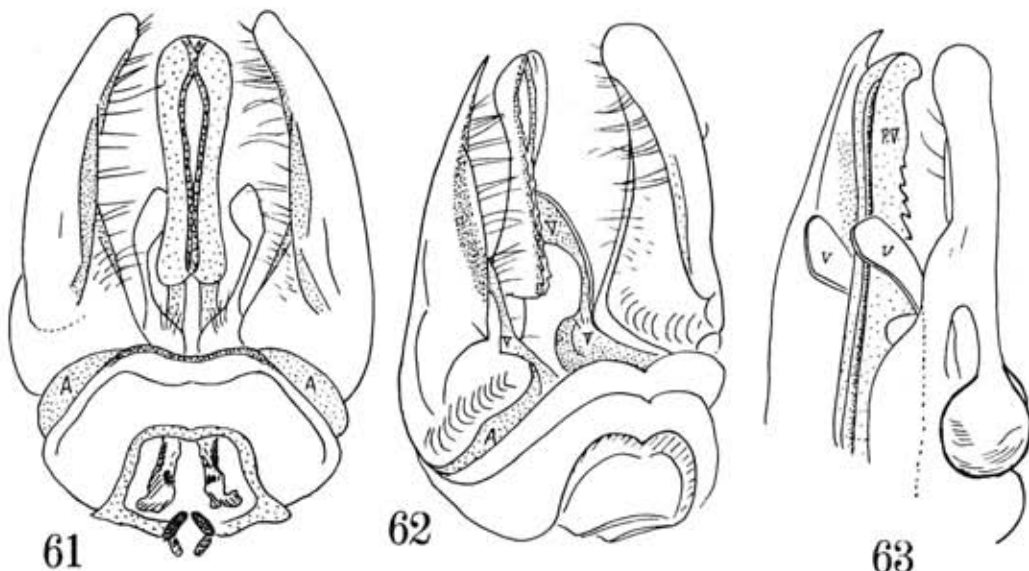


60

swollen upwards (Fig. 60), in dorsal (vertical) view L:W=5:4, GT 7: Fig. 57, epipygium flattened and at medio-apical area depressed, without marginal carinae, GS 8: Fig. 58, apical half strongly roundly swollen; left hind femur in posterior view: Fig. 59, broadly excavated beneath, flat-bottomed, with margins edged and carinated, surface transversely finely closely ruguloso-striate and at the base of excavation triangularly, somewhat roundly produced (not toothed). Genitalia in ventral view: Fig. 61, (enlarged, actually similar in size to GS 8), in ventro-lateral (from left side) view: Fig. 62, in dorso-lateral view (do.): Fig. 63, paramere on ventral side with a median longitudinal lamellate expansion and at base lamellately, roundly expanded and rolled or reflected (A in Figs. 61 and 62),

penis valve hook-shaped in lateral view, with ventral edge stoutly serrate, volsella slender, with apical and basal parts enlarged, but without glove-shaped organ at ventral end.

Ground punctulation (densely micro-punctulate or microgramulate) as usual in this genus. Apical margin of clypeus behind glabrous area with a transverse line of a few gross piliferous punctures, pronotal collar transversely somewhat coarsely rugoso-striate, propodeal dorsum transversely, finely and closely rugoso-striate, striae laterally especially postero-laterally and medio-posteriorly stronger and sparser (at antero-lateral areas turned to oblique, appearing in some light as if to be the incomplete lateral carinae); sides obliquely (nearer to transverse) and arcuately, finely and closely striate; posterior aspect at dorsal and dorso-lateral areas transversely, coarsely striate,



Figs. 60-63. *Diceranorhina papuana* sp. nov., ♂

on the rest covered densely with piliferous punctures, GT 7 somewhat largely, densely, subcontiguously punctured, but punctures slightly sparser towards base.

♀, unknown.

Holotype: ♂, Huon Golf, Simbang, 1898, Biró leg. (Coll. Mus. Nat. Hung.).

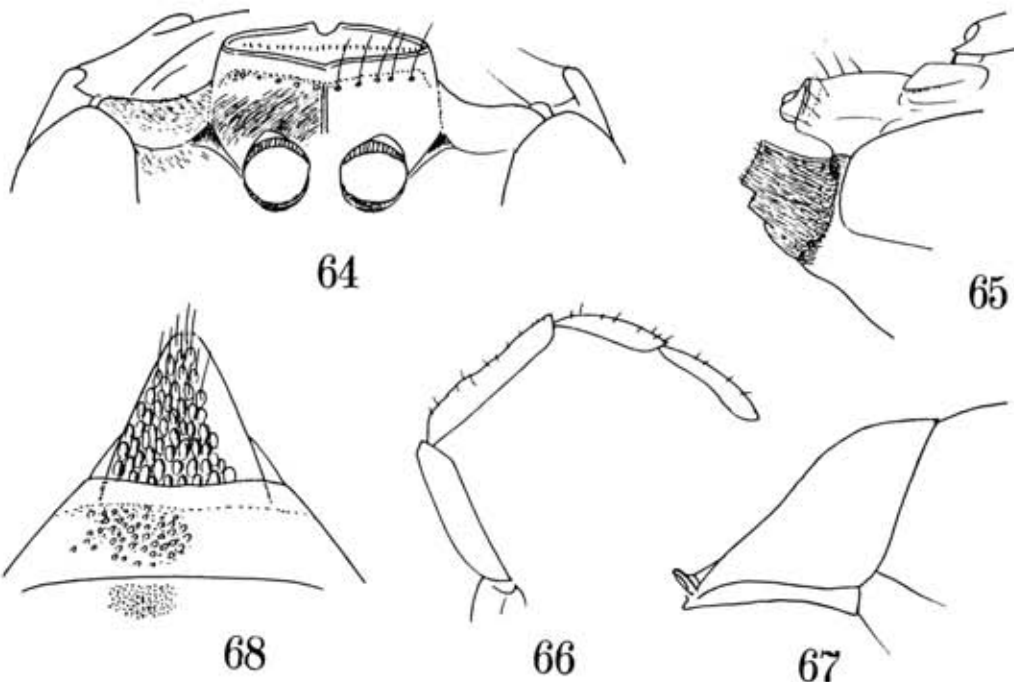
Remarks. In the form of the apical margin of the median lobe of the clypeus the present species seems to be consistent with *D. intaminata* Turner known from Queensland, but in this genus it is a rule that different sexes of the same species have the clypeal form different from each other and, moreover, it differs from this in the colour of the legs and in the wing venation (too scanty are given the specific distinctions!) and can not be combined with the Turner's species. Rather, the species that will be described next seems to have a problem.

16. *Dicranorhina huonensis* sp. nov.

The present species (♀) is, except the clypeal form which is different sexually in this genus, apparently very similar to the preceding species, and as the locality of the specimens is also the same we are tempted to combine it with this. However, in the present species scutellum and postscutellum without median furrow, propodeal sides only simply and densely micropunctulate, without striae, G 1 much less swollen upwards (Fig. 67, cf. Fig. 60) and different in the relative length of the maxillary palpus (Fig. 66, cf. Fig. 56). Based upon these the present species is dealt with as a separate species.

♀, 7-7.5 mm. Coloration generally similar to *papuana*, but fore femur on inside and fore tibia and tarsus more brightly ferruginous, A 1 more broadly brown beneath, mid and hind legs more distinctly brownish, tegulae on anterior half opaque- and on posterior half translucent-brown, pygidial area also brown apically; hair silvery, somewhat long, dense on lower frons, clypeus, dorsal base and especially posterior aspect of propodeum; pile bands on gaster indistinct, short setae on apical part of pygidial area brassy; wings as usually fasciated.

HW:HL, IODv, A1, A2, A3=100, 45, 26, 39, 12, 21. HW:HL:CML in frontal view =100, 78, 28. Inner orbits on lower portion as in *papuana*. IODv:IODc:A3=10:20:8. CML:CLL=20:14. AOD, WAS, IAD=16, 10, 5. A1, 2, 3, 4, 5..10, 11, 12=18, 5.5, 10, 8, 8..5, 5, 6. A3, 4, 5 in dorsal view as



in papuana (at apex suddenly widened and as a whole laterally compressed), $A_3=AW \times 4$ or $=Mw \times 6$, in lateral view $=AW \times 3.3$ or $=Mw \times 4$. Abscissae 1,2,3,4,5 of radius (when $abs.5=5$) = 13,5,6,23,5(right) and 12,4,6,21,5(left), $abs. 1,2,3$ of cubitus of cubital cell 2 = 5,3,10(right) and 7,2,12(left) (under same scale as in radius).

Clypeus: Fig. 64 (vertically seen to the median lobe), median lobe raised apically and acutely bevelled at apex and then reflected (Fig. 65, lateral view), the reflected marginal area thin, gently rounded out and medianly minutely roundly incised, disc raised towards median line which is carinated, maxillary palpus: Fig. 66, relative length between joints markedly different from that of papuana (!), pronotal collar thick and roundly swollen at lateral areas, but at middle obliquely inclined and then raised anteriorly, mesoscutum broadly depressed at medio-anterior area, the depression reaching posteriorly near middle of the scutum, in dorsal view anterior margin roundly emarginate in middle, scutellum and postscutellum entire, mesopleuron as in papuana. Propodeal dorsum with very fine, weak lateral carinae in 2 specimens examined (in certain light well visible), arising at a short distance behind spiracle, minutely zigzagged and reaching posteriorly the lateral strong carinae of posterior aspect; median carina of dorsum also fine and weak, but reaching near posterior margin (in one specimen much weaker and somewhat intermittent), in lateral view the form and the relative length of both the aspects are as in papuana, form and surface state of posterior aspect also similar. GT 1 not so strongly roundly raised above as in papuana (Fig. 67, cf. Fig. 60) in dorsal view slenderer than in papuana, with $L:W=10:7$, pygidial area and GT 5: Fig. 68, hind femur normal beneath, not excavated nor tuberculate.

Propodeal dorsum transversely, finely and closely striate, very slightly stronger and sparser postero-laterally and posteriorly (in paratype very indistinctly so), but sides completely without striae, densely micropunctulate (in papuana obliquely, somewhat arcuately, finely and closely striate), GT 5 somewhat largely, closely but irregularly (in size, density and strength) punctured, pygidial area closely, subreticulately covered with large, somewhat elongate punctures (Fig. 68), apical ones of which bear short brassy setae.

δ , unknown.

Holotype: ♀, Huon Golf, Simbang, 1892, Biró leg. (Coll. Mus. Nat. Hung.).

Paratype: 1 ♀, Huon Golf, Satterberg, 1899, Biró leg. (Coll. Mus. Nat. Hung.).

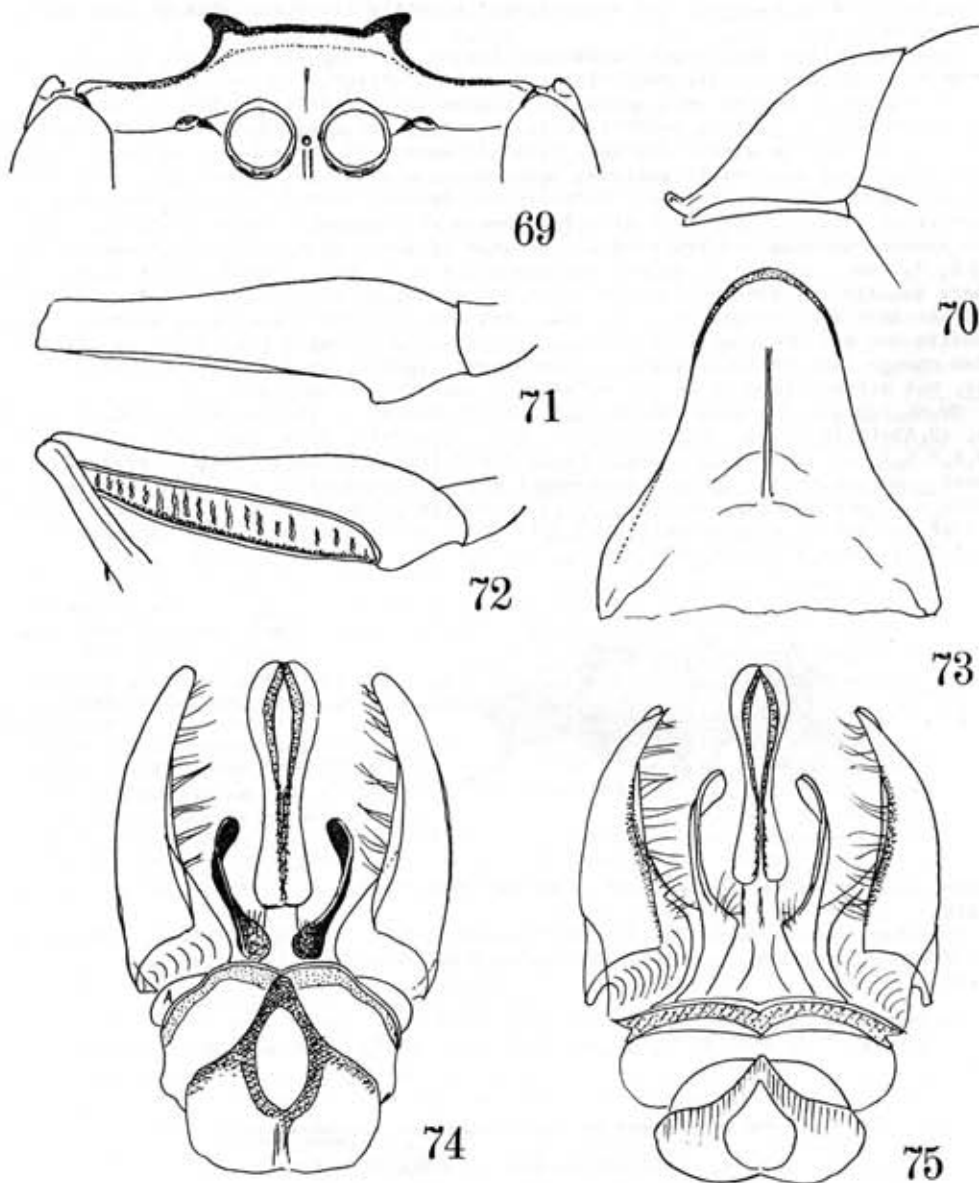
17. Dicranorhina papuensis sp. nov.

The male of the present species (δ ♀) is very similar in general to D. papuana sp. nov., but in the present species apical margin of the median lobe of clypeus not smoothly emarginate, but the emargination is two-angled, or rather at lateral corners abruptly strongly toothed (Fig. 69), GT 1 is not so strongly roundly raised above (Fig. 70, cf. Fig. 60), GS 8 much robuster and without apical incision (Fig. 71, cf. Fig. 58) and the genitalia are much more slenderly built, though similar in pattern of the structure.

δ , 7.5 mm. (paratype 6.5 mm). Black, mandible except basal castaneous hairy area and apical fourth ferruginous, tubercle of pronotum somewhat brownish, tegula pale brown, on basal half opaque, rest translucent, fore tibia and tarsus on inner side ferruginous, rest and fore femur brown, mid and hind tibiae and tarsi dark brown, in some light partly fairly pale, wings hyaline, bearing a fascia as usual. Hair silvery as usual.

$HW, HL, 10Dv, A_2, A_3=100, 50, 27, 8, 19$. HW, HL, CML (in frontal view) = 100, 74, 26. $10Dv, 10Dc, A_3=10, 20, 6.7$. $CML: CLL=20:14$, $AOD: WAS: IAD=8:5:2$. $A_2, 3, 4, 5 \dots 11, 12, 13=5.5, 10, 8, 8, \dots 5, 4.5, 7$. $A_3=AW \times 3$, or $Mw \times 5$ (dorsal), but $=AW \times 3$ and $Mw \times 3.6$ (lateral). $abs. 1, 2, 3, 4, 5$ of radius when $abs.5=5$, in right wing = 13, 8, 9, 30, 5 and $abs. 1, 2, 3$ of cubitus of cubital cell 2 under same scale = 3, 8, 16, while in the left wing $abs. of radius and cubitus respectively = 14, 8, 8, 32, 5$ and = 3, 8, 15. In paratype $abs. 1, 2, 3, 4, 5=9, 8, 6, 20, 5$ (right) and 10, 7, 7, 19, 5 (left) and $abs. 1, 2, 3=4, 3, 13$ and 3, 4, 13 respectively.

Clypeus: Fig. 69, median lobe apically somewhat translucent brownish and the apical marginal black hemming very marked; maxillary palpus with joints 2,3,4,5 relatively 8,10, 8,9 in length. Pronotal collar thick, with top area distinctly roundly raised in lateral view as in papuana (in huonensis top area in lateral view not raised, obliquely inclined anteriorly and then raised towards nape region), form of anterior margin of mesoscutum in dorsal view and its medio-anterior depression as in papuana, scutellum and postscutellum medianly finely furrowed, scrobal and episternal furrows as in papuana, propodeum in lateral view with both the dorsal and posterior surfaces straight, 10:6 in relative length, forming an angle of about 120° , in dorsal view post-stigmatal constrict-



Figs. 69-75. *Dicranorhina papuensis* sp. nov., ♂

tion stronger than in *papuana*, dorsum with weak, incomplete (intermittent) lateral carinae, in some light well visible, in others indistinct, median carina weak; posterior aspect with distinct lateral carinae, median furrow and medio-dorsal wedge as in *papuana*. G1 in lateral view: Fig. 70, not so markedly swollen upwards as in *papuana* (cf. Fig. 60), epipygium generally similar to that of *papuana*, but surface flat area more rounded at anterior part. Hind femur broadly excavated beneath, flat-bottomed and transversely thickly rugosed, with the margins edged and carinated and at base on posterior corner roundly produced (not toothed nor spined): Figs. 71 (left one posterior view) and 72 (do. obliquely from beneath). GS 8: Fig. 73. Genitalia in ventral view: Fig. 74, in ventro-apical view to observe volsella somewhat from apex: Fig. 75, similar in

pattern to those of papuana, but each organ distinctly slenderer than in this species (cf. Fig. 62).

Pronotal collar transversely, finely, feebly and sparsely striate, tegula on anterior half finely and closely punctulate; propodeal dorsum transversely, finely, closely striate, striae on median area strongly rugulose into subreticulation and on lateral areas, especially on postero-lateral parts, stronger and sparser, posterior margin bordered with one or two strong carinae, sides transversely, somewhat arcuately, finely, slightly sparsely and weakly striate, interspaces closely micropunctulate, apparently microcoriaceous, posterior aspect dorsally and dorso-laterally somewhat strongly and transversely striate. Epipygium closely covered with somewhat large punctures, punctures sparser upwards and replaced at the base of the segment with microreticulation.

♀, 8.0 mm. Similar in colour and vestiture to ♂, but clypeal median lobe apically more broadly and distinctly pale brown and apical margin narrowly brown, mandibles nearly to base ferruginous on outer side, antenna more brightly brown, especially on A1 beneath and mid and hind legs also more distinctly brownish (but these may be a post-mortem change from original black). The present species in ♀ fairly resembles D. huonensis, but differs from it in the relatively shorter antennal joints.

HW, HL, IODv, A1, A2, A3=100, 50, 26, 34, 11, 21. HW, HL, CML in frontal view =100, 76, 28. IODv, IODc, A2, A3=10, 19, 4, 7.5. CML:CLI=20:13. AOD, WAS, IAD=17, 10, 5. A2, 3, 4, 5, ..10, 11, 12=5, 10, 8, 8, 5, 5, 5, 6. A3=AW×3.3, =NW×4.2 (dorsal and lateral almost similar, almost without lateral compression and apical enlargement not so sudden as in ♂), relative length of maxillary palpus as in ♂. Abs. 1, 2, 3, 4, 5 of radius (when Abs. 5=5) =12, 5, 5, 21, 5, those 1, 2, 3 of cubitus of cubital cell 2 =5, 2, 14 (same scale) in left wing, in the right = 13, 5, 7, 23, 5 and 5, 3, 15 respectively.

Clypeus: Fig. 76, apical bevel shallower than in papuana, with reflected marginal area narrower than the bevelled area; each part of thorax as in ♂, propodeum also generally similar (in lateral view dorsum:posterior aspect =2:1), but lateral carinae more incomplete, only on median area of dorsum (intermittent) and posterior part of posterior aspect defined, G1 as in ♂,



76

pygidial area as in huonensis; hind femur not excavated, not tuberculate nor toothed beneath.

Pronotum transversely, finely and closely striate, tegula on anterior opaque area alone closely punctured, propodeal striae similar in pattern to ♂, but much finer, closer and weaker.

Holotype: ♂, Astrolabe B., Erima, 1896, Biró leg. (Coll. Mus. Nat. Hung.)

Paratypes: 1 ♀, same as holotype; 1 ♂, Huon Golf, Simbang, 1896, Biró leg. (Do.).

Tentative key to the species of Dicranorhina in Indo-Australian and Pacific areas

- ♀ ♀
- | | | |
|---|---|---|
| 1 | Clypeus, prothorax, G1, G6 and legs, all largely ferruginous red | 2 |
| - | Body and legs not so broadly ferruginous red | 4 |
| 2 | Antenna black, except ferruginous A1 (mesoscutum in front of tegulae and tegulae red, clypeus with a semicircular depression at apex in middle, which has a distinct margin and a slight incision, hind femur at base slightly thickened beneath, the part ending in an indistinct tooth; hair silvery), 10 mm, Singapore | |
| - | Antenna more broadly ferruginous red | 3 |
| 3 | A1, A4-6 and part of A7 ferruginous red (a triangular marks on sides of mesoscutum at tegulae red, pile on its sides with a golden hue, clypeus depressed, apex slightly waved inwards, disc keeled in middle, hair silvery on clypeus and posterior slope of propodeum, metapleuron obscurely striated above, propodeal | |

- disc on basal part irregularly wrinkled and medianly with a fine keel, hind femoral tooth short and oblique), 8 mm, Sikkim varicornis (Cameron, 1904)
- Al-10 or entirely ferruginous red (mesoscutum broadly in front and mesopleuron partly, propodeal dorsum, except black median area and posterior aspect, and GT 2 at base ferruginous red, clypeus with apex medianly incised, disc broadly keeled in middle which is narrowed at base, IODv=A3, A3 > A4, recurrent veins 1 and 2 almost united at top, propodeal dorsum can hardly be said to be transversely striated, femoral spine a mere thickening as in ritsemae, hair silvery), 9 mm, Ceylon ruficornis (Cameron, 1889)
- Hind femur flattened or excavated beneath 5
- Hind femur normally rounded beneath, sometimes with a slight tubercle near base 10
- Hind femur near base beneath without tooth or tubercle (legs black, clypeus without median carina on disc, apical margin medianly incised, propodeal dorsum without median carina), 9 mm, Sumatra and Solomon Is. niger (Maidl, 1925)
- Hind femur near base beneath with a tooth or angulate tubercle (apical margin of clypeus medianly incised) 6
- Legs black, only fore leg partly brownish or brownish yellow (scutellum medianly longitudinally impressed) 9
- At least fore leg broadly ferruginous and other legs variously ferruginous (scutellum without medial impression, hind femur excavated beneath and toothed at basal end of the excavation, IODv:A3=10:8.5, A3:A4=10:9, A3=AWx3.5), 9-11 mm, Java - Luzon ritsemae (Ritsema, 1872) 7
- All the legs ferruginous except part of femora, trochanters and hind tibia, Java ritsemae ritsemae (Litsema, 1872)
- At least mid and hind legs fairly broadly black 8
- Fore leg ferruginous red, others brownish black, Luzon Is. ritsemae luzonensis Williams, 1928
- Fore leg nearly wholly, mid leg fairly broadly and hind leg partly reddish ferruginous, Mindanao, Negros and Cebu Is. ritsemae mindanaonis Tsuneki, 1983
- Al beneath, fore leg broadly brownish yellow, clypeus without median carina, propodeal dorsum also without medial carina, hind femur with a feeble tubercle or completely without, two recurrent veins separated on top, 9 mm, Sumatra and Solomon Is. (see also couplet 5) niger (Maidl, 1925)
- Antenna black, fore leg black, only tarsus brownish, clypeus propodeal dorsum with median carina, hind femur at base beneath tuberculate, recurrent veins 1 and 2 united at top and shortly petiolated, IODv=A3, A3:A4=10:9, A3=AWx4, 9-11 mm, West Java cavernicola (van der Vecht, 1937)
- Hind femur near base beneath with a weak tubercle (IODv:A3=11:9, A3=AWx4 (dorsal) or =AWx3.5 (lateral), clypeus broadly, Al, greater part of mandible, pronotal sides partly, tubercle, tegula, pygidium, fore leg largely, mid and hind legs partly ferruginous, hair silvery), 10 mm, Palawan Is. palawanensis Williams, 1928
- Hind femur without tubercle or tooth near base beneath 11
- In length A3=A4, apical margin of clypeus without incision 12
- A3 > A4, clypeus anteriorly bevelled, marginal area reflected and distinctly incised in middle 13
- Apical margin of clypeus truncate, disc with a median carina, hair pale fulvous (fore leg pale testaceous, recurrent vein 1 interstitial with transverse cubital vein 1, IODv=A2+3, GT5-6 finely, sparsely punctured), 9 mm, New Guinea Minika River wollastoni Turner, 1912
- Apical margin of clypeus feebly emarginate, disc slightly convex (fore leg black, with tarsus fuscous above and testaceous beneath, recurrent vein 1 received by cubital cell 2 apart from its base, IODv > A3, propodeal dorsum transversely rugoso-striate), 10 mm, Australia, Queensland intaminata (Turner, 1910)
- Apical part of clypeus and antenna dark brown, clypeus with bevel low, apical marginal area at each side depressed and apparently narrower than the width of the bevel (Fig. 76), median carina of disc of clypeus acute and distinct, A3 relatively shorter, with apical incensation strong, but not so strong as in the following species (IODv:A3=10:7.5, A3=AWx3.3 and =AWx4.2), 8.0 mm, New Guinea, Hon Golf and Austrolabe B. papuensis Tsuneki, 1983
- Clypeus and antenna black, clypeus with bevel higher, reflected marginal area as wide as bevel (Fig. 64), median carina of disc much blunter, A3 relatively longer, with apical incensation more marked than papuensis (IODv:A3=10:8, A3=

♂ ♂

(In the still undiscovered males of varicornis, ruficornis and ruficollis possibly the clypeus, prothorax, part of antennae and of gaster may be red.)

- | | | |
|---|--|---|
| 1 | Apical margin of clypeus provided with strong teeth in middle (hind femur near base beneath long toothed) | 2 |
| - | Apical margin of clypeus without teeth in middle | 6 |
| 2 | Clypeal teeth slender, divergent apically, with a short triangular process between the pair, hind femoral tooth much longer than in the following species (hair on face pale golden, femora and tibiae brownish red, but fore femur blackish above, fore tarsus brown, $A3:A4=7:6$, $IODv > A3$ slightly, scutellum deeply furrowed in middle, GS8 with apex medianly incised), 8-8.5 mm, West Java | |
| - | Clypeal teeth forming a pair, strong and stout, with their outer margins convergent apically, hind femoral tooth shorter and blunter than in the preceding species | 3 |
| 3 | Clypeus, prothorax, G 1 broadly ferruginous (legs, mandibles broadly ferruginous, propodeal dorsum transversely striate), 7-8 mm, Ceylon | |
| - | The parts of the body wholly or largely black, 6-9 mm | |
| 4 | All legs broadly ferruginous, Java | 4 |
| - | Fore leg nearly wholly ferruginous, mid and hind legs partly or wholly blackish ($IODv:A3=10:7$, $IODv:A2+3=10:10.5$, $A3=AW \times 3.3$ - dorsal), 6.5-9.0 mm | 5 |
| 5 | Mid and hind legs black | |
| - | Mid leg fairly broadly and hind leg partly ferruginous | |
| 6 | Apical margin of clypeus almost truncate | 7 |
| - | Apical margin of clypeus distinctly emarginate | 8 |
| 7 | Antenna and legs black, propodeal sides striate (clypeus more produced anteriorly, hind femoral tubercle beneath better developed), less than 9 mm, Sumatra, Solomon Is. | |
| - | Antenna reddish, at least fore leg broadly ferruginous, propodeal sides without striae ($A3 > A4$, $IODv=A2+3$, scutellum and postscutellum medianly impressed, propodeal disc finely reticulate), 5.3 mm, Palawan Is. | |
| 8 | Apical margin of clypeus with median straight area narrow, with lateral obliquely produced teeth comparatively small and weak, G 1 robust, strongly swollen upwards ($A3=AW \times 4$, G 1 with $L:W=10:8$, GS 8 medianly deeply incised at apex, paramere and penis of genitalia thicker and lobuster than in the following species), 7.5 mm, New Guinea | |
| - | Apical margin of clypeus with median straight area distinctly broader, with lateral teeth stronger and robust, G 1 not so strongly swollen upwards ($A3=AW \times 5$, G 1 with $L:W=10:7$, GS 8 without apical incision, paramere and penis much slenderer and weaker), 7.5 mm, New Guinea | |

Remarks. As to D. ruficornis, ruficollis, varicornis, fasciatiipennis, all described by P. Cameron, the morphological characters are quite obscure. They may be merely the local races of D. ritsemae as suggested by J. van der Vecht in regard to ruficollis. As to D. intaminata, wollastoni, huonensis, apart from 3 Cameron's species, the males remain unknown.

18. Tachytes papuanus sp. nov.

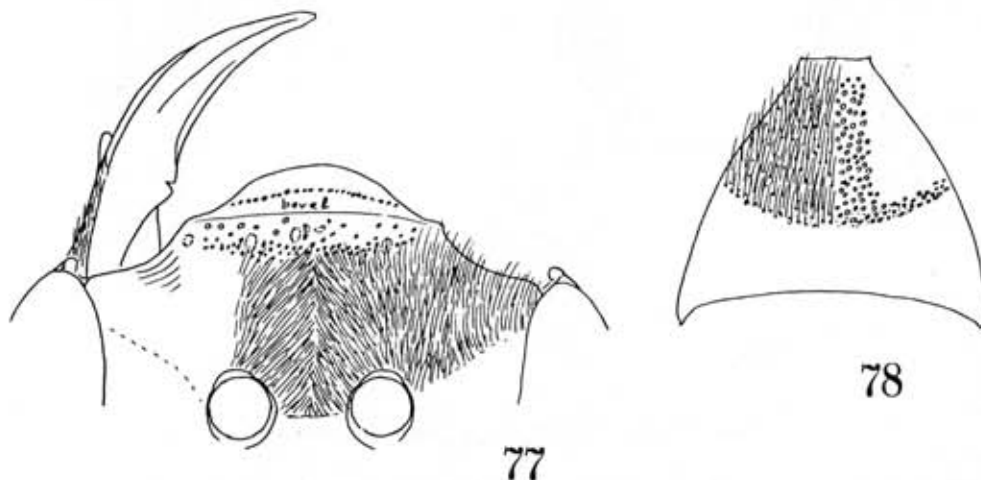
The present species (♀ ♂) is very closely allied to T. modestus banoensis Williams, 1928, but differs from it in that externally the medial incision at apex of clypeus and the fine medial furrow of propodeal dorsum are lacking, the spines of legs are

yellow (in *m. banoensis* white), punctures on mesothorax are sparser, with PIS strongly microcoriaceous and the hair on head and thorax is silvery in ♀; internally in ♂ GS 8 is slenderer, paramere with apical lamellate area shorter, without reflected prominence on outer side and ventral hair of paramere and volsella much denser and shorter.

♂, length 9.0 mm. Black, mandible except basal area ferruginous, apically broadly castaneous, palpi ferruginous, tegula translucent pale brown, anterior and inner parts blackish, apices of fore and mid coxae, base of fore femur, fore tibia except except median area of outer and ventral sides, both ends of mid tibia, knee and inner and apical area of hind tibia, tibial spurs and greater part of tarsi ferruginous. Wings hyaline, slightly yellowish. Hair on frons and clypeus brassy, on thorax and gaster silvery, but U-shaped tomentosa on mesoscutum in some light appears pale brassy, pile bands on gaster (mostly rubbed off) on GT 1-4 (a little rest laterally), hair on GT 5 and 6 rather sparse, brownish and on GT 7 dense and silvery (Fig. 78), apical margins of GS 3 and 4 also adorned with a band of sparse silvery hair.

HW, HL, IODv, A3=100, 58, 21, 16. IODv, IODc (base and apex)=10, 27, 30. CW(maximum):CL (in middle)=40:19. IODv:A2+3:A3=10:11.5:8. A3, 4, 5=10, 9, 9. A3=AW×2.2(dorsal). Abs. 1, 2, 3, 4 of radial vein=10, 5, 7, 20 (almost without abs. 5, accordingly without appendiculate cell), abs. 1, 2, 3 of cubital vein of cubital cell 2 (same scale)=4, 6, 12.

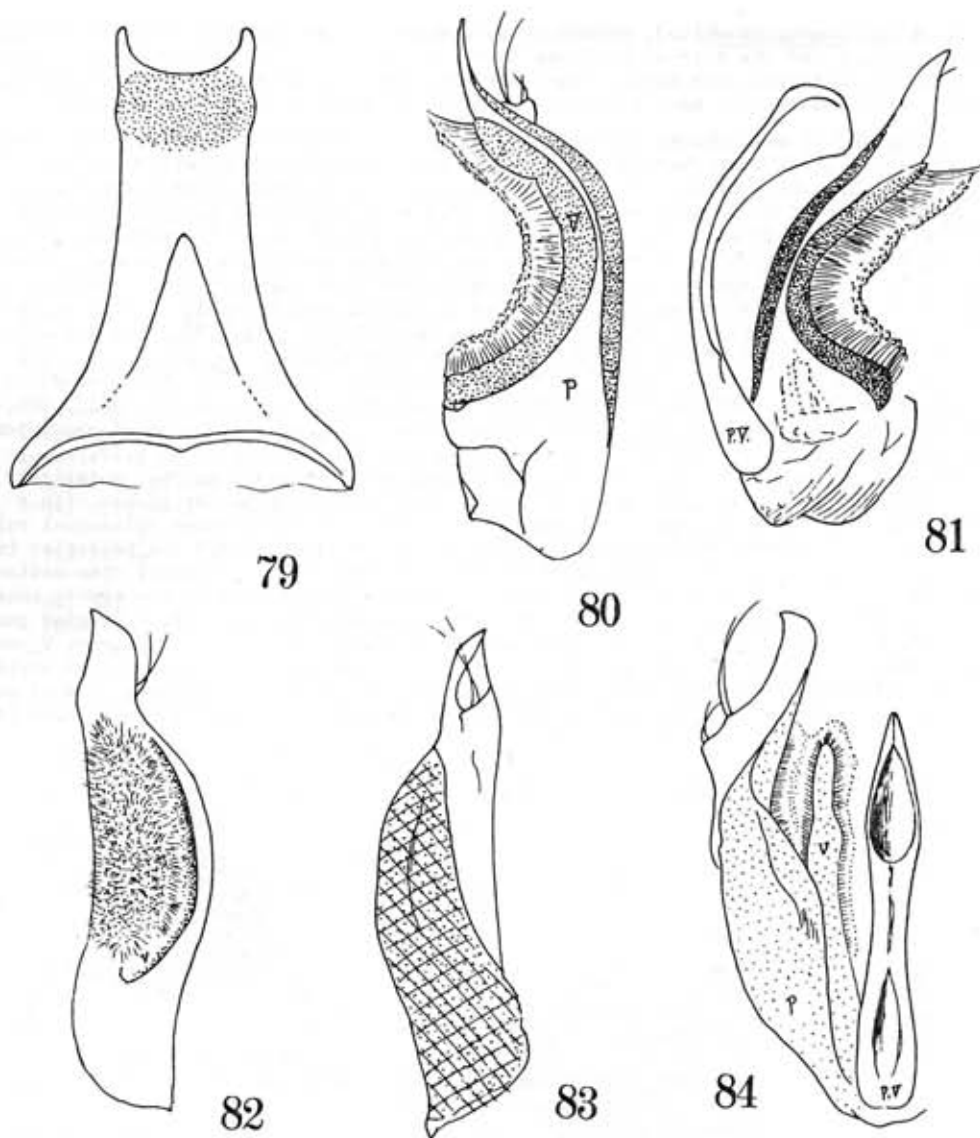
Clypeus and mandible: Fig. 77, disc of median lobe markedly convex, anteriorly bevel distinct, apical marginal area reflected, with posterior border marked with a line of fine punctures. Labrum and galea unobservable. On mesopleuron episternal sulcus distinct. Propodeum in lateral view with length ratio of dorsum and posterior inclination appr. 2:3, angle between them pointed and about 120°, in dorsal view medio-apical impression oval in form, nearly rounded, median apex raised in low minute cone. GT 7: Fig. 78, surface flat, GS 8 very characteristic in form: Fig. 79. Dissected genitalial paramere and volsella (left ones) seen from inside: Fig. 80 (P, paramere; V, volsella), volsellar hair very dense, right ones with penis valve, also seen from inside: Fig. 81, left ones in ventral view: Fig. 82 (V, volsella), hair of volsella and of paramere densely covering ventral surface without being separated, left paramere seen from



dorsal side: Fig. 83, right paramere, volsella and whole of penis valve in dorsal view: Fig. 84 (P, paramere; V, volsella; P.V., penis valve).

Mesoscutum finely and closely punctured, PIS 0.5-1 times PD, on antero-lateral areas punctures slightly sparser, PIS everywhere microcoriaceous, not shining, on mesopleuron punctures slightly larger and sparser; propodeum finely and sparsely punctured, PIS on both mesopleuron and propodeum distinctly microcoriaceous.

♀, 12.0 mm. Similar in colour to ♂, but legs with tibial spurs and spines all ferruginous, all tarsal joints at base and fore T5 pale brown. Labrum roundly, not strongly produced, pale brown in colour, surface flat. Hair silvery, only U-shaped tomentosa on mesoscutum somewhat brassy; hair on pygidium short, thick, pointed, all appressed, coppery brown in colour, without half erected long spines (originally ?).



Figs. 79-84. *Tachytes papuanus* sp. nov., ♂

This specimen is a worn-out female, with her mandibles and clypeus heavily rubbed down, clypeal apex without reflected marginal area, only gently rounded, anterior surface of the roundly elevated disc is also worn off, with punctures almost completely lost, but at sides of apical margin very faint trace of tridentate structure is observed, but without even the trace of medial incision.

HW, HL, IODv, A3=100, 45, 18, 14. IODv: A2+3: A3=10:12:8.5. A3, 4, 5=10, 9, 9. IODv: IODc (at base and apex)=10:28:33. CNL: CLL=20:10 (but apical margin rubbed down). AOD, WAS, IAD=8, 5, 5, 6. Abs. 1, 2, 3, 4, 5 of radius =10, 6, 8, 18, 1; those 1, 2, 3 of cubitus of cubital cell 2 =5, 5, 13 (same scale). Relative length of dorsal and posterior aspects of propodeum in lateral view =20:35, angle about 120°, but not so acute as in ♂ (posterior inclination is more rounded than in *modestus banoensis*).

Medio-apical impression of propodeal dorsum similar in form to ♂, very deep (much deeper than in *modestus banoensis*), the form of pygidial area as in *m. banoensis*.

Punctuation on mesothorax and propodeum as in ♂.

Holotype: ♂, New Guinea, Huon Golf, Satterberg, 1899, Biró leg. (Coll. Mus. Nat. Hung.).

Paratype: 1 ♀, New Guinea, Friedrich-Wilhelm-Hafen, 1896, Biró leg. (Do.).

19. Tachysphex novarae (Saussure, 1867)

Tachysphex novarae: Tsuneki, SPJHA, 24: 56, 1983 (list of ref., figs., Philippines).

Specimens examined: 1 ♀ (headless), New Guinea, Kwaranson, 21.XII.1898, Biró; 1 ♂, Berlin-Hafen, date? Lemien.

Remarks. From the female specimen the head is lacking, but it is easily identified with the present species from the characters of thorax and propodeum.

20. Lyroda formosa (Smith, 1858)

Morphota formosa Smith, J. Proc. Linn. Soc. London, 3(9): 17, 1858 (♀, Celebes).

Lyroda formosa: Williams, Ann. Mag. Nat. Hist., (10) 18: 130, 1936 (4 ♀, Solomon Is.).

Lyroda formosa: Tsuneki, SPJHA, 24: 77, 1983 (list of ref., redescr., figs., ♀ ♂, Philippines).

Specimens examined: 1 ♀, Is. St. Joseph., 1900, Biró; 1 ♀ 1 ♂, ditto.

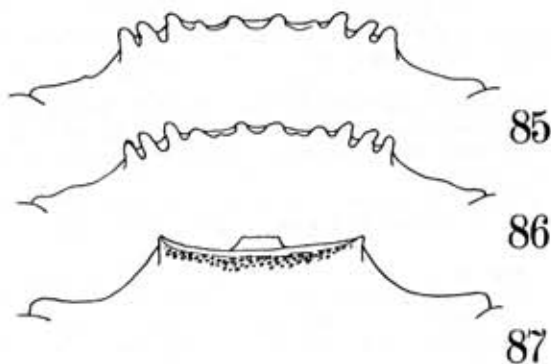
Remarks. In the New Guinean specimens examined the apical margin of the clypeus is as given in Figs. 85, 86 (♀) and 87 (♂). The adial pair of the teeth in ♀ is shorter and the intermediate one between the two sets is much weaker and more indistinct than in the Philippine specimens. In ♂ the medial prominence is smooth and polished and directly inclined from apical margin of the disc.

Measurements with ♀ ♀ ♂:

(One of the females is pinned below the male, so that some parts of this specimen are unmeasurable within parenthesis: ♂).

♀♂♂L, 10Dv, A3=100, 51, 47, 24; 100, -, 8, 24. (100, 54, 54, 16). In frontal view HW, HL, 10Dc=100, 74, 56; 100, 73, 55; (100, 74, 56). CML:CLL=20:6.5; 20:6; (20:12). AOD, CAS, IAD=6, 5, 7; 6, 5, 5, 8; (7, 5, 7). OOD, Od, POD, OCD=8, 3, 8.5, 15; 8, 3, 8, -; (8, 3, 9, 15). A3, 4, 5=10, 7, 7; 10, 7, 7; (10, 9, 9). A5=AW×3 (dorsal and minimum); =AW×3; (=AW×2). Abscissae 1, 2, 3, 4, 5 of radius (left) when abs. 5=4, =10, 4, 9, 9, 4; 10, 4, 9, 11, 4; (12, 4, 11, 16, 4). Abs. 1, 2, 3 of cubitus of cubital cell 2 under same scale =3, 9, 6.5; 3, 9, 7 (♂ unmeasurable). The length of the body: ♀ 8.5 mm, 9.0 mm and ♂ 7.0 mm.

In ♀ ♀ GL-2 red and G 6 brown, marginal area of pygidium ferruginous, hair coppery brown; in ♂ GT 1 and 2 black, with one or two scattered reddish patches, but on sides and beneath red, pygidial hair basally silvery and apically brassy, hair on clypeus silvery, but on frons, pro- and mesonotums, scutellum, postscutellum and gastral pile bands appearing in some light brassy. Pile bands are on GT 1-3 present in both sexes and in ♀, further, GT 5 wholly covered with short, velvety silky pile; in ♂ the hair on sides of GT 5 and whole of GT 6 appears in some light brassy.



The genus Trypoxylon Latreille

Five species of this genus were already described as new in No. 6 of SPJHA (1977), based upon the material of the Hungarian National Museum of Natural History, namely, T. japonum, dorsale, huonense, bituberculatum and longicorne.

Key to the species of *Pison* known from New Guinea

(♀ ♂)

- 1 Head and thorax without puncture, smooth and subopaque, gaster shining (clypeus broadly rounded out, $10Dv=A3$, $OOD=0$, $A3=A4$, propodeal dorsum medianly furrowed and carinated in middle, surface without striae, posterior aspect with a few transverse striae, hind tibial spur : hind T 1 = 3:4, abs. 1:2 of radius = 2:1, recurrent veins 1 and 2 interstitial with transverse cubital veins 1 and 2 respectively), 6 mm *impunctatum* Turner, 1912, ♀
- Head and thorax punctured 2
- 2 Punctures on frons and mesothorax large, strong and coarse 3
- Punctures on frons and mesothorax fine or medium-sized 6
- 3 Propodeal dorsum with lateral carinae, surface obliquely and coarsely striate, gaster smooth and polished and sparsely punctured, 7.5-9 mm
(not as yet been discovered from New Guinea, *punctifrons* Shuckard, 1857)
- Propodeal dorsum without lateral carinae, surface simply punctured or punctate-striate, gaster delicately microstriolate and moderately closely superimposed with punctures 4
- 4 Gastral sternite 2 somewhat sparsely covered with medium-sized uniform punctures, PIS 2-3 times PD, but punctures on narrow medio-apical area sparser and on extreme lateral areas slightly smaller and closer (tegula except postero-lateral quarter closely punctured), 8.5-10.5 mm *bismarckianum* Tsuneki, 1982
- Gastral sternite 2 more sparsely covered with somewhat large punctures, but on lateral areas punctures very fine (difference very marked) and central broad area impunctate, polished (tegula on basal third and inner fourth alone closely punctured) 5
- 5 $A3=Aw \times 2.8$, posterior elevation of vertex medianly excised (clypeus finely and closely punctured and sparsely mixed with somewhat large punctures, PIS on mesoscutum feebly microcoriaceous, frons without median carina), 7.5 mm
..... *biroi* sp. nov., ♀
- $A3=Aw \times 3.5$, posterior elevation of vertex without median furrow (clypeus closely covered with uneven punctures and mixed with markedly large, sparse punctures, PIS on mesoscutum strongly microcoriaceous, frons on lower half with a fine carina), 7.5 mm *huonense* sp. nov., ♀
- 6 Propodeal dorsum obliquely, strongly striate to the margin, clypeal hair silky white, so dense that ground sculpture completely invisible, 6.0-7.5 mm
..... *ignavum* Turner, 1908
- Propodeal dorsum punctate or partly punctate-striate, clypeal hair not so dense 7
- 7 A 1 broadly ferruginous beneath (medio-apical margin of clypeus broadly rounded, the area reflected, pronotal collar smoothly roundly raised in frontal view, without ridge or medial elevation, frons and mesoscutum somewhat finely, closely and uniformly punctured, PIS distinctly microcoriaceous, propodeal dorsum finely punctured, surface shining, wings except base broadly darkened, hair bands on gaster distinct, on GT 1 broad, on GT 2-5 narrow), 10-12.5 mm
..... *erimense* sp. nov., ♀
- A 1 black 8
- 8 Medio-apical prominence of clypeus transverse, partly ferruginous, apical margin only gently rounded, disc covered with long, curved coppery hair apically, $10Dv \neq A3+4$ (pile bands on gaster dense and distinct, collar of pronotum smoothly rounded, punctures on mesothorax fairly large and close, with PIS distinctly microreticulate), 10 mm *novaguineanum* sp. nov., ♀
- Medio-apical prominence of clypeus triangular, if rounded, less than 7 mm in body length, hair on apical part of disc not coppery, $10Dv < A3+4$ 9
- 9 6-7 mm ($10Dv:A3=5:3$, hind ocellus not contiguous to eye, mesoscutum finely and closely, mesopleuron finely and sparsely punctured, on both PIS strongly microcoriaceous, propodeal dorsum transversely, finely and closely striate, lateral carinae distinct, GS 3 in ♂ with a short transverse ridge in middle), broadly spread over Pacific Is. *iridipenne* Smith, 1879
- 9-11 mm 10
- 10 $OOD > POD$, wings subhyaline, punctures on mesoscutum and propodeum fine and close, propodeal dorsum simply punctured, without striae, (gastral segments moderately constricted at each base, longer hind tibial spur only slightly shorter than T 1, cubital cell 2 small, occupying a third the length of transverse cubital vein 1, GT 7 rugose, frons rugulose, eye incision opaque and smooth), 11 mm
..... *papuanum* Schulz, 1904, ♂

(Synonym: morosum Smith, 1864, nec 1856; constrictum Turner, 1912; ? collare Kohl, 1887).

- OOD \leq POD, wings fairly strongly darkened, punctures on mesoscutum and propodeum medium-sized, fairly large, propodeal dorsum laterally punctate-striate (gaster only between G 1 and 2 constricted, longer hind tibial spur distinctly shorter than T 1, cubital cell 2 about half the length of transverse cubital vein 1, GT 7 finely and closely punctulate, mesoscutum somewhat sparsely punctured, PIS feebly microcoriaceous, surface fairly shining, on mesopleuron punctures subcongruous, GS 2 densely punctate, PIS < PD, GS 3 without tubercle or ridge in δ), 9-10 mm hospes Smith, 1879

21. Pison iridipenne Smith, 1879

Pison iridipenne Smith, J. Proc. Linn. Soc. Lond., Zool., 14: 676, 1879 (δ , Hawaii).
Pison iridipenne: Krombein, Proc. Hawn. Ent. Soc., 13(3): 386, 408, 1949
Pison iridipenne: Williams, Occ. Pap. Bishop Mus., 18(21): 331, 1945 (Society Is.).
Pison iridipenne: Tsuneki, SPJHA, 19: 38, 1982 (Bismarck Arch., figs.)

Specimens examined: 2 δ 1 δ , Friedrich-Wilhelmshafen, 1896; 3 δ 3 δ , Erima, Astrolabe B., 1896; 1 δ , Seleu, Berlinhafen, 1896; 2 δ , Stephansort, Astrolabe B., 1897; 1 δ , same loco, 1899; 1 δ , Simbang, Huon Golf, 1898; 2 δ , Satterberg, Huon Golf, 1898, 1900; 1 δ , Malape, 1900, all leg. Bir6 (Coll. Mus. Nat. Hung.).

The female specimens above listed well agree in characters including the measured values with those of the Bismarck Islands specimens previously (1982) redescribed by me. The males are also very similar in general, but in this sex there are some important differences between the two populations: (1) In 5 out of the 6 specimens, besides the short transverse ridge on GS 3, there is a mammiform tubercle in middle of GS 4, and in one of them even on GS 5 a similar but smaller and weaker tubercle is present. (2) GS 8 relatively broader and shorter. (3) Genitalia volsella is in lateral view broader, not narrowed apically, but subparallel-sided. (4) Parameral hair not covering the outer zone of ventral side, but a series of long, curved bristles arranged on outer margin as a fringe - compare Figs. 91 (ventral), 92 (lateral) and 93 (ventro-lateral) with Figs. 79 and 80 of my 1982 paper. But this last may be an apparent difference based on the fact that the hairs are glued together during the preparation.

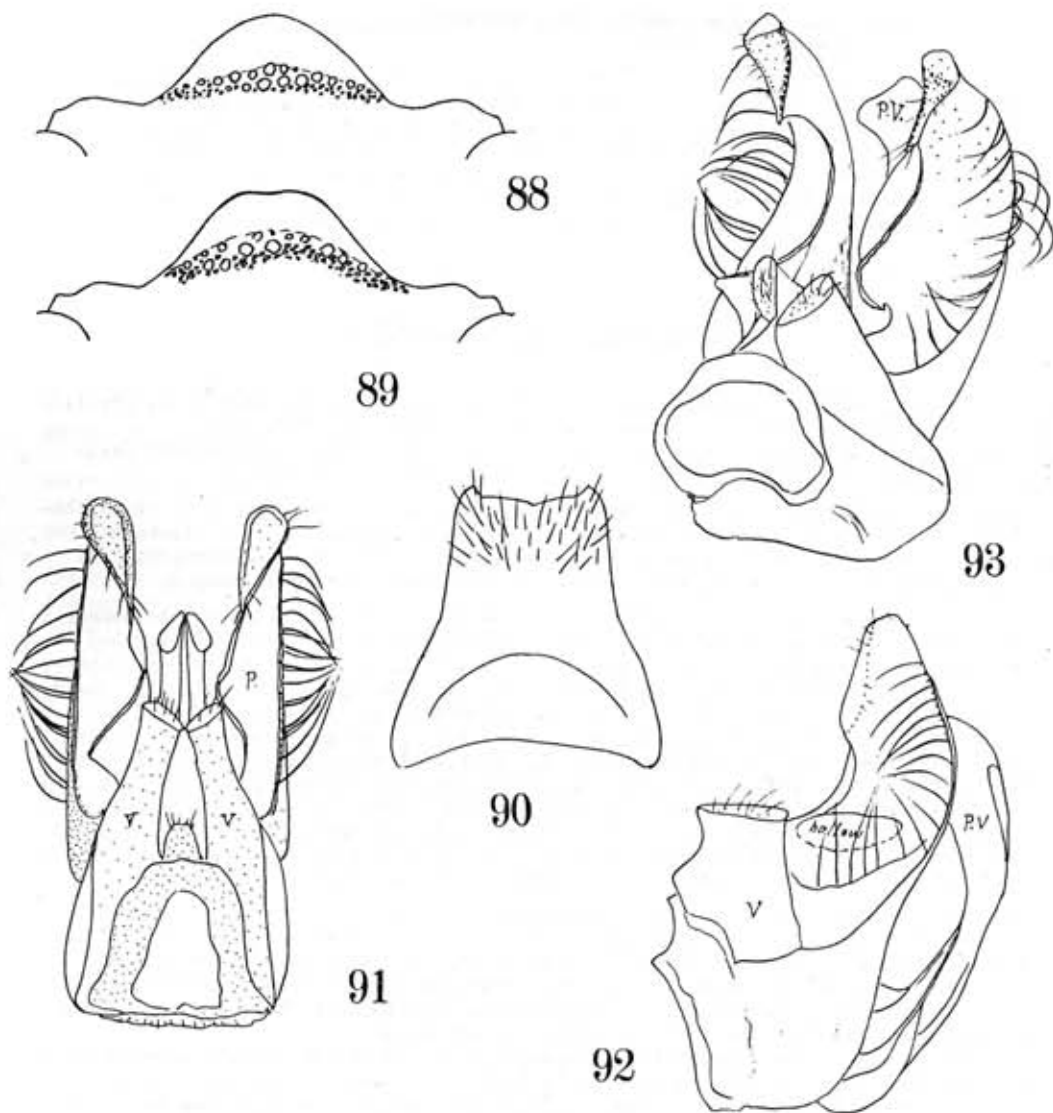
On some characters of the Papuan specimens.

δ . Length 7.0-7.5 mm. Apical margin of clypeus usually: Fig. 88, but in one of the specimens from Stephansort it is as given in Fig. 89. Seen from above occipital margin roundly emarginate and the frons roundly produced, with median area broadly straight, HW, HL, IODv, A3=100, 46, 18, 17. OOD, Od, POD, OCD=1, 10, 5, 28. Seen in front IODv, IODi, IODc=10, 40, 20. A3, 4, 5=10, 8, 5, 8. A3=AW \times 2.7 (dorsal).

δ . Length 5.0-6.0 mm. HW, HL, IODv, A3=100, 54, 23, 14. Occipital margin roundly emarginate, but much less strongly so than in δ , frons more roundly produced than in δ , without being broadly flattened in middle, hence HL relatively longer than in δ . OOD, Od, POD, OCD=1, 10, 8, 32. IODv, IODi, IODc=10, 31, 17. Eye incision broader and shallower than in δ . A3, 4, 5=10, 7, 5, 7. A3=AW \times 2.8 (dorsal). As to the gastral tubercle or ridge Krombein (1949) says that in the typical specimens a short transverse ridge is present. In the Philippine males, however, the character of GS 3 varies considerably, some being completely unarmed, while others having a median tubercle, a pair of tubercles or a short transverse ridge. The presence of the additional tubercle on GS 4, or GS 4 and 5 in the Papuan specimens may fall within this variation, since in one of them GS 4 is completely unarmed as in the typical specimen.

22. Pison hospes Smith, 1879

Pison hospes Smith, J. Proc. Linn. Soc. Lond., Zool., 14: 676, 1879 (δ , Hawaii).
Pison hospes: Williams, Occ. Pap. Bishop Mus., 18(21): 331, 1945 (Society Is. with the distribution records).
Pison hospes: Krombein, Proc. Hawn. Ent. Soc., 18(3): 404, 1949 (Marshall and Caroline Is., list of ref.).



Figs. 88-93. *Pison iridipenne* Smith, 88-89, ♀; 90-93, ♂

Pison hospes: Tsuneki, SPJHA, 19:37, 1982 (♀ ♂, Bismarck Arch., redescr., figs.)

Pison hospes: Tsuneki, Ibid., 24: 95, 1983 (♀ ♂, Philippines, ditto).

Specimens examined: 1 ♀, Seleo, Berlinhafen, 1896; 3 ♀ 1 ♂, Prima, Astrolabe I., 1896; 4 ♀ 2 ♂, Friedrich-Wilhelm-Hafen, 1896; 10 ♀ 4 ♂, Stephansort, Astrolabe I., 1897; 2 ♀, Simbang, Huon Golf, 1898, all leg. Biró.

In the Papuan specimens of this species the punctures on the mesothorax are somewhat larger than in the specimens from the Philippines. In order to see the variation of measured values (including technical error) 10 ♀ 5 ♂ specimens from various localities were examined. The results were given in Table 4.

Remarks. A Javanese female specimen that is collected at Beutensorg and is mixed among the Papuan representatives has the medio-apical tooth of the clypeus broadly yellowish ferruginous in colour. This is quite exceptional.

Table 4. Variations in the measured values on parts of the head and antenna in the Papuan specimens of Pison hospes Smith

Loco	Sex	HL	IODv	A3	IODv	i	c	A3=AWK	A3	A4	A5	OOD	Od	POD	OCD
Seleo	♀	53	23	18	10	30	18.5	3.0	10	9.0	8.5	2.0	5.0	3.0	14
Erima	♀	53	22	18	10	31	19.0	3.0	10	9.0	8.0	2.0	5.0	3.0	14
"	♀	53	22	19	10	30	18.5	3.2	10	9.0	8.5	2.0	5.0	3.0	15
"	♀	52	23	18	10	32	19.2	3.0	10	9.0	8.0	2.0	5.0	3.0	15
Friedr.	♀	53	22	18	10	32	19.0	3.2	10	9.0	8.0	2.0	5.0	3.0	14
"	♀	51	22	18	10	32	19.0	3.0	10	9.0	8.0	2.0	5.0	3.0	16
Steph.	♀	50	22	18	10	32	19.0	3.0	10	9.0	8.0	2.0	5.0	3.0	15
"	♀	50	23	18	10	32	18.0	3.3	10	8.5	8.0	2.0	5.0	3.5	15
"	♀	50	24	18	10	30	18.0	3.0	10	8.5	8.0	2.0	5.0	3.0	15
Simb.	♀	50	23	18	10	31	18.0	3.3	10	9.0	8.0	2.0	5.0	3.0	16
Erima	♂	53	28	17	10	25	15.2	3.0	10	9.0	8.0	4.5	5.0	4.5	20
Friedr.	♂	54	28	16	10	26	15.5	3.0	10	9.0	8.0	4.0	5.0	4.5	19
Steph.	♂	54	26	16	10	26	15.5	3.0	10	9.0	8.0	4.0	5.0	4.0	20
"	♂	53	27	16	10	26	15.0	3.3	10	8.5	8.0	3.0	5.0	3.5	17
"	♂	53	25	17	10	27	16.0	3.0	10	9.0	8.0	3.0	5.0	3.0	17

Remarks. In HL:IODv:A3 scale is HW=100. IODv: i : c = IODv:IODi:IODc.
 In Loco Fried. = Friedrich-Wilhelm-Hafen. Steph. = Stephansort.
 Simb. = Simbang.

23. Pison ignavum Turner, 1908

Pison ignavum Turner, Proc. Zool. Soc. Lond., 30: 511, 1908 (♀ ♂, Australia).
Pison ignavum: Krombein, Proc. Hawn. Ent. Soc., 13(3): 404, 1949 (Caroline Is.).
Pison ignavum: Tsuneki, SPJHA, 19: 36, 1982 (♀ ♂, Bismarck Arch., measurement., figs.).
Pison ignavum: Tsuneki, Ibid., 24:89, 1983 (♀ ♂, Philippines, measurement., figs.).

Specimen examined: 1 ♂, Erima, Astrolabe B., 1896, Biró.

Observation. Length 7.0 mm. Legs markedly turned brown, especially the fore leg except coxa. Clypeal hair not silky white and soft, but silvery and rather stiff, but dense, completely covering the surface sculpture. Measurements: HW, HL, IODv, A3=100, 53, 34, 12. OOD, Od, POD, OCD=6, 5, 5, 16. IODv:IODi:IODc=10:22:12.3. IODv:A3=10:4. A2, 3, 4, 5=6, 10, 10, 10. A3=AWK2.5(dorsal) or =AWK2.0(lateral). Post-ocellar furrow is strong and deep.

This Papuan specimen well agrees in characters, except the relative length of A3, with the specimen from the Lavongai Is., the Bismarck Archipelago.

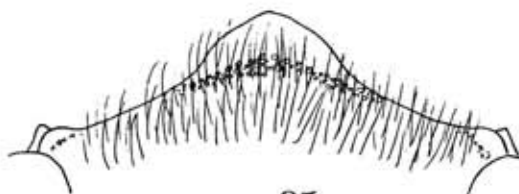
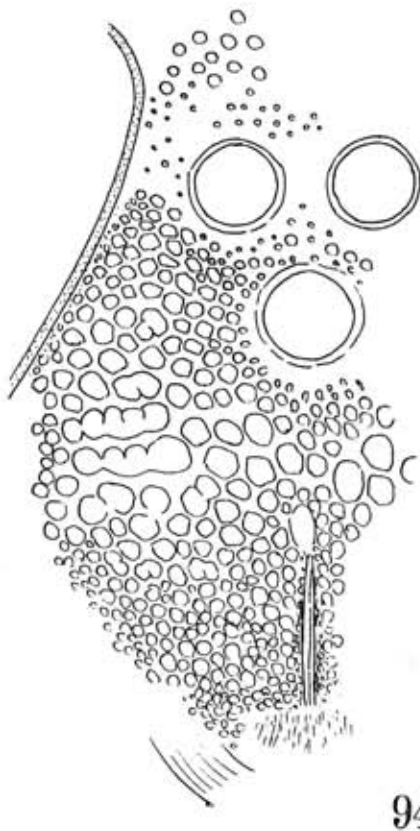
24. Pison bismarckianum Tsuneki, 1982

Pison bismarckianum Tsuneki, SPJHA, 19: 41, 1982 (♂ ♀, Bismarck Archipelago, 18 figs.)

Specimens examined: 3 ♀, Simbang, 1899, 1900, 1900, Biró; 1 ♀, Friedrichwilhelmhafen, 1896, Biró.

Observation. The Papuan specimens observed differ from the Bismarck specimens slightly in punctuation. Punctures on frons and vertex generally slightly larger, but the size distribution - Fig. 94 - and the delicate microreticulation on PIS similar. Propodeal dorsum without basal crenation and on medial furrow transversely shortly striate (not crenate, this is due to that the furrow is broader), on lateral areas to verge to the sides without longitudinal series of short transverse striae, but simply punctured; punctures on gastral tergites much larger, especially marked on GT 1.

Frontal median furrow indistinct, median carina at anterior part short, well defined as in the Bismarck specimen (Fig. 94), but antero-lateral areas of frons simply gently roundly raised, not obliquely ridged as in this. Clypeus (Fig. 95) with medio-



95

Figs. 94-95. *Pison bismarckianum* Ts., ♀

apical prominence broader than in Bismarck specimens of usual form, rather similar to that of the wider variation shown with Fig. 103 of my 1982 paper. Head in profile with occipital carina highly raised and reaches buccal carina, gradually lowering. In fore wing recurrent veins 1 and 2 are received by cubital cells 1 and 3 respectively as in Fig. 101 of this paper. Punctures on GS 2 at base and on sides fairly close, but on medio-apical area very sparse.

Tegula black, except a quarter at postero-outer area fairly closely covered with punctures, punctures very fine and close, and gradually larger (to medium-sized) and somewhat sparser posteriorly. Mesoscutum on central broad area grossly and sparsely punctured (punctures larger than those on vertex), but at base and apex punctures finer and closer, with PIS smooth and shining; PIS on mesopleuron and propodeum similar; GT 1 on basal third finely and distinctly grooved in middle, almost without puncture, on the disc moderately largely

and sparsely punctured, with PIS 2-3 times PD and very feebly microcoriaceous, at apical marginal area finely and closely punctured. Measurements with two specimens:

HW, HL, IODv, A3=100, 44, 21, 17; =100, 44, 21, 17. OOD:Od:POD:OCD=3.5:5:3.5:18, =2.5:5:2.5:19. IODv:IODi:IODc=10:33:21.5:8.5, =10:33:21:8. HW:HL in frontal view =100:83, =100:82. IODc:CW:CL=20:22.5:13, =20:22:12.5. AOD,WAS:IAD=7.5:5:9, =8:5:10. A3:4:5:11:12=10:8.5:8:5:6.5, =10:8.5:8:5:6.5. A3=AW×3.4(dorsal), =AW×3.3(do.). A12=HW×2.6, =HW×2.7.

Remarks. The present species is similar in general characters (especially of the head) to *Pison collare* Kohl, 1883, described from Australia (Duke of York Is.) (Bohart and Menke, 1976, listed it as described in 1887 from Bismarck Archipelago and the Solomon Islands), but differs from it, according to the Kohl's description, markedly in the much stronger punctation of thorax and gaster, and there is no doubt that it belongs to a different species.

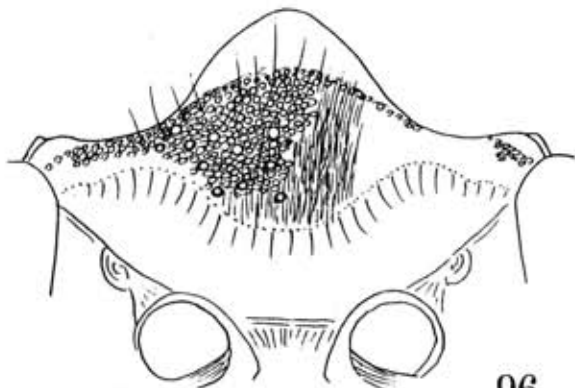
25. *Pison biroi* sp. nov.

The present species (♀) may be a variation of *P. bismarckianum* m., but it is much smaller in body size, bearing the head much thicker, frons without median carina on its lower half, A 3 shorter and the impunctate area of the tegula much broader. Based upon such differences it is dealt with as a separate species. Final determination must be done, however, by the future comparative study of the male genital organs.

♀, 7.5 mm. Black; mandible on apical half dark brown, except black extreme apex, antenna completely black, tegula black; spurs, spines, hairs and claws of tarsi brownish. Wings hyaline, very slightly darkened, veins dark brown. Hair silvery, not so

dense as in *bismarckianum*. Pile bands at apical margins of *Gf* 1-4, not marked, on lateral areas only in some light discernible. Measurements:

HW, HL, IODv, A3=100, 52, 22, 16. OOD:Od:POD:OCD=2:5:2.5:15. IODv:IODi:IODc:A3=10:32:20:7. HW:HL in frontal view =100:85. IODc:CL=20:22:13.5. AOD:WAS:IAD=7:5:9. A3, 4, 5, 11, 12=10, 8, 7, 4, 6, 5. A3=AW×2.8. A12=BW×2.3 (lateral).



96



97

Figs. 96-97. *Pison birói* sp. nov., ♀.

Ocelli in a triangle, slightly higher than the equilateral, similar in size to each other, fore ocellus in a large shallow hollow which is triangularly extended forwards, but ending above middle of frons, ocellar area not raised, inclined backwards with hind ocelli, vertex from posterior margins of hind ocelli gently

raised to post-ocellar elevation, forming a lunate depression behind ocelli, bearing a transverse shining bottom line just behind hind ocelli, the depression narrowly extended in middle backwards as a short longitudinal furrow, cutting the elevation and reaching its top height; frons without central tubercle, without shining carina running thenceforth; instead with a very fine impressed line there, the antero-median area of frons including the impressed line slightly depressed as a whole and on dorso-lateral margins of which the surface of the frons gently roundly raised as in the New Guinean specimens of *P. bismarckianum*, but not ridged there; clypeus: Fig. 96. Head in profile with temple slightly shorter than eye, occipital carina highly raised, lowering towards the buccal carina, but not reaching it. Antenna relatively shorter than in *bismarckianum*, collar of pronotum with top line bluntly carinated, carina medianly acute and subtriangularly roundly raised in frontal view (Fig. 97) and at lateral ends incrassate into transverse and rounded cones (inside of the lateral rounded top surface transversely ridged); on mesoscutum notaulus is a series of punctures running to near apex, parapsidal suture is a short impressed line; on mesopleuron episternal furrow distinct, foveolate, scrobal furrow from scrobe posteriorly distinct, not foveolate, shining. Propodeal dorsum medianly with a broad and shallow furrow, not well outlined, without median carina, also without lateral carinae, median furrow of posterior inclination not reaching apex, in lateral view dorsal and posterior aspect same in length, forming an angle of about 120°, with top broadly rounded. *Gf* 1 as long as wide, basal flat area medianly finely grooved, *Gf* 1-4 with posterior margins depressed, having a pair of short transverse swelling before each depression as usual. In fore wing recurrent vein 1 received by cubital cell 1 a short distance before transverse cubital vein 1, recurrent vein 2 interstitial with transverse cubital vein 2.

Frons strongly, coarsely punctate-reticulate with irregular-sized (including large) punctures, size distribution generally similar to that of *bismarckianum* (Fig. 96), but the difference in size is not so marked as in this species, with PIS similarly strongly microreticulate. Clypeus much more finely, closely punctured, punctures generally **unifrom** but mixed very sparsely with somewhat large punctures, with PIS shining. Punctuation, striation and microreticulation of thorax-complex and gaster are generally similar to those of the compared species of the Papuan representatives. However, punctures on these areas are, on an average, slightly smaller and closer, on mesoscutum PIS≠PD and punctures on tegula are confined to narrow anterior part and inner margin only, with the greater part smooth and polished.

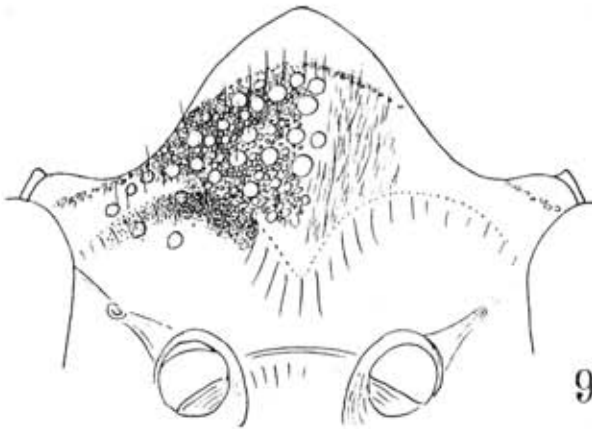
♂ unknown.

Holotype: ♀, Simbang, Huon Golf, 1899, Biró leg. (Coll. Mus. Nat. Hung.).

26. Pison huonense sp. nov.

This species (♀) may be a variation of the preceding species or of bismarckianum. It is similar to biroi in body size, punctation of tegula and general other characters, but differs from this in that medio-apical carina of frons is present, though incomplete as compared with bismarckianum, A3 much longer, clypeus also relatively longer, antenna apically beneath brownish; from bismarckianum in that body is smaller, head is thicker, tegula more broadly impunctate, GS2 more irregularly punctured, and from both in that clypeal punctures much more irregular in size (Fig. 98), posterior elevation of vertex without medial furrow, PIS on mesoscutum distinctly microreticulate, GT 1-4 with apical depressions much weaker and with latero-apical incassations much more feeble and indistinct and tarsi of legs relatively longer.

Coloration generally as in biroi, but wings somewhat more distinctly infusate. Hair similar to that of biroi, on frons long and soft hair sparsely erected, longer



than in bismarckianum.
 HW, HL, IODv, A3=100, 48, 20, 19.
 OOD, Od, POD, OCD=2, 5, 3, 17. IODv,
 IODi, IODc=10, 36, 23. IODv:A3=
 10:9. HW:HL in frontal view =
 100:86. IODc: CW: CL=20:24:15.
 AOD: WAS: IAD=7:5:8.5. A3, 4, 5,
 11, 12=10, 8, 7.5, 5, 7.5. A3=AW×
 3.3. A12=BW×2.7.

Clypeus: Fig. 98, punctures on disc much more markedly irregular than in two species compared. Postocellar depression medianly interrupted by low elevation extended from interocellar area, so that there is no medial incision on posterior elevation of vertex; punctuation and microreticulation on frons similar gene-

rally to those of biroi. Head in profile similar in form to that of biroi, but elevation of occipital carina much higher; in structure of pronotum also similar to this species, but with lateral incassations more rounded, without transverse carina inside; punctation of thorax is, except the distinct microreticulation on PIS, similar to that of biroi.

Propodeal dorsum more sparsely punctured than in biroi and sometimes at base mixed with oblique striae, medial furrow weaker than in biroi, with short transverse striae also weaker and confined in distribution to posterior part only (but this may vary). Sculpture on sides and posterior inclination also similar to this.

Gastral segment 1 similar in form to biroi, but medial furrow on basal flattened area broader, otherwise as given above regarding the gastral comparison.

Tarsal joint 1 half the length of preceding tibia as in the compared two species, but in the present species each distinctly finer than in the two (in biroi thickest) and appears slenderer and longer.

♂, unknown.

Holotype: ♀, Huon Golf, Satterberg, 1899, Biró leg. (Coll. Mus. Nat. Hung.).

Paratype: 1 ♀, same data.

Remarks. The final determination of the true state of the present species must be done by the comparative study of the male, especially of the genital organs.

27. *Pison novaguineanum* sp. nov.

In the Turner's key to the Australian species of *Pison* the present species (♀) runs to couplet 35 and runs out, because in this species A3 is distinctly longer than A4, but punctures on gastral segments above are distinct and close.

The present species is characteristic in the following characters:

Medio-apical margin of clypeus nearly transverse, very gently rounded out (Fig. 98), IODv markedly broader and the ratio of IODi, IODc and A3 to IODv are smaller accordingly, pronotum without median elevation, punctures on head, thorax and gaster comparatively small and close, with PIS everywhere distinctly microcoriaceous, propodeal dorsum sparsely punctured and feebly microcoriaceous without striae, but with lateral carinae, though somewhat incomplete, and 1st and 2nd recurrent veins are received by 1st and 3rd cubital cells respectively close to transverse cubital vein 1 and 2 (almost interstitial).

♀. Length about 10 mm. Black, mandible except base and apex broadly ferruginous, antenna on apical half beneath dark brown, tegula and basal plate of wing pale brown, the former translucent, apical margins of GT-GS 4,5,6 comparatively broadly translucent yellowish brown, fore tibial spurs and all tarsi slightly brownish, more marked on the claws. Wings hyaline, slightly brownish, veins dark brown. Hair somewhat longer and closer than usual, not silverily glittering, rather lustreless silky white (? once moistened), on lower frons and upper clypeus with somewhat a brassy tint, dense, on apical part of clypeus turned to long curved somewhat stiff and brown or coppery hair (Fig. 99), on thorax-complex, except scutellum and propodeal dorsum, closer than

usual and on gaster closely covering the apical depressed areas of GT 1-5, forming a broad pile band on each which is on GT 1-2 silky white, but on GT 3-5 appearing somewhat brassy (this is due to the yellowish brown ground coloration).

Measurements:

HL, HL, IODv, A3=100, 45, 28, 16.
 OOD, Od, IOD, OCD=4, 5, 4, 14. IODv:
 IODi:IODc=10:28:15. IODv:A3=10:
 6.5. HW:HL in frontal view =100:
 32. IODc:CL=20:23:15. AOB, CAS,
 IAD=8, 5, 8. A3:4:5:12:13=10:7:6.5:



99

3.5:6. A3=AW×3 (dorsal), A3=HW×2.2.

Head seen from above with ocelli in a triangle, very slightly higher than equilateral one, similar in size, pupil distinct, yellow and hind ones each with a broad central transparent (=black) window (constant?), ocellar area gently raised, each ocellus in a shallow hollow, in hind ones small and in fore one large, hind ocellus inclined postero-laterally and its posterior margin roundly bordered with deep shining furrow, but the furrows not connected with each other, though interspace depressed somewhat in front of post-vertical elevation, the broad shallow hollow around fore ocellus extended anteriorly to weak frontal furrow, which is replaced from mid point of frons with a shining carina, top of which is minutely tuberculate, the carina is not accompanied with a furrow on each side and frons at verge to scapal hollow not roundly elevated nor obliquely ridged. Clypeus: Fig. 99. Head in profile with occipital carina low, very indistinct. Pronotum with collar comparatively thick, dorsal surface smoothly rounded in frontal view, also in lateral view, without transverse carina or ridge on median area, mesoscutum with admedian suture and notauli indistinct, parapsidal suture short shining impressed line and from the posterior end of which a short fine raised line runs till apical margin which is well defined in certain light; scutellum gently rounded, postscutellum medianly weakly incised; on mesopleuron epimeral area only weakly raised, scrobe distinct but scrobal furrow weak, while episternal furrow distinct, but fine. Propodeal dorsum with fine shining and minutely zigzagged lateral carinae, originating at a short distance behind spiracle and runs till apex, medial furrow comparatively deep, somewhat broad, parallel-sided, reaching apex and medianly finely carinated and shortly costate on each side of the carina, posterior aspect flattened, medianly deeply furrowed, but the furrow confined to upper half, in lateral view slightly longer than dorsum, forming with it an angle of about 120°. G1 as long as

wide at apex, with baso-dorsal flat area reaching about middle of the segment and medianly longitudinally finely impressed, apical marginal areas of GT 1-4 comparatively broadly depressed, but without a pair of the particular incassation or swelling in front of the depression, as a whole without constriction (because the depressions are densely filled with appressed hair).

Frons and vertex closely covered with fine, shallow punctures, PIS < PD and PIS strongly microcoriaceous or microgranulate, surface dull and opaque and, moreover, fairly closely covered with comparatively long, curved, somewhat brassy hair; pronotum similar, but punctures finer, closer and weaker, on posterior depressed area hairs are dense and reversely erected, punctures on mesoscutum slightly larger, deeper and sparser, PIS 1-2 times PD, but on medio-anterior area finer and closer and on postero-mid-lateral areas very fine and very close, with PIS strongly microreticulate, on scutellum punctures generally much sparser, but irregular in distribution, on postscutellum finer and closer, on mesopleuron much stronger, mixed with somewhat larger ones, PIS irregular, partly as large as, but mostly less than, PD, punctures partly contiguous into short puncture-lines, irregular in direction, metapleuron finely and closely punctured. Propodeal dorsum on central broad area sparsely punctured, punctures medium-sized, as large as those on mesoscutum, with PIS 1-3 times PD, with microsculpture weaker, surface fairly shining, but laterally, especially postero-laterally punctures closer, somewhat larger, transversely subrugosely arranged, posterior aspect transversely, strongly and coarsely striate or carinate, interspaces weakly foveolate or punctulate, sides obliquely, strongly punctate-striate, punctures generally larger than those on dorsum, mostly obliquely elongated and subcontiguous, on posterior aspect and sides without microreticulation, surface shining. Gastral tergite 1 finely, sparsely and weakly punctured, PIS distinctly microcoriaceous, but on posterior area in front of the hair banded posterior depression punctures closer and deeper, GT 2 more closely and more finely punctured, GT 3,4,5 with punctures gradually finer, closer and shallower posteriorly, GS 2 finely (strictly with somewhat larger punctures mixed) and closely punctured all over, PIS 1-2 times PD, but on lateral areas punctures finer and closer.

♂, unknown.

Holotype: ♀, British New Guinea, date undescribed, leg. Mazalan (Coll. Mus. Nat. Hung.).

28. Pison erimaense sp. nov.

A large species and characteristic in having the close, fine punctules covering whole the body, with PIS on frons and mesothorax microcoriaceous and on propodeal dorsum and gaster without microreticulation. It is also characteristic in having the moderately darkened wings, distinct gastral hair bands, fairly strong lateral carinae of propodeal dorsum and ferruginous underside of A1.

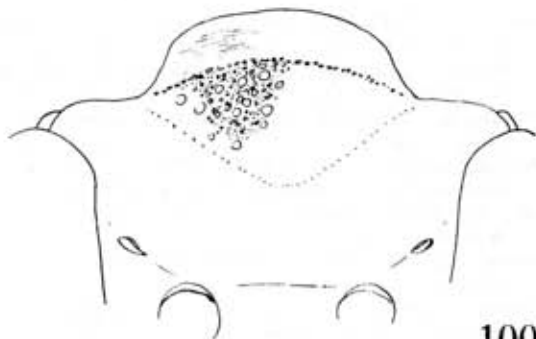
♀. Length 10.0-12.5 mm. Black, A1 broadly beneath, A2 at apical ring, tegula and basal plates of wings, knees and all tibiae on inner side apically ferruginous, tarsi dark brown. Wings except basal area distinctly brownish. Hair silvery, not long, not close, only on inner orbits below eye-incisions dense, with silky lustre, on apical part of clypeus long, curved, with coppery shine, hair of pile bands on gaster short, dense, greyish white, the band on GT 1 comparatively broad, on GT 2-5 narrow, but distinct, in oblique light silverily glittering.

Table 5. Measurements on the types of Pison erimaense sp. nov.

HW	HLIODvA3	HLfr	OOD.Od.	POD.OCD	IODvIODiIODc	A3	A4	A5	A3=AW	AOD	WAS	IAD						
100	45	26	18	84	4	5	3	14	10	29	15	10	7	6	3.7	5	5	7
100	48	26	18	84	4	5	3	16	10	29	15	10	7	6	3.3	6	5	8
100	46	26	18	85	4	5	3	14	10	29	15	10	7	6	3.3	6	5	8
100	46	26	18	86	4	5	3	15	10	29	14	10	7	6	3.0	6	5	8

HLfr ... Head length in frontal view.

Fore ocellus in a large and comparatively deep hollow, hind ocelli inclined posteriorly, with deep transverse depression behind them and in front of posterior elevation of vertex, the depression medianly obscurely interrupted by the low, weak ridge that is extended from interocellar elevation, frons without distinct medial furrow, but from mid point through anterior inclination longitudinally strongly carinated, anterior and antero-lateral inclinations of frons markedly higher than usual and elevation of clypeal disc is marked, thus the scapal hollows including bases of antennae becoming very deep. Clypeus: Fig. 100, medio-apical glabrous area distinctly reflected. Head in profile with occipital carina very low, completely covered with dense hair. Pronotal collar in frontal view gently roundly raised, without median and lateral elevations, but with transverse ridge, dorsal surface without anterior border, smoothly roundly inclined forwards; on mesoscutum admedian lines and notauli in 4 short impressed lines, shining, the former slightly longer, parapsidal sutures



also in short impressed lines, posterior margin with or without weak crenae, scutellum with a minute medio-posterior tubercle; on mesopleuron scrobe large and deep, episternal furrow distinct and foveate. Propodeal dorsum with distinct lateral carinae, accompanied inside with a longitudinal series of foveae arising at a distance from spiracle inner-dorsally and reaching anterior margin of lateral excavation of posterior aspect, dorsum at base strongly foveolate and in middle comparatively deeply and narrowly furrowed, bearing a distinct and complete medial carina, the furrow sometimes roundly enlarged posteriorly, always strongly foveate on each side of medial carina; posterior aspect flattened, forming an angle of about 130° with dorsum, medial furrow narrow, confined to dorsal half only. GT 1-4 deeply depressed at each posterior margin, but the apparent incrassation in front of each is not provided with a pair of particular swellings at mid-lateral areas of the incrassation; as the depressions are filled with hair bands the gaster as a whole does not give an impression of being constricted in dorsal view. In fore wing recurrent veins 1 and 2 are received by cubital cell 2 close to transverse cubital veins 1 and 2 or interstitial, but never by cubital cell 1 or 3.

Frons and vertex finely and closely punctured, PIS < PD, microreticulation on PIS strong and surface dull and opaque, on mesoscutum punctation similar, but microsculpture weaker, surface somewhat shining, on episternum of mesopleuron punctures slightly larger and slightly sparser, microsculpture weaker and surface more shining. Propodeal dorsum at central area sparsely punctured, punctures gradually closer laterally and transversely, rugosely arranged and finally mixed with transverse rugae, sides dorsally strongly and transversely punctured, on lower half transversely, somewhat arcuately, strongly and coarsely striate, mixed with punctures, posterior aspect covered with very strong transverse carinae, almost without puncture. GT 1-6 finely and closely punctured, punctures finer and closer posteriorly, on GS 2 punctures slightly larger than on GT 2, fairly close, uniformly covering all over, but on lateral areas punctures finer and closer.

♂, unknown.

Holotype: ♀, New Guinea, Erima, 1896, Biró leg. (Coll. Mus. Nat. Hung.).

Paratypes: 3 ♀, same data (ditto).

Remarks. In two of the paratypes the head is partly devoured by noxious insects and in the other the contents of the thorax is completely emptied from beneath.

References

Dohart, R. M. and A. S. Menke. 1976. Sphecoid Wasps of the World. A Generic Revision. Univ. Calif. Press. 695 pp.

- Cameron, P. 1889. Mem. Manch. Lit. Phil. Soc., (4) 2: 16.
- 1904. Description of new genera and species of hymenoptera from India. Zeitschr. Sys. Hymen. Dipt., 4: 5-15.
- 1906. Hymenoptera of the Dutch Expedition to New Guinea in 1904 and 1905. Part 1. Thynnidae, Scoliidae, Pompilidae, Sphegidae and Vespidae. Tijds. Ent., 49: 215-233.
- 1911. Hymenoptera (except Anthophila and Formicidae) in Nova Guinea, 9 (2): 185-248.
- 1913. On the Hymenoptera (exclusive of the Anthophila and Formicidae) collected by Mrs. de Beaufort in the Papuan Islands of Waigeu and Saonek, in PIAEDA ITINERIS a L. F. de Beaufort in Archipelago indico facti annis 1900-1910. 8. Bijdr. Dierk. k. Zool. Genot. "Nat. Art. Mag." Amsterdam, 19: 75-86.
- Krombein, K. V. 1949. The aculeate Hymenoptera of Micronesia. I. Scoliidae, Mutillidae, Pompilidae and Sphecidae. Proc. Hawm. Ent. Soc., 13 (3): 367-410.
- Menke, A. S. and R. N. Bohart. 1979. Sphecid Wasps of the World: Errors and Omissions (Hymenoptera: Sphecidae). Proc. Ent. Soc. Wash., 81(1): 111-124.
- Maidl, F. 1925. Fauna Sumatrensis (Beitrag Nr. 11). Sphegidae (Hym.). Ent. Mitt., 14 (5-6): 376-392.
- Pulawski, W. J. 1975. Synonymical notes on Larrinae and Astatinae (Hymenoptera: Sphecidae). J. Wash. Acad. Sci., 64 (4): 308-323.
- 1977. A synopsis of *Tachysphex* Kohl (Hym., Sphecidae) of Australia and Oceania. Polsk. Pism. Ent., 47: 203-332.
- Ritsema, C. 1872. Description of a new genus and two new exotic species of the family Larridae. Ent. Mon. Mag., 9: 121-123.
- Smith, F. 1856. Catalogue of Hymenopterous Insects in the collection of the British Museum. IV. Sphegidae, Larridae and Crabronidae. London.
- 1858. Catalogue of Hymenopterous insects collected at Celebes by Mr. A. R. Wallace. J. Proc. Linn. Soc. London, 3(9): 4-26.
- 1859. Catalogue of Hymenopterous insects collected by Mr. A. R. Wallace at the Islands of Aru and Key. Ibid., 3 (11-12): 132-177.
- 1860. Descriptions of new species of Hymenopterous insects collected by Mr. A. R. Wallace at Celebes. Ibid., 4, Suppl., 57-93.
- 1860. Catalogue of Hymenopterous insects collected by Mr. A. R. Wallace in the Islands of Bachian, Kaissa, Amboyna, Gilolo, and at Dory in New Guinea. Ibid., 5 (Suppl.): 93-143.
- 1862. Catalogue of Hymenopterous insects collected by Mr. A. R. Wallace in the Islands of Ceram, Celebes, Ternate, and Gilolo. Ibid., 6: 36-
- 1864. Catalogue of Hymenopterous insects collected by Mr. A. R. Wallace in the Islands of Mysol, Ceram, Waigiou, Bouru and Timor. Ibid., 7: 6-48.
- 1869. Descriptions of new species of the genus *Pison*; and a synonymic list of those previously described. Trans. Ent. Soc. London, 1869, Pt. 4: 289-300.
- Tsuneki, K. 1967. Studies on the Formosan Sphecidae. 1. The subfamily Larrinae. Etizenia, 20: 1-60.
- 1974. A contribution to the knowledge of Sphecidae occurring in Southeast Asia (Hym.) Polsk. Pism. Ent., 44: 585-660.
- 1976. Sphecidae taken by the Noona Dan Expedition in the Philippine Islands (Ins. Hym.). Steenstrupia, 4: 33-120.
- 1981. Studies on the genus *Trypoxylon* Latreille of the Oriental and Australian Regions. VIII. Species from New Guinea and the South Pacific Islands. SPJHA, 14: 1-98.
- 1982. Sphecidae collected by the Noona Dan Expedition to the Bismarck and Solomon Archipelagoes (Hymenoptera). Ibid., 19: 1-58.
- 1983. Further studies on the Larrinae of the Philippine Islands, with remarks on the Indian species of the genus *Lyroda* (Hym., Sphecidae). Ibid., 24: 1-116.
- Turner, H. E. 1908. Notes on the Australian fossorial wasps of the family Sphegidae, with descriptions of new species. Proc. Zool. Soc. Lond., 30: 457-535.
- 1912. Notes on fossorial Hymenoptera VI. On the species collected in New Guinea by the Expedition of the British Ornithological Union. Ann. Mag. Nat. Hist., (8) 9: 194-202.
- 1916a. Notes on Fossorial Hymenoptera. XIX. On new species from Australia. Ann. Mag. Nat. Hist., (8) 17: 116-136.
- 1916b. Idem. XXI. On the Australian Larridae of the genus *Tachytes*. Ibid. (8) 17: 299-306.
- 1916c. Idem. XXIII. On some Australian genera. Ibid., (8) 18: 277-288.

- Turner, R. E. 1916. Notes on the wasps of the genus Pison and some allied genera. Proc. Zool. Soc. Lond., 42: 591-629.
- Vecht, J. van der. 1937. On a new Piagetia, with notes on other species (Hym., Sphecidae). Ent. Med. Ned. Ind., 3(2): 21-26.
- Williams, F. X. 1928. Studies in tropical wasps - their hosts and associates. III. The Larridae of the Philippine Islands. Bull. Exp. Sta. H.S.P.A., Ent. Ser., 19: 61-111.
- _____ 1928b. Larridae, in Insects of Samoa and other Samoan terrestrial Arthropods. Insects of Samoa, Pt. V. Hymenoptera, Fasc. 1. Tr. Brit. Mus., pp. 33-39.
- _____ 1936. Notes on some Larrid wasps from the British Solomon Islands Protectorate, with the description of one new species. Ann. Mag. Nat. Hist., (10) 18: 124-130.
- _____ 1947. Aculeate wasps of Fiji. Occas. Pap. B. P. Bishop Mus., 18(21): 318-336.
- Yasumatsu, K. 1937. Sphecoidea of Micronesia (Hymenoptera). Mushi, 9(2): 129-134.
- _____ 1941. Idem. III. Family Larridae. Ibid., 14: 44-47.

ABBREVIATION

In order to simplify and to formulate the measured values and comparison in the main the following abbreviations are employed, but some of them are also used in the text:

- A1, A2 ... Antennomere (= antennal joint) 1, 2 ...
- ACD ... Antenno-clypeal distance (distance between socket of antenna and upper margin of clypeus, in Larrinae as a rule 0).
- AOD ... Antenno-ocular distance (distance between socket of antenna and the nearest eye margin), (measured at the top of rim carina of socket).
- AW ... Apical width.
- CLL ... (Width of) clypeal lateral lobe (unless otherwise mentioned the distance between lateral angle of apical margin of median lobe (median produced part) of clypeus and the nearest inner orbit).
- CML ... (Width of) clypeal median lobe (distance between lateral angles of apical margin of median produced part of clypeus).
- G1, G2 ... Gastral segment 1, gastral segment 2, and so on.
- GS1, GS2 ... Gastral sternite 1, gastral sternite 2, and so on.
- GT1, GT2 ... Gastral tergite 1, gastral tergite 2, and so on.
- HL ... Head length (dorsal or frontal view, both in middle).
- HW ... Head width (maximum, in vertical or frontal view).
- IAD ... Interantennal distance (distance between inner margins of antennal sockets)
- IODc ... Interocular distance at base of clypeus.
- IODi ... Interocular distance at bottoms of eye incisions.
- IODv ... Interocular distance at vertex
- OCD ... Ocello-occipital distance (distance between posterior margin of hind ocellus and occipital margin seen vertically from above).
- Od ... Ocellar diameter.
- OOD ... Ocello-ocular distance (distance between outer margin of hind ocellus and nearest inner orbit).
- PD ... Puncture diameter.
- PIS ... Puncture-interspaces.
- POD ... Postocellar distance (distance between inner margins of hind ocelli, measured as a rule at the foot of the elevation of ocellus, when measured at the margin of pupil, particularly mentioned).
- T1, T2 ... Tarsomere (= tarsal joint) 1 (=basal- or meta-tarsus), tarsomere 2, and so on.
- WAS ... Width of antennal socket.
- FOD ... Fore ocellar diameter.