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ON THE CRABRONINE WASPS OF THE SOUTHERN PACIFIC AND
AUSTRALIA (HYMENOPTERA, SPHECIDAE)

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M I S H I M A

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ON THE CRABRONINE WASPS OF THE SOUTHERN PACIFIC AND
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By K. Tsuneki

Abstract. The new taxa dealt with in the present paper are Rhopalum (Rhopalum) cornigerum, R. (R.) tubarum papuanum, Podagritus (Ec-
huca) australiensis, Crossocerus (Exililoides) papuanus, Dasypro-
ctus septemmaculatus, D. pacificus, D. semifulvus, Lestica (Sole-
nius) biroi and L. (S.) tobleri. Supplemental descriptions and
figures are given to some known species examined in the present
investigation.

The specimens which form the basis of the present paper are a part of the sphecid material kindly sent to me for study independently by Dr. J. Papp, Hungarian National Museum of Natural History, by Dr. B. Petersen, Zoological Museum of Copenhagen and by Dr. P. H. Arnaud Jr., California Academy of Sciences, to whom I express my hearty thanks for their kindness. I am also indebted much to Dr. A. S. Menke, Systematic Entomology Laboratory, U. S. Department of Agriculture, Washington, who takes trouble for me to examine some characters of the type species.

1. RHOPALUM (RHOPALUM) TUBARUM PAPUANUM SSP. NOV.

Rhopalum (Rhopalum) tubarum Leclercq, Bull. Ann. Soc. R. Ent. Belg., 93 (7-8): 218, 1957 (♀ ♂, Queensland).

The Papuan specimen differs from the typical form in the colour of the antennal flagellum, gastral segments 2 and 3 and hind femur, in the structure of antennal joints 5 and 6 (may be overlooked), and somewhat in the punctuation on the head and thorax. As the figures given to the original description are apparently inaccurate and there are considerable differences between those and what I observe the detailed description with figures of the Papuan specimen will be given below (all of my figures are drawn on the basis of numerous measurements):

♂. Length 5.5 mm. Colouration as in the typical race (characteristic is yellow of mandible, fore and mid legs and basal half of gastral petiole) except the following: Antennal joint 2 wholly yellow, flagellum light brown and paler basally, wing tegula transparent yellow, with an opaque yellow spot, gaster except basal half of petiole totally brownish black, hind leg with coxa except base and trochanter largely yellow, femur wholly brownish black and tarsal joints 2-5 pale brown. Hairs on clypeus, sides of face, epicnemius, prepectus and anterior part of episternum silvery, dense and appressed, on temple, mesosternum finer, weaker and greyish white.

Head from above: Fig. 1 (cf. Fig. 14 of tubarum), frontal furrow deep, on both sides roundly raised, frontal fovea completely lacking (in tubarum très obsolète, but given in the figure), vertex and upper frons without bluish shine (un faible reflet bleuté), with punctures fine, distinct, fairly close, with interspace nearly as wide as puncture diameter, ocellar triangle slightly lower than equilateral one, OOD : POD = 2 : 1, occipital carina complete, clypeus: Fig. 2, minimum IOD at base of antennae 2/3 the length of antennal scape, or as long as joints 2-4 taken together, interantennal tubercle with top flattened and medianly canaliculate, antenna seen from above: Fig. 3, jo-

ints 5 and 6 slightly excavated from behind (in tubarum s. str. sans échancrure) and joint 3 distinctly shorter than 4 (le deuxième e troisième funicule subégalez). Pronotum: Fig. 4, presumably more angulated at antero-lateral corners. Mesoscutum punctured as on upper frons, mesopleuron more finely and more sparsely punctured, punctures on epimeral area somewhat closer. Propodeum with area dorsalis smooth, not outlined by a groove, with a comparatively broad median furrow, posterior aspect on upper half medianly deeply furrowed, on lower half flattened and transversely finely closely rugoso-striate, lateral carinae distinct, but not reaching the dorsal aspect, the sides on posterior portion rugoso-striate, on anterior portion broadly polished. Gastral segments 1 and 2: Fig. 5, on 1 spiracles located at about middle of its length. Pygidial area flattened, smooth, but not enclosed by carinae. Fore leg normal, metatarsus not modified, hind tibia weakly clavate with whitish short spinules scattered on outer side. In fore wing radial vein with abscissa 1 slightly less than half the length of 2 and about twice as long as 3 which is vertical to costa, but oblique to abscissa 2 of radial vein, cubital vein with abscissa 1 slightly longer than 2 (appr. 7 : 5).

♀, unknown.

Holotype: ♂, New Guinea, Sattelberg, Huon-Golf, 1908, Biró leg. (Coll. Mus. Hung.).

2. RHOPALUM (RHOPALUM) FRENCHII (TURNER, 1908)

Crabro (Rhopalum) frenchii Turner, Proc. Zool. Soc. London, 30: 526, 1908.

Rhopalum frenchii: Turner, Ann. Mag. Nat. Hist., Ser. 8, 15: 87, 552, 1915

(with remarks).

Rhopalum (Rhopalum) frenchii: Leclercq, Bull. Ann. Soc. R. Ent. Belg., 93: 220, 1967 (redescription with figs.).

Rhopalum (Rhopalum) frenchii: Bohart and Menke, World Sphecid Wasps, p. 389.

Specimens examined: 4 ♂, Mt. Victoria, N. S. Wales, Australia, 1900, Biró leg. (Coll. Mus. Hung.).

According to the explanation of Leclercq this species is markedly variable in some usually important characters. The specimens observed by me are considerably different in the form of the head from the figure given by him and in the ocellar location, in the state of the frontal furrow etc. from the explanations of both authors so that some comments on the characters of the specimens examined will be given in the following:

♂. Length 3.5-4.5 mm. Colouration: Black, with the following portion yellow: Mandible except apex and inner margin, antennal joint 1 wholly, pronotal tubercle, apices of coxae, trochanters (in mid leg narrowly and in hind leg broadly brownish above), apices of femora, fore tibia except inside, mid tibia broadly at base and at apex, basal ring of hind tibia, broadly extended to inside (as given by Leclercq), all tibial spurs and fore and mid tarsi except ultimate joints; antennal joint 2 and tegula of wing dark brown, black parts of legs more or less brownish.

Structure and sculpture: Head from above: Fig. 6 (the form of the posterior half markedly different from the figure by Leclercq), ocellar triangle slightly lower than equilateral one, OOD : POD : OCD = 5 : 5 : 7.5 (in the Turner's explanation OOD = POD > OCD), anterior and posterior ocellus relatively 3 and 4 respectively, frontal fovea located along eye, narrow lunate in form, curved and connected at the posterior end with the outer depression of postocellus. Minimum IOD slightly shorter than antennal scape (nearly 5 : 6), interantennal tubercle transversely raised, rounded in sagittal section; clypeus: Fig. 7, mandible bidentate at apex, with upper (inner) tooth longer,

without protuberance on inner margin. Head seen in profile: Fig. 8, antenna in part: Fig. 9, pronotum very short (Fig. 10), depressed much below level of mesoscutum, mesopleural scrobe small and shallow, locating close to mesopleural suture. Propodeum in lateral view (Fig. 11) roundly inclined posteriorly, with area dorsalis feebly outlined by fine obsolete impressed line, medianly somewhat impressed, but the median furrow at base indistinct due to close fine longitudinal striae covering basal half of the area, but on posterior smooth part the furrow fairly well defined, posterior aspect medianly deeply furrowed, with distinct lateral carinae that become indistinct on dorsal aspect. Gastral segments 1 and 2: Fig. 12, in lateral view: Fig. 13, end tergite provided with flattened, coarsely punctate pygidial area (Fig. 14), acutely edged at the margin. Hind tibia and tarsus: Fig. 15, the former having short whitish spinules sparsely scattered on outer side. Cubital and radial cells of fore wing: Fig. 16.

Vertex finely fairly closely, upper frons finely densely punctured, mesoscutum punctured as on vertex, but the punctures slightly larger, with interspaces slightly broader than puncture diameter, mesopleuron in part finely very sparsely punctulate. Posterior aspect of propodeum with median impression margined posteriorly by two upwards divergent carinae, behind which the surface finely irregularly plicate, with a few transverse rugae coarsely striate. Gastral tergites 1 and 2 smooth and shining, 3 on basal half transversely very closely microstriolate, with the surface mat, posteriorly smooth and polished, the following tergites rather sparsely covered with fine pile-bearing punctules.

Remarks. The specimens observed were possibly collected at the same time and the characters above described are almost constant to each of them, only in the relative length between gastral tergites 1 and 2 a slightly difference is observed, namely, in two 10:10 and in the other two 10:11 (in the Turner's description on ♀ the first segment is about one third shorter than the second, and on ♂ given in 1915 the petiole longer and less clavate than the female).

3. RHOPALUM (RHOPALUM) CORNIGERUM SP. NOV.

Similar in appearance to the preceding species, differs from it in the structure of the head and pronotum, in the punctuation of the head and mesoscutum, in the sculpture of the propodeum and somewhat in the colour of the legs.

♂. Length 4.0 mm. Black; yellow are mandible except reddish brown apex, palpi, antennal joint 1, pronotal tubercle upwards, apices of all coxae narrowly, fore and mid trochanters, fore femur except a large brownish mark on outer side, mid femur except base and apex, fore tibia wholly, mid tibia except inner side, fore tarsus except brown apical joint and mid tarsus except apical two joints. Mouth parts pale brown, antennal joint 2, flagellum beneath, tegula and basal plates of wing and gaster beneath light castaneous brown; blackish parts of legs and rest of gaster more or less brownish (post mortem change?). Wings hyaline, stigma and veins dark brown, the former somewhat paler except marginal area. Hairs on side of lower face, interantennal tubercle and clypeus appressed and silvery; short pubescence on temple, mesopleuron, mesosternum and parts of propodeum in some light well defined, silky white.

Head from above: Fig. 17, with sides behind eyes somewhat longer and occipital margin more strongly emarginate than in frenchii (similar to Fig. 7 of Leclercq's frenchii); configuration of vertex similar, but with a me-

dian longitudinal furrow in ocellar area, running posteriorly beyond it, ocellar triangle slightly lower than equilateral one, ocelli comparatively smaller than in the species compared, with interspace relatively broader (cf. Fig. 16) $OOD : POD : OCD = 2 : 2 : 3$, postocellar diameter relatively about 1, anterior ocellus somewhat smaller, frontal fovea smaller, deeper and more distinctly outlined than in *frenchii*, frontal furrow similarly broad and deep. Head seen in front, with minimum IOD $2/3$ as long as antennal joint 1, or clypeus in middle, interantennal tubercle higher and excavated on anterior surface (Fig. 18 black part, in profile), clypeus: Fig. 19, mandible bidentate at apex. Head in profile similar in general outline to *frenchii*, but the temple slightly longer, occipital carina at apices subparallel, gradually lowering and ended slightly before reaching posterior edge of hypostomal area. Antennal joints in dorsal view generally similar, but each joint except 2 (pedicel) shorter than wide, in lateral view joint 2 excavated beneath and following joints roundly swollen out above and beneath. Pronotum: Fig. 20, markedly different from that of *frenchii* (cf. Fig. 10), mesopleural scrobe small, without scrobal furrow, episternal furrow distinct, coarsely crenate, prepectus anteriorly more or less bluntly angulated as in *frenchii*, but the angulate structure more distinct than in this, not rounded as in most species of the genus; metapleuron above gently gibbous. Propodeum in lateral view with dorsal and posterior aspects forming a right angle, the latter about twice as long as the former (Fig. 21), in dorsal view the part of area dorsalis raised and margined by carinae, in form right-angled isosceles triangle, with apex broadly rounded, the area was divided by a transverse carina into anterior rectangular and posterior subsemicircular subareas, the former coarsely sectioned by longitudinal carinae into a transverse row of subquadrate foveae and the latter coarsely irregularly reticulate, with a part of carinae highly raised at the centre; posterior aspect flattened, medianly with a broad and deep furrow or excavation which is margined on both sides by the upwards diverging carinae, a few coarse meshes present between the excavation and posterior carina of area dorsalis which may belong to the extension of the apical part of area dorsalis, lateral carina distinct, running upwards till near the spiracles, though weakening gradually. Gastral segments 1 and 2 in dorsal view: Fig. 22, in lateral view: Fig. 23, pygidial area: Fig. 24, with surface flattened. Fore and mid legs without modification, hind tibia and tarsus: Fig. 25, the former more strongly clavate than in *frenchii*, with spinules on outer side stronger than in this and at base more distinctly tuberculate, basitarsus relatively thinner. In fore wing abscissa 1 of cubital vein not sinuate, as long as 2 or slightly longer, radial and accessory cells similar to those of *frenchii*.

Upper frons finely, very closely punctured, vertex somewhat more largely and strongly punctured, especially on ocellar area and oculocellar space, on posterior inclined part uniformly microcoriaceous; pronotum on anterior inclination also microcoriaceous, mesoscutum with punctures anteriorly fine and close and posteriorly gradually sparse, on central disc very sparse, with only small numbers scattered, but on posterior margin again becoming close; on scutellum fine punctures arranged in close longitudinal lines, but on central area somewhat weaker and sparser; prepectus of mesopleuron finely closely rugoso-punctulate, epimeral area anteriorly longitudinally striate and punctate, posteriorly without puncture, but not polished, lower episternum finely closely striate (in paratype whole the mesopleural area finely closely rugoso-punctate, except a narrow smooth space above the scrobe); propodeum outside area dorsalis finely irregularly reticulate and partly transversely striate, posterior aspect transversely coarsely striate, with interspaces weakly microsculptured, sides anteriorly smooth and polished, posteriorly closely irregularly punctured and striated. Gaster with tergite 1 weakly microcoriaceous, not shining, 2-4 transversely very closely microstriate, mat, on posterior $2/3$ of tergite 4 striae somewhat aparse, well defined under magnification of $80\times$, 5 and

6 simply finely closely punctured, interspaces shining, 7 on pygidial area very grossly sparsely punctured.

Holotype: ♂, Sydney, Botany B., Australia, 1900, Biró leg. (Coll. Mus. Hung.).

Paratype: 1 ♂, ditto.

4. PODAGRITUS (ECHUCA) AUSTRALIENSIS SP. NOV.

In the key by Leclercq (1955) the present species runs to P. (E.) tricolor (F. Smith), differs from it, however, in the relative length of antennal joints, gastral petiole, in the structure of hind femur and in the presence of inter-ocellar furrow (in both sexes) and according to the descriptions of Turner on Rhopalum tricolor (♀) and R. militaris (♂) considerable differences are observed, apart from the colour of hind leg which is said variable, in the characters of clypeus (♀ ♂), interocular distance, ocellar location (♀), mesoscutum (♂), gastral petiole (♀) and somewhat in the wing venation, as far as his explanations go. However, according to Leclercq (1955) Turner's tricolor is a complex of three species (Turner himself synonymized militaris with tricolor as its male already in 1915), but the present species differs from any of them indicated by Leclercq. Moreover, in the present species the metapleuron is roundly gibbous-convex above, though not sculptured, with a flattened dorsal plane which is distinctly edged at the margin and in this respect the species is utterly deviated from the scope of the recent definition of Podagrītus (Echuca) (Leclercq, 1970; Bohart & Menke, 1976). But the species is allocated in the subgenus Echuca, by enlarging the range of its category. Possibly the present species may have been confused with tricolor.

♂. Length 8.0-9.5 mm. Black; yellow are antennal joint 1 wholly, apices of all femora (in hind leg very narrow), apical third of fore femur above, fore tibia except brownish inside, basal ring of hind tibia and all tarsi except hind metatarsus and arolia. Antenna from joint 2 apically dark brown, ferruginous beneath and slightly more yellowish towards base; pronotal tubercle dark brown; tegula, apices of coxae ferruginous; tibial spurs of fore and mid legs pale brown, turning yellowish apically, those of hind leg dark brown. Gastral tergites 2, 3 and base of 4 and from apex of sternite 1 to 3 or 4 reddish ferruginous, segment 1 with sides broadly reddish and tergites 2 and 3 posteriorly more or less broadly dark brown. Wings hyaline. Appressed hairs on sides of face, interantennal elevation and clypeus silvery.

Head from above: Fig. 26, OOD : POD : OCD = 6 : 4 : 9.5 (head width relatively 40), vertex gently convex, ocelli slightly inclined externally and the areas encircling median ocellus and outside paired ocelli gently impressed, a fine but distinct groove running from anterior ocellus between postocelli and a weak transverse impressed line connecting the posterior margins of postocelli, behind this the vertex slightly raised, frontal fovea distinctly outlined, fairly remotely separated from postocellus (in the figure shown with dotted line), frontal furrow deep, broad triangular in cross section. Head seen in front: Fig. 27, interantennal elevation inclined above and below, with a transverse ridge at the top, clypeus flattened and apically gently reflected, without medial elevation, apical margin as given in Fig. 27; mandible bidentate at apex, lower tooth markedly shorter, inner margin slightly roundly swollen near middle, but not toothed. Antennal joint 1 ecarinate, in lateral view: Fig. 29 relative length of joints 2-5 appr. 4.3, 4.0, 4.5, 2.7, in dorsal view: Fig. 30, in lateral view: Fig. 31, joints 3 and 4 from above both 1.7 times as long as broad at apex, 5 only slightly longer than wide, 7 as long as wide, succeeding joints till penultimate joint slightly wider than long, ultimate joint as long as joint 3, laterally compressed apically, with apex in lateral view wide-

rounded. Head seen in profile: Fig. 28, occipital carina seen from beneath gently roundly convergent anteriorly, abruptly ended at the edge of hypostomal inclination far before reaching the buccal carina. Pronotum: Fig. 32, median furrow distinct, but not extended to the anterior inclination, postero-lateral tubercle of prosternum simply rounded, mesoscutum medio-anteriorly not impressed, uniformly gently rounded, admedian line slightly raised, bordered on both sides by fine impressed lines and reaching posteriorly about middle of the scutum, notauli short, very feebly raised, rather indistinct, parapsidal suture in a short impressed line, posteriorly slightly widened and deepened, posterior margin not carinate, scutellum medianly with a weak raised line, scuto-scutellar furrow not foveolate, mesopleuron with distinctly crenate episternal furrow, prepectus flattened, rather slightly concave, in the same plane with the rest of episternum, forming an angle of about 90 degrees with the epicnemium, the bordering line distinctly edged, but not carinated and the edge acuter above and blunter below, episternal scrobe distinct located close to posterior margin, precoxal tubercle absent. Metapleuron deeply inclined posteriorly and raised above into a large rounded gibbosity, the top of which is flattened into a narrow dorsal plane and edged at the margin, the edge extended posteriorly to form the metapleural flange. Propodeum without area dorsalis distinctly margined, but the corresponding area smooth and shining, at base narrowly impressed and rather coarsely crenate, the impression triangularly widened in middle and connected with the shallow weak, very delicately sculptured median furrow, the furrow posteriorly stronger and more distinct, extended to the posterior aspect and deepened and widened into a large fusiform excavation, posterior part of which turns into a deep furrow and margined by carinae; lateral carinae defined only within apical part of posterior aspect. Gaster: Fig. 33, segments 1 and 2 in lateral view: Fig. 34, not so long as four times as long as its maximum width, pygidial area: Fig. 35, with surface flattened and weakly carinated at the lateral margins. Fore coxa with a strong carina on outer side, the carina higher towards base, but not toothed, fore femur in posterior view: Fig. 36, bluntly triangulate, somewhat twisted, in cross section subtriangular, lower aspect flattened, fore metatarsus not modified, slightly longer than the following 3 joints united, mid femur in posterior view: Fig. 37, hind femur in anterior view: Fig. 38, acutely edged beneath, with posterior aspect flattened and anterior aspect longitudinally deeply excavated below to receive the tibia when folded, tibia strongly clavate, with outer surface sparsely spinose, each spine minutely tuberculate at base, pale ferruginous and markedly contrasted with the dark brown ground colour of the segment, longer tibial spur slightly surpassing the middle of the metatarsus. Fore wing venation: Fig. 39, characteristic in the position of recurrent vein at the cubital cell.

Vertex, upper frons (slightly more strongly) and mesoscutum very minutely and closely (under 32) punctured, punctures on scutum antero-laterally and posteriorly somewhat sparser and weaker and on scutellum slightly sparser and stronger, collar of pronotum without puncture, only very finely coriaceous not shining; mesopleuron somewhat more sparsely punctured than on scutum and more weakly so upwards, metapleuron without puncture; propodeum at base crenate then minutely plicate in middle and on the basal part of rounded disc longitudinally or obliquely, very delicately closely striolate, the range of striae considerably varied with the specimen, posterior part of the disc smooth and shining, posterior aspect finely punctured and on posterior portion transversely and arcuately striate, sides on the anterior depressed part shining and longitudinally very finely closely striolate, on central part finely sparsely and very weakly punctulate, sometimes this part also longitudinally striolate, on postero-ventral part longitudinally arcuately strongly coarsely striate. Gastral tergite 1 largely smooth and polished, 2, 3 and base of 4 very delicately transversely closely striate, nearly mat, from 4 apically very minutely

closely covered with hair-bearing punctules, pygidial area at base moderately largely, very closely, on the remaining area very grossly and sparsely punctured.

♀. Similar to ♂, but slightly larger (10.5 mm), coloration similar, but yellow mark on apical part of fore femur smaller, gastral segment 1 more widely reddish, blackish marks on tergites 2 and 3 smaller, all tibial spurs pale brown and hind metatarsus apically ferruginous.

Head from above: Fig. 40, more markedly transverse than the figure of *P. tricolor* given by Leclercq (1955, fig. 5), with sides behind eyes more stoutly swollen than in ♂, vertex nearly flattened, with post-ocellar elevation weaker, depression outside each ocellus broader, impressed lines in and behind ocellar area stronger, frontal fovea larger and more closely approaching postocelli, frontal furrow deeper, ocellar location similar (OOD:POD:OCD = 6:4:10, when head width 40). Head seen in front slightly broader than in ♂, minimum IOD equal in length to OOD and slightly greater than half the length of antennal joint 1 which is similar in formal pattern to that of ♂, but relatively longer and slenderer. Clypeus: Fig. 41, with disc flattened and somewhat reflected apically. Relative length of antennal joints 2-5 seen from above appr. 5, 6, 7, 4, joint 3 appr. twice as long as wide at apex, joint 10 as long as broad, ultimate joint as long as joint 3, laterally slightly compressed, with apex broadly rounded in lateral view. Thorax-complex similar in structure to that of ♂, but the character of metapleuron more marked, gastral segments 1-3: Fig. 42, slightly thicker than in ♂, petiole not so long as thrice as long as its maximum width. Pygidial area: Fig. 43, surface flattened, at base roundly gently raised (dotted area) and at apex weakly depressed, in lateral view curved. Legs similar, with the swelling somewhat more exaggerated; fore wing venation also similar, except that abscissa 2 of cubital vein twice as long as transverse cubital vein (in ♂ slightly less). Punctuation similar.

Holotype: ♂, Mt. Victoria, N.S. Wales, Australia, 15. XI. 1900, Biró leg.
Paratypes: 1 ♀ 8 ♂, ditto.

5. *CROSSOCERUS* (*EUPLILOIDES*) *PAPUANUS* SP. NOV.

Very closely resembles *C. (E.) cheesmanae* Leclercq, 1955, known from British New Guinea (Kokoda), but is different from this at least in the form of clypeus, in the state of the occipital carina at the ends and of the scuto-scutellar furrow of mesonotum and further in the presence of genal teeth beneath the head.

♀. Length 6.0 mm. Black and shining, without plumbeous shine. Mandible largely yellow, antennal joint 1 in front narrowly and 2 wholly brownish yellow, clypeus except dark brownish apical margin ferruginous, covered with silvery pubescence, tarsal joints 1-4 of fore leg and 1-3 of mid leg yellowish white, rest of antenna, pronotal tubercle, tegula and remaining parts of legs dark brown. Wings hyaline, stigma and veins dark brown. Hairs on temple and mesopleuron long, moderately close, silky white.

Head from above: Fig. 44, gently roundly elevated and impressed at the outer side of each ocellus, frontal foveae indistinct, under high magnification and in oblique light feebly defined by the delicate difference in the surface shining as given in Fig. 44 by dotted lines, ocelli in a nearly equilateral triangle, the anterior distinctly larger than the posterior, OOD : POD : OCD = 5 : 3 : 6, frontal furrow broad and deep. Head seen in front: Fig. 45, anterior ommatidia about 10 times as large as the posterior, minimum IOD markedly narrow, as wide as anterior ocellus, interantennal tubercle distinctly elevated, clypeus (in Fig. 45) without dental appendage on the disc, lateral

tooth at the anterior margin acutely pointed. Antennal joint 1 ecarinate, but edged at antero-interior corner, as long as joints 2-7 combined, relative length of joints 2-5 appr. 5, 6, 4, 4, joint 3 2.5 times as long as wide at apex, mandible bluntly bidentate at apex (in Fig. 45). Head seen in profile with eye distinctly wider than temple, occipital carina strong and high, gradually lowered at the ends (not tuberculate as in cheesmanae), terminated considerably before reaching hypostomal carina; a strong genal tooth present at about mid point between the end of occipital carina and baso-posterior angle of mandible. Collar of pronotum: Fig. 46, anterior margin not carinate, almost without median furrow, gently roundly elevated across middle and weakly tuberculate in middle, the tubercle bearing a very feeble median impressed line, anterior inclination gently roundly swollen on both sides of medial line; prosternum minutely dentate in front of procoxa; mesoscutum medio-anteriorly with a large deep hollow (Fig. 46) as in cheesmanae, parapsidal suture as a oviform impression, not deep, scuto-scutellar furrow smooth, completely lacking sectioning carina, postscutellum with a lunate deep impression in front. On mesopleuron omaulus distinct (Fig. 47), episternal furrow coarsely foveolate, scrobe deep but without scrobal furrow, short obliquely running precoxal carina slightly raised into a blunt tubercle at the end. Propodeum with area dorsalis marked off only on basal portion by a short carina on each side, with a broad deep medial furrow, the furrow broader and deeper on posterior aspect that bears an enclosed quadrate platform at apical part (Fig. 48). Petiole of gaster: Figs. 49 (dorsal) and 50 (lateral), as long as thorax-complex or hind tibia and tarsus united, but shorter than the rest of gaster (appr. 3:4) which is in dorsal view: Fig. 51. Caudal tergite triangular, without pygidial area, the surface gently roundly raised and, further, very weakly raised in middle on apical half. Femora 1, 2, 3 in frontal view: Figs. 52, 53 and 54, fore metatarsus not modified, each apical tarsal joint markedly large. In fore wing part of venation: Fig. 55.

Body wholly and legs down to femora smooth and polished.

♂, unknown.

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

6. CROSSOCERUS (EUPLILOIDES) ALBOCOLLARIS (ASIMEAD, 1904)

Crabro elongatus Nurse, J. Bombay Nat. Hist. Soc., 15: 18, 1903 (♀, India: Holta, Kangra Valley, 4500 ft., nec Lepeletier et Brullé, 1934).

Rhopalum albocollare Ashmead, Proc. U.S. Natl. Mus., 28: 130 (♀, recte ♂ after Pate, Manila).

Crossocerus (Eupliloides) albocollaris: Pate, Proc. Ent. Soc. Wash., 48: 56-57, 1946 (Philippines and Borneo, including ssp. princesa Pate).

Crossocerus (Eupliloides) holtensis Leclercq, Bull. Inst. Sci. Nat. Belg., 26: 16, 1950 (India and Malaisia).

Crossocerus (Eupliloides) albocollaris var. holtensis: Leclercq, Bull. Ann. Soc. R. Ent. Belg., 93: 353, 1957.

Eupliloides tanoi Tsuneki, Polsk. Pism. Ent., 44: 646, 1974 (Thailand) SYN.NOV.

Specimen examined: 1 ♂, Is. Ceylon (Colombo), 1902, Biró leg. (Coll. Mus. Hung.).

Remarks. In the specimen examined the clypeal tubercle long, cylindric, with apex hollowed out; the concave impression on medio-anterior part of mesoscutum moderately deep, with a distinct pit at the centre which is as large as postocellus. Yellow maculae on thorax well developed: Collar with two large marks, axillae, two large partly contiguous marks on scutellum, whole of post-

scutellum. Pale yellowish white: Mid tibia at base vaguely, hind tibia at base broadly, fore tarsal joints 1-4, mid 1-2 (except apex of 2), hind metatarsus except base and apex. The process on the disc of clypeus not tuberculiform, nor spiniform, but cylindric with apex hollowed out just as in var. tanoi.

7. CROSSOCERUS (EUPLILOIDES) BOUGAINVILLEAE DENTATUS SSP. NOV.

Crossocerus (Eupliloides) bougainvilleae Pate, Proc. Ent. Soc. Wash., 48: 59, 1946 (♀, Bougainville Island, Solomon Islands).

The present subspecies differs from the nominate race in that the precoxal carina of mesopleuron is fairly distinct and the legs are more brightly maculated.

♀. Length 6.5 mm. Black and polished; mandible largely ferruginous, antennal joints 2 and 3 and tegula of wing pale brown, joints 1-3 of fore tarsus and 1-2 of mid tarsus and base of hind tibia narrowly white, rest of antenna and legs more or less brownish. Hairs on clypeus, temple and mesopleuron silvery.

General structure similar to the nominate race which is described in detail, except the genal tooth (see remarks). Main characters of the present subspecies: Clypeus: Fig. 56, occipital carina well developed, suddenly sharply cut at the ends, but not toothed, instead a remarkable genal process (Fig. 57 in profile) at about mid point of the distance between the end of the occipital carina and posterior corner of the mandibular base (Fig. 58, ventral view). Antennal joint 1 subcarinate at antero-interior corner, joints 2, 3, 4 with relative length appr. 8, 10, 7; joint 3 appr. 3.3 times as long as wide at apex; interantennal tubercle indistinct, ocelli uniform, OOD : POD : OCD = 14 : 7 : 16 (in the same scale as antennal measurement); frontal foveae indistinct, in oblique light weakly defined as given in Fig. 59 (dotted lines). Collar of pronotum structured as in the nominate race, antero-lateral corners shortly spinose and separated from this by a small notch another short blunt spine is produced behind it, the collar in frontal view medianly broadly and laterally narrowly elevated, medial impressed line on central elevation somewhat more distinct than in papuanus, medio-basal hollow of mesoscutum large, but shallower than in papuanus, with the longitudinal bottom furrow more distinct than in this, scuto-scutellar furrow minutely crenate, postscutellum with a large lunate impression in front, coarsely crenate. Structure of propodeum generally similar to that of papuanus, medial furrow deep and distinct, smoothly connected to posterior aspect without interruption, reaching the enclosed quadrate platform, but at the lateral margin above the lateral carina of the platform a longitudinal fairly deep furrow, broader in middle, extended upwards till above middle of the total length of propodeum (in papuanus the furrow is lacking). Petiole also as in this (Fig. 49), relative length between petiole, rest of gaster and united length of hind tibia and tarsus: 40, 50, 45 (in the same scale as above), caudal tergite, femora of legs and fore wing venation also as in papuanus. In hind wing jugal lobe as long as submedial cell. Body smooth and highly polished.

Holotype: ♀, Yalom, 1000 m, New Britain Is., 22. V. 1962, Noona Dan Exp. 61-62. (Coll. Zool. Mus. Copenhagen).

Paratype: 1 ♀, ditto, 20. V. 1962.

Remarks. In the original description of C. bougainvilleae, Pate says that occipital carina well developed, finely foveolate anteriorly, terminating below in a strong tubercle. The underlined part is quite different from what I see upon my material. If this is literally correct dentatus is to be raised to the species rank. So I asked Dr. A. S. Menke, U.S. Department of Agriculture, now in the Smithsonian Institution, to examine the type of bougainvilleae in this

regard. He kindly investigated the Pate's type and wrote to me: It is true that the occipital carina appears to end well before the tubercle. However, I examined the specimen under higher magnification and discovered that although the flange does end well before reaching the tubercle, the carina is continued to the tubercle as a fine, almost imperceptible ledge. If you look at the back of the head at a slight angle the fine ledge becomes apparent with good lighting. I reexamined my material and could confirm the presence of the delicate ledge discovered by him. Strictly, therefore, the Pate's description is not incorrect. But it must be said quite incomplete and misleading to explain the true feature of the occipital carina of the species at the lower ends.

In this connection I reexamined also the type of *C. papuanus* to see if the state is similar. In this specimen, however, the presence of the delicate ledge connecting the genal tooth and the end of the occipital carina could not be confirmed. Whether the Menke's discovery is also true with *C. cheesmanae* Leclercq or not is a problem to be solved in future. (La carène occipitale s' incurve ventralement avant de se terminer en tubercule — celui-ci est donc dressé au milieu de la joue) — from Leclercq, 1955.

8. DASYPROCTUS SEPTEMMACULATUS SP. NOV.

The present species is characterized by the combination of the following characters: Frontal transverse carina lacking, pronotal carina turning posteriorly to tubercle, body and legs black and yellow maculated, mesopleuron at least on hypopleural area striate, postscutellum and prepectus of mesopleuron without maculae, propodeum with dorsal and posterior aspects obliquely striate without foveolate sculpture on disc, with sides longitudinally finely closely striolate.

♀. Length 9.5 (paratype 10.5) mm. Black and broadly mat, yellow are: Antennal joint 1, a mark on mandible, medianly interrupted band on collar, lateral maculae on tergites 2-4 and whole of 5 and tibiae and tarsi except black arolia of all legs. Mandible apically dark brown, tegula and apices of femora ferruginous. Wings clear hyaline, a narrow band along anterior margin slightly darkened, veins and stigma black. Hairs on clypeus silvery.

Head from above with ratio of maximum width (at temple), maximum length (at eye) and minimum length (in middle) as 50 : 36 : 31, deeply roundly emarginate at the verge of upper frons, frontal foveae nearly as long as antennal joint 3, OOD : POD : OCD = 8 : 7.5 : 18. Clypeus: Fig. 60, antennal joint 1 bicarinate, inner carina incomplete, length ratio of joints 3, 4, 5 appr. 10, 6, 5; joint 3 from above 2.5 times as long as broad at apex. Head seen in profile: Fig. 61. Pronotal collar: Fig. 62, very similar to *D. jungi* Maa (= *formosanus* Tsuneki), ♂; medianly deeply incised, anterior carina roundly curved at the corner, running along lateral margin and reaches lower margin of tubercle which is conical. On mesopleuron epicnemial area completely encircled by carinae, episternal furrow strongly foveolate, precoxal carina accompanied by a row of weak foveae in front. Area dorsalis on propodeum very indistinctly margined by very shallow grooves, only in certain light discernible, median furrow fine, but deepened and broadened on posterior aspect, but not reaching the apex, lateral carinae of the segment distinct. Gastral segments 1 and 2: Fig. 63. Mid tibia with a row of 4 spines and a single separated spine on outer side, hind tibia with about 10 strong, basally tuberculate spines externally (Fig. 64 from outer side and Fig. 65 from posterior side).

Vertex finely closely, upper frons slightly more largely and closely punctured, punctures on mesoscutum as on upper frons, but on medio-posterior area slightly sparser, posterior margin of mesoscutum longitudinally coarsely striate, scutellum on posterior half similarly striate, but the striae somewhat

longer, postscutellum carinated at the anterior verge and coarsely striate, with intervals minutely shagreened, but not mat; episternum of mesopleuron moderately largely punctured, with interspaces as large as puncture diameter (in paratype the area distinctly longitudinally or obliquely rugoso-punctate), precoxal area grossly and closely punctate, partly subrugosely so, metapleuron longitudinally finely closely striate, mixed with a few strong striae. Dorsal aspect of propodeum coarsely foveolate at base, oblique striae stronger on posterior aspect, with intervals sparsely punctured all over, sides of propodeum longitudinally very finely and very closely striate, punctuation of gaster normal.

Holotype: ♀, Lamikamin, New Ireland, 23. IV. 1962, Noona Dan Exp., 61-62. (Coll. Zool. Mus. Copenhagen).

Paratype: 1 ♀, Yalom (1000 m), Bismarck Is., New Britain, 21. V. 1962, Noona Dan Exp., 61-62. (Ditto).

Remarks. The yellow marks on tergites 2-4 in the holotype are broader than the interspace, but in the paratype they are smaller and remotely separated from each other.

9. DASYPROCTUS PACIFICUS SP. NOV.

According to the key by Leclercq (1972) the present species runs to D. expectatus (Turner, 1912), but it differs from this at least in the sculpture of the propodeum and in the maculation of the gaster. Further, the structure of the pronotum is presumed to be different between the two species*.

♀. Length 9.5-10.0 mm. Black; yellow are antennal joint 1 except a lengthened patch on inner side, basal half of mandible in front, medianly broadly interrupted band on pronotal collar, tubercle, transverse lateral marks on tergites 2-4, on 2 and 4 almost contiguous to each other in middle, and tergite 5 wholly, a minute spot at apex of fore and mid femora, greater part of outer side and apical portion of all tibiae and all metatarsi. Ground colour of legs dark brown, tibial spurs ferruginous yellow, rest of tarsi ferruginous, apically slightly darker; tegula of wing dark brown. Wings hyaline, stigma and veins black. Hairs on clypeus silvery.

Head from above with ratio of maximum width (at eyes = at temples), maximum length (at eye) and minimum length (in middle) as 50 : 35 : 28, anterior verge of upper frons subtriangularly deeply emarginate and weakly but distinctly carinated, frontal foveae longer than antennal joint 3 (7 : 5), inner orbit posterior to the fovea narrowly smooth and shining and sparsely punctate, but not distinctly outlined, OOD : POD : OCD = 9 : 7 : 17 (the same scale as above), very fine longitudinal carina running from frontal carina to occiput. Clypeus: Fig. 66, medio-anterior produced part sharply inclined and shining; antennal scape distinctly bicarinate, with intervallic area deeply hollowed out, joints 3, 4, 5 with relative length 10, 7, 6; joint 3 appr. thrice as long as broad at apex. Head seen in profile (Fig. 67) with temple better developed than in preceding species (cf. Fig. 61). Collar of pronotum seen from above: Fig. 68, seen in front: Fig. 69, anterior carina runs down towards precoxal carina of prosternum. On propodeum area dorsalis distinctly margined by a furrow and medianly with a fine groove which is connected with the deeper and broader furrow of the posterior aspect, but not reaching the apex; lateral carinae distinct. Gastral segments 1 and 2: Fig. 70. Hind tibia with about 6-7 strong spines on outer side, each tuberculate at base.

* The form of the pronotum in D. expectatus can not be understood from the descriptions of the previous authors.

Vertex, upper frons, mesoscutum, scutellum finely closely uniformly punctured, not striate all over the area, mesopleuron finely more sparsely punctured, with precoxal area punctate and striate, glossy; metapleuron longitudinally coarsely striate; propodeum with dorsal and posterior aspects (except posterior mat quadrate) obliquely somewhat coarsely striate and punctate, with sides obliquely arcuately, very finely and densely striate, punctation on gaster as usual.

Holotype: ♀, Danu, Kalili Bay, New Ireland, 3. IV. 1962, Noona Dan Exp., 61-62 (Coll. Zool. Mus. Copenhagen).

Paratype: 1 ♀, Bitu Paka, 15 km SE of Kokopo, New Britain, 10. VI. 1962 (ditto).

Remarks. The paratype may represent a different local race. The tibiae are wholly brownish black, only a spot at base of each tibia and a short line on apical part of hind tibia yellow. Yellow marks on tergites 2-4 are remotely separated from each other and the yellow of tergite 5 is turned into a narrow semicircular band. The spines on the hind tibia are somewhat more abundant than in the holotype.

10. DASYPROCTUS VENANS (KOHLE, 1894)

Dasyproctus venans: Leclercq, Bull. Soc. R. Sci. Liège, 41: 121, 1972.

Specimen examined: 1 ♀, Palau Is. (Peleliu), 10. VIII. 1945, E. Hagen leg. (Coll. Calif. Acad. Sci.).

Remarks. The specimen carries the label by Krombein as immaculatus and that by H. Court as venans. The former is of course a synonym of the latter.

11. DASYPROCTUS CEVIRUS LECLERCQ, 1963

Dasyproctus cerirus Leclercq, Bull. Ann. Soc. R. Ent. Belg., 99: 17, 1963; Bull. Soc. R. Sci. Liège, 41: 108, 1972 (keyed).

Specimen: 1 ♂, New Guinea South, Kapakopa, (Mag. Giugno - 89), L. Loria leg. (Coll. Calif. Acad. Sci.).

Remarks. In the specimen yellow are antennal joint 1 wholly, 2 beneath, mandible except apex, collar except ferruginous posterior margin, tubercle, a spot on tegula, axilla, a large mark on scutellum, two large marks on tergite 2 (as wide as interspace), a spot (slightly smaller than tegula) on each side of tergite 3, transverse mark on 4 (slightly narrower than interspace) and 5 (wider than interspace), fore femur on apical portion, broadly expanded basally on outer and under sides till about middle of the segment, mid femur at apex (slightly expanded basally), all tibiae except a pale brown streak on inner side, fore and mid tarsi and basal two joints of hind tarsi. Sinuation of anterior margin of pronotal collar very weak; clypeus acutely and long spinose at apex in middle.

12. DASYPROCTUS SEMIFULVUS SP. NOV.

Closely allied to D. solitarius (Smith), differs from it in the form of the clypeus, in the relative length of antennal joint 3, in the sculpture of the frons and possibly in the presence of postmandibular carina on the temple below

and of a small hollow on gastral tergite 2. It is also somewhat similar in appearance to D. venans Kohl (= immaculatus Krombein), but differs therefrom in many structural, sculptural and colorific distinctions.

♀. Length 9.0 mm. Body wholly black except brownish basal part of petiole, mat and shining parts as usual. Yellow: antennal joint 1 (partly pale brown above) and 2 in front. Palpi, tegula, tibial spurs and tarsi ferruginous, ground colour of legs dark brown, with articulations and basitarsi somewhat paler.

Head from above with ratio of maximum width and length (at eye) and minimum length (in middle) as 50 : 36 : 29, OOD : POD : OCD = 6.5 : 6 : 10.5, frontal foveae as long as antennal joint 5, but much narrower, located in the shining inner orbits of upper frons and very inconspicuous, defined only in oblique light, a very fine weak median carina running from anterior verge to occiput, anterior verge without transverse carina, but the difference in sculpture between upper and lower frons very marked and abrupt, having a distinct border line at the verge of upper frons. Head seen in front with minimum IOD only slightly more than as wide as anterior ocellus; clypeus: Fig. 71, in lateral view: Fig. 72, with median carina distinct, covered with silvery hairs, antennal joint 1 strongly bicarinate, relative length of joints 1-5 as 15, 3, 5.5, 4 and 3 (under the scale of head width 50), joint 3 appr. 2.7 times as long as wide at apex. Head seen in profile with relative length of eye and temple 20 : 16, occipital carina strong and high, gradually lowered at apex, ending far before reaching hypostomal carina, a short glittering carina arising from posterior end of basal condyle of mandible runs posteriorly, curving up for a short distance of about the length of antennal joint 3. Pronotal collar short, transverse, gently roundly raised across middle and deeply furrowed in middle, anterior carina roundly curved at the lateral angle, running through the lateral margin of the collar and connected with the antero-ventral carina of tubercle, scuto-scutellar furrow and postscutellar furrow smooth, without crenation. Propodeum with area dorsalis distinctly margined by the furrow which is anteriorly weaker, median furrow also distinct. Gastral tergites 1 and 2: Fig. 73, similar to D. solitarius, 2 at base in middle with a small deep concave hollow. Legs and wing venation without particularly.

Upper frons finely closely, vertex sparsely punctured, mesoscutum more largely and closely punctured, punctures posteriorly sparser and on medio-anterior depressed area and posterior portion longitudinally subrugosely confluent, scutellum anteriorly sparsely punctate and posteriorly closely and strongly striate, on mesopleuron punctures very weak and sparse (almost obsolete); propodeum obliquely, posteriorly transversely, sides longitudinally finely closely striate.

♂, unknown.

Holotype: ♀, the Mafor, Geelvink Bay, New Guinea, Fruhstorfer leg. (Coll. Mus. Nat. Hung.).

13. ECTEMNIUS (CAMERONITUS) PAXINUS LECLERCQ, 1963

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

Ectemnius (Cameronitus) paxinus Leclercq, ibid., 99: 29, 30, 1963.

Specimens examined: 2 ♀, Yalom (1000 m), Bismarck Is., New Britain, 9, 19. V. 1962, Noona Dan Exp., 1961-62 (Coll. Zool. Mus. Copenhagen).

Remarks. According to Leclercq (1963) this species belongs to the group of nigritarsus and subdivided with palitoides Leclercq from nigritarsus subgroup including radiatus Pérez (= mizuho Tsuneki) by the characters that the prepectus is without striae and the thorax is always adorned with yellow marks. In

the comparison with the Japanese representatives (*nigritarsus* and *radiatus*) the present species are different in the structure of pronotal collar (Fig. 75, cf. Figs. 77 and 79), but in the relative length of antennal joint 3 it is similar to *radiatus*, and different from *nigritarsus* (Fig. 76, cf. Figs. 78 and 80). The form of the clypeus in the female: Fig. 74.

The prepectus (= Leclercq's epicnemium) of the two specimens examined has very faint longitudinal or oblique striae, hardly visible under low magnification, in one of them (coll. 9. V. with legs less maculated) fairly distinct on lower portion. If the state is taken as striated, the specimens run, according to the Leclercq's 1963 key, to *E. (C.) orius* Leclercq. But they are not *orius*.

There are marked differences in the maculation of the legs and in the sculpture of the propodeum between the two specimens: In one of them (coll. 19.V) yellow mark on prepectus occupies nearly whole the area; apical mark of fore and mid femora shortly extended from outside to underside, much larger in mid leg, apical small spot of hind femur and all tibiae except brownish apices yellow; tibial spurs and tarsi except dark brown apical joints ferruginous. While in the other (coll. 9. V) mark on prepectus on upper half only, apical mark of fore and hind femora completely lacking and that of mid femur turns into a minute spot; tibial yellow is separated into small basal and apical patches in fore and mid legs and confined to an apical patch in hind leg.

In the bright maculated specimen area dorsalis of propodeum longitudinally slightly obliquely finely closely striate, without puncture interposed, outside the area obliquely and posterior aspect longitudinally finely somewhat sparsely striate and closely punctured on interspaces. In the more melanic specimen the striae on area dorsalis slightly sparser and mixed with weak flat-bottomed punctures and outsides of the area and posterior aspect very closely punctured, with puncture-bottoms weakly rugulose, so that the surface not simply subreticulate and in some light appears obliquely rugoso-punctate. Medial furrow of area dorsalis parallel-sided till middle, thence attenuating posteriorly. The differences are very marked, but I take this specimen as a variety within the specific range of *E. paxinus*.

14. *Ectemnius (Cameronitus) bogorensis* Leclercq, 1958

Ectemnius (Cameronitus) bogorensis Leclercq, Bull. Ann. Soc. R. Ent. Belg., 94: 142 (keyed), 151, 1958; *ibid.*, 99: 26-28, 1963. ——— Tsuneki, Steenstr. 4: 104, 1976 (ssp. *tarawakanus*).

Specimens examined: 1 ♀, Indonesia: Moluccas, Ambon Is. Waai, 10. III. 1965, A.M.R. Wegner leg.; 1 ♂, the same place and collector, 2. XII. 1965 (Coll. Calif. Acad. Sci.).

Distribution: Java, Singapore, South India, Philippines (Mindanao, Sibuyan, Negros and Tawitawi).

Remarks. The original description is given by means of the key and quite incomplete. Later in regard to the Philippine material it is supplemented in respect of the variation in maculation and punctuation and somewhat of the structure of some parts of the body and appendages. But little is given as to the morphology of the clypeus, antenna (♂), pronotum (♀) and especially of the gaster. The examination of the above listed specimens which are derived from the place closer to the type locality has made it clear that the clypeus in the female is considerably different in form from that of *E. b. tarawakanus* described (and figured) by me from the Tawitawi of the Philippines. It is much broader (Fig. 81) than in the Tawitawi specimen (cf. Tsuneki, 1976, fig. 138). Thus, on some other characters of the species some supplemental descriptions seem to be necessary.

Head in dorsal view with frontal fovea slightly impressed and vaguely outlined on inner margin, it is very long, extending along eye from the transverse line of postocelli to anterior verge of upper frons, at middle about as wide as the ocellus. Head in frontal view (Fig. 81) with lower face (=scapal hollow) remarkably narrow. Antennal joint 3 1.7 times as long as broad at apex and somewhat longer than joint 4. Pronotum: Fig. 82. Area dorsalis posteriorly margined by a very weak furrow which is laterally obsolete and at base turned into short carina, lateral margin of propodeum only on posterior aspect obtusely angulated not carinated except extreme apex. Gastral segment 1 slightly wider than long (8:7), tergite 2 considerably, 3 gently constricted at base. Punctuation is as given in the original description, generally fine, sparse and weak, but punctures at the anterior verge of upper frons strong and close, on mesoscutum slightly larger than on mesopleuron, much larger than on vertex and closer anteriorly; admedian line longer than half the length of scutum, with punctures on both sides somewhat elongate; posterior margin of the scutum distinctly longitudinally striate. Area dorsalis on propodeum and gastral tergites practically impunctate; metapleuron and sides of propodeum longitudinally very finely and closely striate. Length 7.0 mm.

Coloration as given by the original author; some local or individual tendencies: Prepectus above with a medium-sized mark, antero-lateral marks of scutellum comparatively large, about twice as wide as interspace, postscutellum except anterior furrow wholly yellow, mid (not hind) femur on outer side near apex with a yellow patch. Gastral marks: on 1 transverse, slightly wider than interspace, on 2-5 suboval, restricted to lateral area and posteriorly smaller, on 5 slightly smaller than tegula of wing.

♂. There is some doubt as to the combination of the present specimen with the female of *bogorensis*. Because it has the antennal joint 6 distinctly excavated beneath (Fig. 84), lower frons much wider (Fig. 83), punctures generally stronger and closer (on head, mesothorax and *area dorsalis*), gastral tergites constricted at base of 2, 3 and 4 (weaker posteriorly) and discoloured, whitish at posterior margins of 1-4 and, above all distinctly, though finely and sparsely, punctured all over the tergites. But it is similar in colour and has the frons and pronotum well agreeing with those of the Philippine specimens of the same sex supplementarily described by the original author and possibly the combination is correct.

Length 6.0 mm. Head seen in front: Fig. 83, pronotum: Fig. 85. End tergite with pygidial area, flattened and margined by carinae. Punctures at the verge of upper frons medium-sized, strong and close, transversely rugoso-subreticulate, on upper frons shallow, posteriorly slightly larger and longitudinally elongate, on ocellar area and posterior vertex slightly finer, fairly close and on ocellular area very sparse, fine and weak. Punctures on the disc of mesoscutum medium-sized, with interspaces 1-2 times the width of a puncture, but laterally and anteriorly punctures closer; posterior margin of the scutum longitudinally striate, punctures on mesopleuron as on the disc of mesoscutum. Area dorsalis of propodeum enclosed posteriorly by the foveolate furrow and laterally by the carina, the carina stronger towards base, the surface finely closely punctured, but posteriorly mixed with transverse rugae, posterior aspect of the segment transversely strongly striate, sides striated as in ♀. Lateral carina distinct and thorough, accompanied by a crenate furrow. Gastral tergites distinctly punctured as above given.

Yellow: antennal joint 1 in front and on outer side, a medianly interrupted narrow line on collar, axilla, a medianly interrupted band on postscutellum, a small spot on each side of tergites 1-3 (4?), a patch on outer side near apex of mid femur.

15. *LESTICA* (*SOLENIUS*) *BIROI* SP. NOV.

The present species considerably resembles *Lestica constricta* Krombein in general appearance, but differs from it in the silvery clypeal hairs, ecarinate antennal scape, coarsely rugoso-punctate mesoscutum, upward distinctly striated mesopleuron, weaker and somewhat different constriction of gastral tergites and in the maculation of the legs. In the key of Leclercq (1958) it runs to *L. molucca* with some disagreements and even taking into consideration the species described thereafter by him it appears closest to it, but the present species is distinguished from it at least by the punctuation of mesothorax, by the form of gastral tergites and by the colour of scutellum.

♀. Length 9.0 mm. Black, ground colour of legs dark brown. Orange yellow: Antennal joint 1 wholly, two large maculae on collar (wider than interspace), tubercle, a large mark on scutellum, a transverse mark on each side of tergites 1-5 (on 1 as wide as and on 2-4 wider than interspace, on 5 only a minute spot), fore and mid tibiae and tarsi (in fore tibia a streak in front weakly ferruginous), hind tibia on outside and tarsus (all tarsi with a more or less ferruginous tint). Mandible, antennal flagellum, apices of coxae, trochanters and femora dark brown to castaneous, flagellum beneath and basally, fore femur apically and wing tegula pale brown, wings slightly yellowish, stigma and veins ferruginous brown. Hairs on sides of lower frons and clypeus silvery.

Head from above (keeping lower frons vertical) with temples strongly swollen out, slightly wider here than at eyes, ratio of width to length in middle 36 : 22 (the following measurements are made under the same scale), of length of eye and temple 15 : 12, occipital margin fairly strongly roundly emarginate, relative width of occipital carina in dorsal view 24, ocellar triangle with the height half its width at base, OOD : POD : OCD = 5.5 : 4 : 11, frontal furrow broad, rather shallow, frontal fovea clavate, with relative length 7, as long as antennal joint 3 and 4 united. Head seen in front with lateral margins on lower half nearly straightly convergent below, relative width at mandibular bases 27, minimum IOD 5, antennal sockets contiguous to eyes and to each other. Clypeus: Fig. 86, medianly longitudinally subcarinate, medial produced part raised towards apex, seen from beneath the part is thin, but the lateral parts thick, with one deep hollow between two lateral protuberances and another shallow rounded one outside the outer protuberance, this thickened lateral parts extended beneath the medial produced part and form a transverse hollow which is unobservable seen in front. Antennal joint 1 with relative length 11, completely ecarinate, joint 3 appr. twice as long as broad at apex; head seen in profile with eye as wide as temple, occipital carina runs subparallel to outer orbit down to its end at hypostomal carina. Collar of pronotum: Fig. 87; mesopleuron with a short transverse precoxal carina; mesosternum without acetabular carina; propodeum on posterior aspect with a raised platform, perpendicularly flattened, margined by carina and medianly weakly furrowed. Gastral tergites 2 and 3 considerably depressed at base, 1-5 weakly depressed at apex, apical margin slightly reflexed and subcarinated, sternites without constriction. Fore femur with a broad smooth area on outer side (Fig. 88) as in many allied species, occupying whole the width of the segment and longitudinally gently roundly elevated, with the surface microstriolate on basal portion and distinctly margined by carina at ventral edge, but the base not reached the base of the segment; mid femur beneath acutely edged, but not carinated, hind tibia not carinated on frontal margin, strongly coarsely spinose on outer side, each spine arising from a small corn-shaped tubercle. Venation normal, accessory cell very widely open at apex.

Upper frons somewhat coarsely closely irregularly punctured, punctures on vertex slightly finer, very closely, in part subrugosely arranged, on occiput much finer and closer, mesoscutum on anterior third finely closely irregularly reticulate-punctate, on the disc and posteriorly punctures larger, longitudinally elongate, with intervallic carinae turning into longitudinally rugosed striae (in *moluccana* mesoscutal punctuation undescribed, judging from comparison with other species, however, the scutum is presumed posteriorly simply closely and co-

arsely punctured), scutellum also longitudinally coarsely striate-punctate, mesopleuron on hypopleural area longitudinally, rather finely and closely striate, on prepectus coarsely irregularly reticulate-punctate, central part coarsely, partly sparsely longitudinally striate-punctate, on lower portion in front of precoxal carina very coarsely punctured, punctures irregular in form, size and distribution, with more or less glittering interspaces and mostly as large as the cross section of mid basitarsus, but some much larger; metapleuron longitudinally coarsely striate; propodeum on dorsal aspect and obliquely inclined part with two rows of transverse series of coarse foveae sectioned by highly raised carinae, medial part of the posterior row annexed with some additional foveae forming a third short row, without medial furrow, the foveate part mat; platform of posterior aspect medianly furrowed and the surface radiately finely closely rugoso-striate; sides on anterior portion longitudinally coarsely striate, on central part rather finely closely striate and on posterior portion without sculpture, shining, only scattered with a few small punctures and at the outside of the platform coarsely foveolate. Gastral tergite 1 on basal portion very sparsely punctured, with surface shining, but gradually closer towards apex and on apical depressed margin very finely and closely punctured, punctures on the disc by degrees sparser towards sides; tergites 2-5 on raised area finely punctured (much more finely so than in *constricta*), with interspaces medianly less than and laterally more than (partly 2-4 times) as wide as the puncture diameter, on basal and apical depressed areas punctures very much finer and closer; pygidial area basally coarsely punctured, on apical narrow parallel-sided area finely weakly punctulate; sternite 2 with a pair of large opaque areas, rounded triangular, covered with dense velvety pile, with interspace much narrower than the area, each sternite with an ante-apical row of punctures.

♂, unknown.

Holotype: ♀, Bismarck Archipelago, Is. Nusa, 24. X. 1900, Biró leg. (Coll. Mus. Nat. Hung.).

16. *LESTICA* (*SOLENIUS*) *TOBLERI* SP. NOV.

The present species is considerably similar in the colour of the legs of the female to *Lestica relicta* Leclercq, but is different in the maculation of the thorax and gaster and in the punctuation of the mesothorax. It resembles also *L. constricta* Krombein, but the constriction of the gastral tergites is not so strong and differs markedly in the punctuation of the mesothorax and in the colour of the legs.

♂. Length 7.5-8.5 mm. Black; yellow are antennal joint 1 (with a short pale ferruginous streak above), collar of pronotum except posterior margin and medial notch from behind (not reaching anterior margin), tubercle (with a semitransparent window at the centre), scutellum nearly wholly, a pair of small maculae in front of mesocoxae, transverse lateral marks (wider than interspace) on gastral tergites 1-3, a band on 4 and 5, all coxae in front, trochanters beneath broadly, fore femur except a brown patch at base above, fore tibia on basal half, mid femur except a broad streak on outer side and sometimes a fine streak on outer side of mid tibia. Antennal joints 2-5, from 6 apically beneath (gradually darkened), mouth parts with palpi and tegla of wings ferruginous. Apical half of fore tibia and fore tarsus yellowish ferruginous, the latter semitransparent, rest of mid and hind legs except coxae reddish ferruginous; wings not strongly darkened, brownish, veins and stigma castaneous. Hairs on sides of lower frons silvery, on clypeus pale brassy, on temple below long but sparse, on lower part of mesopleuron and on mesosternum dense, short, appressed and silvery; fore femur beneath covered with silvery hairs of moderate length, directing from apex towards base, on dorsal half of outer side hairs long, some

what stiff and dense, forming a sort of silky white tuft; short hairs on coxae not conspicuous, but on hind trochanter beneath somewhat long, dense, silvery and in some direction very conspicuous; hairs on gastral sternites from apical half of 3 apically short, dense, appressed and silky white.

Head seen from above: Fig. 89, OOD : POD = 4 : 5, head seen in front: Fig. 90, clypeus medianly distinctly carinated, mandible bidentate at apex, with a short tooth on inner margin before middle. Antennal joint 1 ecarinate, flagellum not particularly deformed, each joint short, joints 3-5 slightly shorter than wide at apex, 6-10 as long as wide, joints 4-11 beneath provided with tyloidea. Collar of pronotum (Fig. 91) with anterior and lateral margins strongly carinated, the anterior carina medianly deeply half-notched from behind, but not completely interrupted. Precoxal carina of mesopleuron short, accompanied in front by a crenate furrow and curved below forwards to form the sternaulus which is not strong, only in oblique light weakly defined, but on the part of signum fairly distinct. Propodeum with dorsal aspect short, represented by only a transverse row of coarse foveae, median furrow distinct; posterior aspect perpendicular, bordering area of the two aspects consisted of a second row of large foveae obliquely inclined. Gastral segments weakly constricted at base and at apex, apical margins of tergites 1-4 carinated and shortly reflected, tergite 7 sharply edged at the margins. Fore leg: coxa posteriorly expanded, forming a flattened quadrate plate, enclosing base of trochanter and carinated on inner and posterior margins, trochanter also carinated on posterior margin and further margined at apex by the other lamellate carina, femur in cross section at base quadrangular, from middle to apex triangular, with a stout spine at base beneath, tarsus characteristically sublamellately dilated and basitarsus excavated forwards (Fig. 92). Mid leg: femur markedly incrassate, at base beneath angularly produced and carinated, tibia with a weak lamellate carina at basal half of outer side, tarsus: Fig. 93, not lamellate. Hind leg: coxa acutely edged on outer margin, trochanter flattened beneath, femur incrassate, but in form normal, tibia weakly carinated at lower half of anterior margin, with outer side sparsely but stoutly spinose, tibial spurs broad, lamellate, the longer spur more than half the length of metatarsus which is slightly incrassate and slightly attenuate apically.

Vertex and upper frons very finely irregularly reticulate, intervallic carinae minutely sinuate, not shining, temple on middle part coarsely irregularly reticulate, with foveae transversely elongate, with intervallic carinae shining. Posterior black part of pronotal collar formed of a row of medium-sized foveae. Mesoscutum anteriorly and laterally punctured as on vertex, from middle posteriorly and scutellum longitudinally, rather coarsely rugoso-punctate, intervallic carinae appearing longitudinal glittering rugae. On mesopleuron prepectus bears about 10-13 comparatively large rounded punctures, some of which contiguous to each other, forming puncture lines, on episternum medianly punctures similarly large and sparse, but partly obliquely contiguous to form puncture lines, with interspaces appearing sometimes as broad glittering areas and sometimes as oblique carinae. Propodeum mat, on upper portion with two rows of very coarse punctures, sometimes with another row of medium-sized punctures between them which is short and incomplete; posterior aspect longitudinally, somewhat obliquely, very sparsely striate, the striae upwards once or twice branched off, sides of propodeum and metapleuron longitudinally, fairly closely striate. Punctuation of gastral tergites as in *constricta*, medium-sized punctures closely covering the central weakly raised area, basal area more finely and closely punctured and apical part very much more finely and closely punctate; caudal tergite slightly largely, longitudinally rugoso-punctate; sternite 2 medianly broadly smooth and polished, bearing sparse fine hair-points, laterally with a large opaque area which is very minutely and closely punctulate.

♀. Length 9.0-11.0 mm. Black; yellow are antennal joint 1 wholly, posterior side of 2 and 3, collar and tubercle of pronotum as in ♂, a spot on xilla, a large mark on scutellum (nearly wholly), a transverse narrow mark on each side

of gastral tergites 1-4, on 1 with interspace wider than the mark, on the rest shorter, a pair of rounded marks on tergite 5 and the following part of legs: apical half of fore and mid coxae, fore and mid femora at apex, fore tibia on posterior side, mid tibia on outer apical half and posterior side and a streak on outer side of hind tibia. Rest of antennal joints 2 and 3 ferruginous, 4, 5 deep brown, paler beneath and darker above, 6, 7 slightly brownish beneath; mouth parts, tegula and stigma and veins of wing ferruginous; from apex of coxae till ultimate tarsal joints reddish castaneous; wings slightly clouded as in ♂. Appressed hairs on sides of face and on clypeus golden, those on temple below (not close) also slightly brassy; mesosternum, legs and gastral sternites almost glabrous, the latter with a line of hair-bearing punctures before apex, end tergite on each side of pygidial area with a tuft of stiff hairs.

Head from above: Fig. 94, seen in front: Fig. 95, mandible tridentate at apex, with a short tooth on inner margin; antennal joint 1 ecarinate, but at antero-lateral corner fairly acutely edged, joints 2-5 slightly longer than broad, 6,7 as long as wide, thence till penultimate joint wider than long. Pronotal collar and propodeum as in ♂, precoxal carina on mesopleuron as in ♂; sternaulus as the lowermost strongest one of the longitudinal rugose carinae of mesopleuron defined. Fore trochanter posteriorly carinate, fore femur subcarinate beneath, the carina at base lamellately triangularly produced as a vestigial spine, mid femur also at base beneath shortly carinated, hind femur flattened beneath, at postero-lateral ridge acutely thoroughly carinate and at antero-ventral ridge rather bluntly edged; longer tibial spur of hind leg sword-shaped, about $2/3$ the length of the following metatarsus.

Punctures generally as in ♂, but upper frons on anterior verge strongly, coarsely punctured, mesopleuron with longitudinal glittering more or less wide puncture-interspaces on mid-upper area only, below on broad area longitudinally closely punctate-substrate with considerably large punctures.

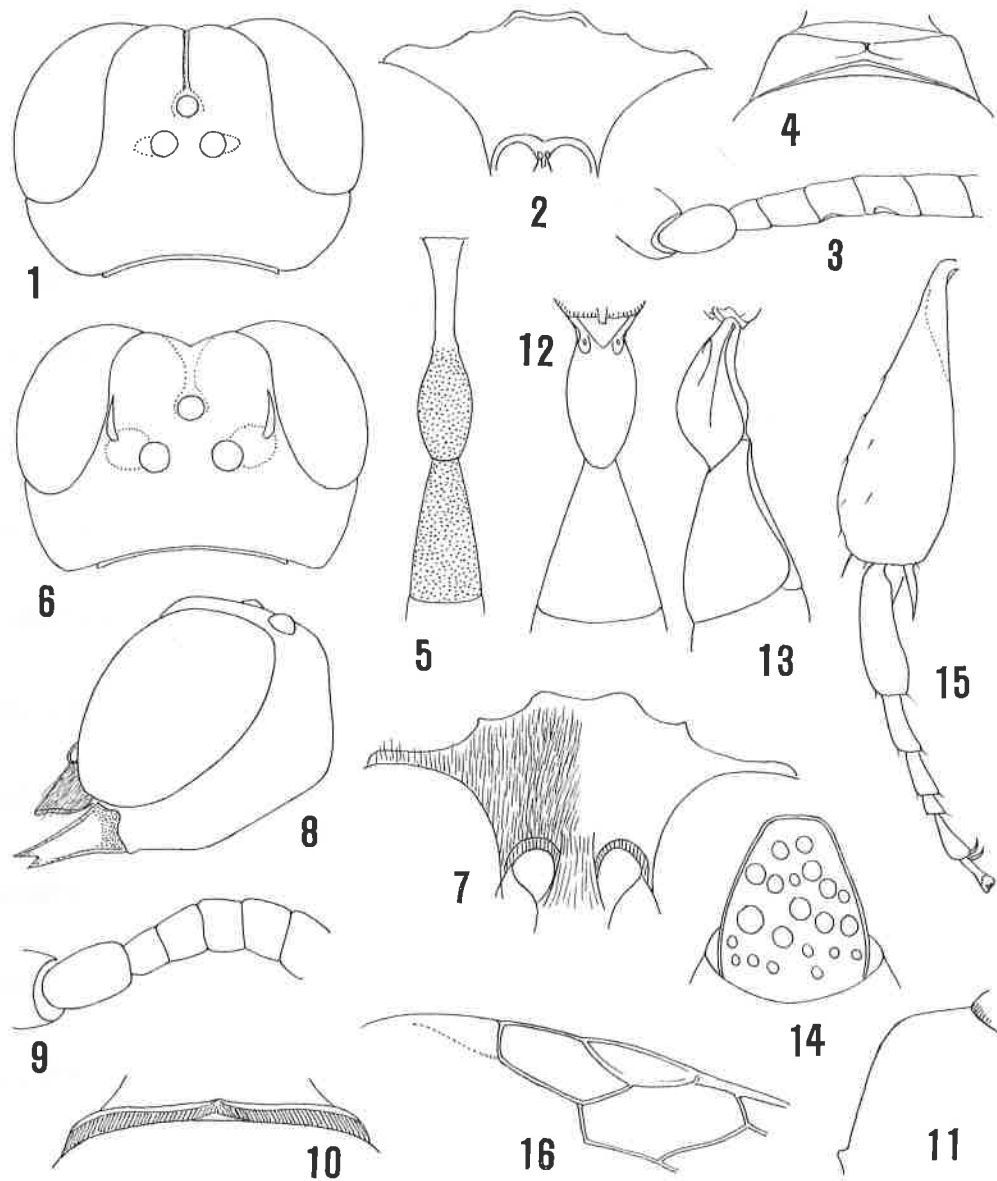
Holotype: ♂, Solomon Islands, Kieta District, Buka, Hanahan, 23. XII. 1969, James E. Tobler leg. (Coll. Calif. Acad. Sci.).

Paratypes: 30 ♀ 9 ♂, the same as holotype.

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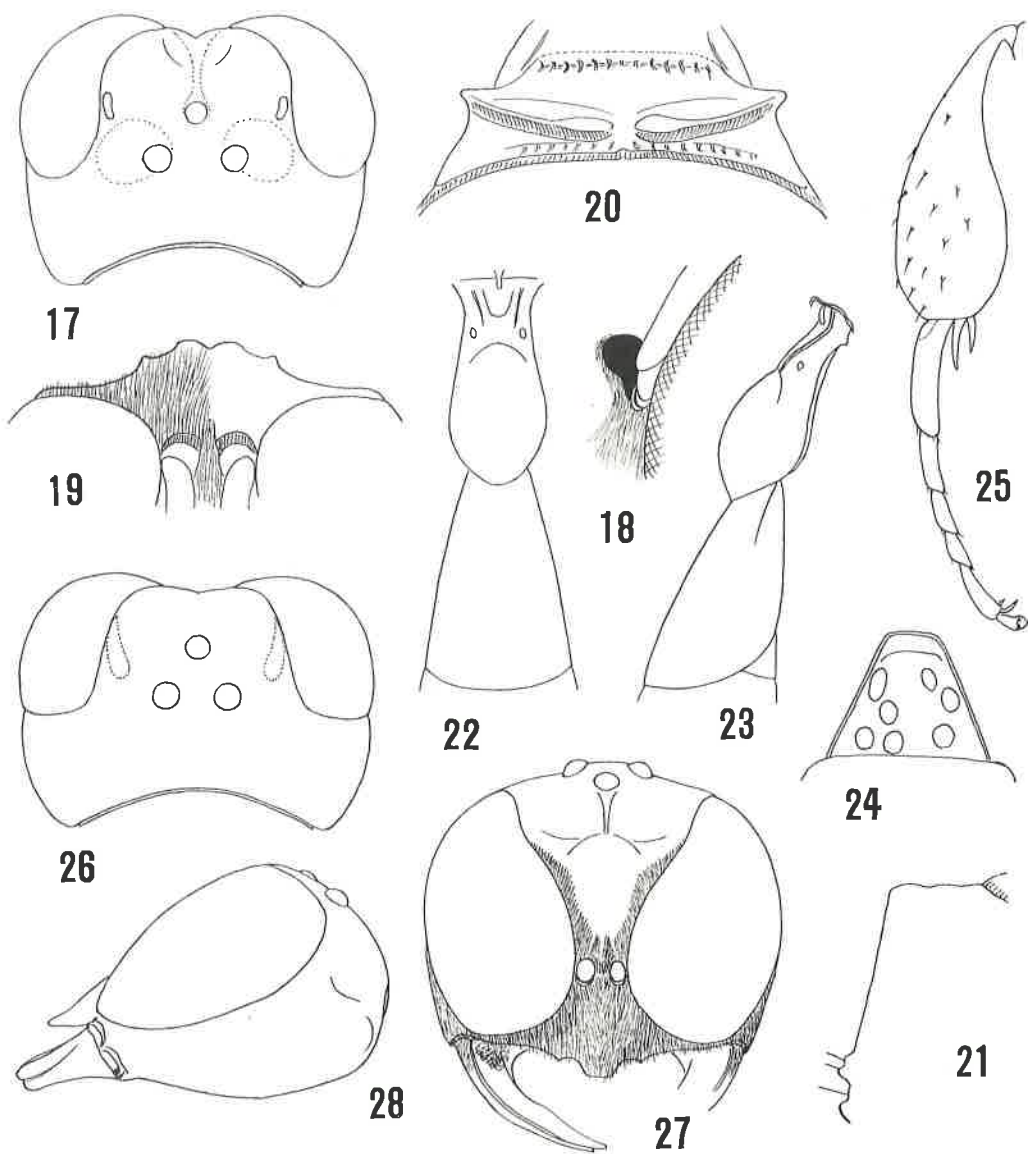


Figs. 1-16.

1-5. *Rhopalum (Rhopalum) tubarum papuanum* ssp. nov., ♂.

6-16. *Rhopalum (Rhopalum) frenchii* (Turner), ♂.

1, 6, 8: Head. 2, 7: Clypeus. 3, 9: Antenna. 4, 10: Pronotum. 5, 12: Gastral segments 1 and 2. 11: Upper and posterior outline of propodeum in lateral view. 13: Gastral segments 1 and 2 (lateral). 14: Pygidial area. 15: Hind tibia and tarsus. 16: Venation of fore wing.

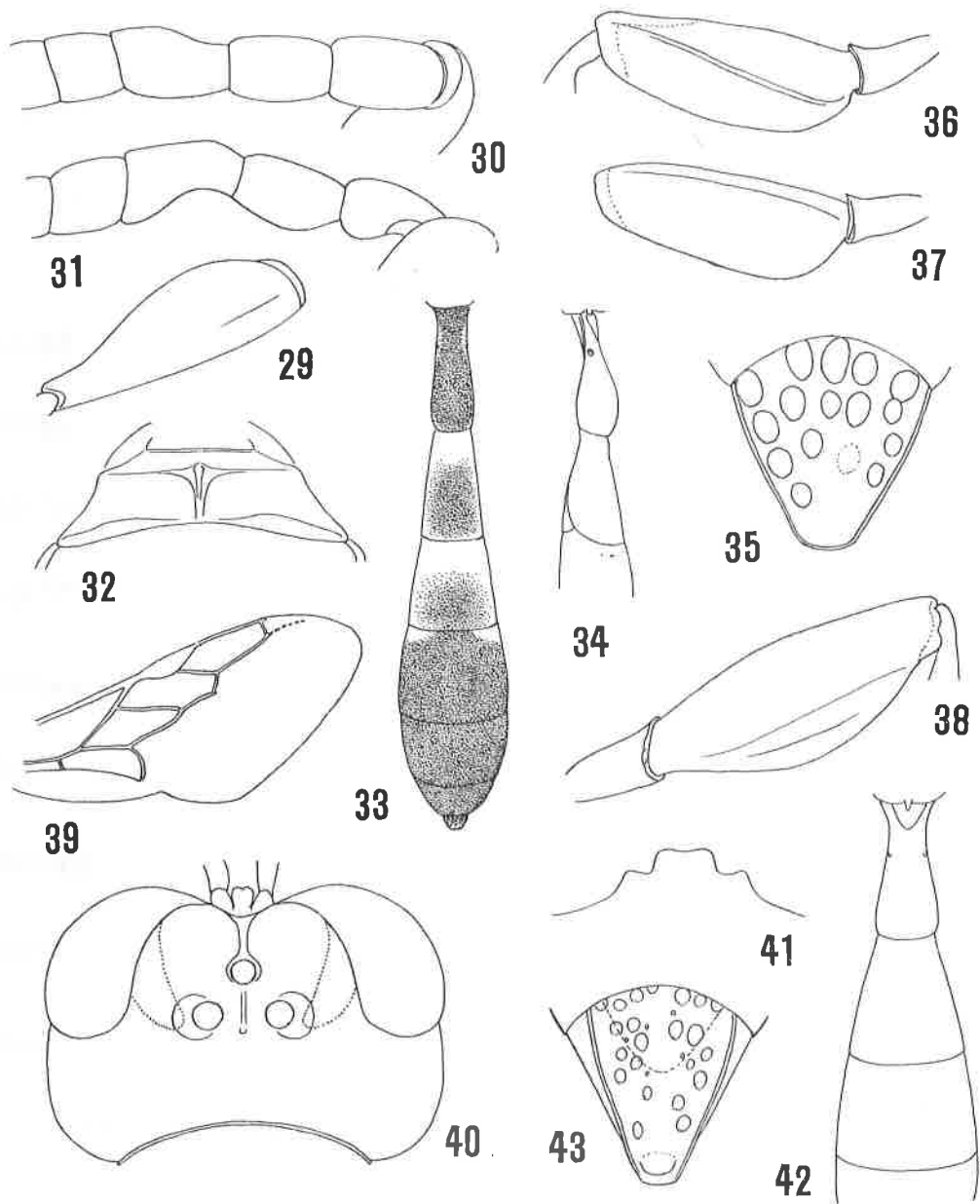


Figs. 17-28.

17-25. *Rhopalum (Rhopalum) cornigerum* sp. nov., ♂.

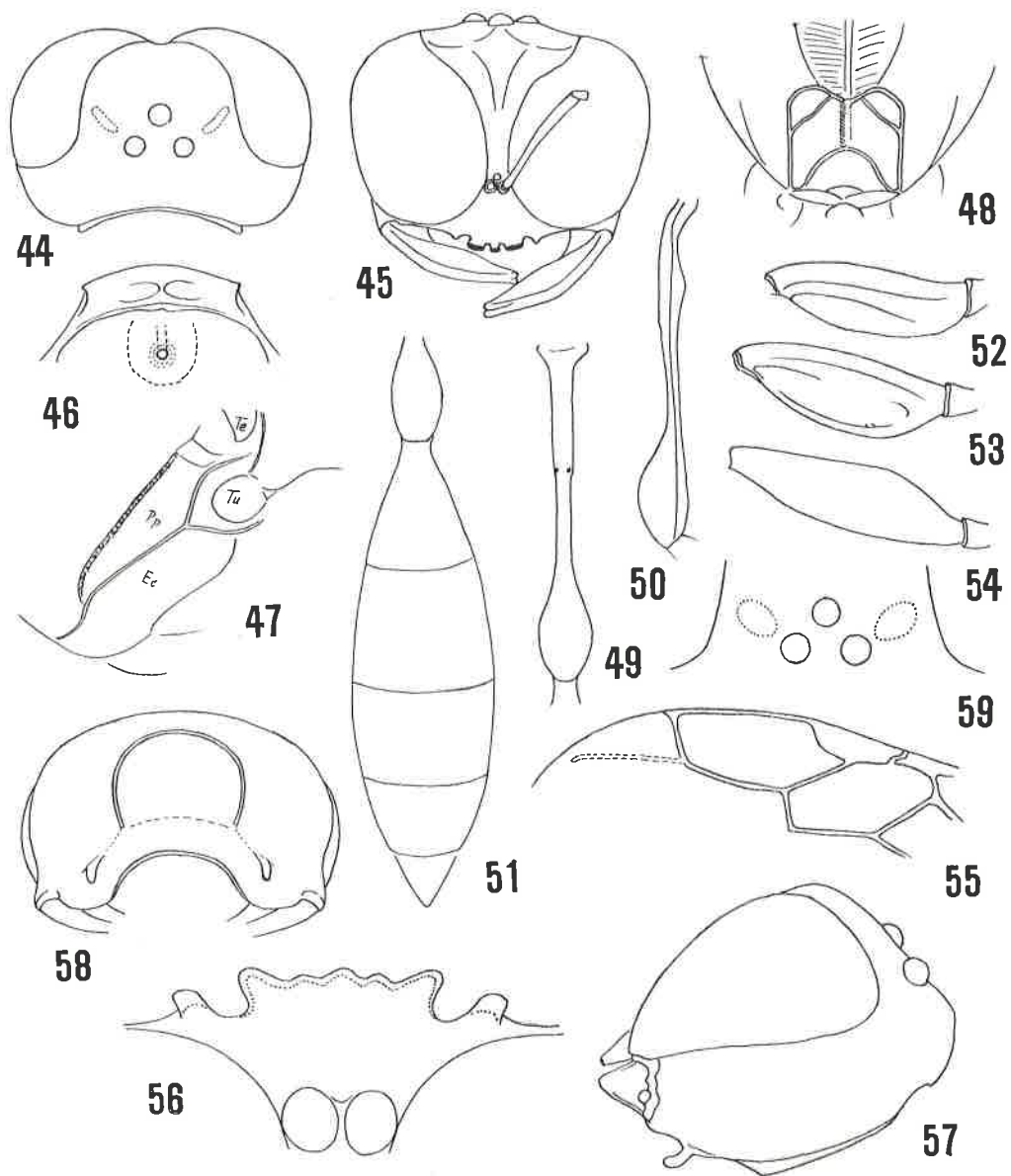
26-28. *Podagritys (Echuca) australiensis* sp. nov., ♂.

17, 26, 27, 28: Head. 18: Interantennal tubercle (black part) in profile. 19: Clypeus. 20: Pronotum. 21: Propodeal outline (lateral). 22: Gastral segments 1 and 2. 23: Ditto (lateral). 24: Pygidial area. 25: Hind tibia and tarsus.



Figs. 29-43. *Podagritys (Echuca) australiensis* sp. nov., 29-39 ♂, 40-43 ♀.

29: Scape of antenna. 30: Antenna (dorsal). 31: Ditto (lateral). 32: Pronotum. 33: Gastral segments (dorsal). 34: Ditto (basal three, lateral). 35: Pygidial area. 36: Fore femur (left, posterior view). 37: Mid femur (do.). 38: Hind femur (right, do.). 39: Wing venation. 40: Head. 41: Clypeus. 42: Gastral segments. 43: Pygidial area.

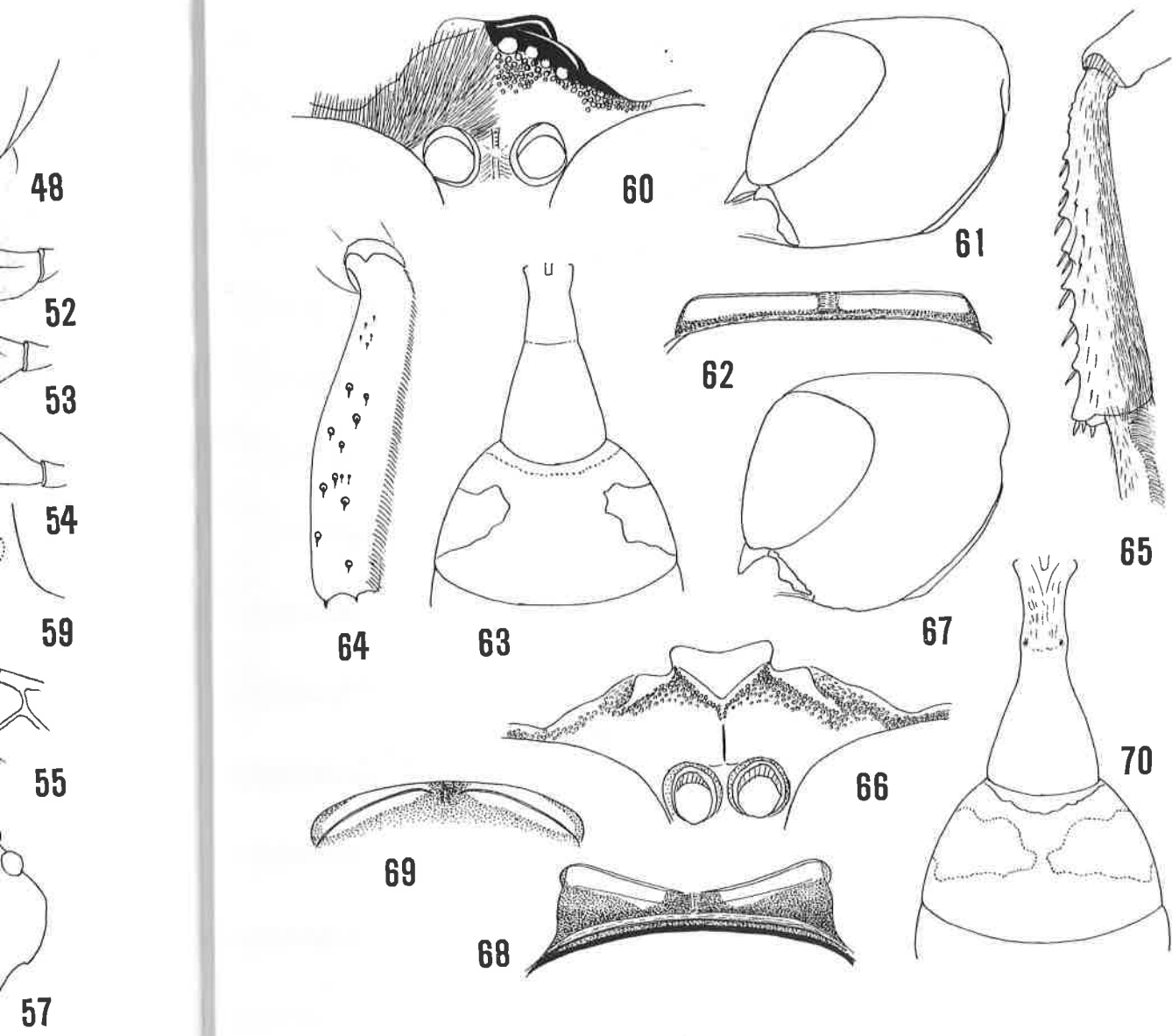


Figs. 44-59.

44-55. *Crossocerus (Eupliloides) papuanus* sp. nov., ♀.

56-59. *Crossocerus (Eupliloides) bougainvilleae dentatus* ssp. nov., ♀.

44, 45, 57: Head. 46: Pronotum. 47: Anterior part of mesopleuron (right side; Ec = epicnemium, Pp = prepectus, Te = tegula). 48: Platform on posterior aspect of propodeum. 49: Gastral petiole. 50: Ditto (lateral). 51: Rest of gaster. 52, 53, 54: Fore, mid and hind femora (left, posterior view). 55: Wing venation. 56: Clypeus. 58: Head from beneath, showing the location of genal teeth. 59: Ocelli and frontal foveae.



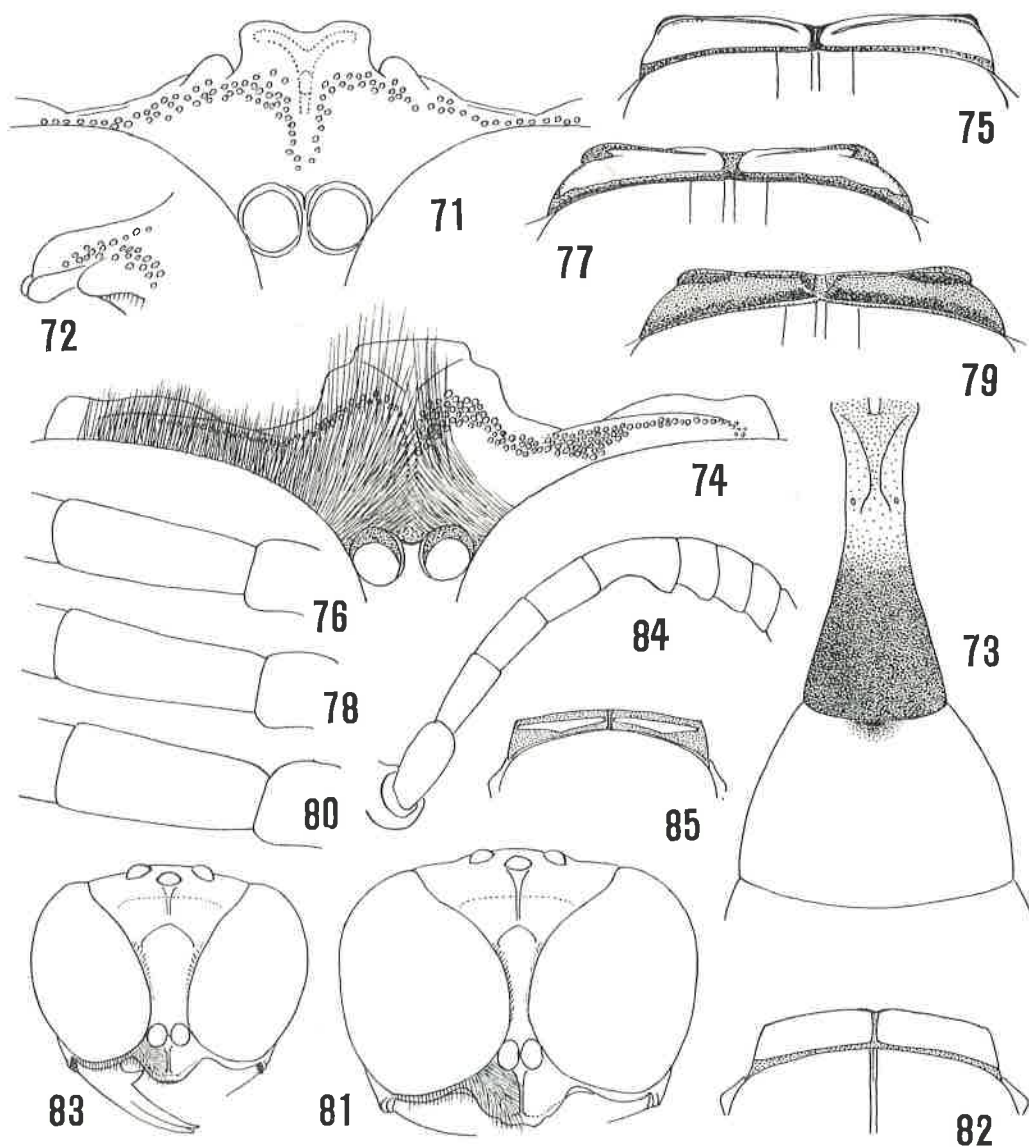
Figs. 60-70.

60-65. *Dasyproctus septemmaculatus* sp. nov., ♀.

66-70. *Dasyproctus pacificus* sp. nov., ♀.

60, 66: Clypeus. 61, 67: Head. 62, 68: Pronotum (dorsal). 69: Ditto (frontal). 63, 70: Gastral tergites 1 and 2. 64: Mid tibia. 65: Hind tibia.

side; Ec =
t of propo-
, 53, 54:
Clypeus.
d frontal



Figs. 71-85.

71-73. Dasyproctus semifulvus sp. nov., ♀.

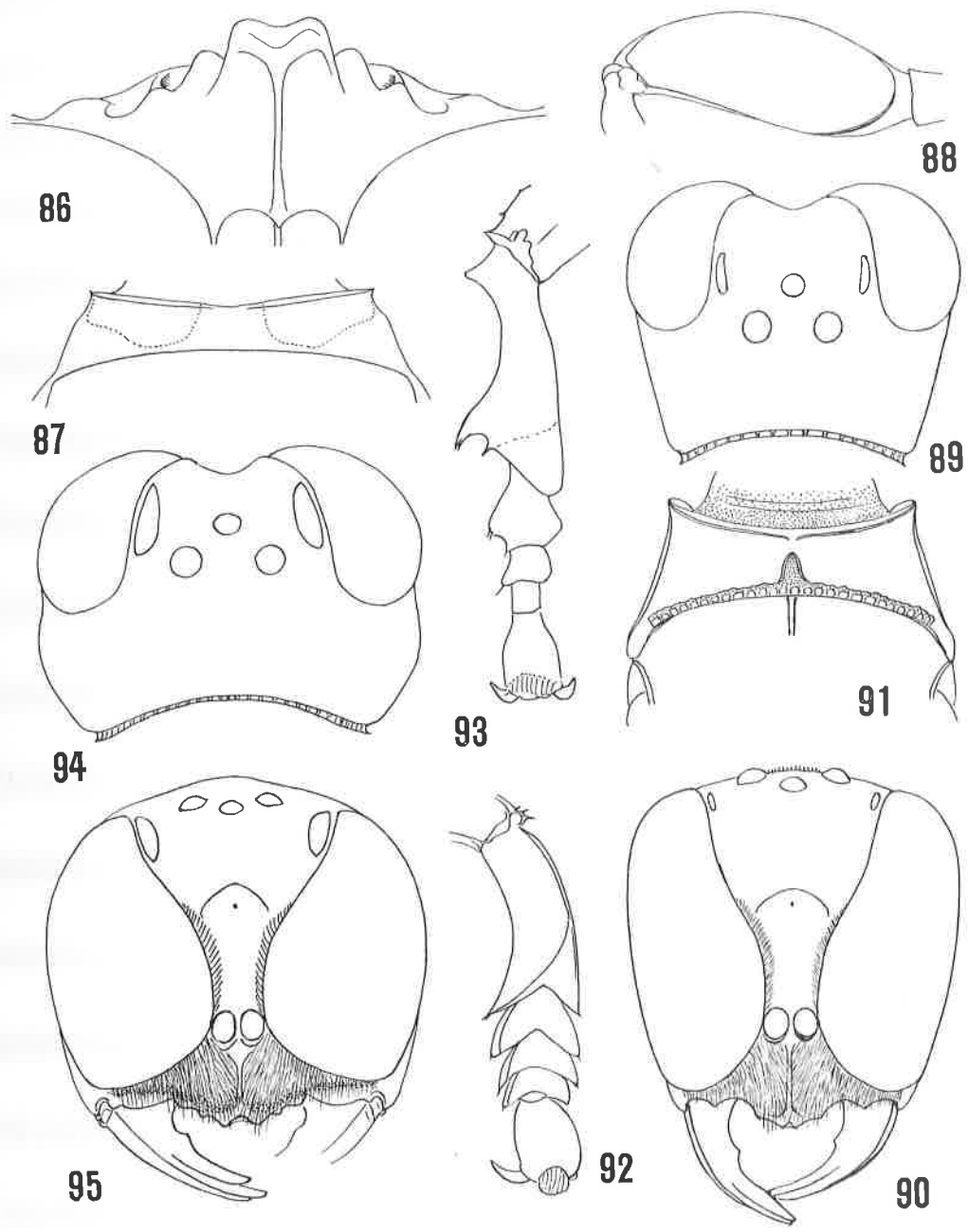
74-76. Ectemnius (Cameronitus) paxinus Leclercq, ♀.

77-78. Ectemnius (Cameronitus) radiatus (Pérez), ♀.

79-80. Ectemnius (Cameronitus) nigritarsus (Herrich-Schaeffer), ♀.

81-85. Ectemnius (Cameronitus) bogorensis Leclercq, ♀.

71, 74: Clypeus. 72: Ditto in profile. 73: Gastral segments 1 and 2. 75, 77, 79, 82, 85: Pronotal collar. 76, 78, 80: Antennal joint 3. 81, 83: Head. 84: Antenna.



Figs. 86-95.

86-88. *Lestica biroi* sp. nov., ♀.

89-95. *Lestica tobleri* sp. nov., 89-93, ♂, 94-95, ♀.

86: Clypeus. 87, 91: Pronotum. 88: Fore femur (posterior view). 89, 90, 94, 95: Head.
92: Fore tibia and tarsus. 93: Mid tibia and tarsus.

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