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SPHECIDAE COLLECTED BY THE NOONA DAN EXPEDITION
TO THE BISMARCK AND SOLOMON ARCHIPELAGOES
(HYMENOPTERA)

By K. TSUNEKI

M I S H I M A

JANUARY 25, 1982

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F o r e w o r d s

The general report on the purpose and progress of the Noona Dan Expedition is given by T. Wolf (1966) and that regarding insects and other land Arthropods is published by B. Petersen (1966).

In the material sent the members of the Ampulicinae, Sphecinae, genus Bembix of Nyssoninae and Pemphredoninae are not included which are separately sent to the respective expert and the results of their investigations have already partly been published.

The present paper deals mainly with the members of Larrinae and partly with those of other subfamilies left, together with some escaped specimens of the above mentioned separated subfamilies.

The number of the species included in the material is 50, of which 34 are discovered for the first time by the Expedition, 8 of which were previously described as parts of the local fauna of certain genera and 26 are here reported to science as new.

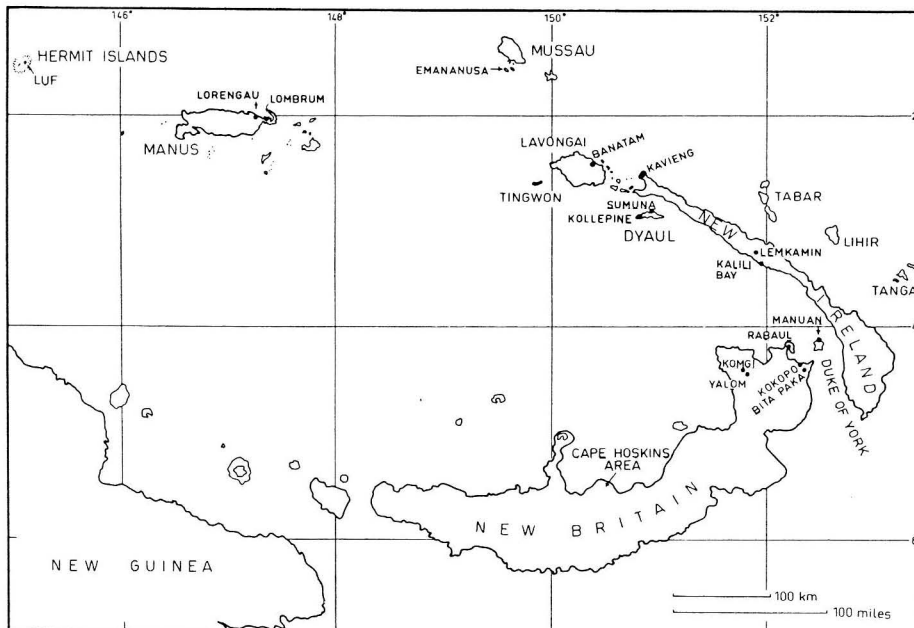
The greater part of the specimens are collected in the Bismarck Archipelago and those captured in the Solomon Islands are but a few and, moreover, they are confined to the Island of Guadalcanal.

During the course of the present study I am much indebted to Dr. K. V. Krombein, Smithsonian Institution, Washington, D. C., to Dr. A. S. Menke, United States Department of Agriculture, Washington, D. C. and to Prof. M. Yamada, Hokkaido University, Sapporo, for their kind help in regard to the literature.

All the specimens treated in the present paper are deposited at the Zoological Museum of University of Copenhagen.

A b b r e v i a t i o n

A1, A2 etc. ... Antennal joint 1, antennal joint 2 etc.
 ACD Antenno-Clypeal Distance.
 AOD Antenno-Ocular Distance.
 AW Apical Width.
 Clypeal Index WC/LC that is to say Width of clypeus / Length of clypeus.
 G1, G2 etc. Gastral segment 1, gastral segment 2,
 HL Head length.
 HLI Head length at inner orbit (seen from above).
 HLM Head length in middle (ditto).
 HW Head width.
 IAD Interantennal Distance.
 IODc Interocular Distance at clypeus.
 IODs IODv : IODc.
 IODv Interocular Distance at vertex.
 LC Length of Clypeus.
 Ocular Index $IODv/IODc$.
 Od Ocellar diameter.
 OOD Ocello-Ocular Distance, Distance between Postocellus and nearest eye.
 PD Puncture Diameter.
 PIS Puncture Interspace.
 POD Postocellar Distance, Distance between Postocelli.
 RC Radial cell.
 T1, T2, etc. Tarsal joint 1, tarsal joint 2,
 TCV Transverse Cubital Vein.
 WAS Width of Antennal Socket.
 WC Width of Clypeus.
 W:L ... Width : Length.



Map of the Bismarck Archipelago.

DESCRIPTIONS AND RECORDS

1. P e m p h r e d o n i n a e

1. PSEN (PSEN) KALILICUS SP. NOV.

According to the keys of van Lith (1959 and 1965) the present species runs almost straight to Psen nitidus van Lith and his explanations of this species fairly well agree with the present specimen except slight differences in the colour of the legs and in the bodily size. Judging from the variable nature of the different characters observed between them I at first considered it as a local race of this species. The close resemblance of the characteristic structure of the paramere of the male genitalia between them seems further to support this consideration.

However, the present specimen (δ) bears some important different characters that he does not mention (and which, if present in nitidus also, must not be overlooked by him) and, moreover, the difference in size is so marked that it let me hesitate to identify them with each other, because nitidus is constantly smaller in the length of the body (7.5-9.0 mm) than the present specimen (about 13 mm).

The characters in question are that (1) ocellar area distinctly margined posteriorly with a deep impressed line that is extended along outer margins of hind ocelli (Lith describes the presence of the longitudinal groove behind fore ocellus and in reality in Formosan subspecies of this species, namely P. n. takasago Tsuneki there is certainly the median longitudinal impressed line, but not the posterior transverse one), (2) vertex at antero-lateral corners at the verge to frons with a remarkable swelling that is contiguous to inner orbit, (3) scutellum with a distinct minute impression at the centre.

Because of the fact that the detailed comparison of genital organs of the male is at present impossible the present specimen is provisionally treated as a distinct species, leaving a doubt that it may be a subspecies of nitidus Lith.

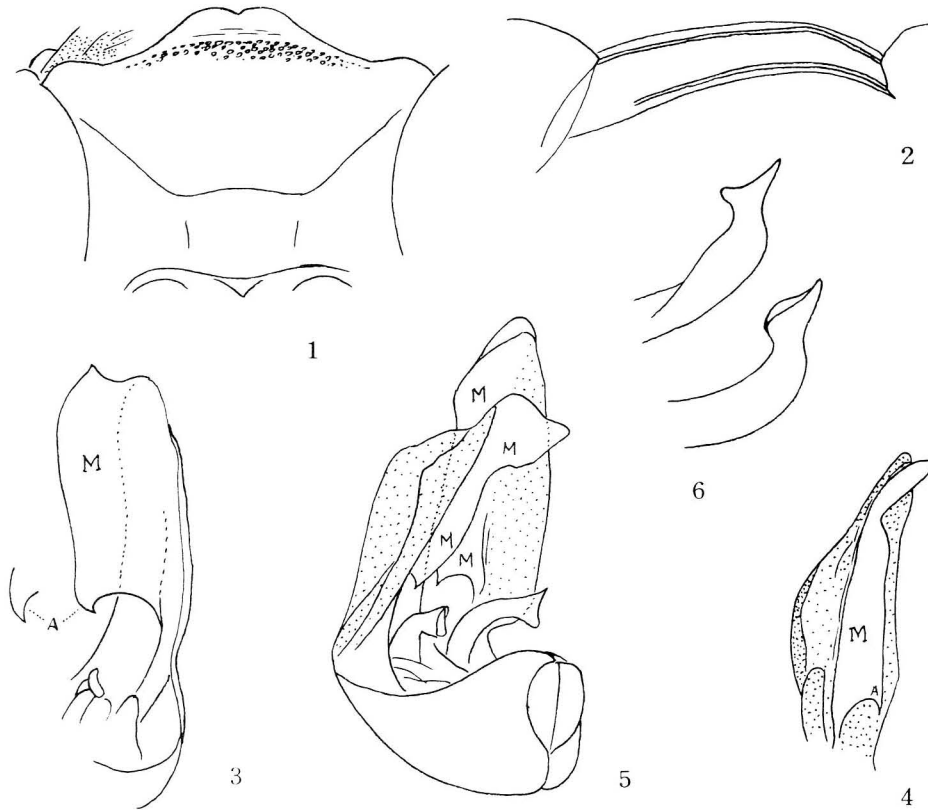
References:

- Psen (Psen) nitidus van Lith, Zool. Verh. (Leiden), 39: 14 (key), 21 (Fig. 63, apical margin of clypeus), 28, 1959 (δ , Java, Krakatau I., Bangka I. - Figs. 3, 16, 32, 48, 63).
Psen (Psen) nitidus: van Lith, Ibid., 73: 13 (key), 30, 1955 (Fig. 26, genitalia).
Psen (Psen) nitidus: van Lith, Tijds. Ent., 111 (4): 105, 1968.

δ . About 13 mm. Black, with strong plumbeous shine on head and thorax-complex, mandible dark red, apically pale, but black at extreme apex; fore tibia in front and at apex, mid tibia at apex and hind one at base and apex ferruginous brown, spurs and tarsi yellowish ferruginous, apically brownish. Hairs silvery on clypeus, dark brown or brown on dorsal side of head and thorax-complex and silky- or greyish white on sides of body.

Head in dorsal view with occipital margin strongly emarginate, relative length of HW, HLI, IODv, A3, P = 100, 44, 54, 22, 76; minimum IOD near antennal base relatively 36, thus IODs=3:2, A3=AWx3 (widest view), A3,4,5=10,7,6.5. AL2=AWx1.2, AL3=BWx2, OOD:POD=7:5, ocellar area distinctly raised, bearing posterior transverse and median longitudinal impressed lines as above mentioned, the latter ends at transverse groove, a fine frontal carina distinct from fore ocellus to interantennal tooth, lateral carina of the tooth connected with lower margin of antennal socket; clypeus convex, medio-apical produced area glabrous and minutely triangularly incised in middle (Fig. 1), antenna as a whole not incrassate apically, no tyloidea on any joint, omaulus (epicnemial carina) not connected with acetabular carina, the space between them slightly less than half the length of acetabular carina, omaulus at its lower end turning posteriorly to become precoxal carina and reaches mesocoxa, though not strongly so. Propodeum with area dorsalis lunately impressed and obliquely, strongly and coarsely carinate (rather foveolate), broad median furrow thus formed in middle divergent posteriorly and in this specimen crossed at mid point with a carinule, posterior margin of the area raised and broadly, smoothly expanded posteriorly as in nitidus, the expanded area in this specimen sectioned posteriorly and laterally with carinae into four large cells (median sectioning carina of the two cells of each side short and weak), surface of inner ones of which posteriorly with irregular sparse weak rugae, outer side of outer cell very coarsely irregularly reticulate, posterior

aspect margined dorsally with zig-zagged carina (= posterior walls of the above mentioned four cells) and surface very coarsely and irregularly reticulate. Petiole of gaster in lateral view abruptly upcurved at base (Fig. 2), in dorsal view gently widened posteriorly, dorsal surface roundly raised in cross section, ventral surface



Figs. 1-6. Psen (Psen) kalilicus sp. nov., ♂

also convex, sides strongly margined with carinae, dorsal carina complete, ventral one not reaching apex. Recurrent veins of fore wing received both by cubital cell 2, the 1st close to transverse cubital vein 2, but the position may considerably vary, hind femur with ventro-posterior edge weakly furrowed, accompanied with a row of closely arranged very minute feeble punctules (similar to, but much weaker than in nitidus).

Right paramere and penis valve in ventral view: Fig. 3, the flag-like lamellate appendage (M) raised from about median line of ventral side of paramere, seen from inner side: Fig. 4, baso-outer corner of the lamella triangularly extended and curved (Fig. 3, A; in some direction appears linearly curled); genitalia seen from ventro-outer (left) side: Fig. 5, penis valve seen from right side: Fig. 6, volsella not well developed, simply round-triangularly raised.

Vertex smooth and shining, with plumbeous tone, and finely sparsely punctured, on frons punctures close, medianly dense, mesoscutum finely sparsely punctured with black-hair-bearing punctures, sides of propodeum posteriorly weakly closely punctured, anterior portion and metapleuron smooth and shining, petiole polished.

♀, unknown.

Holotype: ♂, New Ireland, Danu, Kalili Bay, 30. IV. 1962, Noona Dan Exp. (ZMUC).

Remarks. From New Ireland a very nitidus-like species, novahibernicus van Lith,

is described from Lelet Plateau and Kandan, the structure of the paramere of genitalia of this species is similar to that of the present species (and also to nitidus) and, moreover, in the colour of the legs it generally agrees with the present specimen, but it is only 9 mm and possibly without transverse impressed line behind ocellar area.

As to the tuft of long hairs at apical margins of certain gastral sternites he said always sternites 4 and 5, with respect to nitidus, but in reality the tufts are present at the medio-apical margins of sternites 3 and 4 in this species.

2. L a r r i n a e

2. LARRA POLITA (F. SMITH, 1857)

Larra polita Smith, J. Proc. Linn. Soc. London, Zool., 2: 103, 1857 (♀, Borneo: Sarawak).

Larra rufipes: Williams, Ann. Mag. Nat. Hist., Ser. 10, 18: 124, 1936 (Solomon Is.).

Larra polita: Tsuneki, Etizenia, 20: 9, 14 (key), 24, 1967 (♀ ♂, Formosa).

Larra polita: Bohart and Menke, World Sphecid., p. 238, 1976 (listed).

Specimens examined: 8 ♂, Bismarck Arch., Lavongai I., 18, 20, 21. III. 1962; 4 ♀ 1 ♂, New Britain, Yalom, 1000 m, 8, 13, 20, 22. V. 1962; 1 ♀, New Britain, Komgi, 1000 m, 14. V. 1962.

Distribution: Ceylon, Burma, Sumatra, Java, Celebes, New Britain, Lavongai I. and Formosa.

Remarks. Bohart and Menke (1976) follow van der Vecht and treated luzonense Williams as a subspecies of the present species. There is, however, some problem about this determination. As to the problem, together with the strange distribution of both the species in question in Formosa, I gave comments at some length in my paper of 1967. It should be noted, however, that in some place of Formosa both the species live in sympatric without intermediate form among them.

To me it seems that the two species, L. polita Smith and L. luzonensis Williams should be separated at the species rank.

3. LARRA DORSALIS SP. NOV.

Belonging to the group of L. fenchihuensis m., 1967 (Etizenia, 20: 22, Formosa) in which pronotum in ♀, as in ♂, is thin, sharply edged on top, without having even the narrow rounded dorsal aspect as usually the case in ♀. Otherwise, the present species is also similar in appearance to common carbonaria F. Smith.

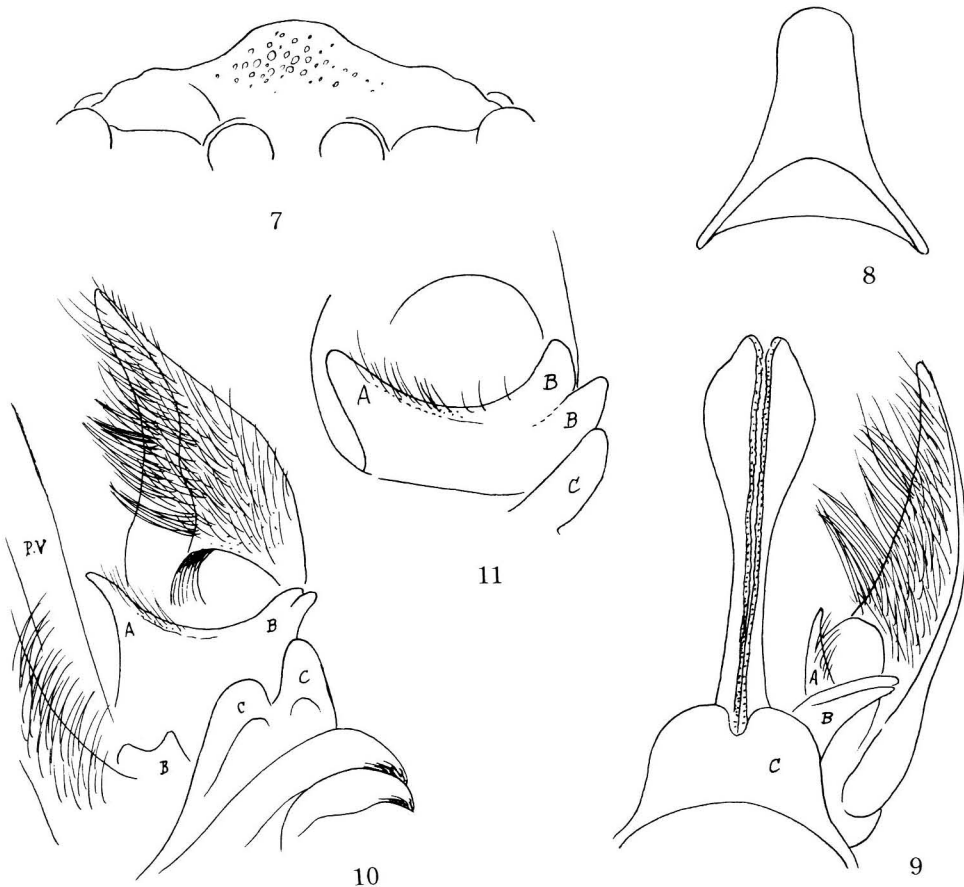
Differs from fenchihuensis, however, in body size (smaller), wing colour (paler), form of head, clypeus and propodeum, relative length of IODv, A3, etc., punctuation of mesoscutum and propodeum and in the structure of volsella of male genital organs.

♂. 5.5-7.0 mm. Black, mandible reddish, except basal area, A1-2 beneath and at apices and tegula brown, mouth parts pale brown. Hair on clypeus silvery, on median area sparse, short pubescence on mesoscutum slightly brownish, on other parts greyish white, hairs on posterior part of mesopleuron in front of mesocoxa and on posterior marginal area of propodeum long and silvery, those on gaster beneath brown and on posterior part dark brown above and beneath.

Head in frontal view with W:L=100:74 (in fenchihuensis 100:80), with IODs=10:22, in lateral view with dorso-anterior angle about 90° (in fenchihuensis much more obtuse), in dorsal view HW:IODv=100:26 (in fenchihuensis 100:24), IODv:A3=10:5 (in f. 10:5). Antenna from A4 to middle of A13 of ventral (or posterior) side turns into rhinaria, the area slightly depressed, glabrous and somewhat brownish in colour and distinctly bordered from dorsal (or anterior) side, A1 and 2 shining, A2 slightly longer than A3 (in f. distinctly shorter), A3 in dorsal view about 1.7 times, in lateral widest view 1.3 times as long as wide at apex, thence apically progressively slightly shorter till A12. Clypeus: Fig. 7, dorsal margin of pronotal collar acutely edged as mentioned above, and much below level of mesoscutum and about triangular in

frontal view, mesoscutum medio-anteriorly, on central area and from along parapsidal sutures to apex more or less depressed (varied in degrees among specimens), scutellum and postscutellum sometimes medianly impressed, dorsum of propodeum as long in middle as wide across middle, but appearing much longer than wide (due partly to the posteriorly curved basal margin and mainly to optical illusion), and broadly, shallowly furrowed in middle, with or without baso-medial carina (when present variable in length), posterior aspect medianly feebly furrowed, the furrow usually roundly divergent upwards, latero-posterior carinae reaching upwards about middle of the lateral margin of the aspect, medio-posterior area sometimes with two short carinae, variable in length and upward divergency, often with only short one, or completely lacking. Pygidial area with apex rounded and medianly broadly truncate. Cubital cell 2 and 3 of fore wing considerably variable in form, usually 2 with dorsal abscissa (= abscissa 2 of radial vein) fairly long, but often very short and relative length of abscissae 1, 2 and 3 of radial vein is quite uncertain.

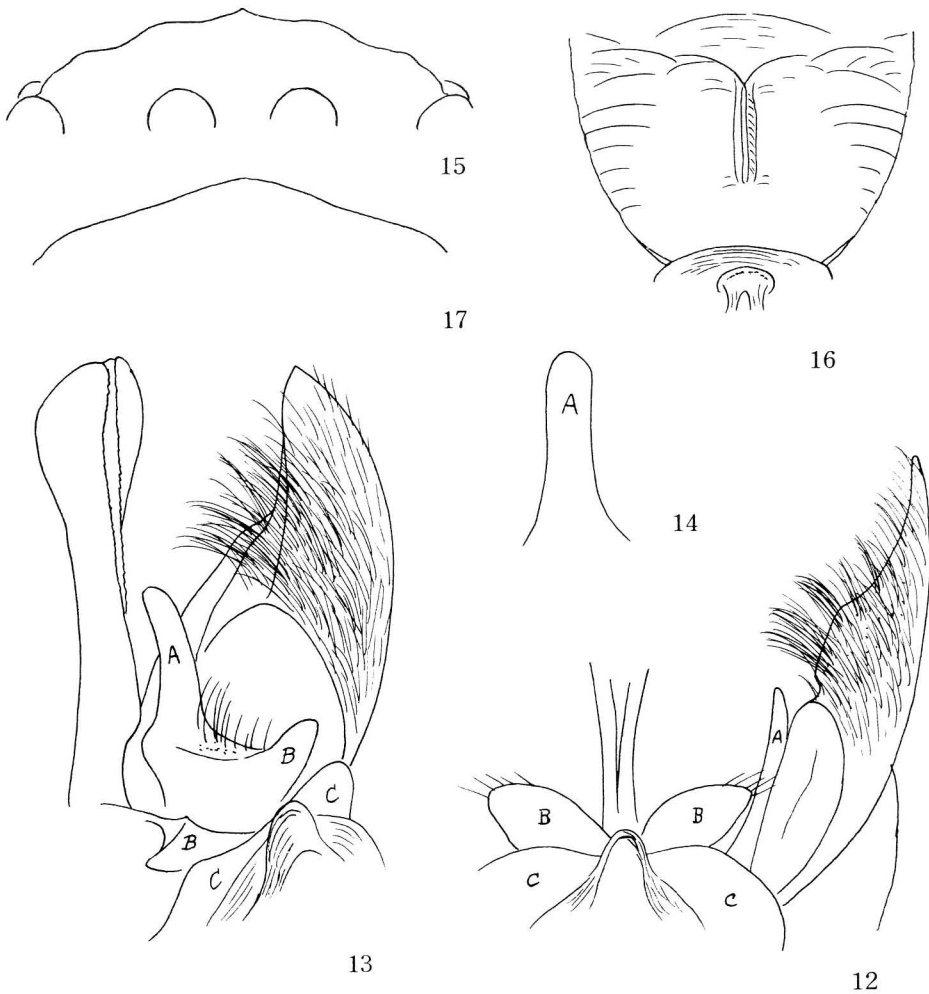
Sternite 8: Fig. 8, apical area smooth and shining. Genitalia similar in the structure of penis valve and paramere to those of *fenchihuensis*, but differs in volsella. Seen from beneath: Fig. 9 (penis, right paramere and volsella including parts A, B and C). Penis valve spoon-shaped as usual, paramere simple at apex, densely covered with long hair on its inner surface and at base with a hollow, volsella consists of two parts, A-B and C, seen obliquely from beneath and from left side: Fig. 10, A-B forms a single thin plate, in this state both are reflected, seen vertically: Fig. 11.



Figs. 7-11. *Larra dorsalis* sp. nov., ♂

B is bifurcate at apex. It is uncertain whether C is cuspis and A-B is digitus, or B is cuspis and A is digitus and C is an expansion of other part of paramere (here cardo is removed).

In *fenchihuensis*, genitalia seen from beneath: Fig. 12 (penis and left paramere omitted), seen obliquely from beneath and from left side: Fig. 13. A seen vertically: Fig. 14, difference in the form of A-B and C is clear (here cardo is present).



Figs. 12-17. 12-14 (♂), 17(♀): *L. fenchihuensis* Tsuneki; rest: *L. dorsalis* sp. nov. ♀

Punctures on dorsal side of head comparatively large, weak, indistinct in outline and confined to anterior area only (in *fenchihuensis* finer, closer, covering much broader area), on clypeus at base fine and close, progressively larger anteriorly, there partly contiguous to each other, turning very large and irregular before apex, but indistinct in outline. On mesoscutum punctures comparatively large, fairly close, on depressed area closer, PIS < PD, on raised area somewhat sparse, PIS = or > PD and irregular in distribution and partly confluent to each other. Dorsum of propodeum moderately largely rugoso-striate and -punctate, on the outer area along lateral margins of median furrow sculpture finer and weaker, but surface not smooth and shining, the direction of striae and rugae most usually on median furrow transverse and on outer areas obliquely backwards, but sometimes medianly longitudinally, or laterally trans-

versely or obliquely forwards, or quite irregular; at verge to sides rugae stronger and sometimes gathered together into subrugae. Posterior aspect with a few strong transverse rugae on top area, on the rest sometimes simply punctured, sometimes transversely punctate-striate, or on central area punctured and on lateral areas punctured-striate, sides smooth and moderately largely, rather sparsely punctured and on anterior, ventral and posterior areas obliquely striate, striae variable in length; gaster moderately closely covered with medium-sized piliferous punctures, on post-marginal, slightly constricted area of each segment fine and close.

♀. 10-12 mm. Black, much more shining on head and gaster than in ♂, as usual. Al and 2 at apices slightly brownish, mandible reddish, at base black, mouth parts, tegula and fore legs similar to ♂ in colour; hair and pubescence generally similar, except that clypeus and dorsal side of gaster are almost glabrous.

Head in frontal view (with face held perpendicularly) with $W:L=100:76$ (in fench. 100:82), with inner orbital downward divergence slightly stronger than in compared species (IODs=20:58, in f. 20:55). Clypeus: Fig.15 (in f. Fig. 17), apical area much thinner, with disc more broadly smooth and shining than in f. Relative length of $A2-6=10,10,9,10,10$ (in f. 8,10,9,8,8), $A3$ largely shining and $=AW \times 2.3$ (in f. $A3$ not shining and $=AW \times 2.7$). Pronotum with dorsal margin level with mesonotum, acutely edged and appressed to mesoscutum, seen in front gently upcurved, mesoscutum with $L:W$ (at posterior margin)=1:1 (in f. $L>W$), surface at central area and along parapsidal sutures more markedly depressed than in fenchihuensis, dorsum of propodeum slightly longer in middle than width across middle, medianly longitudinally and broadly depressed, posterior aspect: Fig. 16, with postero-lateral carinae reaching upwards about a third from apex, but rest of lateral margin considerably edged, pygidial area with sides rounded out, at anterior part parallel, at extreme base slightly roundly convergent inwards, at posterior part weakly sinuate and at apex minutely rounded; length in middle : broadest width = 4:3, surface gently roundly raised and at lateral areas comparatively broadly, obliquely raised and carinated at the margin. Fore tibia without spine on outer surface, tibial spur with some breadth, and flat, sinuately curved and twisted, provided with a slender transparent lamella on inner margin (as in fench.) Wing venation as in ♂, abscissae 1, 2, 3 of radial vein variable in relative length, but in the specimens observed abscissa 2 always considerably long and two recurrent veins also considerably separated from each other at cubital vein.

Punctures on clypeus fine and sparse, on lateral areas finer and close, on median area anteriorly with a few somewhat large scattered punctures; mesoscutum closely covered with medium-sized punctures, $PIS=$ or $<PD$, on antero-lateral areas punctures finer and closer, posteriorly somewhat larger and close. Propodeum at base transversely (somewhat in V-shaped) finely carinate and just posterior to it transversely finely furrowed, the furrow coarsely crenate, surface at median furrow transversely and strongly, coarsely rugoso-striate and from base till about middle longitudinally carinate in middle (but this is possibly variable even in its presence), on sides of the furrow surface raised and fairly broadly without striae, smooth, and finely sparsely punctured, smooth area irregular in form, further sides again coarsely obliquely rugoso-striate and finely rugulose on interspaces of striae, at verge to side of the segment rugae partly confluent into longitudinal carina, but not completely so; posterior aspect on dorso-lateral areas coarsely rugoso-striate, rest of the surface nearly flat and finely sparsely punctured and mixed with weak indistinct carinae. Sides finely closely punctured, on anterior portion punctures arranged into oblique lines, posterior area transversely coarsely striate. Gasteral tergites at base finely closely, thence apically finely and very sparsely punctured, posterior areas of $G2, 3, 4$ and 5 triangularly bordered with a row of distinct punctures as in fenchihuensis, but the surface of the triangular area very much more finely and sparsely punctured than in this and the surface almost smooth and shining; pygidial area sparsely scattered with medium-sized punctures, mixed with a few gross ones, on medial raised area punctures sparser.

Holotype: ♂, New Britain, Yalom, 1000 m, 21. V. 1962, Noona Dan Expedition.

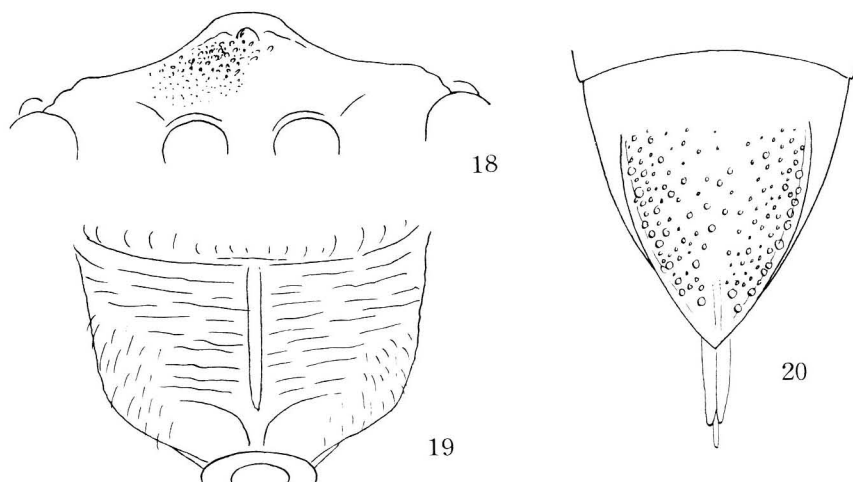
Paratypes: 2 ♀ 3 ♂, same locality, 16, 18, 20, 23. V. 1962 (♀ Malaise trap).

Remarks. In my description of Larra fenchihuensis the structure of the pronotum is not treated, but is confirmed during the comparison with the present species. The character seems to be important in taxonomy as in the state of spines on the fore tibia.

4. LARRA MELANIA SP. NOV.

♀. 12.5 mm. Very similar to the preceding species, but is distinguished therefrom by the following distinctions:

Wings much more strongly darkened, clypeus: Fig. 18 (cf. Fig. 15), more closely and more broadly punctured, A3 distinctly longer than A2, mesoscutum without depressed areas, with punctures slightly finer, though similarly posteriorly somewhat sparser, propodeum with dorsal side distinctly shorter (W across middle : L in middle \approx 4:3), posterior side also broader and relatively shorter (Fig. 19, cf. Fig. 16) and pygidial area much more closely punctured (Fig. 20).



Figs. 18-20. Larra melania sp. nov., ♀

Black; A1 and 2 partly brownish, mandible broadly reddish ferruginous, at base black, mouth parts pale brown, tegula posteriorly transparent brown (and smooth, at base only punctured as usual), fore tibia in front and fore tarsus beneath distinctly brownish, other tarsi also more or less brownish. Hair generally similar to that of preceding species, but on legs, especially on tibiae and tarsi, much sparser, with surface more shining.

Head in frontal view $W:L=100:86$, $HW:IODv=100:24$, $IODv:A3=10:5.5$, $IODs (=IODv:IODc) = 10:24$, $A2,3,4,5,6=8,10,8,8,8$. A3 on dorsal side wholly, on ventral side basally glabrous, sparsely punctured and shining. Dorsum of propodeum at base transversely roundly (curved out posteriorly) carinate, carina in middle enlarged into small flat triangular area, from apex of which median carina runs posteriorly and on both sides of the carina surface narrowly impressed into longitudinal grooves and strongly crenate, disc obliquely, sublongitudinally, coarsely rugoso-striate, striae-intervals scabrous with rugulae, on medio-apical highly raised triangular area rugae weaker and distinctly, but not closely, punctured, lateral margins distinctly edged, subcarinate; posterior aspect with lateral margins also fairly acutely edged, the edge at apex turns into short distinct carina, surface transversely, fairly closely striate, striae on upper part stronger and coarser, on lower part mixed irregularly with stronger ones, stria-intervals not smooth; pygidial area: Fig. 20, $L:W=5:4$, at apical area bluntly carinate in middle, in the state of lateral carinae similar to the preceding species, surface gently roundly raised and more closely punctured than in this species, punctures irregular in size, with intervals under high magnification microreticulate and surface not strongly shining.

♂, unknown.

Holotype: ♀, New Britain, Yalom, 1000 m, 21. V. 1962, Noona Dan Expedition.

Remarks. In general appearance the present species closely resembles also L.

carbonaria Smith, but is different from it in the structure of pronotum, in the form of apical margin of clypeus and in the punctuation or sculpture of propodeum and pygidial area and can easily be separated from this species.

ANNOTATED KEY TO SPECIES OF LIRIS (LIRIS) (♀)

OCCURRING IN SOUTH PACIFIC ISLANDS

In order to make clear the differences of the 8 new species below described from each other as well as from the known species an annotated (in new species rather descriptive) key will be presented first. The key is not desirable one, because it is restrained in the characters treatable, in order to include all the known species that are mostly realized through the descriptions only. As to the wing infumation and colour of pygidial hair, when they are doubtful, try to follow both of the couplet.

- 1 Head with a short horizontal area behind eye, thence perpendicularly inclined to occipital carina (A1, 2, mandible except apex and legs except coxae and trochanters red, covering hair on head and thorax golden, very small rhinaria on A6-12, on 12 especially small) 15-22 mm, widely spread over Oriental Region and Pacific Islands
aurulenta (Fabricius, 1787)
- Head abruptly inclined from posterior margins of eyes (antenna, mandible, legs black) 2
- 2 Wings strongly infumated, dark brown 3
- Wings moderately infumated, yellowish brown, often anterior margin darker ... 8
- Wings almost clear hyaline or pale yellow 16
- 3 Strong setiferous punctures behind marginal area of clypeus close, confluent to each other (A3=A2x2, IODv not quite equal to length of A3, thorax subopaque, in length propodeum=mesoscutum, dorsum of propodeum transversely closely striate, striae stronger towards lateral margins, median furrow runs from base to apex, tomentosa on G1,2,3 medianly broadly interrupted; pygidial area narrowly rounded at apex, with pubescence golden, mixed with numerous black setae; on radial vein abscissa 2=3, wings pale fuscous (in ♂ median produced part of clypeus with apex triangularly emarginate), 17-18 mm
melania Turner, 1916
- A. Pubescence on head and thorax-complex silvery or white -
 Australian race
- B. Pubescence on head and thorax-complex brassy -
 Solomon race
- Strong setiferous punctures behind marginal area of clypeus much sparser, with distinct interspaces 4
- 4 A3 slightly longer than IODv 5
- A3 slightly shorter than IODv 7
- 5 Pygidial hair bronzy golden, mixed with suberect bristles or setae, propodeum dull, with fine, weak, close recurved wrinkles (gaster with three narrow and rather dull silvery sericeous bands, pygidium not quite twice as long as wide, A3 slightly longer than IODv, medio-apical part of clypeus rounded out, not straight, vestiture quite sparse silvery pile, with sparse longer erect hair, sericeous patch on subalar area thin and visible in certain light), 18 mm, Mindanao and Solomon Islands. mindanaoensis Williams, 1928
 (Similar in general, but wings without a yellowish tinge, medio-apical notch of clypeus deeper, silvery golden sericeous bands on abdomen almost invisible -measured value very strange and doubtful as pointed by Krombein, length not given, Caroline Is. (Truk)
mindanaoensis carolinensis Yasumatsu, 1941
carolinensis: Bohart and Menke, 1976)
- Pygidial hair not bronzy golden 6
- 6 Pygidial hair brownish black, in some light dark coppery and mixed sparsely with half erect bristles of the same colour, dorsum of propodeum with distinct transverse striae (IODv:A3=20:21-22, under eye measurement appearing same, wings dark brown except somewhat pale basal areas, mesoscutum finely, very closely punctured, P1<PD all over the area, propodeum medianly with shallow furrow, the furrow posteriorly enlarged and at base with a short longitudinal carina, surface dull and transversely distinctly, but not strongly, striate,

- striae sparse, with interspaces almost as wide as fore ocellus and similar in strength laterally till rounded verge to sides of the segment; posterior aspect also dull, with short lateral carinae at apex, surface transversely, arcuately striate, the striae on top area strong throughout, on middle area strong on lateral areas only and rather obsolete on its central area and on lower area weak and strongly curved down above each latero-apical flat area, median furrow as usual, sides dull, smooth, on anterior area below spiracle obliquely, weakly and sparsely striate except lower area. Lateral and apical pubescence bands on mesoscutum well visible, in oblique light strongly golden, tomentosa on epimeral area of mesopleuron silvery, that on side at posterior part of propodeum silvery golden, both well visible; gastral tomentosa silvery, narrow, on apical sides alone of G1-3 and in some light distinct, A5-11 with distinct rhinaria, elliptic in form, smaller towards both ends of series and even on A8 less than half joint length and narrower than in that of bismarckana, apical margin of pygidial area medianly incised, incision narrower and deeper than in this species), 18-20 mm, New Ireland ubatama sp. nov.
- Pygidial hair golden coppery throughout, propodeum with fine close delicate transverse arcuate striae, that are towards sides sparser and stronger (pygidial hair mixed sparsely with coppery golden, obliquely erect bristles, IODv: A3=20:23-24, wings slightly weaker in infumation than in ubatama, yet fairly strongly darkened, mesoscutum finely closely punctured, but on central area, slightly behind middle, punctures somewhat sparse, PIS>PD, propodeum medianly with shallow furrow and distinctly longitudinally carinated in middle till near apex (but this may be variable), posterior aspect with postero-lateral oblique carinae, reaching near mid point of the height of the aspect, surface on top area transversely, strongly and coarsely rugoso-striate, on the rest transversely, finely, closely and weakly striate, striae sometimes indistinct on broad central area and finely closely punctured, sometimes striae partly indistinct and mixed with fine close punctures, median furrow as usual, sides dull, smooth, below spiracle with a few short striae, anterior area sometimes with feeble striae, on lower marginal area always crenately striate, mesoscutum with marginal U-shaped pile band weak, in oblique light only defined, almost silvery, tomentosa on epimeral area of mesopleuron and on side of propodeum also silvery, both in oblique light well visible, gastral tomentosa similar to those of ubatama, silvery in colour also. A5-11 with distinct but small rhinaria, similar in pattern and relative size (slightly larger than usual) to those of ubatama, apical margin of pygidial area covered with short spinules, incision not well observed, but apparently broad and shallow), 15-16 mm, Is. Manus manusana sp. nov.
- 7 Pygidial hair golden coppery, striae on propodeum transverse, sometimes slightly oblique, very fine and very close (IODv:A3=20:18-19, under eye measurement almost same, wings strongly infumated as in ubatama, mesoscutum finely closely punctured, PIS=PD, but on the area slightly behind middle somewhat sparse, PIS slightly >PD, propodeum medianly shallowly furrowed, the furrow enlarged posteriorly, sometimes longitudinally carinate at base in middle, sometimes without carina, when carinate, variable in length - sometimes more than half -, surface dull, transversely very finely and very closely and delicately striate, striae sparser and slightly stronger on lateral areas of dorsal aspect, posterior aspect also dull, with very short lateral carinae at apex, surface transversely striate, striae on top area strong, but only a few in number, on the rest weak and sparse, but near median furrow closer; sides dull, from below spiracle posteriorly finely sparsely striate, anterior area under high magnification obliquely, delicately, very closely striate. Lateral pile bands on mesoscutum very weak and indistinct, in oblique light faintly shining, not golden, gastral tomentosa silvery, on apical sides alone of G1-3, in some light only visible, A4-11 with distinct but small elliptic rhinaria, on 8 comparatively largest and progressively smaller towards both ends, in general, however, somewhat larger and broader than in ubatama, apical margin of pygidial area medianly incised, incision also somewhat broader and shallower than in the compared species), 17-19 mm, New Britain and New Ireland bismarckana sp. nov.
- Pygidial hair dark brown, striae on dorsum of propodeum from baso-medial area radiating outwardly and strong and distinct (punctures on mesoscutum sparser posteriorly, PIS>PD), 10 mm, Caroline Is. esaki Yasumatsu, 1941 (sensu Krombein, 1949)

- 8 IODv < A3 (sometimes very slight) 9
 - IODv > A3 (sometimes very slight) 13
- 9 Strong setiferous punctures behind marginal area of clypeus very close, more frequently contiguous to each other transversely (tomentosa on epimeral area of mesopleuron conspicuous and silvery, IODv slightly < A3, apical produced part of clypeus rounded out, not straight - see also couplet 3), 17-18 mm, North Queensland and Solomon Is. (Guadalcanal) melania Turner, 1916
 - The punctures sparser, not contiguous to each other 10
- 10 Dorsum of propodeum dull, with fine recurved transverse wrinkles, pygidial area with bronzy golden pile (wings mildly infuscate, - see also couplet 5) mindanaoensis Williams, 1928
 - Dorsum of propodeum delicately, finely, closely transversely striate, sometimes arcuately so and on each lateral area striae stronger and sparser, pygidial area with hair coppery golden (rhinaria on A5-11) 11
- 11 Wings fairly strongly clouded throughout, punctures on mesoscutum fine and close, but on central area and slightly behind middle, sparser, PIS > PD (IODv markedly narrow, HW:IODv=100:16, IODv:A3=20:24, - see also couplet 6) manusana sp. nov.
 - Wings much brighter, pale yellowish brown, punctures on mesoscutum fine and close throughout, PID < PD) 12
- 12 Close striae on dorsum of propodeum irregular in strength, with somewhat stronger ones mixed, parapsidal sutures of mesoscutum distinctly impressed (U-shaped tomentosa on mesoscutum strong and distinct, brassy in colour, those on epimeral area and propodeal side also distinct but silvery, rhinaria on A8 about half joint length, HW:IODv=100:17, IODv:A3=20:22), 19 mm, New Ireland lemkamin sp. nov.
 - Close striae on dorsum of propodeum quite regular in strength, parapsidal sutures on a raised line respectively (U-shaped tomentosa on mesoscutum weak, in oblique light only defined, silvery, but sometimes fairly distinct and brassy, rhinaria on A8 smaller, less than half joint length, HW:IODv=100:18-19, IODv:A3=20:21), 15-16 mm, Solomon Is. solomonis sp. nov.
- 13 Medio-apical produced part of clypeus with a downbent tooth in middle (A3 slightly > A4, IODv slightly < A2+3, thorax finely reticulate-punctate, dorsum of propodeum with a rather broad and shallow median furrow till apex, surface crossed with recurved wrinkles that become less distinct and nearly straight on the pleurae, posterior aspect finely reticulate, with subobsolete transverse wrinkles, radial vein with abscissae 5<2<3<1<4, hairs silvery, tomentosa on thorax not conspicuous, pile bands on G1, 2 and 3), 12.5 mm, Solomons (S. Mela) corniger Williams, 1936
 - Apical margin of clypeus without tooth in middle 14
- 14 Punctures on thorax-complex weak, surface fairly well shining, especially so on posterior aspect of propodeum, surface not scabrous, medio-apical produced part of clypeus with apical margin straight, pygidial hair pale golden (A3 slightly shorter than IODv, punctures on mesoscutum fine, well separated, dorsum of propodeum transversely finely wrinkled, the wrinkles arched in an anterior direction, sides above and below with some vertical wrinkles, posterior aspect nearly smooth except for a few oblique wrinkles above, vestiture silvery, sometimes pale golden), 13 mm, Samoa Is., New Hebrides samoensis Williams, 1928
 - Punctures on thorax-complex stronger, surface of propodeum dull and opaque, not shining, medio-apical margin of clypeus roundly curved, pygidial hair not pale golden 15
- 15 Dorsum of propodeum with fine transverse wrinkles that are stronger and coarser towards postero-lateral areas (wings slightly clouded with brown, pygidial area with brownish pile, thorax having a very finely reticulate appearance), 10 mm, Caroline Is. esakii Yasumatsu, 1941
 (sensu Yasumatsu)
 - Dorsum of propodeum with fine, close, transverse striae, striae uniform all over, not stronger and coarser towards lateral areas (fore wing slightly brownish and more strongly so along anterior margin and slightly dusky at apical area, pygidial hair golden coppery, apex of the area narrowly and deeply incised in middle between spinules, punctures on mesoscutum fine and close throughout, PIS < PD, U-shaped tomentosa on mesoscutum weak, in oblique light appears golden, that on epimeral area of mesopleuron and on side of propodeum also weak and silvery golden; rhinaria on A5-11, small and smaller towards

- both ends of the series, even on A8 about 1/3 the length of the joint), 15 mm, New Ireland and New Britain crux sp. nov.
- 16 IODv= or >A3 (mesoscutum finely closely punctured, dorsum of propodeum with with fine transverse wrinkles that are obscured with fine reticulations, the carinulae recurved mesially, pygidium about 5/3 times as long as wide, covered with bronzy pile, wings nearly clear hyaline, slightly infuscate at tips and in radial cell), 12.5 mm, Luzon intermedia Williams, 1928
- IODv < A3 17
- 17 Length 10.5-10.8 mm (mesoscutum with moderately large punctures, anteriorly closer than on posterior 3/4 where PIS≠PD, propodeum with weak irregular oblique carinae, pygidial hair dark brown, wings hyaline, iridescent, apex slightly infuscated), Palaus williamsi Krombein, 1949
- 17-18 mm (mesoscutum finely closely punctured all over, PIS < PD, propodeum finely, very closely, somewhat obliquely and quite regularly striate, on both lateral areas at verge to sides striae somewhat stronger and sparser, pygidial hair golden coppery, wings pale yellowish throughout and on apical margin slightly brownish, without iridescent reflection, marginal U-shaped tomentosa on mesoscutum distinct, brassy in colour, a patch of silvery hair on epimeral area of mesopleuron and posterior part of propodeal sides distinct, rhinaria on flagellum comparatively small, even on A8 less than half joint length) 18
- 18 IODv comparatively narrower, HW:IODv=100:16, A3 relatively longer, IODv:A3=20:24 (rhinaria on A6-11, on A5 lacking in the specimen - constant? - sides of propodeum on antero-ventral half obliquely, distinctly striate), Dyaul I. claripennis sp. nov.
- IODv comparatively broader, HW:IODv=100:22, A3 relatively shorter, IODv:A3=20:21 (rhinaria on A5-11, sides of propodeum dull and smooth, only along anterior and ventral margins weakly crenate), New Ireland kaliliana sp. nov.

ON SOME CHARACTERS OF LIRIS (LIRIS), ♀

1. Clypeus (cf. Fig. 21 in Liris ubatama). The size of medio-apical incision is variable within a species, hence the comparison of its size between species is improper; inner half of apical margin of the medial produced part is usually raised into subcarina, glabrous, while the outer half is somewhat depressed and punctured, therefore, seen from apex the margin is distinctly sinuate (raised towards incision). The raised and subcarinated part is variable in extent, sometimes extended more sideways than usual. The disc of the clypeus gently raised in middle and the surface is punctured as given in the figure, the area behind the series of large setiferous punctures very finely and very closely punctulate. The distance between lateral end of clypeus and lateral angle of medial produced part is always nearly equal in length to apical margin from lateral angle to angle of medial incision.

2. Antenna. AOD:IAD=2:1, this is common to all the species examined here. A3, 4 and 5 are always nearly equal in length. As to the presence of rhinaria on antennal joints it is completely overlooked by the previous authors. As a rule, however, they are present on A5-11, elliptic in form and distinctly impressed and flat-bottomed, largest on A8 and gradually smaller towards A5 and A11. But in one species, namely in claripennis nov. they are present on A6-11 and completely lacking on A5. However, this may possibly be aberrant, since the specimen is but a single and rhinaria are more or less variable in number in many species of Larrinae when they are present. Apart from this exception, the rhinaria in this subgenus are constant in number and in location, but their relative size is varied between species and this is of some value in separating the species, because their relative size is considered constant within a species.

3. IODv. Relative length of HW to IODv and IODv to A3 are only slightly variable within species and of considerable value to identifying the species.

4. Punctuation. Punctuation of mesoscutum and sculpture of dorsum of propodeum are also rather constant to the species and sometimes variable between species, but the striation on posterior aspect and sides of propodeum is more or less variable and less valuable than that of dorsal aspect. There is always a broad shallow medial furrow on dorsum and frequently accompanied with a medial longitudinal carina at base, but the presence and absence and the relative length of the carina are very

variable and except for the complete and strong case (e.g. manusana) it has no taxonomic value.

5. Tomentosa. The conspicuousness of the U-shaped hair band on lateral and posterior margins of mesoscutum and the state of hair patch on epimeral area of mesopleuron and on posterior side of propodeum must be compared under the natural condition, because when disturbed they become markedly conspicuous. Latero-posterior parts of gastral tergites 1, 2 and 3 are adorned with a band of tomentosa that becomes obsolete inwards, the appressed hair of the bands is usually silvery (rarely with a golden tint) and visible in certain light condition.

6. Pygidial area. Pygidial area of the female shows no great difference in form, but the colour tone of the appressed hair and of half erect bristles sparsely mixed is sometimes of value to separate the species. Most usually it is coppery or coppery golden, sometimes dark coppery, glittering brown, shining castaneous brown and pale golden. Williams says "bronzy golden". Usually the pygidial area shows an incision at apex in middle. The character is also neglected by all previous authors, possibly because it is frequently covered with a row of spinules or stuffed with the dust or resin. It is invisible from beneath, because of the protruded genitalia or spine, frequently it is visible through the gap between spinules, but it should be observed by removing the obstacle. The form seems constant to the species and sometimes different between species.

7. Gastral sternites. Sternite 2 is always medianly at base abruptly raised and longitudinally shortly carinated, in lateral view the carina is curved, on both sides of the carina surface obliquely flattened and the flattened area is dimly outlined, sometimes it is coloured brownish. But the character is of little use for separating species. Surface of sternites 2-6 is complicated with punctuation, feeble microstriae, dull smooth area and shining area, but these are also of little use, because they are roughly similar between species and varies more or less within species.

8. Venation of fore wing. Williams uses relative length of abscissae 1-5 of radial vein in his descriptions. But they vary considerably within a species, especially between abscissae 2 and 3, and without the knowledge of variation in the species concerned, the easy application of the length formula to species identification is not a sound way.

In the present group of species before me the wings are on outer marginal area always longitudinally coarsely wrinkled, but in any of them there is no iridescent reflection, the presence of which is frequently mentioned by previous authors. This may be, however, due to the postmortem treatment of the specimens.

5. LIRIS (LIRIS) UBATAMA SP. NOV.

♀. 17-21 mm. Characteristic in the strongly infuscated wings, fine and close punctuation throughout mesoscutum, distinctly transversely and coarsely striated propodeal dorsum and brownish black hair of pygidial area. In these characters the present species is somewhat similar to L. esakii sensu Krombein, 1949, but differs from it in that the antennal joint 3 is longer than interocular space at vertex and further, it is very much larger in the body size. Main characters are given in the key.

Supplement. Relative length of IODv as against HW as 100 is in the four specimens: 18, 18, 18, 18; that of A3 as against IODv as 20 is 21, 21, 22, 22. Antennal rhinaria on A5-11 beneath, on 5 and 11 very small, on 8 largest, elongate elliptic in form, with relative length of basal space, rhinarium itself and apical space (= section lengths of rhinaria) is 3, 3, 2, relative length of A3:A2 = 20:6, A3=AW×3.1. Clypeus: Fig. 21, mandible black, without reddish patch, apically somewhat brownish. On mesoscutum notauli and parapsidal sutures are in fine raised lines, not in impressed lines as usual. Baso-medial carina of propodeum always present, in 3 specimens short, about a third or less of segment length, but in one about a half of it.

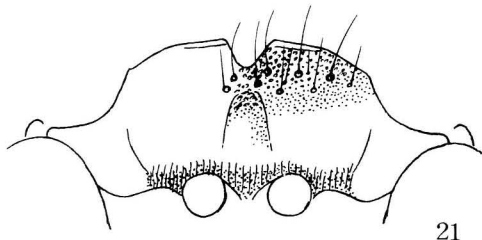


Fig. 21. Liris (Liris) ubatama sp. nov.

♂, unknown.

Holotype: ♀, New Ireland, Lemkamin, 23. IV. 1962, Noona Dan Expedition (ZMUC).

Paratype: 3 ♀, same locality, 11, 11, 20. IV. 1962.

6. LIRIS (LIRIS) BISMARCKANA SP. NOV.

♀. 17-18 mm. Closely resembles L. ubatama, but differs from this in that IODv greater in length than A3, mesoscutal punctuation slightly sparser on the area in front of apical margin, striae on dorsum of propodeum finer, closer and regular, the hair on pygidial area not dark brown, but coppery golden and apical incision of the area broader and shallower. Details are given in the key.

Supplem. HW:IODv in four specimens: =100:19,19.5,19.5,20. IODv:A3=20:18,19,19,19. Antennal rhinaria on A5-11 beneath, on 5 only a spot, section length on All=3,3,2, on A8=2,4,2, relative length of A3:A2=20:8, A3=AWx2.7, baso-medial carina of dorsum of propodeum in two specimens lacking, in one very short and in one about 2/3 the length of segment.

♂, unknown.

Holotype: ♀, New Ireland, Yalom, 1000 m, 16. V. 1962, Noona Dan Expedition (ZMUC).

Paratypes: 2 ♀, same locality, 16, 19. V. 1962; 1 ♀, New Ireland, Lemkamin, 5. IV. 1962, caught by mercury light.

Remarks. The anterior carinate part of apical margin of clypeus in all the specimens from Yalom is longer than in ubatama, but in one specimen the area is less strongly raised, in these specimens apical punctured area bears several short longitudinal impressed lines transversely arranged, while in the specimen from Lemkamin there is not the series of short impressed lines and the structure of the marginal area is rather similar to that of the specimen of ubatama, otherwise, however, the specimen completely agrees with those of Yalom. Possibly the differences are of the local variation.

7. LIRIS (LIRIS) MANUSANA SP. NOV.

♀. 15-16.5 mm. Infumation of wings slightly weaker than the two preceding species, but far darker than usual. Main characters are given in the key.

Supplem. In 3 specimens observed HW:IODv=100:16,16,17; IODv:A3=20:22,23,24; A3=AWx3.0,3.0,3.1. Rhinaria on A5-11, on 5 very small, in the holotype on All with section length 3,4,2, slenderer than others and on A8 section length 3,5,2.

Medial incision of apical margin of clypeus comparatively large in all the specimens observed, not sharply edged, but bevelled, inner apical carina is also bevelled on its sides, state of apical carina is rather similar to that of ubatama, punctuation of apical area variable, sometimes fairly broadly without puncture and shining (but not flatly smooth) and sometimes broadly punctured till apical margin; in all the specimens without the series of short longitudinal impression at anterior area and zone of gross setiferous punctures is broader and the number of the punctures is also more numerous than in the compared species. Mandible black, apically somewhat brownish, without reddish patch before apex. Baso-medial carina of dorsum of propodeum is always long, almost in full length of the segment.

♂, unknown.

Holotype: ♀. Is. Manus, Lorengau, 24. VI. 1962, Noona Dan Expedition (ZMUC).

Paratypes: 2 ♀, same data.

8. LIRIS (LIRIS) SOLOMONIS SP. NOV.

♀. 15.5-16.0 mm. Clypeus similar in apical structure and general punctuation to that of ubatama and in the state of medial incision to that of manusana. Main characters are given in the key.

Supplem. In 3 specimens examined, HW:IODv=100:18,18,19; IODv:A3=20:21,21,21; rhinaria on A5-11 beneath, generally smaller than in other species, but similar in

pattern, section length on A5=6,2,3; on A8=3,3,3; on A11=3,2,2. A3=AWx2.9,3.0,3.0. Baso-medial longitudinal carina of propodeum in two specimens lacking, in one present, reaching about middle of the segment.

♂, unknown.

Holotype: ♀, Solomon Is., Rennel I., Niupani, 25. VIII. 1962, Noona Dan Expedition (ZMUC).

Paratypes: 1 ♀, same locality, 21. VIII. 1962; 1 ♀, Dyaul I., Kollepine, 13. III. 1962.

Remarks. In one of the Solomon specimens lateral flat areas of median carina of sternite 2 are dark reddish brown in colour.

9. LIRIS (LIRIS) CRUX SP. NOV.

♀. 14.5-15.0 mm. Main characters in the key. Clypeus somewhat exceptional in structure: On each side of medio-apical incision which is obliquely inclined at the verge, apical margin slightly more strongly produced anteriorly than usual, forming a blunt tooth (Fig. 22) and marginal carina reaches the lateral angle of the produced part; the distance between this angle and lateral end of the main body of clypeus distinctly longer than half the apical margin of the produced part (Fig. 22). Large setiferous punctures are roughly in two rows, closer to each other than in ubatama.

In the paratype the apical margin is already rubbed down and the blunt bidentate structure can not be observed.

Supplem. In two specimens HW: IODv=100:21,21. IODv:A3=20:18,18. A3:A2=20:6,6. Rhinaria on A5-11, small as in solomonis; section length in holotype: on A5=6,1,6, on A8=3,2,2, on A11=5,2,3. ♂, unknown.

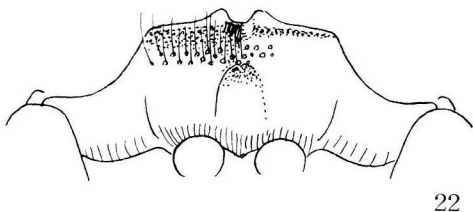


Fig. 22. Liris (Liris) crux sp. nov., ♀

Holotype: ♀, New Ireland, Lemkamin, 9. III. 1962, Noona Dan Expedition (ZMUC). Paratype: 1 ♀, New Britain, Yalom, 1000 m, 10. V. 1962.

10. LIRIS (LIRIS) CLARIPENNIS SP. NOV.

♀. 16.5 mm. Characteristic in the narrow ocular interspace at vertex and relatively longer antennal joint 3. In these respects it closely resembles manusana sp. nov., but differs from it in that wings are nearly clear hyaline, mesoscutal, epimeral and propodeal tomentosae are much more strong and distinct, notauli and parapsidal sutures of mesoscutum are distinctly impressed (in manusana all distinctly elevated) and antennal joint 5 lacks the rhinarium. Clypeus very similar to Fig. 21 except that apical carina is slightly wider, but medial elevation seems to be somewhat weaker, distance between lateral angle of medial produced area and lateral corner of main body of clypeus almost equal to half the apical margin of the produced part; the large setiferous punctures rather sparse, sides of propodeum anteriorly broadly and obliquely, posteriorly narrowly and transversely, both weakly and sparsely striate. Mesoscutal tomentum well-defined, brassy in colour.

HW:IODv=100:16. IODv:A3=20:24. A3=AWx3.0. Antennal rhinaria on A6-11, but on A5 a very minute puncture present at 2/3 from base, defined only by particular search, section length on A8=3,3,3 and on A11=4,2,3.

♂, unknown.

Holotype: ♀, Is. Dyaul, Sumuna, 10. III. 1962, Noona Dan Expedition (ZMUC).

11. LIRIS (LIRIS) LEMKAMIN SP. NOV.

♀. 19.0 mm. Closely resembles in the measured values to solomonis, but larger, with wings less strongly infumated, rather strongly yellowish, notauli and parapsidal sutures distinctly impressed, frontal and clypeal hair brassy in colour, mesoscutal tomentosa also brassy and much more conspicuous than in the compared species; still further, the fine, close transverse striae on dorsum of propodeum somewhat irregular, mixed with stronger ones, especially markedly so on posterior portion. Structure of clypeus similar to Fig. 21, except that the medio-apical incision is roundly bevelled on the verge (it is already considerably rubbed down).

HW:IODv=100:18. IODv:A3=20:22. A3:A2=22:6. A3=AWx3.1. Antennal rhinaria comparatively large, on A5-11 beneath present, section length on A5=6,2,3; on A8=3,4,2; on A11=3,3,2.

♂, unknown.

Holotype: ♀, New Ireland, Lemkamin, 14. IV. 1962, Noona Dan Expedition (ZMUC).

12. LIRIS (LIRIS) KALILIANA SP. NOV.

♀. 18 mm. Apparently very similar to the preceding species, but in the present species IODv relatively much broader, propodeal striation more regular and facial tomentosa silvery. Clypeus similar in structure and punctuation to that of lemkamin, but medio-apical incision slightly smaller. Antennal rhinaria also similar to this species in the relative size and distribution. Rhinaria on A5-11, comparatively large, section length on A5=7,2,3; on A8=3,3,2; on A11=2,2,1. HW:IODv=100:22. IODv:A3=20:21; A3=AWx3.1.

♂, unknown.

Holotype: ♀, New Ireland, Danu, Kalili Bay, 29. III. 1962, Noona Dan Expedition (ZMUC).

ANNOTATED KEY TO SPECIES OF LIRIS (LEPTOLARRA) (♀♂)

OCCURRING IN SOUTH PACIFIC ISLANDS

- | | | |
|---|--|---|
| 1 | Hair on head and thorax-complex golden or brassy | 2 |
| - | Hair on head and thorax-complex not golden or brassy | 5 |
| 2 | Pile bands on gaster on G1-4, A3=AWx1.5, rhinaria on A4-12, in full length of each joint except A12 (wings slightly infumated, strongly yellowish, medio-anterior broad furrow of mesoscutum weak), 9-12 mm, Solomon Is. and widely spread over Oriental Region | |
| - | Pile bands on gaster on G1-3, in ♂ A3=AWx3 and rhinaria on A4-11, elliptic in form, mostly not in full length of each joint (wings fuscous, basally paler medio-anterior broad furrow of mesoscutum more conspicuous) | 3 |
| 3 | Mesoscutum with median furrow somewhat shallow, with hairs rather brassy (central elevation on disc of clypeus only gentle, IODv=A2+3, propodeum without lateral carinae), 13-15 mm, New Ireland | |
| - | Mesoscutum with median furrow deep and distinct, with hairs suffused golden (central elevation on disc of clypeus marked, otherwise similar) | 4 |
| 4 | All legs black, 12-13 mm, New Ireland | |
| - | All tibiae and all tarsi except apical portion red, 12 mm, New Ireland | |
| 5 | Mesoscutum closely covered with comparatively large punctures, punctures under 10x magnification easily discerned | 6 |
| - | Mesoscutum much more finely, very closely and delicately punctured or reticulate-punctate, under 10x magnification each puncture undiscernible | 7 |
| 6 | IODv slightly less than A2+3, dorsum of propodeum transversely, fairly coarsely reticulae-striate, number of transverse striae at lateral areas about 10 (lateral oblique margin of clypeus in ♀ transversely minutely incised, rhinaria in ♀ on A6-12, in ♂ on A6-7, often on A8 or on A8-9 also present) 8-10 mm, Japan, Formosa, Philippines, Marianas, Carolines, Australia, Solomons, | |

- New Caledonias, Fijis and Samoas festinans (Smith, 1859)
 (= manilae Ashmead, = (ssp) japonica Kohl)
- IODv larger than A2+3, dorsum of propodeum more coarsely reticulate-punctate, number of transverse striae at lateral areas about 6-7 (lateral oblique margin of clypeus in ♀ without transverse notch, rhinaria in ♂ on A5-12), 8-10 mm, Philippines, new to Is. Manus bakeri (Williams, 1928)
- 7 Hairs on head and thorax-complex very indistinct, under oblique light short, velvety, coppery glittering pubescence can be seen on lateral areas of face, on sides of thorax-complex and on legs (pitchy black, wings strongly infumated, with bluish shine, apical margin of produced part of clypeus narrowly reflected, subcarinated, IODv longer than A3, rhinaria on A7-11, very small, posterior aspect of propodeum without lateral carinae except extreme apical areas), 18 mm, New Ireland atripennis sp. nov., ♀
- Hairs silvery on clypeus and lateral areas of face 8
- 8 Hairs on dorsal side of head and thorax-complex long, fine, sparse and erected, whitish in colour (punctures on mesoscutum somewhat large, close, but with more or less PIS, PIS distinctly microcoriaceous and surface not shining, apical bevel of clypeus closely punctured except narrow marginal area, propodeum with lateral carinae) 9
- Hairs on the areas short, appressed, silvery (propodeum with lateral carinae) 10
- 9 Dorsum of propodeum with area dorsalis weakly outlined with broad shallow furrow, disc of the area finely punctate-reticulate, outsides of the area mainly transversely rugoso-striate (mesothorax uniformly punctured, IODv distinctly longer than A3, rhinaria on A5-12, on A5 small), 13-15 mm, New Britain philippinica* yalomensis ssp. nov., ♀
- Dorsum of propodeum without margined area dorsalis, transversely and coarsely rugoso-striate (mesothorax with somewhat larger punctures sparsely scattered, IODv=A3, rhinaria on A7-11, very small), 12 mm, New Ireland dana sp. nov., ♀
- 10 Anterior bevel of clypeus closely punctured to the margin, pubescence on mesoscutum yellowish white, tomentum pale brassy, pile bands on gaster on Gl-4 (wings strongly yellowish, IODv longer than A3, A3=AW×2.7, rhinaria on A8-11, very small, dorsum of propodeum without medial furrow, medianly longitudinally weakly carinate, surface transversely, finely and closely rugoso-striate, striae on lateral areas feeble, with surface microcoriaceous), 14-16 mm, Solomon Is. (widely spread over Oriental Region) laboriosa (Smith, 1856), ♀
- Bevel of clypeus at least anteriorly smooth and shining, pubescence on mesoscutum not yellowish, pile bands on gaster on Gl-3 11
- 11 ♀ (IODv≠A3, A3 > AW×2.5, rhinaria small) 12
- ♂ (IODv > A3, A3 < AW×2.5, rhinaria large) 14
- 12 Wings strongly infumated throughout, 13-14 mm (A4 slightly shorter than A3, dorsum of propodeum without lustre, transversely, coarsely, but not strongly striate, striae-interspaces irregularly, more feebly striolate, median furrow of posterior aspect narrow, medianly slightly enlarged, minute punctures on median area of mesoscutum with more or less PIS and PIS shining and larger posteriorly, punctures on scutellum as on medio-posterior part of scutum, minute rhinaria on A8-12, hairs on pygidial area long, coppery golden, but posteriorly dark brown), New Ireland melanoptera sp. nov.
- Wings hyaline, on apical margin more or less clouded, 10 mm or less (A4≠A3, dorsum of propodeum with silky shine, hairs on pygidial area short, silvery, with a slight yellowish tinge) 13
- 13 About 10 mm, punctures on mesoscutum and scutellum fine and distinctly separated from each other and on scutum sparser and weaker posteriorly, with surface strongly shining (dorsum of propodeum very finely and closely transversely striate, striae only on lateral areas strong and sparse, median furrow of posterior aspect narrow and rather short, minute rhinaria on A7-12), Bismarck Archipelago, I. Mussau mussauana sp. nov.
- About 7-8 mm, mesoscutum and scutellum microreticulate, delicate punctures transversely arranged in the main, surface nearly mat (dorsum of propodeum transversely, feebly and sparsely striate, posterior aspect medianly with a large subtriangular excavation, comparatively large rhinaria on A7-13), New Ireland tibicunda sp. nov.
- 14 Silvery pubescence on flattened underside of fore femur somewhat obliquely

* = liloides Williams, 1928, nec Turner, 1913; see p. 21.

erected and well visible as glittering tomentum, hair of mesoscutum and propodeum comparatively less abundant and not conspicuous (rhinaria on A4-12, on 13 lacking, dorsum of propodeum transversely, rather coarsely striate, lateral carinae of posterior aspect complete and strong), 9-10 mm, New Ireland

- pygidialis sp. nov.
- Silvery pubescence on flattened underside of fore femur strongly appressed, not seen as a shining hair layer, hairs on mesoscutum and propodeum abundant and conspicuous (rhinaria on A4-13, on A13 not reaching apex, lateral carinae of posterior aspect of propodeum incomplete) 15
- 15 Hind femur black, lateral margins of posterior aspect of propodeum roundly convergent posteriorly (dorsum of propodeum transversely, comparatively more distinctly and coarsely rugoso-striate, wings somewhat more distinctly yellowish), 10 mm or so (docilis Smith, 1873)
- Hind femur at least more or less red, lateral margins of posterior aspect of propodeum more steeply (straightly) convergent apically (dorsum of propodeum with transverse striae coarse but feeble, on central area often rather indistinct, wings less yellowish), 8-10 mm 16
- 16 Hind femur broadly distinctly ferruginous red, widely spread over Oriental Region and South Pacific areas (subtessellata (Smith, 1856)
- Hind femur only basally obscurely reddish, Bismarck Archipelago subtessellata banatama ssp. nov.

13. LIRIS (LEPTOLARRA) FESTINANS (SMITH, 1859)

Larrada festinans Smith, J. Proc. Linn. Soc. London, Zool., 3: 17, 1959 (♀ ♂, Celebes)

Larra festinans: Kohl, Verh. Zool. Bot. Ges. Wien, 34: 244, 1884.

Notogonia manilae Ashmead, Proc. U. S. Natn. Mus., 28: 130, 1904 (♂ ♀, Philippines).
? Notogonia retialia Turner, Proc. Zool. Soc. London, 30: 479, 1908 (♀, W. Australia. ... Mesonotum microscopically and very closely punctured and opaque!)

Notogonidea williamsi Rohwer, Bull. 14. Ent. Ser. Exp. Stat. H.S.D.A., p. 9, 1919.

Notogonidea manilae: Williams, Bull. Exp. St. Hawaii. Sug. Plant. Ass., Ent. Ser., 19: 75, 1928 (♀ ♂, Philippines, Borneo, Amboina, Singapore, Penang, Formosa and possibly Japan and Australia).

Motes manilae: Yasumatsu, Mushi, 14 (1): 44, 1941 (Marianas, Palau).

Notogonidea manilae: Swezey, B. P. Bishop Mus. Bull., 172: 184, 1942 (Guam).

Notogonidea manilae: Williams, Proc. Hawai. Ent. Soc., 12: 444, 1945.

Motes manilae: Krombein, Proc. Hawa. Ent. Soc., 13 (3): 395, 1949 (Micronesia).

— Ref. ssp. japonica Kohl, 1884: —

Notogonia japonica Kohl, Verh. zool. bot. Ges. Wien, 33: 357, 1884 (♀, Kioto); Ibid., 34: 254, 1884..

Larra nigricolor Dalla Torre, Cat. Hym. etc., 8: 670, 1897.

Notogonia praetermissa Richards, Proc. Zool. Soc. London, 1928: 361 (♀, France).

Leptolarra praetermissa: Beaumont, Bull. Soc. Fouad ler Ent., 24: 18, 1940 (Egypt).

Liris praetermissa: Beaumont, Mitt. Schweiz. Ent. Ges., 34 (3): 236, 1961.

Liris japonica praetermissa: Tsuneki, Kontyu, 32: 221, 1964.

Liris (Nigliris) japonica: Tsuneki, Etizenia, 20: 34, 1967 (Formosa).

Liris (Leptolarra) festinans (with ssp. japonica): Bohart & Menke, World Sphecid., p. 245, 1976.

Specimens examined: 5 ♀ 3 ♂, Is. Manus, Lorengau, 18,19,19,20,20; 18,20,24. VI. 1962; 3 ♀ 4 ♂, Labongai Is., Banatam, 18,25,25; all 25. III. 1962; 2 ♀ 2 ♂, New Ireland, Lemkamin, 4,14; 14,16. IV. 1962; 1 ♀, Is. Dyaul, Kollepine, 12. III. 1962; 2 ♀ 1 ♂, New Britain, Yalom, 1000m, 19,21; 23. V. 1962; 1 ♀, New Britain, Valoka, 13. VII. 1962; 5 ♀ 1 ♂, Solomon Is., Rennell I., Niupani, 24,25. VIII. 1962.

Remarks. Specimens are comparatively small, ♀ mostly 7-8 mm exception 10 mm, ♂ 5-6 mm, exception 7 mm. This is partly due to that the gaster is shrunk.

In connection with the Formosan specimens of this species (Tsuneki, 1967) variation in antennal rhinaria and ventral hair of the gaster were examined:

Of the 11 male specimens the state of the ventral hair:

In 9 type 1 (apical part of sternites 3-6 broadly covered with sparse long stiff hair, with interspaces densely filled with short erect curved pubescence)

In 2 type 5 (sternites 3-6 covered only with very short curved appressed pubescence, almost without long stiff hair and completely without short erect curved pubescence). (Yalom- and Valoka-specimens).

There is no other types.

As to the antennal rhinaria:

In 7 on A6-9 and at base of A10. (3 Manus, 3 Lavongai, 1 Lemkamin)

In 2 on A6-7 and base of A8. (Lavongai and Yalom).

In 1 on A6-10 (Solomon).

In 1 on A6-9 (Lemkamin).

As to ♀ in 18 specimens out of 19 rhinaria are present on A6-12, elongate oval in form, generally small, but more or less variable between specimens in relative size; in the remaining one rhinaria very small and on A6-11 present, that on A6 is only a spot and on A12 completely lacking.

The results show that the variation in both characters has no geographical relation with the locality of the specimens.

14. LIRIS (LEPTOLARRA) BAKERI (WILLIAMS, 1928)

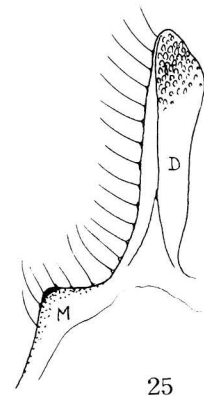
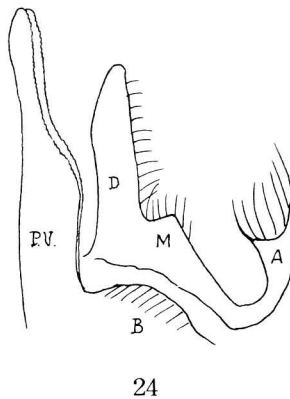
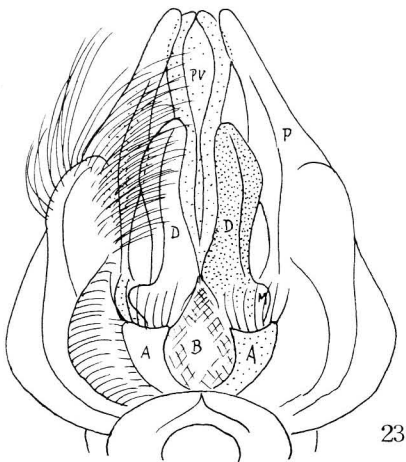
Notogonidea bakeri Williams, Bull. Exp. Sta. Hawn. Sug. Plant. Ass., Ent. Ser., 19: 74, 1928 (♀ ♂, Philippines: Samar, Negros, Luzon)

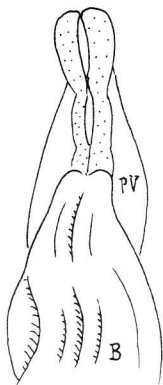
Liris (Leptolarra) bakeri: Bohart and Menke, World Sphecid., p. 244, 1976 (listed).

Specimens examined: 1 ♂, Bismarck Arch., Is. Manus, Lorengau, 23. VI. 1962.

Observation. Williams' description of the male of this species is rather simple, but he gives figures of genitalia and 8th sternite. Although the figure of the genitalia is not detailed, it tolerably well agrees with those of the present specimen, especially in the ventral lobe of the volsella, and the characters of the present specimen also agrees with his description as far as it goes. Some supplements:

♂. Length 8 mm. Belongs to the group of festinans. !W:IODv=100:26, IODv:A3=10:4. A3,4,5=1,1,1. A3=AW×1.6. Rhinaria on A6-11. Punctures on mesoscutum slightly larger than in festinans, PIS < PD, PIS shining, but under high magnification delicately microcoriaceous, dorsum of propodeum gently concave and at medio-basal area slightly raised, surface very coarsely irregularly reticulate, meshes of network larger laterally and posteriorly, on lateral areas regularly arranged in transverse lines and connected with the lateral carinae, inside of the network finely rugulose, not smooth, but fairly shining. Posterior aspect also with strong lateral carinae and some coarse network on upper area, sides strongly, fairly closely and obliquely or transversely striate, striae everywhere not straight. Gastral tomentosa on tergites 1-3 and 6. 8th sternite as given by Williams, apex minutely incised in middle. Paramere of genitalia simple at apex, at base broadly excavated and on ventral surface of apical half densely covered with long bristles (Fig. 23, ventral view, P paramere, PV penis valve), volsella with anterior lobe (A in Fig. 23) fringed with long hair





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at upper margin, posterior lobe (D in Fig. 23) black in colour, surface minutely reticulate and medianly longitudinally ridged on inner side, ventral margin also fringed with sparse whitish hair, between anterior (=cuspid) and posterior (=digitus) lobes a triangular elevation present (M in Fig. 23) whence also a row of hair arises. Right volsella seen obliquely (somewhat ventrally) from inner side: Fig. 24 (PV, A, D and M same as in Fig. 23), left digitus with median elevation (M) seen from inside: Fig. 25. Penis valve structured as usual in this group (cf. Figs. 23 and 24) but in this species a strange dark brown block is present at base in front (Fig. 23, B), seen vertically (ventro-apical view): Fig. 26, B. This may be a supporting block of the pair of volsella.

Remarks. This species is also closely related to the Australian species, Liris (Leptolarra) retialia (Turner, 1908). According to the descriptions of both the species it is difficult to find out the differences between them. Actual comparison of the specimens seems to be necessary, including together those of festinans. Here, from the male characters the present specimen is ascribed to bakeri (retialia is ♀).

On LIRIS (LEPTOLARRA) LIROIDES (WILLIAMS, 1928), nec (TURNER, 1913)

In 1963 I described a female specimen from Thailand as a local race of L. liroides, naming it Liris (Notogonidea) liroides thaiana, without taking notice that liroides was preoccupied by the Turner's species. In 1976 Bohart and Menke in their Sphecid monograph widely rearranged the names of the known species and among which liroides Williams was suppressed and thaiana was raised instead. This is certainly correct, but they left the work of renaming the Philippine subspecies.

In view of the present knowledge, however, the difference of thaiana from liroides Williams is considered beyond the range of specific variation and it should be raised to specific rank without connection with the Philippine species:

Liris (Leptolarra) thaiana Tsuneki, 1963 (stat. nov.).

Hereupon a simple renaming the Williams' species becomes necessary:

Liris (Leptolarra) philippinica Tsuneki nom. nov. for

Notogonidea liroides Williams, Bull. Exp. Sta. Hawn Sug. Plant. Ass., Ent. Ser., 19: 72, 1928 (nec Turner, 1913) (Luzon, Samar, Sibuyan, Iliga, Mindanao, Basilan).

15. LIRIS (LEPTOLARRA) PHILIPPINICA YALOMENSIS SSP. NOV.

The present specimens from New Britain differ from the Philippine typical form in that the body is larger (♀ 13-15 mm, ♂ 9-10 mm), wings are more strongly infumated (dark yellowish and apical area much darker), tomentosa on gaster is usually on G1 and 2 only present (♀ ♂), but sometimes on G3 vaguely observed and in ♂ IODs distinctly less than as long as A3+4.

Holotype: ♀, New Britain, Yalom, 1000 m, 20. V. 1962, Noona Dan Expedition (ZNUC).

Paratypes: 1 ♀ 2 ♂, same locality, 13, 14, 20. V. 1962. (ZMUC).

Remarks. In holotype antennal rhinaria on A5-10 beneath, small, nearly oval in form, in paratype ♀ a very minute spot is present on A11 also. In ♂ ♂ on A4-12, in full length of each joint. In the specimens dorsum of propodeum baso-medial area is broadly enclosed with broad shallow, but distinct furrow, thus so-called area dorsalis present, the area expanding its range to dorsal part of posterior aspect, surface of the area transversely, finely rugoso-reticulate and medianly longitudinally carinate, carina reaching somewhat beyond middle, median furrow anteriorly shallow, posteriorly slightly broader and distinctly deeper, inside of the furrow transversely striate, narrow outer sides of the area till lateral carinae transversely rugoso-

striate, rugae fine and fairly close, mixed with stronger ones and near lateral carinae becoming coarse and strong, especially so on postero-lateral areas, lateral carinae strong and complete, connecting with postero-lateral carinae of posterior aspect.

16. LIRIS (LEPTOLARRA) SUBTESSELLATA (SMITH, 1856)

Larrada subtessellata Smith, Cat. Hym. Brit. Mus., 4: 277, 1856 (♀, India, Sumatra and Java).

Notogonia insularis Cameron, Bijdr. Dierk., 19: 81, 1913 (Is. Waigeo).

Notogonia subtessellata: Williams, Bull. Hawn. Sug. Plant. Ass., Ent. Ser., 14: 9, 1919 (♀, Philippines, partim); Ibid., 19: 76, 1928 (partim).

Liris (Dociliris) subtessellata: Tsuneki, Etizenia, 20: 32, 1967 (Formosa, with ref.).

Liris (Dociliris) subtessellata: Tsuneki, Steenstrupia, 4: 59, 1976 (Palawan).

Liris (Leptolarra) subtessellata: Bohart & Menke, World Sphecid., p. 248, 1976.

Specimen examined: 1 ♂, New Ireland, Lemkamin, 16. IV. 1962.

Remarks. In the specimen the left antenna is abnormal, A10-13 are dilated, slightly concave beneath, with each rhinarium occupying whole the area beneath, while, the right is normal, carrying rhinaria on A4-13, on 13 not reaching apex.

16a. LIRIS (LEPTOLARRA) SUBTESSELLATA BANATAMA SSP. NOV.

♂. Differs from the typical form in that hind femur strongly infuscated, only inner and outer sides, both partly, dimly reddish. Sculpture on dorsum of propodeum is, in comparison with the Formosan representatives, much weaker on central area and much coarser and stronger on lateral areas. Antennal rhinaria on A4-13, on 13 not reaching apex.

♀, unknown.

Holotype: ♂, Lavongai I., Banatam. 23. III. 1962 (Malaise trap).

Remarks. Notogonia subtessellata: Williams (1919 and 1928) is a mixed group of L. subtessellata (Smith) and L. docilis (Smith) and Motes subtessellata: Krombein (1949) is only L. docilis. Bohart and Menke (1976) erroneously cited Hawaiian (introduced) and Marshal populations as subtessellata, but they are in reality only docilis (Smith).

17. LIRIS (LEPTOLARRA) DOCILIS (SMITH, 1873)

Larrada docilis Smith, Trans. Ent. Soc. London, 2: 192, 1873 (♀, possibly ♂ in reality, but not his ♂, Japan).

Larrada Tisiphone Smith, Ibid., p. 192 (Japan) (nec Tisiphone Smith, 1858).

Larra tisiphonoides Dalla Torre, Cat. Hym. etc., 8: 625, 1897.

Notogonia manilensis Rohwer, Proc. U. S. Nat. Mus., 37: 659, 1910 (♂, Philippines).

Notogonia subtessellata: Williams, 1919 and 1928 (loc. cit.), both partim).

Notogonia subtessellata: Williams, Ann. Mag. Nat. Hist., Ser. 10, 18: 124, 1936 (Solomon Is. all having black femora).

Motes subtessellata: Krombein, Proc. Hawn. Ent. Soc., 13 (2): 382, 394, 1949 (Marianas, Hawaii)

Motes tisiphone: Tsuneki, Life Study (Fukui), 6 (1): 2, 1967 (Ryukyus).

Liris (Notogonia) subtessellata docilis: Tsuneki, Kontyu (Tokyo), 32: 221, 1964 (Japan and Ryukyus).

Motes subtessellata: Baltazar, Pac. Ins. Monogr., 8: 333, 1966 (listed, but partim).

Liris (Notogonia) docilis: Tsuneki, Etizenia, 17: 1, 1966 (Formosa and Ryukyus).

Liris (Notogonia) vortex Tsuneki, Ibid., p. 7, 1966 (Formosa, only variant).

Liris (Dociliris) docilis: Tsuneki, Ibid., 20: 33, 1967 (Formosa)

Liris (Leptolarra) docilis: Bohart & Menke, World Sphecid., p. 245, 1976.

Specimens examined: 2 ♂, Bismarck Arch., Lavongai I., Banatam, 18, 19. III.

1962; 1 ♂, New Ireland, Kalili Bay, Danu, 30. IV. 1962; 1 ♂, Is. Dyaul, Summa, 9. III. 1962.

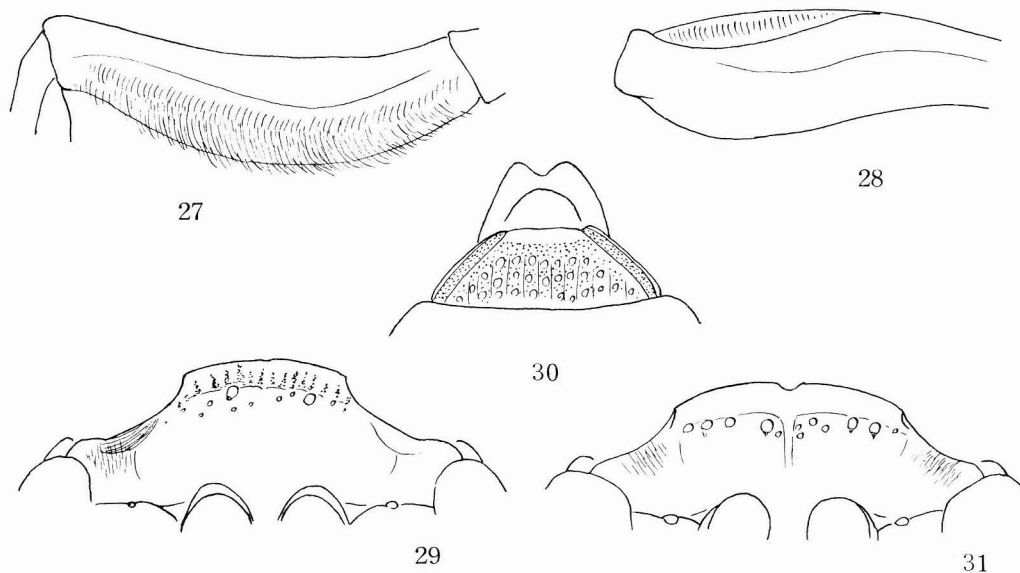
Remarks. In all the specimens observed antennal rhinaria are on A4-13, on A4-12 in full length of each joint, but on A13 not reaching apex.

18. LIRIS (LEPTOLARRA) PYGIDIALIS SP. NOV.

Belonging to the group of subtessellata, docilis, rohweri and formosana and among which closest to L. formosana m. in that IODv is very narrow (HW:IODv=100:15, ♀) and gastral tomentosa is on G1-3 only (in rohweri on G1-4), but differs from all of them in the following distinctions:

In ♀ hair on pygidial area long, anteriorly golden and posteriorly broadly brownish black and most of them setaceous; in ♂ fore femur not broadly excavated and flattened beneath, but only on fore side at apical half flattened, in posterior view, therefore, almost normal (Fig. 27), but in dorsal view the deformed feature is well visible (Fig. 28); in ♀ ♂, wings much more strongly darkened.

♂. 9 mm (gaster shrunk, possibly 10-11 mm when alive). Dull black due to very fine and close punctures and very fine, close and short pubescence covering whole the body. Mandible apically dark reddish brown, tegula only apically dark brown, not completely shining due to microsculpture, anteriorly distinctly closely punctured and dull as in other parts of body, mouth parts brownish black, legs also black. Wings fairly strongly clouded throughout, dark brown. Hair silvery on lower face, clypeus, on posterior patch of propodeal sides and on medianly widely separated bands at apical sides of G1, 2 and 3.



Figs. 27-31. Liris pygidialis sp. nov. 27-30, ♂; 31, ♀.

HW:IODv=100:19, IODv:A3=10:7, IODv≠A2+3, A3,4,5=10,10,10, A3=AW×1.7. A5-12 with rhinaria, covering posterior half of each joint, on A12 with apex rounded and not reaching apex of the joint. Clypeus: Fig. 29, mesoscutum on medio-anterior area broadly depressed, depression reaching posteriorly about middle of the scutum, pygidial area broad, lateral margins rounded out and obliquely highly raised into carinae, apical margin comparatively broad, nearly truncate, without medial carina on posterior area (Fig. 30). Sternite 8 with apex triangularly bilobed (Fig. 30). Fore femur in posterior view: Fig. 27, in dorsal view: Fig. 28, not broadly flattened beneath as in subtessellata, docilis and formosana, while hind femur broadly excavated

beneath as in compared species, with basal angle in posterior view minutely rounded.

Punctuation of thorax similar to that of other allied species, on dorsum of propodeum also generally similar, namely medianly longitudinally long carinate and surface transversely, somewhat arcuately, moderately closely striate, lateral margins subcarinate, posterior aspect provided with 2 or 3 transverse strong carinae above, surface transversely and arcuately, finely and closely striate, striae stronger and sparser towards lateral margins that are strongly, distinctly carinate; sides transversely, fairly strongly and coarsely striate, but on central area striae somewhat weaker; pygidial area longitudinally coarsely rugose and mixed with gross punctures between rugae (Fig. 30).

Table 1. Relative length of IODv and A3 (♀)

Species	Loco	HW	IODv	IODv	A3
pygidialis	Lemkamin	100	15.5	10	12.0
pygidialis	Lemkamin	100	16.0	10	10.0
pygidialis	Lemkamin	100	17.0	10	9.5
pygidialis	Yalom	100	17.0	10	10.0
pygidialis	Yalom	100	18.0	10	9.5
formosana	Taiwan	100	16.0	10	12.0
formosana	Taiwan	100	15.5	10	12.5
docilis	Taiwan	100	19.5	10	9.0
docilis	Taiwan	100	18.0	10	10.0

♀. 9-10 mm. Relative length of HW, IODv and A3 is given in Table 1. Clypeus: Fig. 31. Antennal rhinaria on A6-12, very small, on 6 and 12 only a minute spot. General structure, punctuation and striation of thorax and propodeum and hair and tomentosa are also as in ♂, except pygidial area. Pygidial area with sides rounded out, length in middle to width at base appr. 4:3, width at base and at apex appr. 5:2,

apex gently roundly emarginate and covered with a series of 4-5 spines, other hairs and setae as mentioned in the comparative note, but to be added is that the pygidial area till about 1/3 from base without hair, smooth and polished, apical margin of the glabrous area sometimes triangular, sometimes rounded.

Holotype: ♂, New Ireland, Lemkamin, 15. IV. 1962, Noona Dan Expedition (ZMUC).

Paratypes: 2 ♀, same loco, 15, 21. IV. 1962.

Other specimens: 1 ♀, same loco, 14. IV. 1962; 2 ♀, New Britain, Yalom, 1000 m, 20, 22. V. 1962.

Remarks. In the specimens from Yalom median carina on the dorsum of propodeum is completely lacking and in them as well as in one of the Lemkamin specimens dorsal surface of propodeum bearing a velvety lustre, not completely dull as in other Lemkamin specimens and, moreover, in them except one of the Yalom the wings are fairly pale in colour. Still further, in the three specimens IODv shows slight different values as against HW (Table 1) and tegula of wing posteriorly broadly smooth and polished (in the typical specimens the place is delicately microrugulose and not shining). As there is no corresponding male, they are treated here as variations of the present species. (The male may show the correct status of the specimens). This is the reason why they are not designated as paratypes.

19. LIRIS (LEPTOLARRA) MUSSAUANA SP. NOV.

This species (♀) is very similar to the specimens that were treated as variants of the preceding species, differs, however, from them in that the mesoscutum and scutellum are much more sparsely punctured, with PIS smooth and strongly shining (but punctures are similarly fine), dorsum of propodeum (with similar delicate lustre, but) more finely and more weakly transversely striate and especially the pygidial area, except base, covered with short golden-silvery pubescence, without dark brown setae (but with a series of brown spines at apex). In the hair of pygidial area it resembles formosana m. (1973), but differs markedly from this in the surface character of the scutum and scutellum. In the relative length of IODv and A3 it is similar to formosana as well as pygidialis.

♀. 11.5 mm. Black; antennal scape narrowly dark red along longitudinal carina beneath, mandible apically reddish dark brown, mouth parts brown to dark brown, tegula of wing with posterior half shining brown.

HW:IODv=100:15, IODv:A3=10:11, A3,4,5=1:1:1, rhinaria on A7-11, generally very small, on 7 only a minute spot, clypeus as Fig. 31, dorsum of propodeum with fine but long medial carina, dorsum weakly transversely, finely and fairly closely and posteriorly arcuately striate, striae on lateral areas stronger and sparser and at margins crossing lateral carina and extending shortly on dorsal part of the sides, posterior aspect transversely, very finely and very closely striate, but on dorsal

area mixed with a few strong striae, on the rest the fine striae becoming stronger and sparser towards sides and connected with the lateral carinae at the margins, the sides of the segment very finely and closely punctulate but PIS shining and mixed anteriorly with transverse weak striae and posteriorly with a few strong ones.

♂, unknown.

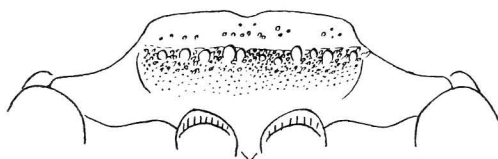
Holotype: ♀, Bismarck Arch., I. Mussau, Talumalaus, 19. I. 1962, Noona Dan Expedition (ZMUC).

20. LIRIS (LEPTOLARRA) TIBICUNDA SP. NOV.

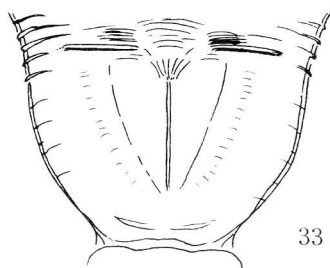
♀. 7.5 mm. In length of the body and in general appearance the present species seems to be very close to funerea Smith known from New Guinea, but the identification through such a simple description is impossible. At least funerea is different from the present specimen in that "propodeum is finely granulate". In the character that dorsum of propodeum has somewhat silky lustre, the present specimen resembles pygidialis (variant) m. treated in foregoing pages, but differs from this in the wing colour, punctuation of mesoscutum and in the relative width of IODv, and further in much smaller body size. In the microsculptured mesoscutum the present species resembles subtesselata-docilis group, but is different from this markedly in many other characters.

Black; mandible apically somewhat reddish brown, mouth parts very slightly brownish, tegula posteriorly brown, wings hyaline, with apical half feebly clouded and somewhat yellowish; hair silvery, short and appressed, tomentosa on mesoscutum only in oblique light defined, that on gaster on Gl-3 present, hairs on pygidial area comparatively long (distinctly longer than in docilis), silvery golden in colour and mixed sparsely with half erected bristles of the same colour.

Head in frontal view HW:HL=100:80, in dorsal view HW:IODv=100:18, IODv:A3=10:9, A3=AWx2.5, A2:A3=1:3, A3,4,5=1,1,1. Rhinaria on A5-12, comparatively large in general and considerably large on A12, but on 6 small and on 5 very small, only a minute spot. Clypeus: Fig. 32, mesoscutum almost without median depression, lateral carinae of propodeum strong and distinct (in this respect similar to funerea Smith), arising very close to spiracle, reaching close to anterior end of postero-lateral carina of posterior inclination, but not directly connected with this. Posterior aspect: Fig. 33, pygidial area with apex gently emarginate and covered with a series of sparse spinules. Fore tibial spur slenderer than usual, with transparent lamellate fringe



32



33

Figs. 32-33. Liris (leptolarra) tibicunda sp. nov., ♀. Clypeus and posterior aspect of propodeum.

also as usual, tarsal spines short. In radial vein of fore wing length order of abscissae from shortest: 5,3,2,1,4 (5≠3).

Clypeus at apical margin gently bevelled, bevelled area smooth and scattered with a few fine punctures; just behind the area a transverse series of large shallow not well outlined punctures present, thence posterior surface weakly microgranulate with piliferous punctules, dorsal area around fore ocellus microreticulate, on the raised area of distorted hind ocelli punctures somewhat large, with distinct PIS, though much less than PD, mesoscutum mainly transversely, somewhat irregularly micropunctulate and -striate; under high magnification punctures transversely contiguous, appearing microgugoso-punctulate (as in subtesselata or in docilis; in pygidialis punctures fine and close, but with distinct interspaces, not transversely contiguous, not transversely microrugulose and under high magnification punctures

are connected with each other with a very fine impressed line or microstria. The state is intermediate between those of subtessellata and festinans). Dorsum of propodeum with surface not shining, but with a silky lustre, without any microsculpture observed under 80x magnification, median longitudinal carina present, attenuating and weakening posteriorly, reaching about 3/4 from base (but possibly the length may vary), surface weakly, rather sparsely, at base obliquely and posteriorly gradually transversely striate, striae stronger near lateral carinae and at postero-lateral corners; posterior aspect medianly with a large triangular excavation and in middle of the hollow finely grooved, the bottom line smooth and shining and reaching apex of the segment, surface weakly microreticulate and on lateral areas strongly and sparsely striate; sides as on dorsum and with a few transverse striae behind spiracle and at posterior corners.

♂, unknown.

Holotype: ♀, New Ireland, Lemkamin, 14. IV. 1962, Noona Dan Expedition (ZMUC).

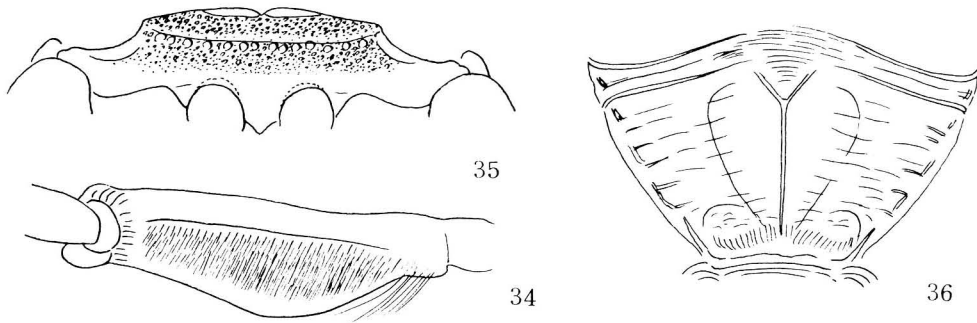
21. LIRIS (LEPTOLARRA) DANA SP. NOV.

♀, about 11 mm. Belonging to the group of subtessellata-docilis and characteristic in the structure of clypeus, the relative length of IODv and A3, mesothoracal and propodeal punctuation and sculpture and in the vestiture of the pygidial area.

Black; tegulae on posterior part faintly brownish, mouth parts also nearly black, wings hyaline, feebly clouded throughout, bearing somewhat a yellowish tinge. Hairs silvery, fairly abundantly mixed with long white hairs, tomentum on mesoscutum and posterior sides of propodeum not conspicuous, only in oblique light defined, on gaster Gl, 2, 3 at apical sides distinct, but in some light median areas also glitter. Hair on pygidial area comparatively long, dark brown or brownish black, in some light with a coppery shine.

Head in frontal view markedly wider than long, HW:HH=100:72, in dorsal view HW:IODv=100:19, IODv:A3=10:10, A3=AW×3.3, A2:3=1:3, A3,4,5=1,1,1. A1 acutely carinated in front as usual, but its form seen in profile characteristic (Fig. 34, in the state that A1 is produced forwards). Rhinaria on A7-11, each small and smaller towards base and apex of the series. Vertex at anterior verge and at inner orbits more highly raised and medial furrow in front of fore ocellus much deeper than in other allied members, say subtessellata, docilis and tibicunda; seen in profile frontal angle much closer to rectangle. Clypeus markedly short (Fig. 35), medio-apical margin comparatively broader than usual and minutely notched in middle, inner half of the margin slightly incrassate and shining, disc from base strongly raised anteriorly and rather acutely bevelled forwards, with verge transversely ridged and shining, bevel comparatively broad and till near apex minutely punctured, except inner apical incrassation, disc just behind ridged verge with a series of large piliferous punctures (in the figure pile omitted). Mesoscutum at medio-anterior area depressed, also at medio-posterior part longitudinally impressed, scutellum and postscutellum also longitudinally impressed in middle, propodeum with longitudinal carina in middle which is long extended till near apex of dorsum where surface longitudinally weakly furrowed, lateral carinae distinct, but not strong and crossed with stronger transverse carinulae, posterior aspect (Fig. 36) with lateral carinae incomplete, intermittent and partly disappeared, postero-lateral carinae of the aspect distinct, but short and acutely pointed at apex, surface medially broadly excavated, with glittering bottom line anteriorly bifid, forming a Y-shaped groove; pygidial area with lateral margins nearly straight and gently incurved at apex, apex weakly outcurved and covered with a series of strong, somewhat flattened spinules, in the holotype 9 in number. Fore tibia without spine in front, spurs slender and long, with inner basal transparent lamellate fringe somewhat broader than usual, tarsal spines moderately long. In fore wing abscissae of radial vein in the following length order (from the shortest): 5,2,3,1,4 and 2÷3, interspace of recurrent vein on cubital vein short, as long as abscissa 5 (transverse radial vein) of radial vein, but the values may vary.

Punctures of mesoscutum fine and close, on antero-lateral areas PIS < PD, minute punctures partly confluent and mixed sparsely with somewhat large strong punctures, on medial area from central part posteriorly punctures somewhat sparser, PIS mostly twice as large as PD, PIS everywhere microstriolate or microreticulate, not strongly shining, scutellum punctured as on medio-posterior part of mesoscutum, on mesopleuron hypopleural area minutely and irregularly rugoso-reticulate, rugae partly stronger and near scrobal sulcus irregularly longitudinally running, the sul-



Figs. 34-36. Liris (Leptolarra) dana sp. nov., ♀

cus broader than usual, irregularly crenate and scrobe itself on a small tubercle; prepectus, episternal area also irregularly microreticulate and sparsely mixed with medium-sized punctures. Dorsum of propodeum somewhat sparsely, transversely and rugosely striate, mixed partly with longitudinal striae, the striae on medial area moderately strong, but on lateral areas much stronger and coarser, crossing lateral carinae, extending shortly to upper part of the sides, the sides transversely, finely and closely striate, striae weaker dorsally and stronger and sparser downwards, posterior aspect with a few strong transverse carinae upwards and some weaker ones downwards, on lateral areas a few short transverse carinae joined to intermittent pieces of lateral carinae, on central excavation at posterior area carina lacking, surface smooth and shining and at anterior area transversely feebly rugoso-striate. Gastral tergites micropunctulate delicately as usual, sternites 5 and 6 except base distinctly, somewhat sparsely punctured.

♂, unknown.

Holotype: ♀, New Ireland, Lemkamin, 14. IV. 1962, Noona Dan Expedition (ZMUC).

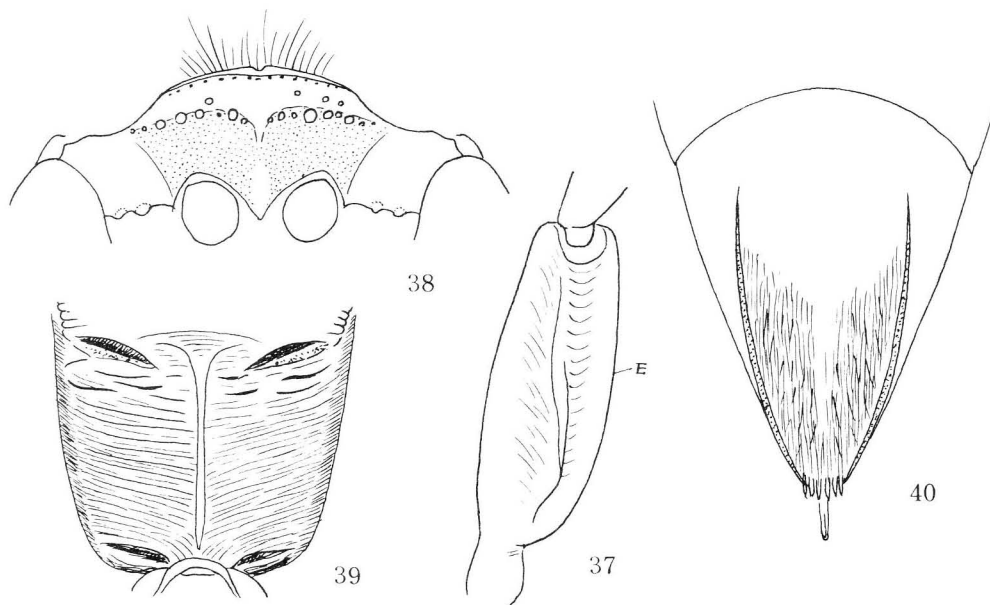
22. LIRIS (LEPTOLARRA) ATRIPENNIS SP. NOV.

♀. Characteristic in the strongly infumated wings, pitchy black body without shining tomentosa, gently roundly and long bevelled clypeus, long A3 (longer than A4), slender pygidial area and state of lateral carinae of propodeum.

About 18 mm. Black without lustre on thorax and propodeum, wings strongly dark brown throughout (even hind wings) and darker along veins of fore wing, especially so along costa and subcosta and at medial and radial cells, but apically somewhat pale and in some light with a purplish and bluish effulgence. Mandible somewhat darkened red and at base and apex slightly darker, mouth parts dark brown, palpi apically brown, tegula black but apical margin in some light slightly brownish. Hair on clypeus very scarce, lateral areas anteriorly with a patch of short brownish pubescence, in some light only observable, head in dorsal view on aculo-antennal areas and on outer side of inner orbital elevation short brownish shining pubescence can be seen, pubescence on dorsal side of thorax and propodeum very short and greyish, also in some light only defined, on sides and underside of thorax-complex and on basal half of legs also very short but somewhat brownish pubescence in oblique light only observable, on apical sides of mesoscutum and of G1, 2, 3 similar brownish pubescence in some light hardly defined, pygidial hair long, shining castaneous brown, the hair medially dark and mixed sparsely with dark brown half erected bristles, apical spinules 6 in number in the specimen, basal third of pygidium and median line of apical part without hair and polished.

In frontal view HW:HL=100:81, IAD:WAS:AOD=5:5:6, in dorsal view HW:IODv=100:17.5, IODv:A3=10:5.5, A2,3,4,5=7,20,17,18, A3=AW×2.7. Rhinaria on A7-11, generally small. Anterior verge of dorsal side of head not strongly produced, in lateral view bluntly rounded as usual (not approaching rectangle), A1 (right) in lateral view (Fig. 37) normal in form, frontal edge rather blunt (do., E). Clypeus: Fig. 38, disc of median area gently roundly raised and on medio-apical area slightly longitudinally depressed and medio-posterior area weakly longitudinally elevated,

apical bevel is indistinct morphologically, but the anterior inclined area smooth and fairly shining (strictly with delicate microreticulation) and distinct from the posterior micropunctulate dull area, showing that the place of inclination is the bevel and at the posterior border a sparse series of comparatively large setiferous punctures present, apical margin raised into transverse carina and minutely roundly incised in middle and at the posterior border of the raised margin a series of medium-sized punctures observed, apical margin, seen from beneath thick, bearing a narrow undersurface whence strong setae, unequal in length, radiately shooting out (Fig. 38).



Figs. 37-40. Liris (Leptolarra) atripennis sp. nov., ♀

Mesoscutum at medio-anterior half broadly depressed, parapsidal sutures in impressed lines, scutellum nearly as long as wide ($W:L=6:5$), lateral and posterior margins roundly curved, dorsal aspect of propodeum slightly wider than long, width just behind spiracle and length in middle about $6:5$, without medial furrow and practically without medial longitudinal carina (only in some light very feeble incomplete carina partly observed), lateral carinae on posterior $2/3$ defined, consisting of a series of minute outcurved carinules, as a whole at posterior part strong and distinct but anteriorly weaker, posterior aspect (Fig. 39) with surface flat and medianly narrowly grooved, and impressed with a pair of oblique wide furrows near top (Fig. 39), but completely without lateral carinae, except very short oblique ones at extreme apex; propodeum seen in profile with each of dorsal and posterior aspects nearly straight (dorsal aspect somewhat roundly raised at base), about $6:5$ in relative length and forming an angle of about 120° at the border, pygidial area: Fig. 40, comparatively narrower than usual, at base broadly glabrous and smooth and polished, the smooth area narrowly extended posteriorly tapering as a weakly elevated line till near apex. Pore tarsal spines moderately long, longest one appr. as long as A8; relative length of abscissae of radial vein (from shortest): 5,2,3,1,4 and 5 is slightly oblique.

Mesoscutum very minutely micropunctate-reticulate (under $30\times$ magnification), scutellum and mesopleuron also similarly microsculptured, postscutellum much more minutely so, appearing mat; propodeum transversely, coarsely, somewhat rugosely striate, with interspaces of striae more finely striolate, but on posterior half the fine striae very scarce and confined to median area only, the coarse carinae not turning stronger towards sides, but on postero-lateral areas short strong and hook-shaped carinulae longitudinally arranged like intermittent lateral carinae, surface between transverse carinae mat, due to very feeble microreticulation; posterior as-

pect with silky lustre, transversely, more distinctly, finely and fairly closely striate, striae on dorso-lateral areas somewhat stronger, rather carinae, and the one that form the posterior ridge of the oblique furrow is thick and high; sides also with a silky lustre, very minutely, densely micropunctulate and obliquely, finely and somewhat closely striate except dorso-posterior area, gastral tergites delicately microcoriaceous, with plumbeous lustre in some light, sternites shining and besides apical large setiferous punctures sparsely scattered with medium-sized punctures, punctures posteriorly closer.

♂, unknown.

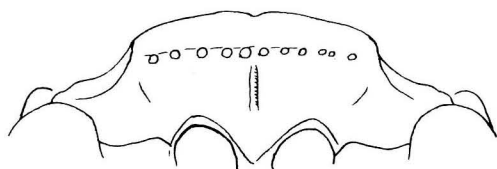
Holotype: ♀, New Ireland, Lemkamin, 6. IV. 1962, Noona Dan Expedition (ZMUC).

23. LIRIS (LEPTOLARRA) MELANOPTERA SP. NOV.

♀. About 14 mm. Apparently similar to the preceding species, but smaller, with wings somewhat less strongly infumated, IODv narrower, clypeus anteriorly more distinctly bevelled and without marginal carina, mesoscutum not microreticulate, but finely and closely punctured, bearing narrow PIS, scutellum distinctly wider than long, propodeum with lateral carinae on dorsal and posterior aspects, pygidial hair longer, posteriorly more broadly darker and mixed with more abundant bristles and the short appressed pubescence on body and legs silvery and much more distinct.

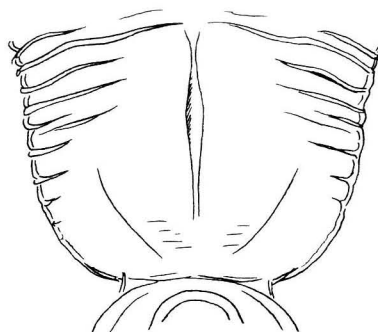
Black, clypeus on apical half dark red, mouth parts and posterior part of tegula dark brown, wings fairly strongly clouded, dark brown, but somewhat paler on hind wing, not iridescent, not showing purplish shine. Hair on sides of frons and of clypeus silvery, short and appressed, in oblique light well visible, on sides and apical margin of mesoscutum weak and indistinct, on postero-lateral areas of propodeum and of Gl,2,3 well shining in certain light.

Head in frontal view wider than long, W:L=100:80, IAD,WAS,AOD=6,11,15, in dorsal view HW:IODv=100:15, IODv:A3=10:11.5, A3=AWx2.3, A3,4,5=10,9,9.5, Rhinaria on A8-11, on A8 very small, clypeus: Fig. 41, bevelled area without microsculpture, strongly shining, disc nearly flat and medianly finely elevated; head in profile with anterior verge of dorsal side not strongly produced. Mesoscutum on medio-anterior area slightly depressed, parapsidal sutures short and distinctly impressed, scutellum much wider than long, W:L=2:1, without medial impression, while postscutellum medianly impressed, on mesopleuron scrobal and episternal sulci fine and crenate. Propodeum with dorsum wider than long, W at spiracle : L in middle =4:3, surface transversely smoothly rounded, without medial furrow, but with a fine median carina, reaching about 2/3 from base, lateral carinae present, arising slightly behind spiracle, extending posteriorly and vaguely connecting with short lateral carina of posterior aspect, not smoothly straight, but minutely curved between crossing striae, that is, forming a series of minute arcs, posterior aspect fairly similar in form to that of the preceding species, but somewhat wider and more strongly convergent towards apex at the posterior half (Fig. 42), surface nearly flat, only laterally slightly depressed and provided with a fine median furrow which is somewhat enlarged and deepened at the central area, propodeum seen from side with both the dorsal and posterior aspects flat and straight, forming an acutely pointed angle of about 120° at the border, dorsal line longer than the posterior, ratio about 5:4. Pygidial area resembles in form that



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Figs. 41-42. Liris (Leptolarra)
melanoptera sp. nov. ♀



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of atripennis, length to maximum and apical widths relatively 20:12:5 (in atripennis 20:11.3:5), basal smooth and shining area roundly produced posteriorly, apical spines 6 in number. Abscissae of radial vein with length order from shortest: 5,2,3,1,4 in this specimen, interspace between tops of recurrent veins as long as abscissa 5 of radial vein.

Mesoscutum very finely and closely punctured, puncture distribution uniform all over, with PIS under high magnification delicately microstriolate, with surface not strongly shining, but on medio-posterior area microstriae disappeared and surface shining, scutellum similarly shining, mesopleuron smoothly microreticulate, half mat. Propodeum with dorsum transversely, somewhat sparsely and rather weakly striate, striae laterally slightly stronger, mixed with irregular longitudinal rugae and at verge to side fairly strong, crossing lateral carina and shortly extending to dorsal part of the side of the segment, surface nearly mat, interspaces of striae minutely and weakly, irregularly rugulose; posterior aspect margined above with a weakly sinuate carina, on dorso-lateral area with a few distinct rugae, the rugae as a series continued below along lateral carina, progressively shortening and weakening, surface of the aspect somewhat shining and transversely sparsely and weakly striate; sides smooth, not shining, but with a silky lustre and along anterior and ventral margins provided with a series of short, weak and oblique striae; surface condition of gaster normal above and beneath.

♂, unknown.

Holotype: ♀, New Ireland, Lemkamin, 18. IV. 1962, Noona Dan Expedition (ZNUC).

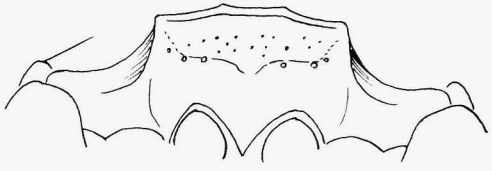
24. LIRIS (LEPTOLARRA) AUREOHIRTA SP. NOV.

Some golden haired allied species have been described from New Guinea, Australia and the adjacent Islands, namely: aurifrons Smith from Celebes, modesta Smith from Aru and New Guinea, sabulosa Smith from Ceram, mindanaoensis Williams from Mindanao and chrysonota Smith from Queensland, but the present species differs from mindanaoensis in the structure of mesoscutum and in the sculpture of mesopleuron and propodeum, from chrysonota in the colour of vestiture of head and gaster at least; as to others their descriptions are simple and superficial and can not be the bases for the correct identification.

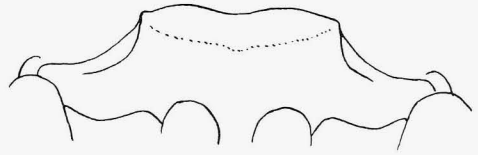
The present species (♂) is characteristic in the dense golden hair of head and thorax-complex, medianly strongly furrowed mesoscutum, comparatively broad IO_{DV}, characteristic antennal rhinaria and slender antenna and legs.

♂. 11-13 mm. Black; mandible at apical third dark red, mouth parts dark brown, tegula on posterior half translucent brown. Wings yellowish pale brown, on radial cell and apical area darker and towards base paler. Hair suffused golden, comparatively long, not strongly appressed on head and thorax, mixed with longer and erect ones, the vestiture is especially marked on sides broadly of frons and clypeus, on temples, posterior margin and sides of pronotum, median, lateral and posterior bands of mesoscutum, epimeral and posterior areas of mesopleuron, postscutellum and whole of dorsal surface and posterior part of sides of propodeum; pubescence on dorsal surface of head fine, long and sparse, rather whitish in colour, that on ventral side of thorax and of coxa-femur of legs well appressed and pale brassy - nearly white - in colour; on posterior margin of gastral tergites 1-3 less suffused golden, well appressed and at broad median area weaker and indistinct; hair on pygidial area long, somewhat thick, not very dense, but appressed, without half erected bristles mixed.

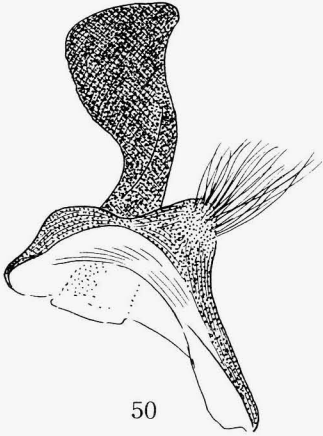
Head in frontal view wider than long, W:L=100:75, IAD:WAS:AOD=3:6:9, in dorsal view HW:IO_{DV}=100:23, IO_{DV}:A3=10:8, A3=AW×3, A3,4,5=1,1,1. Rhinaria on A4-12, on 4 and 12 narrow and short, reaching only 1/3 the length of the segment, on 6-10 about 4/5 as long as respective segment, leaving both ends narrowly and on 5 and 11 intermediate in relative length and width. Clypeus: Fig. 43, apical margin sometimes medianly gently emarginate, but sometimes gently produced, never distinctly incised (Figs. 44 and 45, medio-apical produced part), disc broadly roundly elevated at the centre and apical 2/5 indinclined and flattened into bevel, with surface minutely sculptured and punctured, not smooth and shining, marginal area narrowly reflected (or becomes horizontal as against bevel), dorsal side of pronotum broad triangularly raised in frontal view, with the inclined margins slightly depressed and with top minutely rounded, noteworthy is that the margin in dorsal view not acutely edged, not thin and not tightly appressed to mesoscutum, but bearing a certain thickness and densely covered with golden pubescence; mesoscutum markedly, fairly broadly depressed along median



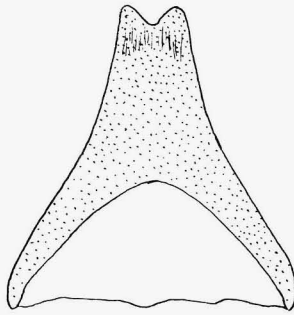
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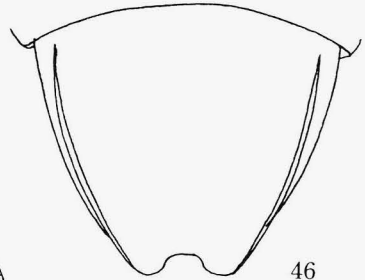
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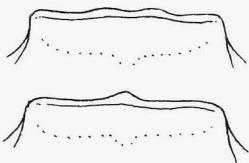
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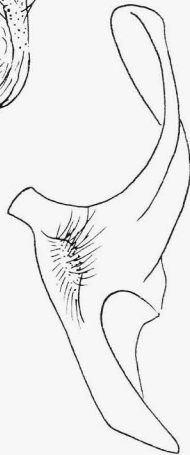


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Figs. 43-51. *Liris (Leptolarra) aureohirta* sp. nov., ♂.

Fig. 52. *Liris aureohirta pallidula* ssp. nov., ♂

line, the depression reaching about $\frac{5}{6}$ from anterior margin and roundly ended, scutum on sides along lateral carina till the line of parapsidal suture also depressed, not so deep as median furrow and the depressed area densely covered with glittering golden pubescence; scutellum wider than long, $W:L=5:3$, nearly semicircular in form, bearing a weak impression posteriorly in middle, on mesopleuron episternal and scrobal furrows comparatively fine, both strongly crenate, the former at anterior verge acutely edged and the latter medianly slightly widened, dorsum of propodeum medianly on posterior portion very shallowly furrowed and at base with a short feeble median carina, surface almost smoothly and gently roundly up-curved, without lateral carinae, posterior aspect transversely roundly curved, also without lateral carinae, bearing a large deep subtriangular (rather oval) excavation in middle, median bottom line distinct, seen from the side the angle formed by two aspects blunter than in atripenis or melanoptera, about 150° and the marginal (or surface) lines of both not clearly observed due to dense golden vestiture, in posterior view lateral margins also obscure. Pygidial area; Fig. 46, lateral margins carinated, posterior margin deeply roundly incised. Eighth sternite: Fig. 47. Genitalia seen from beneath: Fig. 48, somewhat more laterally: Fig. 49. Paramere at base with a large lamellate basin, lateral margin of which is covered with extension of outer margin of basiparamere, paramere on ventral side medianly thickly carinate and the carina densely covered with a tuft of long hair, outer margin also covered with hair, somewhat more sparsely so, volsella black, when taken out separately: Fig. 50 (lateral), in ventral view: Fig. 51 (shading omitted), penis valve produced ventrally like a bill (Fig. 49), with inner ventral margin minutely serrate.

Mesoscutum finely (but comparatively somewhat largely) closely punctured, with narrow PIS, episternum of mesopleuron very finely microcoriaceous and scattered with very minute tubercles, dorsum of propodeum (seen vertically along hair) covered very closely with fine shallow and indistinctly outlined punctures, without transverse striae, but at posterior end margined with a distinct carina, posterior aspect bearing sparse and weak carinae from dorso-central area downwards along sides, posterolateral carinae short but distinct, ventral side of gaster delicately microcoriaceous and on sternites 4, 5, 6 with somewhat large and weak punctures sparsely scattered.
♀, unknown.

Holotype: ♂, New Britain, Yalom, 1000 m, 19. V. 1962, Noona Dan Expedition (ZM UC).

Paratypes: 2 ♂, same locality, 9, 19. V. 1962. (ZMUC).

24a. LIRIS (LEPTOLARRA) AUREOHIRTA PALLIDULA SSP. NOV.

♂. 13-15 mm. Differs from the typical race in the following characters:

1. Golden colour of vestiture less suffused and somewhat less dense.
2. Median furrow of mesoscutum similar in width and length, but distinctly shallower.
3. Central elevation of clypeus weaker and form of apical margin of median area somewhat different (Fig. 52, cf. Fig. 43).
4. Wings slightly more strongly darkened.
5. Antennal rhinaria somewhat larger.

Measurements of the holotype:

HW:HL in frontal view: 100:74. IAD:WAS:AOD=3:5:8, in dorsal view HW:IODv=100:23 IODv:A3=10:8, A3=AW×2.7, A3,4,5=10,10,10, rhinaria on A4-12, on A4 and A12 smallest reaching half the length of the segment, on A6-10 nearly in full length of each segment and on A5 and A11 slightly smaller. Eighth sternite and genitalia completely agree in structure with those of the typical race.

♀, unknown.

Holotype: ♂, New Ireland, Lemkamin, 14. IV. 1962, Noona Dan Expedition (ZMUC).

Paratypes: 2 ♂, same locality, 7, 16. IV. 1962 (do.).

Remarks. Anterior bevelled area of clypeus broad as in typical race, in holotype surface gently curved up apically, but in paratypes not. Apical margin somewhat variable in form, though lateral angles acutely subpointed in all, in holotype: Fig. 52, in one of paratypes as in Fig. 44 and in the rest apical margin almost straight.

25. LIRIS (LEPTOLARRA) HUBRIPES SP. NOV.

In the structure and characteristic vestiture the present species is very similar to the preceding species, aureohirta, but is markedly different from this in the colour of legs.

♂. 10.5 mm. Black; mandible apically dark red, mouth parts dark brown, tegula on posterior half transparent yellow, all tibiae and tarsi ferruginous red, but mid and hind spurs wholly and all tarsi apically dark brown to black; wings pale yellowish brown, fore wing basally and hind wing wholly paler. Vestiture golden, mixed partly with long whitish hair and brassy pile just as in aureohirta.

In frontal view HW:HL=100:74, IAD:WAS:AOD=3:5:9, in dorsal view HW:IODv=100:23, IODv:A3=10:8, A3=AW×2.7, A3,4,5=10,10,10. Rhinaria on A4-12, relative length of each rhinarium generally as in aureohirta, but on A12 very slender and shorter. Clypeus very similar to that of the preceding species, with apical margin as in Fig. 44. Pronotal collar with some thickness on top and densely covered with golden pile, mesoscutum deeply furrowed in middle, the furrow not reaching apex, scutellum, post-scutellum, mesopleuron, propodeum and pygidial area also similar, relative length of abscissae of radial vein of fore wing also similar. Punctuation without noticeable difference from that of the preceding species.

♀, unknown.

Holotype: ♂, New Britain, Yalom, 1000 m, 13. V. 1913, Noona Dan Expedition (ZM UC).

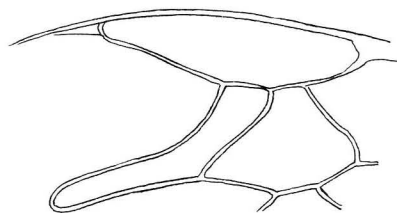
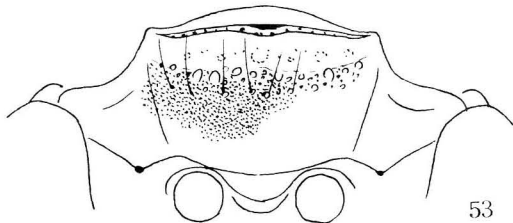
Remarks. The genitalia are not examined, since the specimen is but a single. The apex of sternite 8 produced from caudal end is similar to Fig. 48. The specimen may be a colour mutant of the preceding species, but the difference is so marked that it is dealt with as distinct.

26. TACHYTES BILUNARIS SP. NOV.

The present species (♀) is characteristic in the combination of the following distinctions:

1. Mesoscutum is adorned with a pair of rounded silvery hair marks on anterior area, besides the usual U-shaped tomentum at the periphery.
2. Dorsum of propodeum roundly impressed at the medio-apical area where is in most species punctureless and smooth.
3. IODv:A3=5:4.
4. Ocular index 0.3 (IODv:WC=1:3).
5. Clypeal index 2 (WC:LC=2:1).
6. Mesothorax and propodeum microsculptured and superimposed with medium-sized punctures, punctures rather sparse and well visible under 40x magnification.

♀. 15 mm. Black; labrum and palpi brown, the latter apically paler. Appressed silvery hair, well shining under oblique light, on frons, clypeus, temples, posterior margin of pronotum, U-shaped band and a pair of rounded marks on mesoscutum, postscutellum, sides of thorax and propodeum, thorax beneath, outer side of femora and tibiae, base broadly of G1, apical margins of G1,2,3 and narrow latero-apical parts of G4 present. Furthermore, head, thorax-complex and dorsum of G1 covered with fairly long greyish pubescence, glittering hair at apex of hind femur, base broadly and apex narrowly of the following tibia and underside of T1 and 2 golden; bristles on pygidial area dark brown, with coppery shine in some light; series of bristles



Figs. 53-54. Tachytes bilunaris sp. nov., ♀.

at latero-apical parts of gastral tergites 4 and 5 and at apical margins of sternites 2-4 dark brown. Tibial spurs, spines of tibiae and tarsi and claws pale brown.

Head in frontal view wider than long, $W:L=100:84$, in dorsal view $HW:IODv=100:19$, $A3=AW \times 2.5$, $A3,4,5=10,9,8$, $IAD:WAS:AOD=5:4:6$, supraantennal short smooth carinae normal; clypeus: Fig. 53, median area convex, anterior bevelled area without puncture and apical margin lunately flattened with base-delimiting line finely grooved and weakly foveolate. Scutellum with a weak ante-apical transverse impressed line and a very feeble median impression, dorsum of propodeum with a rounded impression or hollow at medio-apical area, posterior aspect flattened, with a lenticular median furrow; pygidial area with lateral margins at base nearly parallel, at apex rounded and at intermediate area broadly nearly straight, $L:W=4:3$. Outer spines of fore tibia 3 in number, outer apical ones also 3, outer spines of following T1 6 and nearly as long as the width of the segment. Abscissae of radial vein in the following increasing order: 5,2,3,1,4, cubital cell 3 characteristic in form: Fig. 54.

Ground sculpture on mesoscutum close micropunctuation, punctures contiguous to adjacent ones and surface in some light appearing transversely rugoso-punctulate, on scutellum similar, but punctures slightly larger and slightly sparse, but tend to be contiguous longitudinally, mesopleuron more weakly microreticulate, with scattered punctures more conspicuous than on scutum; dorsum of propodeum longitudinally, somewhat radiately, closely and not strongly microrugoso-striate, posterior aspect generally similar, but striae transverse in the main and somewhat stronger, on sides the striae oblique, otherwise as on dorsum.

♂, unknown.

Holotype: ♀, New Ireland, Kalili Bay, Danu, 3. IV. 1962, Noona Dan Expedition (ZMUC).

27. TACHYSPHEX NOVARAE (SAUSSURE, 1867)

Tachytes novarae Saussure, Reise österr. Fregatte "Novara" um die Erde, Hymen., p. 69 (♀, Nicobar Is.), 1867.

Tachysphex novarae: Bohart and Menke, World Sphecid., p. 275, 1976 (listed).

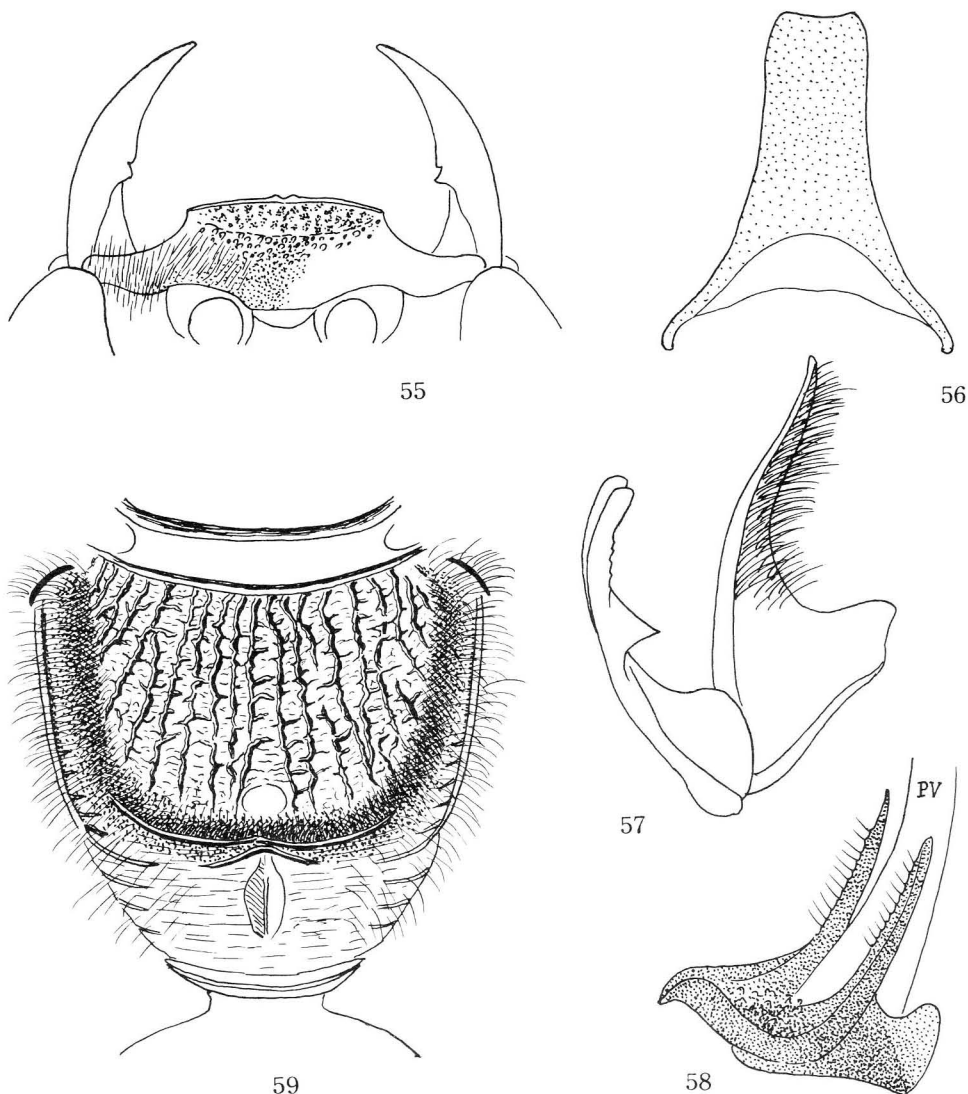
Specimens examined: 1 ♂, Lavongai Is., Banatam, 23. III. 1962; 1 ♂, New Britain, Bitu Paka, 15 km SE of Kokopo, 10. VII. 1962, Noona Dan Expedition (ZMUC).

The specimens above listed well agree in non-sexual characters with the description of Tachytes novarae Saussure, except that body is much smaller (♀ 10 mm) and gastral sericeous bands are only on G1, 2 and 3, and not on 4. As the male of this species has been unknown the description of the specimens will be tried below:

♂, 6.5 mm. Black, mandible on apical 2/5 shining brown, tegula pale brown, palpi dark brown, apically paler, tibial spurs and tarsi ferruginous, but all T1 except apices dark brown and T4 and 5 brown to dark brown. Hairs on frons, clypeus, posterior margin of pronotal tubercle, thorax beneath, apical margins of G1, 2, 3 (all medianly broadly interrupted) and all femora and tibiae on outer side and beneath silvery, but everywhere not dense; pubescence on other parts of head and thorax-complex somewhat long, rather sparse, fine, erected and whitish in colour.

Head in frontal view wider than long, $W:L=100:76$, $IAD:WAS:AOD=4:2.5:4$, in dorsal view $HW:IODv=100:28$, $IODv:WC=10:19$, $IODv:A3=10:3$, $WC:LC=4:1$, $A3=AW \times 1.8$ (in dorsal view $AW \times 2.2$), $A3,4,5=10,9,8$. Antenna not so long as the combined length of head, thorax and propodeum, if extended posteriorly straight it will not reach the apex of mesoscutum. Hind ocellar scar forming an angle of about 120° , rounded elevations on both sides of medial furrow of ocellar area moderately high; clypeus: Fig. 55, apical margin of medial produced part gently rounded, with a feeble minute emargination in middle, margin finely raised into a carina, disc gently elevated, top of elevation located at about 2/3 from base, anterior bevelled area coarsely irregularly punctured and disc finely and closely punctured, mandible as shown in Fig. 55; mesoscutum at medio-anterior area broadly flattened, somewhat depressed, on each side of the flattened area, shortly apart from it and along lateral margin a fairly broad shallow groove running down; length ratio of scutellum and dorsum of propodeum appr. 1:2, the latter with width at base and length in middle relatively 2:1 and distinctly marginated laterally with strong carina, posterior margin also transversely carinated (Fig. 59), seen in profile length ratio of dorsal and posterior aspects appr. 3:2 and forming an angle of about 110° . Rim of gastral socket broad and acutely highly raised

vertically; pygidial area with lateral margins bluntly edged, not carinated, with surface nearly flattened, ratio of width at base and at apex and length in middle roughly about 10,4,8, apex weakly emarginate, sternite 2 at base in middle minutely roundly tuberculate, sternite 8: Fig. 56. Of genitalia right paramere and penis valve seen from left side: Fig. 57, volsella in ventro-lateral view (from right side) Fig. 58 (PV penis valve).



Figs. 55-59. *Tachysphex novarae* Saussure, ♂

Elevated ocellar area microcoriaceous and sparsely superimposed with fine punctures, vertex more feebly microcoriaceous and more sparsely scattered with somewhat larger punctures, mesoscutum rather strongly microreticulate and somewhat more sparsely punctured, punctures larger than those on vertex and PIS mostly 1.5 times as large as PD, scutellum almost without microsculpture, shining and more finely and sparsely punctured than on scutum, mesopleuron with microsculpture somewhat weaker than on scutum and more finely and sparsely punctured, dorsum of propodeum flattened and ra-

ther gently concave and longitudinally, somewhat radiately and coarsely rugoso-striate (Fig. 59), interspaces of striae more finely and irregularly rugulose, posterior aspect without lateral carinae, but with a longitudinal series of short strong transverse carinulae instead (Fig. 59), sides anteriorly obliquely, posteriorly transversely and arcuately rugoso-striate, interspaces of striae microcoriaceous and surface not smooth. Pygidial area covered with gross piliferous punctures.

Remarks. The present specimens are also considerably similar in many non-sexual characters to Tachysphex walkeri Turner, 1908 (♀) described with a female specimen from NW district of Australia. Differs, however, from this species markedly in the length of antenna (in walkeri as long as head, thorax and propodeum combined), in the ratio of IAD:AOD and in the colour of the legs. As to these characters, except for the colour of the legs, however, no mention is made with respect to Tachytes novarae Saussure. If novarae agrees in these characters with walkeri the latter is considered to be a local race of novarae and the present specimens must be treated as a distinct species. But the characters of walkeri are rather abnormal and I identified the specimens with Tachysphex novarae (Saussure).

T r y p o x y l o n i n i

28. PISON IGNAVUM TURNER, 1908

Pison ignavum Turner, Proc. Zool. Soc. London, 30: 511, 1908 (♀ ♂, Australia).

Pison ignavum (or argentatum ignavum): Turner, Ibid., 42: 601, 1916 (Austr., Fiji).

Pison ignavum: Cheesman, Ann. Mag. Nat. Hist., Ser. 10, 1: 169, 1928 (Tachti).

Pison ignavum: Williams, B.P. Bishop Mus. Bull., 98: 152, 1932.

Pison ignavum: Krombein, Proc. Wawn Ent. Soc., 13 (3): 404, 1949 (Carolin I.).

Pison ignavum: Yasumatsu, J. Fac. Agr. Kyushu Univ., 10 (2): 140, 1953 (Tachti).

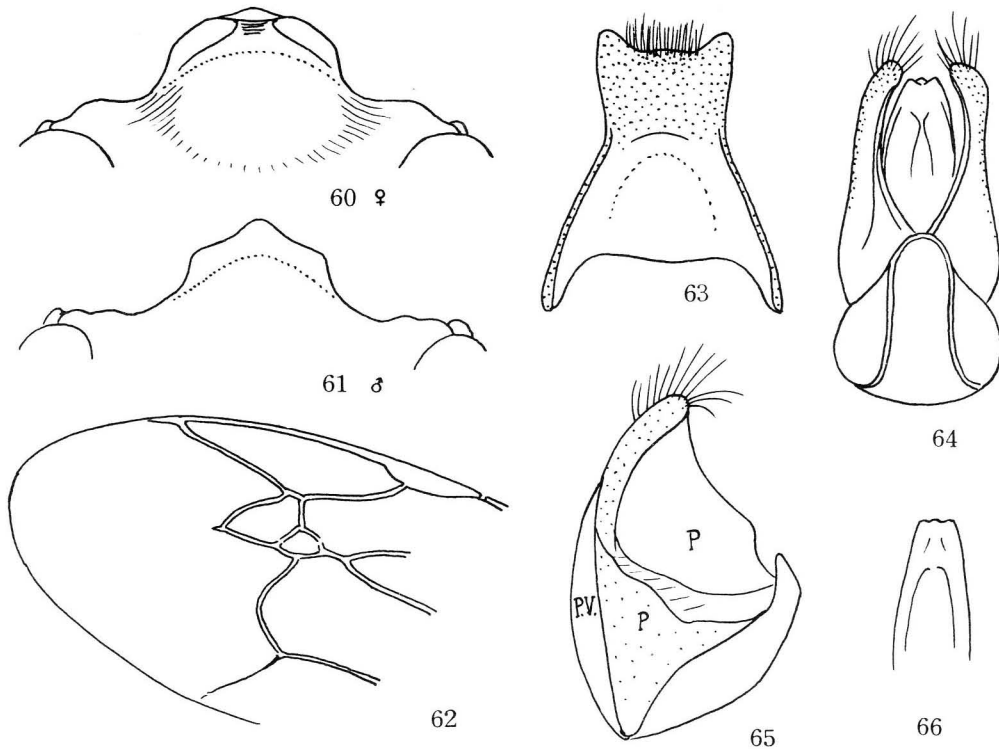
Pison ignavum: Tsuneki, Etizenia, 22: 21, 1967 (Formosa).

Pison ignavum: Tsuneki, Steenstrupia, 4: 95, 1976 (Philippines: Tawi Tawi).

Specimens examined: 6 ♀ 5 ♂, Bismarck Arch., Lavongai I., Banatam, 16, 18, 19, 21, 22, 23. III. 1962, Noona Dan Expedition (Malaise trap).

Remarks. The original description is considerably detailed, dealing with IODs, OOD:POD, IODv:A3, W:L of clypeus, length relation of abscissae of radial and cubital veins etc., but the detailed observation of the clypeus is not made (may be due to covering hair) and if the description is faithfully followed the present specimens must be separated from ignavum. Krombein certainly alluded to the apical margin of the clypeus in the male, but he does not mention about the difference of it from the original description. Both the authors give no illustration about their descriptions and their descriptions are of little use to compare the subspecific relationships between specimens from different localities. Some characters of the present specimens are given below:

Apical margin of clypeus: Figs. 60 (♀) and 61 (♂) (in the original description "clypeus broadly rounded anteriorly" - ♀, and "♂, similar in all respects to the female".). HW:IODv=100:28, IODv:A3=10:5.3. (♀); HW:IODv=100:34, IODv:A3=10:5.5 (♂). (in Turner IODv about A3×2). A3=AW×3 (♀), ×1.8 (♂), A3,4,5=10,9,9 (♀ ♂). Transverse impressed line just behind hind ocelli without interruption (as described by Turner). Propodeum with distinct lateral carinae, down-curved in lateral view, series of striae strong and coarse, consisting of 7-8 short striae, area dorsalis without lateral furrows, median furrow shallow, with a distinct longitudinal carina in middle, disc obliquely, strongly and coarsely striate, posterior aspect transversely coarsely striate, sides with about 5-6 oblique strong striae (in ♂ weaker and less in number), interspaces of striae and posterior area obliquely, finely and closely striolate. Venation at RC and TCV 1,2,3: Fig. 62, sternite 8: Fig. 63 (seen from inside). Genitalia in ventral view: Fig. 64, in lateral view (from left side): Fig. 65 (P paramere, PV penis valve), paramere incrassate on outer margin (dotted in the figure), well chitinized, castaneous brown in colour and fringed with hair at apex, inner and ventral area thin, pale ferruginous in colour, only with ventral margin somewhat incrassate. Volsella not developed, penis valve, soft texture, not chitinized, pale yellowish white, but thick, in dorsal view: Fig. 66.



Figs. 60-66. Pison ignavum Turner (60 ♀, 62 ♀♂, others ♂)

29. PISON HOSPES SMITH, 1879

Pison hospes Smith, J. Linn. Soc. London, Zool., 14: 676 (♀ ♂, Hawaii).

Pison fuscipennis: Yasumatsu, nec Smith, Mushi, 9: 131, 1939 (♀ ♂, Palau, detailed descriptions, figs.).

Pison hospes: Cheesman, Ann. Mag. Nat. Hist. Ser. 10, 1: 175, 1928 (Society Is.).

Pison hospes: Krombein, Proc. Hawn Ent. Soc., 13 (3): 404, 1949 (syn. incl. palauensis Yasumatsu - nom. nud.).

Pison hospes: Yoshimoto, Pac. Ins., 2 (3): 334, 1960 (listed)

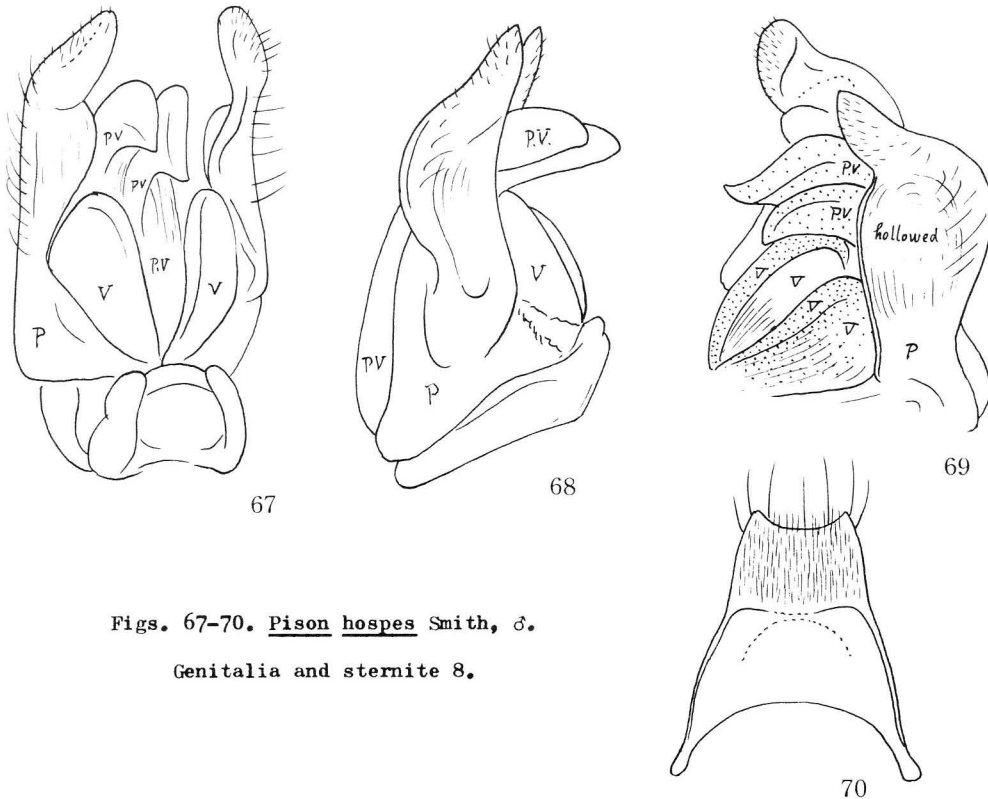
Distribution: Molokai, Niihau, Marshall Is., Carolin Is., Samoa, Fiji, Tonga, Marquesa Is.

Specimens examined: 1 ♀, Bismarck Arch. Hermit Isl., Luf., 27. VI. 1962; 1 ♀, New Britain, Yalom, 1000 m, 10. V. 1962; 1 ♀ 2 ♂, New Britain, Valoka, 10. VIII. 1962.

Remarks. Measurements with Valoka ♀ ♂:
 HW:IODv:A3=100:25:18 (♀), =100:27:16 (♂); IODs=10:17.5 (♀), =10:15.5 (♂); A3=AWx3 (♀), x3 (♂); A3,4,5=10,9,8 (♀ ♂). OOD:POD in Yalom ♀ nearly equal to each other, in all others (♀ ♂) POD slightly greater than OOD. The males from the same locality differs markedly in body length, 9 and 7 mm, in ♀ 9-9.5 mm.

Genitalia of the smaller one of the above mentioned specimens(♂): Fig. 67 (ventro-lateral view), Fig. 68 (lateral view) and 69 (apico-lateral view). Pamamere (P) swollen at apical area with short hair, median part lamellate except posterior marginal area and lamellate part hollowed from outer side (Fig. 69), marginal area scattered with long stiff hairs, volsella (V in the figures) thick, large triangular and also hollowed out, but from inside, penis valve (PV) thick, weakly chitinized and yellowish. Sternite 8: Fig. 70.(from inner side), apical area covered with short

soft pubescence, outer area provided with sparse long stiff hairs near apical margin.



Figs. 67-70. Pison hospes Smith, ♂.

Genitalia and sternite 8.

30. PISON IRIDIPENNE SMITH, 1879

Pison iridipenne Smith, J. Linn. Soc. London, Zool., 14: 676, 1879 (♀ ♂, Hawaii).

Pison iridipenne: Perkins, Faun. Hawaii., 1: 14, 1899 (Hawaii).

Pison iridipenne: Williams, Occ. Pap. B.P. Bishop Mus., 18: 331, 1947 (Hawaii, S. Pac. Is., Australia).

Pison iridipenne: Krombein, Proc. Hawn. Ent. Soc., 13 (3): 386, 408, 1949 (Marshall Is., Mariana Is., Carolin Is.).

Pison iridipenne: Yoshimoto, Pac. Ins., 2 (1): 334, 1960 (Hawaii).

Distribution: Oahu, Maui, Molokai, Niihau, Marshall Is., Mariana Is., Carolin Is., Samoa, Fiji, Tuamotu Arch., Marqueas Is.

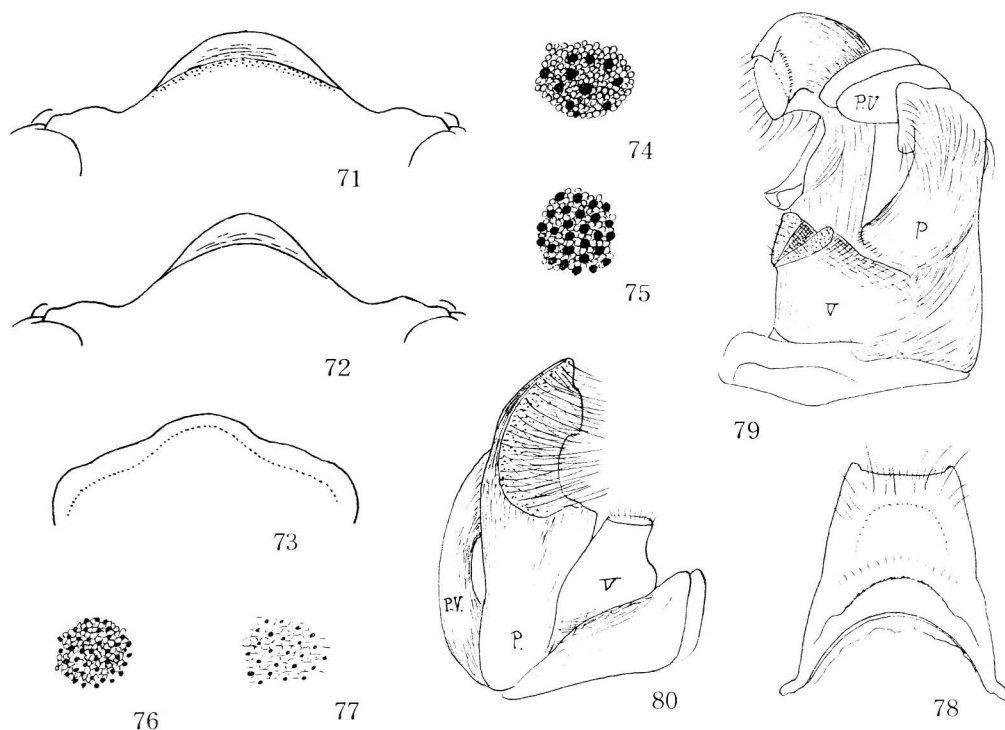
Specimens examined: 7 ♀, New Britain, Valoka, 10. VII. 1962; 1 ♀, New Ireland, Lemkamin, 14. IV. 1962; 1 ♀ 1 ♂, New Britain, Yalom, 1000 m, 8, 9. V. 1962; 1 ♂ (gaster lacking), Hermit Is., Luf, 27. VI. 1962.

Remarks. For the future investigation about the subspecific relationships some details in characters of the Bismarck specimens are given below:

♀. (Volka specimen). Apical margin of clypeus: Fig. 71. HW:IODv:A3=100:18:16. IODs=10:21. A3,4,5=10,9,8. A3=AWx2.7. OOD very narrow, sometimes completely lacking, namely hind ocellus completely contiguous to eye, when OOD is present OOD:POD=1:4-5.

Frons medianly slightly below middle with a minute elongated impressed spot, from a short distance below this a fine glittering carina runs down till apex of frontal raised area, surface nearly flat, punctures comparatively fine, fairly close, PIS 1-2 times as large as PD, PIS regularly microreticulate (Fig. 74). Pronotum in frontal

view with dorsal margin medianly broadly roundly raised (Fig. 73), in dorsal view narrowly transverse, with posterior margin transversely depressed, lateral angle not compressed, not thinly raised like a ridge; posterior margin of mesoscutum strongly crenate, punctures on disc as large as those on frons, but much closer, PIS < PD and filled with about a single mesh of microreticulation (Fig. 75), punctures on mesopleuron sparse, PIS 1-2 times as large as PD and filled with weaker 3-4 meshes. Propodeum with strong distinct lateral carinae, carina arising at a short distance behind spiracle and reaching apex, accompanied just inside with a series of strong coarse striae, the striae on posterior aspect extended inwards to turn to coarse transverse striae. Area dorsalis practically without lateral furrows, medial furrow distinct, with margins subparallel-sided and medianly strongly carinate from base to apex, surface including the area transversely striate, striae at base strong and coarse, on median area near medial furrow close and distinct, on the rest fine, feeble and rather indistinct; sides of the segment closely covered with fine and distinct punctures, mixed with weak, indistinct striae, but on posteriormost depressed area strongly and coarsely rugose, interspaces of distinct striae on dorsal side finely and very weakly punctured. Gastral tergites 1 and 2 very finely and closely punctured, PIS 1-1.5 times as large as PD (as punctures are very fine PIS becomes relatively broad, but number of punctures is very large). Under high magnification punctures connected with each other with weak microstriae (Fig. 76, in reality the striae are much weaker impressed lines), sternite 2 similarly punctured and microstriolate, but PIS relatively wider and striae running transverse in the main (Fig. 77). Length of specimens 5.5-7.0 mm, mostly about 6 mm.



Figs. 71-80. Pison iridipenne Smith, 71 ♀, 72, 78-80 ♂

♂. 5.0-7.0 mm. Clypeus: Fig. 72, more narrowly produced than in ♀.
 HW:IODv:A3=100:25:14. IODs=10:16. A3,4,5=10,9,8. A3=AW×2.2. Hind ocellus ocellus distinctly separated from inner orbit, OOD:POD=2:5. Median impressed spot below mid point of frons distinct, median shining carina more remotely separated from the spot and slightly shorter, dorsal margin of collar medianly broadly and roundly raised as in ♀ (Fig. 73), but the elevation somewhat lower. Structure of propodeum as in ♀, general punctuation and microstriae also as in ♀, but on propodeum striae much stronger and more distinct and the mixed punctures smaller, sparser and rather indis-

tinct. Sternite 3 at base in middle with a smooth shining elevation, wider than long, top area transversely roundly ridged, sternite 8 at apex comparatively broad (Fig. 78). Genitalia in oblique latero-ventral view: Fig. 79, - P paramere, V volsella, PV penis valve; in lateral view: Fig. 80. Paramere at apical half excavated on outer side and densely covered with long curved hairs, volsella strange in form (Figs. 79, 80), shortly pubescent on top, penis valve bent ventrally at apical part, simple.

In the female specimen collected in Yalom, Gazelle Peninsula, New Britain, punctures on the frons are shallow, weak and quite indistinct, moreover, covering short pubescence is closer than usual and the surface appears mat and without puncture; but the male collected in the locality is normal in this respect, so I treated the punctuation of the female as mere aberration, because otherwise, except slight difference in venation it well agrees in other characters with the normal specimens.

Recurrent vein 1 of fore wing in all the specimens but two from Yalom (♀ ♂) joins with cubital vein before transverse cubital vein 1, while in the exceptional ones from Yalom it is interstitial with cubital vein 1. Difference in Yalom specimens in this character may be a very slight local variation.

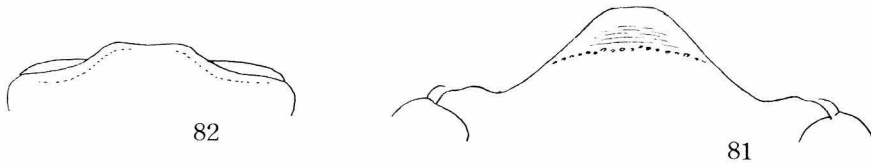
In one of the females that is collected in Valoka anterior median carina of frons arises directly from the impressed spot.

31. PISON NOVABRITANICAE SP. NOV.

The present species (♀) is similar in the characters of frons to P. karrorense Yasumatsu, 1937, and in the structure of propodeum to iridipenne Smith, 1879, but differs from both of them in some characters as given below (as to karrorense as far as the description goes):

From karrorense:

- (1) Collar of pronotum medianly broadly raised and in frontal view with top of the raised area distinctly emarginate (Fig. 82).
- (2) Parapsidal sutures distinct, each is a fine impressed line and the area along it deep black and shining.
- (3) Propodeum with distinct lateral carinae, area dorsalis much more finely punctured and completely without striae.



Figs. 81-82. Pison novabritanicae sp. nov., ♀

From iridipenne:

- (1) Frons medianly slightly below middle with a minute shining tubercle instead of impressed spot, thence anteriorly runs a weak carina which is again raised at end above the anterior inclination, median area above the first tubercle distinctly (though broadly and shallowly) impressed into frontal furrow.
- (2) Punctures on frons larger and closer, especially anteriorly so, PIS filled with very minute microreticulation.
- (3) Eye incision distinctly narrower and more acutely angulated at the end (though minutely rounded at apex).
- (4) Clypeus similarly markedly produced in middle, but apical margin of produced area much narrower and anterior hairless area much broader. (Fig. 81, cf. Fig. 71).
- (5) Punctures on mesoscutum finer and sparser than those on frons, PIS mostly 1-1.5 times as large as PD and PIS more weakly microcoriaceous.
- (6) Lateral carinae of propodeum with anterior end more remotely separated from spiracle, beginning from about mid point of dorsal aspect.
- (7) Medial furrow of dorsum of propodeum narrower and more distinctly outlined and as a whole narrower medianly and broadened towards base and apex.
- (8) Area dorsalis (without lateral furrows) completely without striae, simply finely, somewhat sparsely punctured, PIS mostly 3-4 times as large as PD (at peripheral areas punctures closer) and PIS filled with comparatively broad network of

feeble impressed lines (on laral areas microreticulation finer, nearly granulate).

(9) A pair of ante-apical incassation of each of gastral tergites 1-4 somewhat more marked (but similarly without incassation on median area).

(10) Gastral tergites 1-3 very minutely, rather granulately microcoriaceous and on 1 very sparsely (PIS on broad median area 7-10 times as large as PD), on 2 somewhat more closely (PIS=PD \times 2-4) and on 3 fairly closely superimposed with fine punctures.

(11) Sternite 2 more strongly, fairly closely (PIS=PD \times 1-2) punctured, PIS filled with feeble network of fine impressed lines.

Some supplements.

HW:IODv:A3=100:18:16. IODs=10:19. A3=AW \times 3. A3,4,5=10,8,7. Hind ocellus contiguous to eye, Ocellar diameter \approx POD \times 4 (holotype), \times 3 (paratype), each bearing an impressed line at posterior margin, but the impressions of both not connected with each other. In this respect similar to iridipenne and hospes, but different from ignavum in which impressed line not interrupted in middle.

Punctures on scutellum similar in size to those on scutum, but closer, microreticulation on PIS similar, on mesopleuron punctures slightly larger, more remotely separated, with PIS microcoriaceous, but posteriorly punctures finer and sparser and on epimeral much closer and finer. Area dorsalis at base obliquely coarsely crenate, medial furrow transversely striate, in paratype a row of very obscure oblique striae are seen on antero-lateral areas of dorsum in certain light, but not in holotype. On sides of propodeum punctures close and on antero-dorsal area mixed with a few weaker striae, posteriormost depressed area transversely, very strongly and coarsely striate.

Punctuation and microsculpture on gastral segments mentioned in remarks 10 and 11 are very characteristic (in korrorense "abdomen almost impunctate").

Apical glabrous area of clypeus and wing tegula castaneous brown, mandible reddish brown, at base black, palpi dark brown, with articulations paler, but covered with silky white pubescence, legs with tibial spurs black, wings transparent, apical margin weakly clouded. Hair silvery on clypeus, not so dense as to cover completely the ground punctuation.

δ , unknown.

Holotype: ♀ (8.0 mm), New Britain, Yalom, 1000 m, 9. V. 1962, Noona Dan Expedition (ZMUC).

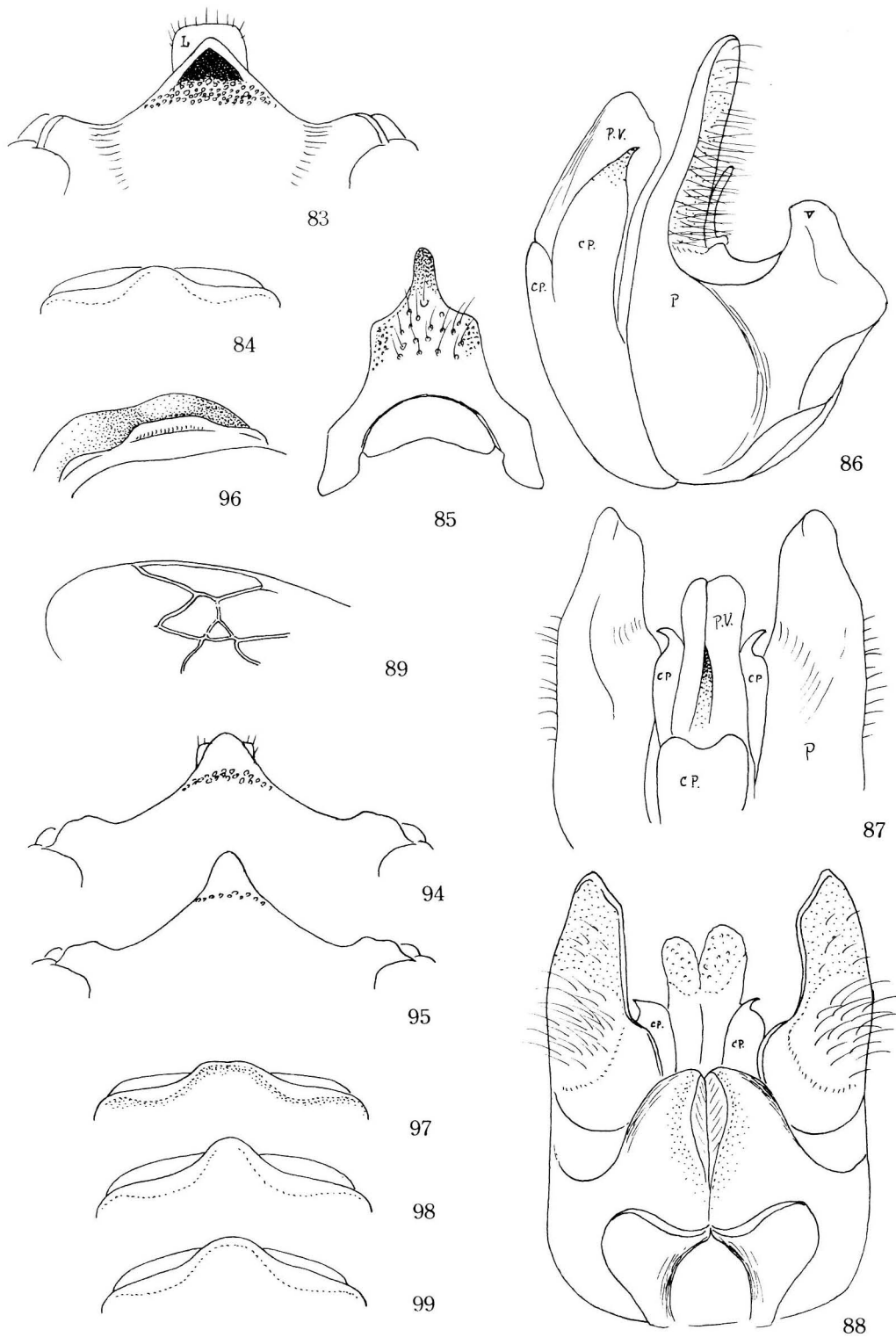
Paratype: 1 ♀ (7.5 mm), New Britain, Valoka, 7. VII. 1962.

32. PISON BISMARCKIANUM SP. NOV.

The present species apparently belongs to the group of punctifrons, having the strong and coarse punctures on the frons and mesoscutum, but judging from the structure of the male genital organs and sternite 8 it seems not so closely related to punctifrons as appears so. Externally it can be separated from punctifrons by the characters that propodeum lacks completely the lateral carinae, collar of pronotum is shorter, with medial broad elevation and lateral ridge-like swellings stronger, apical margin of clypeus is on an average narrower and punctures are on mesoscutum much sparser and on gastral tergites much smaller.

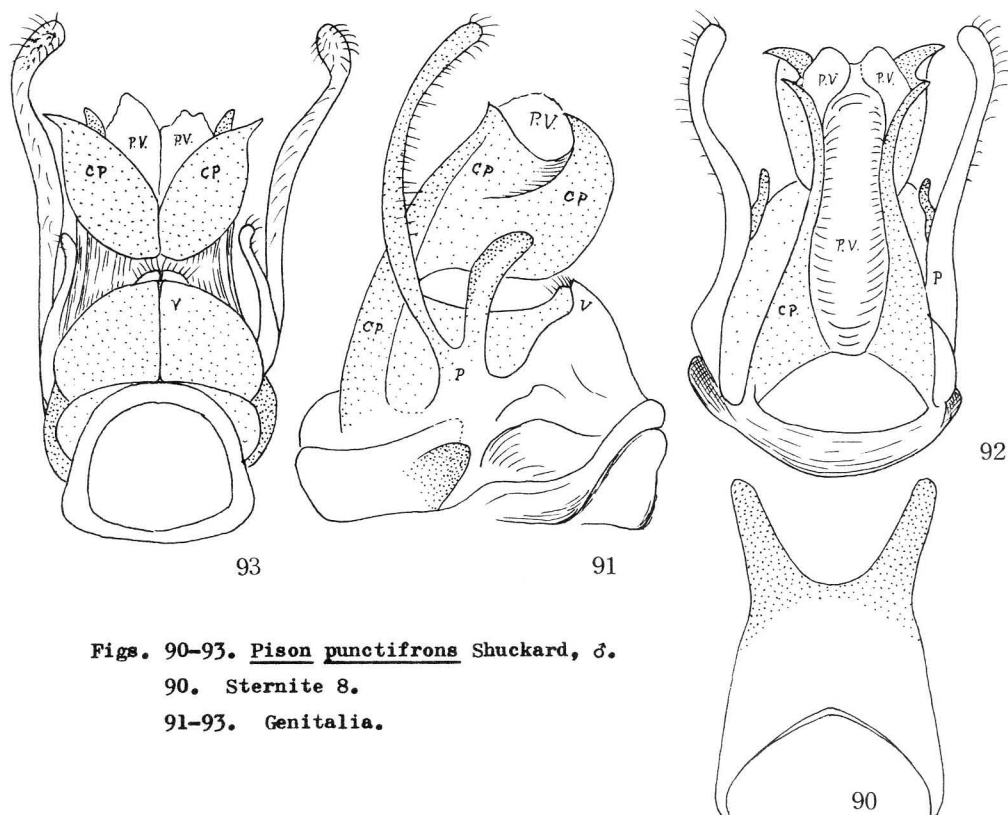
δ . About 10 mm. Black, mandible completely black, palpi and wing tegula dark brown, the latter nearly black. Hair on clypeus silvery, fairly dense except medio-apical area, but ground sculpture can be seen, short hair on tarsi of legs somewhat brownish.

Head in frontal view with lateral margins rounded, wider than long, W:L=100:83, eye incision shallow and broad, nearly equilateral triangle, IODs=10:17, frons raised downwards and obliquely inclined to interantennal area and to scapal hollows, median furrow present, but not well outlined and rather indistinct, at apex it is weakly hollowed and smoothed, below the hollow a weak carina runs down till apex; on each side of the carina, separated by a shallow longitudinal depression there is a raised area at the antero-lateral area of the raised part of the frons, forming an oblique blunt ridge at verge to scapal depression (in punctifrons δ without median carina and without raised area on antero-lateral part of frons), IAD:AOD=5:4, clypeus markedly convex as usual, apical margin: Fig. 83 (L, labrum), medio-apical area triangularly produced and apical glabrous area deeply triangularly excavated (in Fig. 83 darkened; in punctifrons δ mesio-apical prominence narrower, acuter and without basal excavation). Head in dorsal view with occipital margin strongly roundly emarginate, vertex



Figs. 83-89, 94-99. *Pison bismarckianum* sp. nov.

behind ocelli depressed, the depression medianly extended posteriorly to occiput, crossing raised posterior margin of vertex. OOD:POD=1:1. HW:HL:IODv:A3=100:52:26:16 (HL is at inner orbit, if in middle 46). IODv:A3=10:6. A3,4,5,12,13=10,8,7,3.5,5. A3=AW×2.5, A12 slightly longer than wide. Dorsal margin of collar in frontal view: Fig. 84, parapsidal suture normal, a short impressed line; metapleural flange horizontal. Propodeum without lateral carinae, area dorsalis without lateral furrows, medial furrow distinct, narrow, subparallel-sided, but with outlines indistinct, gastral tergites 1-6 each apically weakly constricted and each with a pair of ante-apical incrassation, not strong and widely separated from each other, tergite 7 medianly distinctly keeled (in punctifrons ♂ without the keel), ventral plates normal, without tubercle nor ridge, sternite 8 at apex pen-formed (Fig. 85). Genitalia similar in the soft extensible and contractile texture to those of punctifrons, the valve is supported by chitinized plates from outer sides and backside, but the form of the chitinized plates, especially the lateral ones, are very much simpler than in punctifrons, and paramere also very much simpler than in this species and different in pattern of formation. Genitalia in lateral view: Fig. 86, in dorsal view: Fig. 87 and in ventral view: Fig. 88 (P paramere, V volsella, PV penis valve and CP chitinized plate).



Figs. 90-93. Pison punctifrons Shuckard, ♂.

90. Sternite 8.

91-93. Genitalia.

In punctifrons sternite 8: Fig. 90, genitalia in lateral view: Fig. 91, in dorsal view: Fig. 92 and in ventral view: Fig. 93. Lateral plate of penis valve wider and at apical area expanded ventrally, turning into a pointed plate and connected with that of the other side (Figs. 91 and 93), penis valve is soft in texture, on dorsal side medianly broadly furrowed (Fig. 92), paramere slender, long and accompanied at base with an elongated well chitinized branch (Figs. 91 and 93), volsella slightly extended at apex and with a sparse tuft of short hair (Figs. 91 and 93).

In the present species the radial, cubital and recurrent veins of fore wing are as given in Fig. 89; legs generally similar to those of punctifrons, but not so glossy

as in this, covered with more abundant hairs, especially all femora beneath closely covered with silky white curved hairs; mid and hind tibiae externally provided with scattered short spines (in mid about 4-5 and in hind 10-12 in number).

Frons strongly coarsely and irregularly (both in form and in arrangement) reticulate, under high magnification each ridge of reticulation distinctly microcoriaceous, not shining; punctures posteriorly finer and on ocellar area very fine and close but on posterior raised area of vertex large and sparse, with PIS filled with microreticulation. Mesoscutum sparsely covered with strong large punctures (as large as those on posterior part of vertex), punctures much sparser on broad central area; propleum with an incomplete series of short strong striae at each lateral margin, originating from about middle of dorsal aspect and extended posteriorly, on posterior aspect the striae of the series extended inwards to form the transverse coarse striae covering the surface; area dorsalis at base and on medial furrow strongly coarsely crenate, disc sparsely scattered with medium-sized punctures, completely without striae on PIS and surface shining; sides with fairly large strong punctures, punctures on anterior and posterior portions obliquely linearly arranged and contiguous to each other, forming oblique shining puncture lines, but on posteriormost area, besides these, very strongly and closely striate. Gastral tergite 1 smooth (under high magnification faint microsculpture observed) and sparsely scattered with fine punctures, following tergites similar, but with punctures gradually closer posteriorly, on apical margins of tergites 1 and 2 punctures especially fine and close. Sternite 2 fairly closely covered with somewhat large punctures, but on medio-lateral broad areas punctures sparse, PIS everywhere transversely closely microstriolate.

♀. 8.5-10.5 mm. In colouration generally similar to ♂, antennal flagellum brownish beneath as in ♂, but mandible narrowly ferruginous before apex; in general structure also similar to ♂, except sexual distinctions. Head in frontal view similar (W:L=100:84, IODs=10:19), medio-apical carina on frons frequently medianly linearly impressed, medio-apical prominence of clypeus generally narrower (Figs. 94, 95, see remarks on variation), usually without broad excavation and if present very narrow and inconspicuous. Ocellar disposition and surface sculpture similar. HW:IODv:A3=100:22:16. IODv:A3=10:7.2. A3,4,5=10,8,7. A3=AW×3. Dorsal elevation of collar considerably variable (Figs. 96 - dorso-postero-lateral view -, 97, 98, 99 - all frontal view; see remarks).

Holotype: ♂, Bismarck Arch., New Britain, Yalom, 1000 m, 19. V. 1962, Noona Dan Expedition (ZMUC).

Paratypes: 5 ♂, same loco, 16,18,18,18,20. V. 1962; 1 ♀, New Britain, Valoka, 8. VII. 1962; 1 ♀, New Ireland, Danu, Kalili Bay, 29. IV. 1962; 2 ♀, Lavongai Is., Banatam, 20, 23. III. 1962; 1 ♀, Bismarck Arch., Dyaul, Sumna, 7. III. 1962.

Other specimens: 1 ♀, Lavongai Is., Banatam, 20. III. 1962 (Cubital cell 2 abnormal); 1 ♀, Manus Is., Lorengau, 18. VI. 1962 (ditto); 2 ♀, Lavongai, Banatam, 21. III. 1962 (in many characters abnormal).

Remarks. On the variation in the characters of the female.

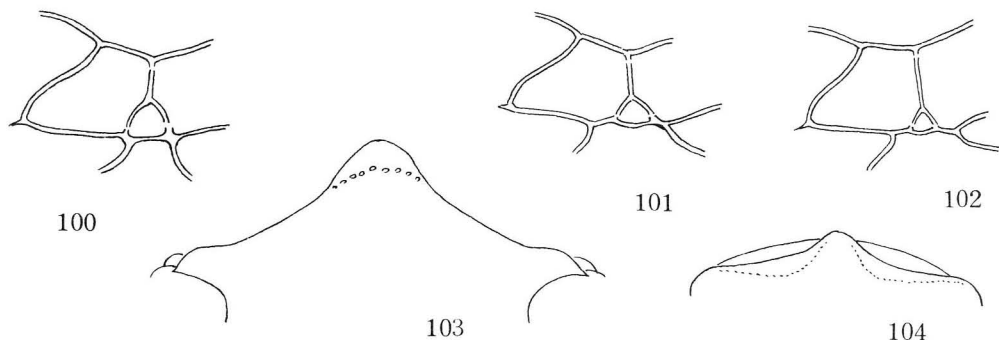
(1) Apical margin of clypeus. Most usually as given in Fig. 94 (Yalom specimen) but width of medial prominence is more or less variable, sometimes much narrower as in Fig. 95 (Lavongai specimen) or much wider as given with Fig. 103 (ditto) (Labrum is comparatively narrower than in ♂).

(2) Elevation on collar of pronotum. Usually with a short ridge-like elevation in the middle area and longitudinally compressed one on each side; in oblique dorso-lateral view: Fig. 96, in frontal view median elevation most usually transverse, with top straight or very gently emarginate (Fig. 97), but frequently it is rounded, with relative width considerably variable (Figs. 98, 99, 104, dotted line in the figures shows the anterior margin of the depressed and smooth area).

(3) Venation of fore wing. Cubital cell 2 is usually half the height of cubital cell 1 at transverse cubital vein 1 (Fig. 100), but it is sometimes smaller as in "other specimens" (Figs. 101, 102); the point at which recurrent vein joins to cubital cell is considerably variable. Usually recurrent vein 1 interstitial with transverse cubital vein 1 or close to it within the range of cell 1. Recurrent vein 2 joins to cell 3 and close to cell 2, but sometimes both or one of them joins to respective cell at a point fairly widely separated from cell 2 (Figs. 101, 102), sometimes both are interstitial with the transverse veins of cell 2 and rarely recurrent vein 2 joins to cell 2 near apical corner (Fig. 100).

(4) Punctures on area dorsalis. Area dorsalis is not enclosed with furrow, but the variation of punctuation of the area is marked. Usually punctures are fine and

sparse, without microsculpture or striae on ground surface. But sometimes punctures somewhat larger and closer than usual (one specimen from Yalom) and sometimes mixed on basal area with oblique weak striae (one from Yalom and one from Lavongai). In two of the exceptional specimens from Lavongai punctures on the area markedly smaller than usual and very much sparser, with surface almost smooth and polished.



(5) On local variation. No distinct local variation is observed which was especially examined with Yalom (1000 m high - 5 ♀) and Lavongai (or New Hanover - 5 ♀) specimens. But it can be said that the variation range of certain characters (e.g. form of apical margin of clypeus, pronotal elevation and 2nd cubital cell) is larger in the Lavongai population than in the Yalom.

(6) Two remarkable specimens from Lavongai (♀♀). In two of the 3 exceptional specimens (given above as "other specimens") from this Island show the extremities in 3 out of 4 variable characters cited in the preceding paragraph. Namely, medio-apical prominence of clypeus distinctly wider and shorter than usual (Fig. 103, cf. Figs. 94 and 95) and the margin without emargination near each side (do. do.); medial elevation on collar of pronotum much narrower and more acute than in others (Fig. 104, cf. Figs. 97 and 99) and the punctures on area dorsalis are much finer and sparser, with the surface almost smooth and polished.

However, in other important characters they well agree with other specimens from various localities. On the other hand, the variations are not of the geographical ones, because, as mentioned in paragraph 5, 3 other specimens from the same Island are normal in these characters and one of them is abnormal in fore wing venation.

33. TRYPOXYLON SCHMIEDEKNECHTI CONNEXUM TURNER, 1908

Trypoxylon connexum Turner, Proc. Zool Soc. London, 30: 522, 1908 (♀ ♂, Australia).

Trypoxylon connexum: Bohart and Menke, World Sphecid., p. 346, 1976 (listed).

Trypoxylon lavongaianum Tsuneki, SPJHA, 6: 12, 1977 (♀, Bismarck Is.).

Trypoxylon schmiedeknechti connexum: Tsuneki, Ibid., 7: 40, 1978 (New Guinean strain).

Trypoxylon schmiedeknechti connexum: Tsuneki, Ibid., 14: 13, 1981 (♀, New Guinea);

Ibid., 14: 101 (♀ ♂ widely in Australia).

Specimens examined: 4 ♀, Lavongai Is., Banatam, 18,22,25,26. III. 1962 .

34. TRYPOXYLON EXIMIUM SMITH, 1859

Trypoxylon eximium Smith, J. Proc. Linn. Soc. London, Zool., 3 (11-12): 161, 1859 (♀, Is. Aru and Key).

Trypoxylon eximium: Smith, Ibid., 5 (Suppl.): 84, 1860 (♀, Makassar and Is. Key).

Trypoxylon gracillimum Smith, Ibid., 7: 35, 1864 (♂, Is. Mysol).

Trypoxylon dorsale Tsuneki, SPJHA, 6: 5, 1977 (nec bicolor dorsale Tsuneki, Akitu, N.S., 9: 4, 1977, ♀, Bismarck Is.).

Trypoxylon eximium: Tsuneki, SPJHA, 8: 9, 1978 (redescr. of types, figs.)
Trypoxylon gracillimum: Tsuneki, Ibid., 8: 24, 1978 (ditto, ♂)
Trypoxylon eximium: Tsuneki, Ibid., 12: 104, 1980 (♂=gracillimum, syn. n ssp. obicola, Is. Obi; ♀, Borneo).
Trypoxylon eximium: Tsuneki, Ibid., 14: 67, 105, 1981 (East Indies, New Guinea, Bismarck Arch., Australia).
Specimens examined: 1 ♀, Lavongai Is., Banatam, 19. III. 1962; 1 ♀, New Britain, Yalom, 1000 m, 21. V. 1962, Noona Dan Expedition.

35. TRYPOXYLON BISMARCKIANUM TSUNEKI, 1977

Trypoxylon bismarckianum Tsuneki, SPJHA, 6: 7. 1977 (♂, nec ♀, New Ireland).
Trypoxylon bismarckianum: Tsuneki, Ibid., 14: 81, 1981 (ditto).
Specimens: 1 ♀ (holotype), New Britain, Vaisisi, 9. VII. 1962; 1 ♀, New Britain, Yalom, 1000 m, 22. V. 1962.

36. TRYPOXYLON KALILICUM TSUNEKI, 1981

Trypoxylon bismarckianum Tsuneki, SPJHA, 6: 7, 1977 (♂, nec ♀)(New Ireland).
Trypoxylon kalilicum Tsuneki, Ibid., 14: 90, 1981 (♂, New Britain).
Specimen: 1 ♂ (holotype), New Ireland, Kalili Bay, Danu, 1. V. 1962.

37. TRYPOXYLON ALBITARSATUM TSUNEKI, 1977

Trypoxylon albitarsatum Tsuneki, SPJHA, 6: 8, 1977 (♀, New Britain).
Trypoxylon huonense Tsuneki, Ibid., 6: 14, 1977 (♀ ♂, New Guinea; ssp.).
Trypoxylon albitarsatum: Tsuneki, Ibid., 14: 45, 103, 1981 (Bismarck Arch., New Guinea, Australia).
Specimen: 1 ♀, New Britain, Yalom, 1000 m, 19. V. 1962.

38. TRYPOXYLON EBURNEIPES TSUNEKI, 1977

Trypoxylon eburneipes Tsuneki, SPJHA, 6: 11, 1977 (♀, New Ireland).
Trypoxylon eburneipes: Tsuneki, Ibid., 14: 49, 1981 (New Guinea, Schouten Is., Bismarck Is., many ♀).
Specimen examined: 1 ♀ (holotype), New Ireland, Kalili Bay, Danu, 30. IV. 1962.

39. TRYPOXYLON PINGUICEPS TSUNEKI, 1977

Trypoxylon pinguiiceps Tsuneki, SPJHA, 6: 12, 1977 (♀, Lavongai Is.).
Trypoxylon pinguiiceps: Tsuneki, Ibid., 14: 14, 1981 (listed).
Specimen: 1 ♀ (holotype), Lavongai Is., Banatam, 25. III. 1962.

3. C r b r o n i n a e

40. CROSSOCERUS (EUPLILOIDES) BOUGAINBILLEAE DENTATUS TSUNEKI, 1977

Crossocerus (Euplioides) bougainvillae dentatus Tsuneki, SPJHA, 3: 9, 1977 (♀, New Britain)

Specimens examined: 2 ♀ (holo- and paratypes), New Britain, Yalom, 1000 m, 22. 20. V. 1962.

41. DASYPROCTUS SEPTEMMACULATUS TSUNEKI, 1977

Dasyproctus septemmaculatus Tsuneki, SPJHA, 3:10, 1977 (♀, New Ireland, New Britain)

Specimens: 1 ♀ (holotype), New Ireland, Lemkamin, 23. IV. 1962; 1 ♀ (paratype) New Britain, Yalom, 1000 m, 21. V. 1962.

42. DASYPROCTUS PACIFICUS TSUNEKI, 1977

Dasyproctus pacificus Tsuneki, SPJHA, 3: 11, 1977 (♀, New Ireland, New Britain).

Specimens: 1 ♀ (holotype), New Ireland, Kalili Bay, Danu, 3. IV. 1962; 1 ♀, New Britain, Bita Paka, 15 km SE of Kokopo, 10. VI. 1962.

43. ECTEMNIUS (CAMERONITUS) PAXINUS LECLERCQ, 1963

Ectemnius (Cameronitus) nigratarsus palitans: Leclercq, Bull. Ann. Soc. R. Ent. Belg., 94: 144, 152. 1958 (partim, Luzon).

Ectemnius (Cameronitus) paxinus Leclercq, Ibid., 99: 29, 30. 1963 (♀, Philippines).

Ectemnius (Cameronitus) paxinus: Tsuneki, SPJHA, 3: 13, 1977 (♀, New Britain).

Specimens: 2 ♀, New Britain, Yalom, 1000 m, 9, 19. V. 1962.

4. N y s s o n i n a e

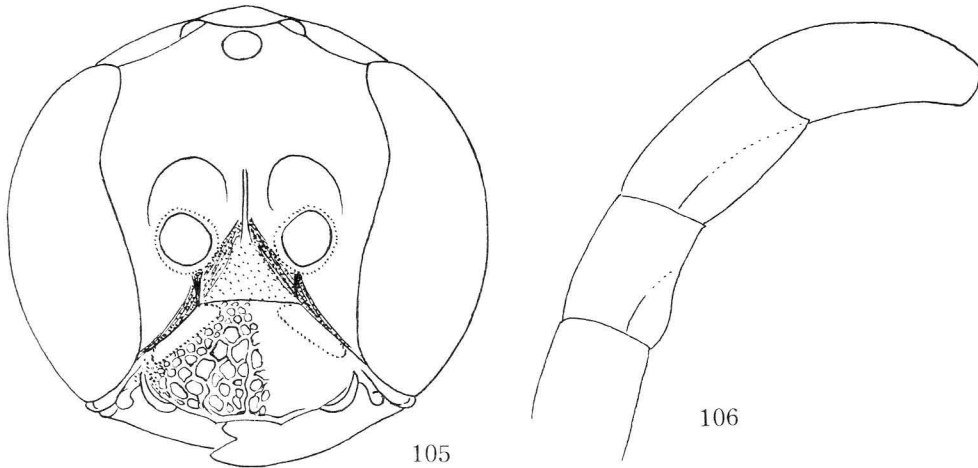
44. ARGOGORYTES BISMARCKIANUS SP. NOV.

Among the relatives known from the south-western Pacific Islands and Australia Argogorytes vagus (Smith, 1859) is presumed to be closest to the present species, both bearing two lateral oblique white marks on the clypeus and the yellowish white fasciae on the gastral tergites. In vagus, however, the pronotum and the prepectus above are without the mark and G3 is also without the band; moreover, the bands on G1 and 2 of vagus differ markedly in colour tone from those of the present species.

♀. Length 11 mm. Black; ivory white are 2 oblique marks on clypeus (Fig. 105), a narrow complete band on pronotum, humeral tubercle, a spot above prepectus of mesopleuron close to tubercle, medianly almost contiguous two large marks on G1 that are distinctly enlarged sideways, narrower and distinctly separated two transverse marks on G2 that are slightly widened outwards and similar but much narrower and more remotely separated lateral marks on G3. Antenna completely black, mandible with a reddish brown area before apex, legs apically somewhat brownish, spurs brown. Wings hyaline, but on radial cell strongly and cubital cell and apical area weakly brownish. Hairs whitish, without blackish hair anywhere.

Head from above with relative length HW,HLM,HLI,IODv=100,56,50,50. A3 relatively 8. IODv:A3=10:1.6. OOD:POD=6:7. Transverse furrow just behind hind ocelli and longitudinal one behind fore ocellus distinct, vertex behind the transverse furrow and frons roundly elevated, without frontal furrow. Head in frontal view: Fig. 105, IODs =25:24 (ocular index 1.04), clypeal index 1.7. IAD:WAS:AOD:ACD=8:5:5:5. A3,4,5,11,12 =10,9.5,9,8,10.5. A10-12: Fig. 106. Two short longitudinal weak impressed lines at medio-anterior part of mesoscutum present, possible basal part of admedian lines, notauli indistinct, ante-scutellar furrow strongly foveolate, scutellum depressed at

medio-posterior area and minutely roundly raised inside the depression, this tubercle finely granulate and densely pubescent on top, deep furrow behind scutellum not foveate. Epimeral area of mesopleuron not distinctly outlined below, because of the longitudinal coarse carinae covering there, mesopleural scrobe sunk in one of the furrows between carinae. Mesopleuron margined beneath with a weak longitudinal carina and separated with it from mesosternum, acetabular carina complete and high, medial carina of mesosternum not strong, but distinct. Area dorsalis on propodeum broad triangular in form, enclosed with broad deep furrow which is obliquely crossed with strong coarse carinulae, medial furrow particularly margined with strong carinae that are extended posteriorly to form lateral carinae of medial narrow deep furrow of posterior inclination, medio-apical area of dorsal aspect raised and shortly produced, lateral area of



Figs. 105-106. Argogorytes bismarckianus sp. nov., ♀

posterior inclination buldging out over the sides, sides margined beneath with intercoxal carina that is up-curved. Gl depressed at base, the depression margined on both sides with carina, without constriction between segments; pygidial area comparatively narrow, margined on each side and at rounded apex with a carina, surface medianly longitudinally broadly raised, lateral depressed areas along margins coarsely punctured. Sternite 1 medianly longitudinally highly keeled, triangular in cross section, top in lateral view minutely rounded, sternite 2 at base abruptly highly elevated to form the level of ventral side, elevated area medianly at base weakly carinated. Tibiae not strongly spinose, each only with scattered fine short whitish spinules on outer side, fore tarsus without comb-hairs. Venation of fore wing typical to the genus, but here curved transverse cubital vein 1 on both ends completely discoloured and indistinct.

Frons closely, vertex somewhat more sparsely covered with medium-sized (rather fine) punctures, clypeus very coarsely irregularly punctate-reticulate, punctures on mesoscutum anteriorly finer, weaker, sparser than on frons, but gradually larger and stronger and closer posteriorly, as on frons; scutellum punctured as on posterior part of mesoscutum, on sides of thorax omaular and sternal furrows broad and deep, very coarsely foveolate, epimeral area and upper part of sternal area longitudinally, very strongly and coarsely carinate, carinae weaker below and mixed with fine weak punctures between. Area dorsalis at base longitudinally, then obliquely, very strongly and coarsely, somewhat rugosely carinate, the fine furrows thus formed between carinae irregularly crossed with carinules, posterior inclination much more coarsely rugoso-carinate and -reticulate, main course of carinae longitudinal, surface of elongate network very minutely irregularly granulate, not shining; gastral tergites closely covered with piliferous punctures, but tergite 6 hairless, with surface delicately rugoso-microstriolate and scattered with gross punctures; sternite 2 posteriorly covered sparsely with medium-sized punctures, on sternites 3 and 4 part of punctures forming an ante-apical row and, in addition, postero-lateral areas very finely and closely punctured;

sternite 5 similar, but punctures larger and more closely arranged on the posterior row; sternite 6, except medial line, more strongly and closely punctured.

♂, unknown.

Holotype: ♀, New Britain, Yalom, 1000 m, 19. III. 1962, Noona Dan Expedition (ZMUC).

Remarks. Noteworthy is that A10 and 11 in the right antenna of the specimen are somewhat deformed as in most of the male of the genus, but not in the left antenna. Possibly the specimen is a partial gynandromorph.

45. ARGOGORYTES TRISTIS SP. NOV.

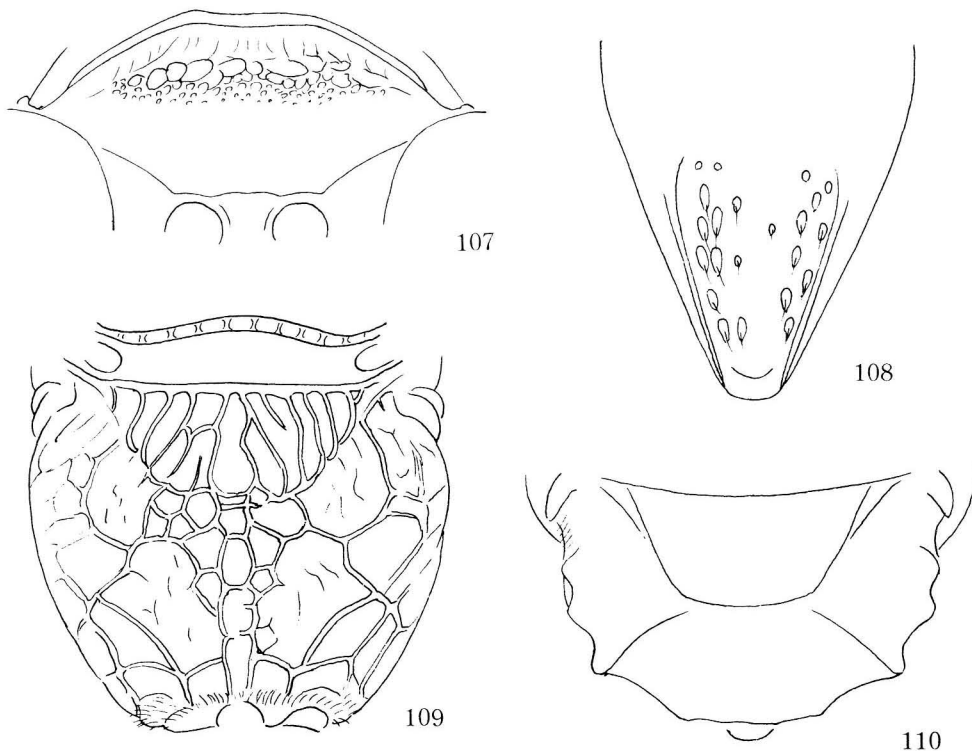
Two species of wholly black Argogorytes have been known from the Pacific southern Islands, of which Formosan fuliginosus m. is different from the present species (♀) in the structure of the clypeus and in the general punctuation of the body, while the other, namely carbonarius Smith known from New Zealand seems to be very close to the present species, especially in having the ciliated fore tarsus. But the present species differs markedly from carbonarius in the sculpture of the propodeum, in the structure of mesopleuron and in the much larger body size.

♀. Length about 12 mm. Completely black, with plumbeous shine on head, only labrum and tibial spurs brownish and mandible at mid area with a ferruginous patch and apically somewhat reddish; wings feebly clouded throughout (somewhat paler basally), without brown patch at radial cell, veins and stigma dark brown. Hairs on clypeus and labrum and pubescence on sides of thorax brownish, on dorsal part of whole the body black, but in some light appearing somewhat brownish.

In dorsal view HW:HLM:HLI:IODv:A3=100:47:46:48:19. IODv:A3=10:4. OOD:POD=3:2, IOD at vertex, mid frons and clypeal base relatively 10,12,10. Frons not so strongly swollen as in preceding species. IAD:WAS:AOD:ACD=10:10:10:2. Clypeal index (=IODc/LC) =1.7. A3,4,5,11,12=10,10,9.5,5.5,7.5. Vertex without transverse impressed line behind hind ocelli, but with a longitudinal one behind fore ocellus, frons only gently swollen, without median furrow, but with a median deep black (surrounded with strong plumbeous shine) somewhat impressed line on the inclined area above antennae, at both ends it is more distinctly impressed; scapal sinus vaguely outlined upwards. Clypeus (Fig. 107) convex (in fuliginosus flat) and strongly inclined anteriorly from above apical margin, the margin narrowly flattened. Mesoscutum with 4 impressed lines at anterior area (lateral = notauli), each bearing a distinct puncture in middle, median two (= admedian line) somewhat longer, reaching posteriorly about a third of the segment from base, without similar impression near sides (the state differs from carbonarius), antero-lateral corner above humeral tubercle and upper margin of prepectus distinctly carinate, lateral margins of mesoscutum raised as usual, accompanied with crenate groove just inside, a short distance from the groove another fine groove runs from posterior margin parallel forwards and connected with parapsidal suture; ante-scutellar furrow strongly crenate, scutellum medianly near posterior margin provided with a small tubercle, covered with short pubescence, postscutellum also provided with a weak central tubercle, this is shining, without hair. On mesopleuron epicnemial carina (omaulus) strong, connected below with acetabular carina, accompanied with a fine crenate furrow posteriorly, mesosternal furrow broad and deep, strongly coarsely foveolate, epimeral furrow also deep, but without foveae, including scrobe within, posterior margin metapleuron from above middle downwards markedly sinuate and accompanied with a furrow which is coarsely foveate. Propodeum with distinctly raised area dorsalis, margined with carinae, posterior inclination flat, margined above also with a carina, median furrow of the inclination anteriorly deep, posteriorly shallow and margined also with carinae on both sides, mid lateral areas of propodeum strongly bulging out over sides (as usual in this genus). Basal depression of G1 only shortly carinate on both lateral margins, G1 not constricted at apex, G2 strongly swollen out laterally, but not constricted at base and apex, following segments also smoothly connected with each other, pygidial area broad (Fig. 108), broader than in mystaceus. Sternite 1 medianly carinate, carina not so highly raised as in the preceding species, sternite 2 at base abruptly strongly raised as usual. Venation normal in this genus, relative length of abscissae 1, 2, 3 of cubital vein inside cubital cell 2 appr. 10, 22, 5; apical transverse cubital vein runs parallel with outer one of cubital cell 2 and straight, only at apex narrowly curved to join to cubital vein.

Frons comparatively finely, fairly closely punctured, PIS 1-1.5 times as large

as PD, clypeus posteriorly finely rugoso-punctate, anteriorly strongly coarsely rugoso-reticulate, on apical bevelled area striae mainly longitudinal (Fig. 107); meso-scutum densely covered with medium-sized shallow piliferous punctures all over, punctures on scutellum and mesopleuron similar. Sculpture on propodeum: Fig. 109 (this is a flatly expanded figure of sculpture of dorsum and posterior inclination, in simple dorsal view the segment appears as Fig. 110). Sides smooth and shining, with a curved



Figs. 107-110. *Argogorytes tristis* sp. nov., ♀

carina posteriorly; G1 somewhat largely and shallowly, the rest of gaster very finely, close-punctured, but sternites 2-5, further, sparsely superimposed with medium-sized punctures and on each posterior margin punctures collected to form a transverse row, the punctures of the rows closer posteriorly and on 5 larger in addition, σ_6 on lateral areas and beneath strongly punctured; on pygidial area punctures large and elongate and collected mainly along lateral margins (Fig. 108).

♂, unknown.

Holotype: ♀, New Ireland, Lemkamin, 11. IV. 1962, Noona Dan Expedition (ZMUC).

Paratype: 1 ♀, same as above.

46. *BEMBEVINUS MANUSSENSIS* SP. NOV.

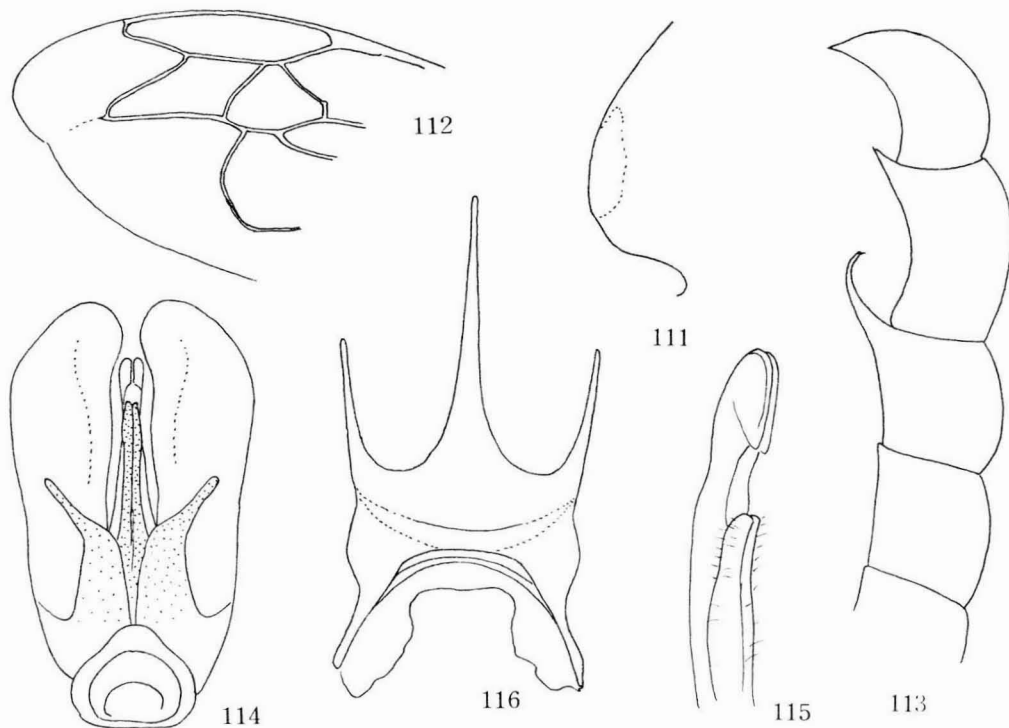
The present species is characterized by the combination of the following distinctions: Gaster completely black, only rarely with two minute yellow spots on tergite 1, yet thorax-complex yellow maculated; postero-lateral corner of propodeum without incision; tergite 6 without impunctate line in middle; ocular index 1.5; AOD:ACD=2:1; cubital cell 2 with short abscissa 2 of radial vein above; length 8-10 mm.

♀. In the living state the species will possibly be over 10 mm. Black; yellow are a mark on supraclypeal area (variable in size, but never in full space), apical mar-

gin of labrum, a spot at apex of A1 beneath, from apex of A3 to A9 or 10 beneath (vaguely outlined and sometimes brownish), palpi, a medianly interrupted or narrowed band on pronotum, apical area of pronotal tubercle, rarely a spot on tegula, a small mark at postero-lateral corners of mesoscutum, lateral marks on scutellum (always less than a fourth of width of the disc), two small marks on postscutellum, a narrow mark at postero-lateral corners of propodeum (Fig. 111), rarely two small transverse marks on gastral tergite 1, a spot at base of mid tibia, all tibial spurs, anterior half of fore T1, rest of fore tarsus except posterior margin, mid T2 and 3 (nearly ferruginous) and all claws (do.); wings hyaline, veins dark brown. Hair white, on clypeus silvery in oblique light, on thorax somewhat brownish above, on G1 greyish white above, from G2 apically black and appressed, mixed with erect pubescence at lateral portions, on ventral side greyish white and longer posteriorly.

Head in frontal view with HW:HL=100:70, without longitudinal impression behind fore ocellus, ocular index 1.6, clypeal index 2.0, IAD:WAS:AOD:ACD=9:10:9:4, IODc:A3=10:4, A3,4,5=10,8,7, OOD:POD=1:1. Postero-lateral corner of propodeum vertically seen: Fig. 111 (left side), venation: Fig. 112 (abscissae of cubital vein inside of cell 2 more or less variable in relative length, usually abscissae 1 and 2 subequal).

Frons covered with medium-sized piliferous punctures, very close anteriorly and sparser posteriorly, impunctate median line present between scapal hollows. Clypeus and labrum finely and closely punctured and sparsely superimposed with larger punctures, mesoscutum moderately closely covered with medium-sized punctures, each puncture posteriorly shallowed and not well outlined, punctures sparser posteriorly and on scutellum well outlined and sparse; area dorsalis at base with narrow impunctate area, in medial length it is about a quarter of dorsal aspect of propodeum, rest of



Figs. 111-116. *Bembecinus manusensis* sp. nov.

the area strongly closely, somewhat irregularly punctured, sides except anterior femoral sinus finely and very sparsely punctured. G6 uniformly punctured, without median impunctate area.

♂. 7-9 mm. The difference in the colour of the gaster is so marked that one is apt to consider the male to belong to another species.

Clypeus completely black (in specimens from Is. Manus) or carrying one or two

small yellow spots, antenna except A1 beneath and ventral hollows of A12 and 13 completely black, Gl, 2, 3, 4, 5 each with a narrow fascia at apex, more or less disappeared at the sides. Propodeum, G6 and cubital cell 2 of fore wing structured and coloured as in ♀. Yellow on head: a mark on supraclypeal area, varying in size, but always not reaching sides, labrum, usually wholly, but frequently with baso-medial area black, a short narrow line along inner orbits; on thorax-complex similar to ♀, but each slightly larger or broader and marks on postscutellum fused into a band. Gl besides above, with a small yellow spot latero-apical corner. Fore and mid femora with an additional elongated mark beneath near apex (on mid often lacking), yellow area of rest of fore leg broader, on T1 black is confined to posterior margin only, T2, 3, 4 wholly yellow (rather orange yellow), T5 with a brown patch posteriorly, mid tibia and T1 usually yellow in front, T2, 3 wholly orange yellow, hind tibia at base with a yellow mark.

Ocular index = 2.5, clypeal index = 1.1-1.2. IODc:A3=10:7. A3,4,5,11,12,13=10, 7.5,6,5.5,7.5,5 (curvature ignored)(see Fig. 113). IAD:WAS:AOD:ACD=6:10:3:9. A11-13 in lateral view: Fig. 113. Genitalia in ventral view: Fig. 114, apical part of penis valve with digitus of volsella in ventro-lateral view: Fig. 115, 8th tergite at basal area medianly distinctly keeled, 8th sternite: Fig. 116 (seen from inside). Punctuation and hair as in ♀.

Holotype: ♀, Manus I., Lorengau, 25. VI. 1962, Noona Dan Expedition (ZMUC).

Paratypes: 9 ♀ 10 ♂, same locality, 14,24,25. VI. 1962 (do.); 2 ♂, Mussau I., 10. VI. 1962 (do.).

47. BEMBECINUS LAVONGALIANUS SP. NOV.

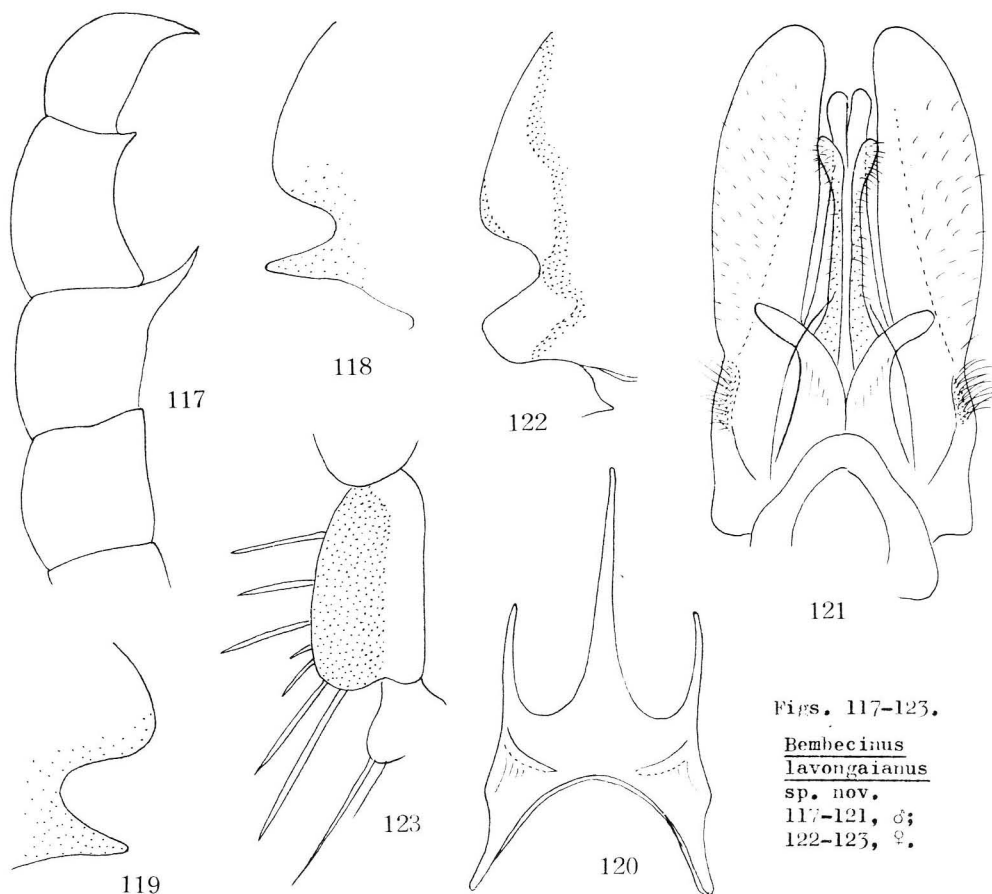
The present species is very close to B. papuanus Cameron and B. pallidicinctus van der Vecht in the deep latero-apical incision of propodeum, in the general coloration and in the strongly convergent inner orbits and it is difficult to find out the differences from them. According to van der Vecht pallidicinctus (♀ ♂) differs from papuanus (♂) in the smaller body size (but in the descriptions they are similar) and in the less hairy genital organs.

The present species is similar to pallidicinctus even in the ocular index (♀ 2.1 and ♂ 2.7; in pallidicinctus ♀ 2.2-2.4 and ♂ 2.5-2.6), but according to the original figure (Fig. 7) of genitalia (dorsal view, hence volsella is not distinctly seen) differs at least in the apical form of paramere. Moreover, the male bears completely black clypeus and propodeum and less maculated gastral sternites. (But the colorific character, except the fundamental ones, is rather unimportant, since variation in this character in Bembecinus is very marked). The present species differs from papuanus at least in the relative length of IODc:Al (Cameron gave in the remarks that eyes distinctly convergent below, separated by slightly less than the length of the antennal scape), namely, in the present species IODc is greater than the length of Al - IODc:Al=10:9 - . Colouration of the clypeus and propodeum is here also distinctly different.

Based upon the differences above mentioned the specimens before me are rather provisionally dealt with as distinct. Future comparative study in regard to the relative situation of antennal socket to each other and to the eye and the clypeus may discover further difference from them.

♂. 7.5 mm (papuanus 7 mm, pallidicinctus 6-8 mm). Black; yellow are supraclypeal area completely, contiguous to inner orbital band which reaches upwards slightly above level of mid point to fore ocellus, labrum except baso-medial medium-sized triangular black mark, antenna beneath completely (apically orange yellow), palpi, medianly shortly interrupted band on pronotum, apical half of tubercle, a minute spot at postero-lateral corner of mesoscutum, a lateral mark of scutellum, a short line on postscutellum, a laterally broadened apical band on Gl, 2, 3, 4 and 5, on Gl medianly and on G3 3-times, interrupted, a small patch at postero-lateral corner of sternite 2 and 3, apical spot of fore and mid femora and fore and mid tibiae and T1, all in front; rest of fore tarsus ferruginous, but with posterior margin brown, mid and hind tarsi apically beneath ferruginous, above brown. Hair on clypeus silvery, appressed; stiff hair on gaster black, pubescence of body greyish white, on thorax above slightly brownish.

Ocular index 2.7, clypeal index 1.3, WAS:IAD:AOD:ACD=10:8:4:8. IODc:Al=10:9. IODc:A3=10:6. A3,4,5,11,12,13=10,6,4.5,3.5,3.5,5,3.5. A9-13: Fig. 117. Frontal medial line slightly raised below middle, no impressed line between hind ocelli; pos-



Figs. 117-123.

Bembecinus
lavongaianus

sp. nov.

117-121, ♂;

122-123, ♀.

tero-lateral corner of propodeum markedly deeply excised, seen vertically (left side, seen from obliquely right side): Fig. 118, seen vertically from outer side (left side, from outer beneath): Fig. 119, G6 without impunctate line in middle, G8 above with a keel in middle, strong at base and lowering posteriorly, sternite 8: Fig. 120 (from outer side, namely ventral view), lateral spines relatively somewhat shorter than in manusensis; genitalia in ventral view: Fig. 121, characteristic is that paramere simply rounded at apex and with a tuft of pubescence at baso-lateral area, paramere also sparsely pubescent on ventral side (according to the remarks of van der Vecht to B. papuanus, in this species the genitalia are densely covered with fine hairs - Treubia, 1949, p. 304), digitus of volsella more closely pubescent than in manusensis and cuspis distinctly thicker than in this species (cf. Fig. 114).

Frons covered with comparatively large punctures, punctures anteriorly close and sparser towards vertex, mesoscutum irregularly covered with not-well outlined punctures as usual, punctures on scutellum distinct and sparse, on mesopleuron close transversely, but more widely separated longitudinally, area dorsalis with a broad triangular smooth and shining area at base, rest of the area closely covered with punctures, puncture anteriorly medium-sized and posteriorly gradually finer, sides except anterior femoral sinus sparsely scattered with fine punctures, G6 without median impunctate line, but uniformly punctured all over.

♀. 8-10 mm. Similar in general characters to ♂, but yellow marks better developed: Clypeus on lateral marginal areas broadly, supraclypeal area wholly, inner orbital bands broader, antenna completely beneath, pronotal band broader and only narrowed in middle, marks on humeral tubercle, postero-lateral corners of mesoscutum, scutellum and postscutellum larger or broader and in addition with a large yellow mark on tegula; propodeum yellow at postero-lateral corners, bands on G1-5 broader, marks on fore femur beneath broader and longer, but colouration on other parts of legs

similar; mandible at apex ferruginous. Hair similar.

Ocular index 2.1, clypeal index 1.5, ASW:IAD:AOD:ACD=10:9:4:6. IODc:Al=10:9. IODc:A3=10:5.5. A3,4,5=10,8,6. OOD:POD=1:1. No impressed line between hind ocelli. Postero-lateral incision of propodeum slightly shallower than in ♂, with lower arm embracing the incision much broader and not pointed (Fig. 122, left side, seen vertically from right side); fore T1 broader (Fig. 123), with following joints strongly combed on outer side, mid and hind tarsi also strongly spined. Cubital cell 2 of fore wing in two specimens (from New Britain) as in ♂, while in two others (Lavongai and New Britain) with transverse cubital veins more closely approached together on radial vein. Difference in punctuation observed on area dorsalis: here basal impunctate area is always lacking and surface very finely and closely punctured and irregularly superimposed with medium-sized punctures. Sides almost impunctate, with fine shallow indistinct punctures very sparsely scattered.

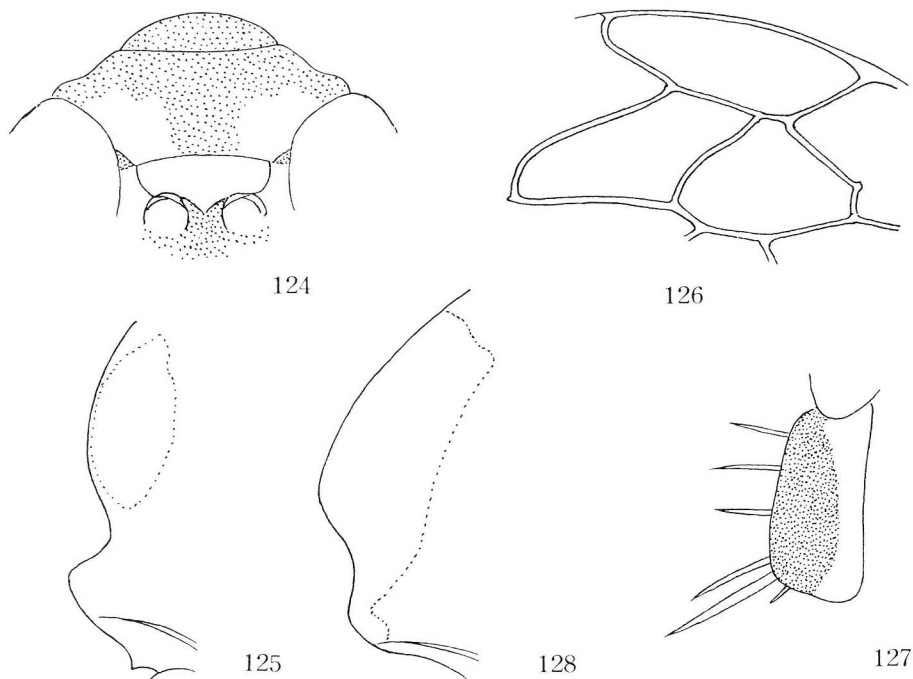
Holotype: ♂, Bismarck Arch., Lavongai (New Hanover), Banatam, 26. III. 1962, Noona Dan Expedition (ZMUC).

Paratypes: 1 ♀, same locality, 25. III. 1962; 3 ♀, New Britain: 2 ♀, Bitapark, 15 km SE of Kokopo, 10. VII. 1962; 1 ♀, Vaisisi, 9. VII. 1962.

48. BEMBECINUS NOVABRITANICUS SP. NOV.

? Stizus versicolor Handlirsch, Sitz. k. Akad. Wiss. Wien, Math.-Natw., 101 (1): 48, 1892 (♀, New Britain, Halmahera and Amboina).

Apparently very close to Bembecinus versicolor (Handlirsch), but the morphological information of this species is very poor, only giving the presence of postero-lateral incision of propodeum, $AOD < ACD$ (etwas) and 12-14 mm of body size. As coloration of each species is considerably variable in this genus the identification based upon the insufficient morphological knowledge has a danger to include different species within the same specific category. Moreover, in the specimens before me $AOD = ACD$,



Figs. 124-128. Bembecinus novabritanicus sp. nov., ♀.

so that the specimens before me are provisionally treated as distinct from versicolor.

♀. 12 mm. Black; lemon yellow are dorso-lateral broad marks on clypeus (Fig. 124), supraclypeal area completely, inner orbital band, reaching upwards above level of mid point of the distance to fore ocellus, antenna beneath completely, labrum except a minute spot at base in middle, a very faint short line on each side of pronotum, humeral tubercle posteriorly, a mark on postero-lateral corner of mesoscutum, lateral marks on scutellum, smaller than tegula, a band on postscutellum, a small mark at postero-lateral corner of propodeum, medianly broadly interrupted band on G1, laterally widened narrow band on G2 and 4, on G4 medianly interrupted, postero-lateral marks on sternites 2 and 3, apical patch of fore and mid femora, fore and mid tibiae both in front, all spurs, fore T1 on anterior half and rest of fore tarsus (rather orange yellow) except posterior margin. Appressed hair on clypeus and on other parts of head and thorax silvery, hairs on mesoscutum pale brown and on gaster above dark brown or black, erect hair and pubescence greyish white.

Ocular index 1.6, clypeal index 1.6, IODc:Al=10:8, IODc:A3=10:5, A3,4,5=10,8,5, 7. WAS:IAD:AOC:ACD=10:7:5.5:5.5. Ocellar area medianly longitudinally feebly impressed, latero-posterior incision of propodeum: Fig. 125 (left side seen vertically from right side), cubital cells 2 and 3 of fore wing: Fig. 126, fore T1: Fig. 127.

Punctures on frons comparatively fine and sparse, not close anteriorly, but sparser posteriorly to vertex, punctures on mesoscutum as usual, not well outlined posteriorly, on scutellum distinct, PIS 1-4 times as large as PD and close on posterior area, area dorsalis on propodeum at base with about a third of dorsal space impunctate and polished, rest of the area anteriorly sparsely and posteriorly closely covered with medium-sized punctures, sides of propodeum finely and closely punctured, punctures anteriorly very fine and close; G6 uniformly punctured.

♂, unknown.

Holotype: ♀, New Britain, Valoka, 7. VII, 1962, Noona Dan Expedition (Malaise trap) (ZMUC).

Remarks. A specimen (♀) from Is. Lavongai (or New Hanover) differs from the above described New Britain specimen considerably in colouration:

Colour tone is not lemon yellow, but strongly orange yellow. On head and antenna as in the above; pronotum with a broad band, the band narrowly interrupted in middle, marks on tegula, axilla, scutellum, postscutellum and propodeum much larger, G1 with an uninterrupted broad band, only shallowly incised in middle, band on G2 and G4 also complete and widened on sides, G3 with a narrow incomplete band, consisting of a few patches and dots; legs as in the above specimen.

Ocular and clypeal indices and length relation between WAS, IAD, AOD, ACD are similar, postero-lateral incision of propodeum shallower: Fig. 128 (notice the larger macula); lateral veins of cubital cell 2 of fore wing more closely approached each other at radial vein, in left wing a considerably long strong veinlet sent off obliquely towards base of stigma from the angle of inner lateral (= first transverse) cubital vein, but in the right wing without such.

Based upon the different colouration and mclulation the Lavongai specimen is treated as a geographical race:

Bembecinus novabritanicus banatamus ssp. nov.

♂, unknown.

Holotype: ♀, Lavongai Is., Banatam, 20. III. 1962, Noona Dan Expedition (ZMUC).

5. P h i l a n t h i n a e

49. CERCERIS PICTIVENTRIS IMMOLATOR SMITH, 1864

Cerceris immolator Smith, J. Proc. Linn. Soc. London., Zool., 7: 37, 1864 (♀, really ♂, Waigion).

Cerceris papuana Cameron, Nova Guinea, 5: 57, 1906 (♀, New Guinea, Manokwari).

Cerceris pictiventris immolator: van der Vecht, Zool. Meded., 39: 354, 1964 (n. st.).

Cerceris pictiventris immolator: Tsuneki, Etizenis, 28: 1, 1968 (listed).
Cerceris pictiventris immolator: Krombein, Smithson. Contr., Zool., 22: 12, 1969 (♀ ♂, Schouten Is. West Irian, Papua, Bismarck Is., Solomon Is.).
Cerceris pictiventris immolator: Bohart and Menke, World Sphecid., p. 585, 1976 (synonym list).

Specimens examined: 7 ♀ 7 ♂, New Ireland, Kalili Bay, Danu, 29, 30. IV, 1962; 1 ♂, New Britain, Valoka, 11. VII. 1962; 1 ♂, Duke of York, Is. Manuan, 19. VII. 1962.

Remarks. The specimen from Is. Manuan is maculated as in the New Ireland specimens, having lateral yellow marks on tergites 3, 4, 5 and 6, while the specimen from New Britain lacks the maculae on tergites 4 and 6 and has it on left side only of 5.

Antennal flagellum beneath ferruginous in both sexes (escaped from the Krombein's redescription).

50. CERCERIS BOUGAINVILLENSIS TSUNEKI, 1968

Cerceris bougainvillensis Tsuneki, Etizenia, 28: 8, 1968 (♀ ♂, Solomon Is., Bougainville - 19 figs.).

Cerceris bougainvillensis: Krombein, Smithson. Contr., Zool., 22: 35, 1969 (♀ ♂, Solomon Is., New Ireland).

Specimens examined: 3 ♂, New Ireland, Lemkamin, 12, 19, 21. IV. 1962.

Remarks. In the specimen the yellow marks on the pronotal collar, wing tegulae, postscutellum, propodeum, gastral tergite 1 (apical band), 2 (medio-basal mark and latero-apical marks) and 3 (apical broad band, roundly excavated from forward) are well developed and large, but tergites 4-7 are always without the yellow marks.

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