YASUMATSU, K., 1934, A list of the species of the genus *Passaloecus* of the world, with a key to the Oriental species and notes on the Japanese, Corean and Formosan ones (*Hym., Pemphredonidae*), Mushi, **7**: 109–114.

YASUMATSU, K., 1953, *Sphecoidea* of Micronesia. 4. Revision of the genus *Pison* SPINOLA. Pt. 1. (*Hymenoptera: Sphecidae*), J. Fac. Agr. Kyushu Univ., **10**: p. 133–150.

Mr. Pulawski. Compliments of the

POLSKIE PISMO ENTOMOLOGICZNE
BULLETIN ENTOMOLOGIQUE DE POLOGNE

Tom 44: 585–660 Wrocław 30 IX 1974

A contribution to the knowledge of *Sphecidae* occurring in Southeast Asia (*Hym.*)

Przyczynek do znajomości *Sphecidae* (*Hym.*) południowo-wschodniej Azji

BY

K. TSUNEKI

Abstract. 70 species of *Sphecidae* from S. E. Asia were recorded including *Liris* (*Colloliris*) subgen. nov. (*Larrinae*) and the following new species: *Sphex tanoi*, *Bembecinus nyamadanus*, *Ammatomus tanoi*, *Liris tanoi*, *L. clypeopunctata*, *L. trifasciata*, *L. punctata*, *L. borneana*, *Tachytes dubiosus*, *Gastrosericus thailanditus*, *G. siamensis*, *Trypoxylon appendiculatum*, *T. monstruosum*, *Psenulus thaianus*, *Stigmus borneanus*, *Eupliloides tanoi*, *Encopognathus kinabalensis*, *Oxybelus ayuttayanus*. The following new subspecies were also described: *Cerceris pictiventris bariana*, *Bembix borrei bariensis*, *Tachytes fruticis taianus*. *Oxybelus transiens thaianus* TSUNEKI was raised to species with nom. emended. Detailed comments were given to the species hitherto remained doubtful.

The material used in the present study was collected by Mr. TADASHI TANO, Fukui, during his recent wasp hunting journey to Southeast Asia in 1971, ranging from Thailand, Malaya, Java including the Bari, to Borneo. Mr. TANO is an experienced hymenopterist. His sense and technique for the wasp collection are quite unique. This will easily be understood by many curious species and abundant number of specimens captured during a short period of time (about 3 weeks from July to August).

The Sphecid wasps of the regions concerned here have been studied by many specialists and a number of species have been described. Among the species, however, a considerable number remain doubtful, because of their simple descriptions. These species are demanded to be reexamined and redescribed. The present paper will contribute more or less in this respect, as well as in introducing a fair number of new species and subspecies. On this occasion I thank Mr. T. TANO for his generosity in placing these valuable specimens at my disposal. I am also much indebted to Dr. W. J. PUŁAWSKI for his kind aid in publishing this paper.

1a. *Sphex* (*Sphex*) *sericeus lineolus* Lepeletier, 1845

Sphex sericeus lineolus: VECHT et KROMBEIN, 1955, p. 37; TSUNEKI, 1967e, p. 3.

Specimens examined: 1 ♀ 1 ♂, Thailand (Doi Sked), 8. VIII.

Distribution: Thailand, Malaya, Sumatra, Eastern coastal region of S. and M. China, Formosa and the Ryukyus.

Remarks. The apical three joints of the hind tarsi are wholly black in the female specimen. In the specimens from Formosa they vary from wholly black to wholly ferruginous red.

1b. *Sphex* (*Sphex*) *sericeus wegneri* Vecht et Krombein, 1955

Sphex sericeus wegneri VECHT et KROMBEIN, 1955, p. 39.

Specimen examined: 1 ♂, Borneo (Kota Kinabalu), 16. VIII.

Distribution: Endemic to Borneo.

2. *Sphex* (*Sphex*) *haemorrhoidalis siamensis* Taschenberg, 1869

Sphex nigripes var. *siamensis*: KOHL, 1890, p. 422.

Specimen examined: 1 ♂, Thailand (Sara Buri), 31. VII.

Distribution: Thailand.

Remarks. In the specimen the wings are pale yellowish brown, on the apical margin broadly darkened and with a conspicuous purplish shine; the hind femora are bright red, the following tibiae are on the external side also reddish; the pubescence is everywhere black. Antennal joints 6–8 are provided with distinct rhinaria, flatly impressed over the entire length of the respective segment (in the Formosan males of this species the rhinaria are observed on joints 6–9 and the colour of the legs is broadly variable). J. VAN DER VECHT applies *S. subtruncatus* DAHLBOM to the present species.

3. *Sphex* (*Isodontia*) *diodon* Kohl, 1890

Sphex diodon KOHL, 1890, p. 377.
? Sphex maia BINGHAM, 1897, p. 249.
Isodontia diodon: VAN DER VECHT, 1957, p. 367 (ssp. *alemon*).

Specimens examined: 1 ♀ 1♂, Thailand (Chieng Mai), 6. VIII.

Distribution: Known from Java and Sumatra and is new to Thailand.

Remarks. In the female specimen the first abdominal segment is completely red and the second is also red at the base beneath, while in the male the segment is wholly black, with a faint brownish shade at the extreme anterior portion. In both the specimens the posterior margins of the following tergites are discoloured, appearing pale ferruginous and the short pubescence on the clypeus is silvery, not golden as in ssp. *alemon* VECHT, 1957. In the male the fringe of long hairs is observed on the apical margins of sternites 4 and 5. The wings are feebly clouded at the apical margin and especially strongly darkened at the outside of the radial and cubital cells. In this respect, together with the characters as far as described; the specimens well agree with *S. maia* BINGHAM except that the eyes are not "parallel", but distinctly convergent towards the clypeus. Possibly *S. maia* is a synonym of the present species.

As to the rhinaria (the so-called sensory area) of the antennae of the male they are observed on joints 4–7, extending over the entire length, covering more than a half of the cylindric surface of the segments and too broad to be called rhinaria, although on both sides they are distinctly bordered by a fine carina. Mandible of the female: Fig. 1, of the male: Fig. 2. Length ♀ 16.5 mm, ♂ 14.0 mm.

4. *Sphex* (*Isodontia*) *morosus* Smith, 1861

? Sphex triodon KOHL, 1890, p. 377.
Sphex morosus BINGHAM, 1897, p. 246.

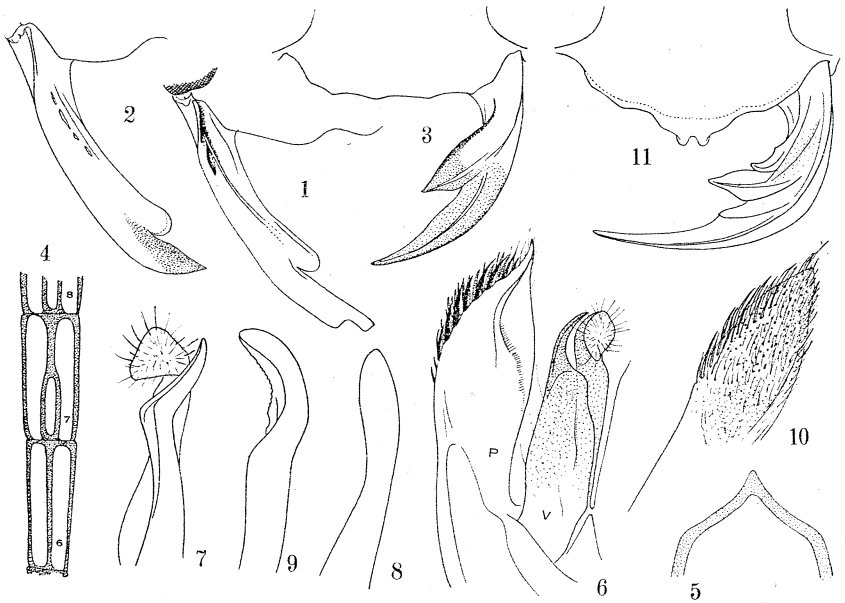
Specimen examined: 1 ♂, Thailand (Chieng Mai), 6. VIII.

Distribution: India, Burma, Malay region, Java, Celebes, Philippines (?), new to Thailand.

5. *Sphex* (*Sphex*) *tanoi* sp. nov.

The female of the present species is very similar to *S. cinerascens* DHLB. (= *S. xanthopterus* CAM.) and runs to this species in the keys of KOHL (1890) and of BINGHAM (1897). It differs from this, however, in the form of the anterior margin of the clypeus, in the relative length of the abdominal petiole (though slight) and in the colour of the hind legs. In the male the differences from the compared species are very marked: In the present species the clypeal tomenta are deep golden, the mandibles are on the basal half ferrginous red and the end sternite is medianly at the apex produced into a broad triangle.

♂. Length 15.0 mm. Black, basal half of mandibles and sternite 8 ferruginous red, the latter with chestnut brown marginal areas, tarsal claws also basally ferruginous; wings slightly yellowish, with the apical margin somewhat clouded. Frons and clypeus densely covered with



1–11. 1 and 2 — *Sphex* (*Isodontia*) *diodon* KOHL, mandible: 1 — ♀, 2 — ♂; 3–11 — *Sphex* (*Sphex*) *tanoi* sp. nov.; 3–10 — ♂, 11 — ♀; 3, 11 — clypeus and mandible, 4 — rhinaria on antennal joints 6–8, 5 — end sternite of abdomen, 6 — left half of genitalia except penis valve, seen from beneath, 7 — volsella seen from the side, 8 — right half of penis valve in dorsal view, 9 — do., in lateral view, 10 — right paramere in dorsal view

appressed deep golden pubescence and sparse erect golden hairs, the appressed velvety pubescence on temples, collar of pronotum, mesonotum (on the sides closer), subalar and posttubercular areas of mesopleuron, posterior and latero-posterior parts of propodeum silvery, in some light appears pale brassy; the hair on vertex, temples and thorax sparse, long, greyish white or silky white, on propodeum much closer and silky white, but on dorsal side sparse, letting the surface sculpture well visible, abdominal segments 5, 6 and 7 slightly more abundantly covered with whitish hair.

Head seen from above with OOD:POD = 6:7, width of postocellus relatively 5.5, ocelli in ani sosceles triangle, much wider at base, with anterior ocellus nearly twice as large in diameter as the posterior, ocellar area roundly raised, with the marginal furrow well-defined, the area medianly longitudinally deeply furrowed, the furrow reaches the posterior gentle elevation of vertex, crossing the transverse ocellar furrow. Head seen in front with inner margins of eyes convergent towards clypeus,

interocular distance at vertex and at middle of clypeus (minimum) 49:41 (= 7:6), clypeus and mandible: Fig. 3, the former gently roundly raised on the disc, antennal joints 3, 4 and 5 with relative length 29, 21 and 20, two rows of rhinaria on joints 4–12, on all except the ultimate joint in full length of the respective segment, on 4–8 separated by a narrow ridge, on 7 and 8 an additional rhinarium on each separating ridge, locating on 7 at the basal half and on 8 at the basal 2/3, both narrower than the others of the series, but with the surface flatly impressed and distinctly outlined (Fig. 4), from joint 9 apically the separating ridge gradually broadened, sometimes becoming lenticular in form and the rhinaria separated as much narrowed, on the ultimate joint the impression shorter, very narrow, not reaching apex. Collar without the median notch, mesonotum shortly impressed medio-anteriorly, scutellum medianly longitudinally weakly furrowed, but the furrow short, defined only on top of the sclerite, postscutellum entire, on propodeum stigmatal furrows distinct, petiole of abdomen slightly shorter than tergite 2 (55:60), or hind tarsal segments 2+3 (55:62) and as long as antennal joints 2, 3 and 4 combined, 8th sternite: Fig. 5. Comb bristles of the longer tibial spur of hind leg close, medianly long and shorter towards both ends. As to genitalia the left half seen from beneath: Fig. 6 (P, paramere; V, volsella, penis omitted), volsella in lateral view: Fig. 7, digitus enlarged at apex and sparsely pubescent and cuspis bent backwards at the apical portion, penis valve in dorsal view: Fig. 8, in lateral view: Fig. 9, paramere in dorsal view: Fig. 10, carrying numeral bristles on distal and external part.

Vertex, mesonotum finely, sparsely punctured, with intervals feebly microcoriaceous, mesopleuron also delicately microcoriaceous, with hair-bases minutely tuberculate on upper portion and impressed on lower portion, propodeum on dorsal aspect transversely, very finely, very closely and weakly rugoso-striate, intervals of the striae raised hither and thither into transverse short ridges, different in length and width, usually carrying some fine striae on themselves and the surface under low magnification appears to be irregularly rugoso-striated.

♀. Length 18.0 mm. Similar to ♂, but mandibles wholly black, only partly reddish beneath, claws of legs coloured as in ♂, wings more strongly yellowish than in ♂, dense appressed pubescence and erect hairs on frons and clypeus silvery, the short velvety pubescence on other parts of body also silvery, the long hairs on propodeum closer, but sparse on dorsal side as in ♂. OOD:POD = 12:15, width of postocellus relatively 6, anterior ocellus 1.5 times as long in diameter as the posterior, configura-

tion of vertex similar, clypeus and mandible: Fig. 11, relative length of antennal joints 3, 4 and 5 approximately 34, 22 and 22, from joint 3 to joint 11 a series of distinct rhinaria observed, on joint 3 short and located near the apical end, on others extended over whole the length, but progressively narrower apically, besides this series the other of the shorter rhinaria on joints 5–9 observed, on 4 and 10 very indistinct. Abdominal petiole in relative length 50, shorter than tergite 1 or 2 (relatively 70 and 65), hind tarsal joints 1, 2, 3 with relative length 77, 40, 30, wing venation and longer spur of hind tibia as in ♂. Punctuation and ground sculpture similar, but on propodeum transverse striae stronger and distinct, without the raised ridges, appearing transversely, finely and closely striate.

Holotype: ♂, Thailand (Pattaya), 1. VIII. 1971, T. TANO leg. (Coll. TANO).

Paratypes: 2 ♀, Thailand (1 ♀, Bangkok, 28. VII; 1 ♀, Ayuttaya, 3. VIII.), T. TANO leg. (Coll. TANO).

6. *Ammophila clavus atripes* Smith, 1852

Ammophila clavus atripes: TSUNEKI, 1967e, p. 12–15.

Specimens examined: 2 ♀ 1 ♂, Thailand (Chieng Mai, 6. VIII); 1 ♂, Malaya (Kuala Lumpur, 12. VIII).

Distribution: India, Burma, Thailand, Malaya and Indo-China.

Remarks. The subspecific character of the Southeast Asiatic population of this species pointed out in my previous paper (1967) was distinctly reconfirmed upon the specimens examined, namely the 1st segment of the abdominal petiole was much longer than the 2nd. In ♀♀ they are 36:28 and 35:29, and in ♂♂ 39:30 and 34:26.

7. *Sceliphron* (*Sceliphron*) *madraspatanum* (Fabricius, 1781)

Sceliphron (*Sceliphron*) *madraspatanum*: VAN DER VECHT et VAN BREUGEL, 1968, p. 225.

Specimens examined: 3 ♀ 20 ♂, Thailand (Bangkok, 3 ♂, 26, 27, 28. VII; Ayuttaya, 1 ♀, 29. VII; 1 ♀ 1 ♂, 3. VIII; Sara Buri, 4 ♂, 31. VII; Chieng Mai, 1 ♀ 2 ♂, 6. VIII; Mae–Tang, 8 ♂, 7. VIII; Doi Sked, 1 ♂, 8. VIII; Lan Pang, 1 ♂, 9. VIII).

Remarks. According to VAN DER VECHT (1968) the specimens examined can be divided locally into the following forms:

Chieng Mai (1 ♀ 2 ♂): Forma *andamanicum* KOHL (In ♂ thorax-complex except tegulae wholly black, in ♀ postscutellum with a transverse yellow band).

Mae Tang (8 ♂): Forma *andamanicum* (4 ♂ with thorax-complex wholly black, 1 ♂ with collar carrying two minute spots, 1 ♂ with postscutellum yellow banded and 2 ♂ with collar carrying two medium-sized spots and postscutellum yellow banded).

Ayuttaya (2 ♀ 1 ♂): Typical form (but mesopleuron with two transverse yellow marks below the tegula, pronotum with two yellow spots, scutellum in 1 ♀ 1 ♂ marked with a yellow spot and postscutellum in all marked with yellow).

Doi Sked (1 ♂): Typical form (collar with two minute spots and postscutellum with a narrow band).

Lan Pang (1 ♂): Typical form (collar with two spots and postscutellum yellow banded).

Sara Buri (4 ♂): Typical form (in 1 ♂ mesopleuron with two marks, collar with two spots and scutellum and postscutellum marked with yellow; in other three scutellum immaculated, otherwise similar).

Bangkok (3 ♂): Typical form (Mesopleuron with two marks, collar with two medium-sized spots and scutellum and postscutellum marked with yellow; in one male mesopleuron and scutellum immaculated).

According to the above *andamanicum* KOHL is considered also to be a form of the highland. In comparison with the Formosan or the Japanese specimens the representatives of Thailand are much smaller in body size, mostly measuring 15 mm or so, the largest female being only about 18 mm.

8. *Sceliphron* (*Chalybion*) *bengalense* (Dahlbom, 1845)

Sceliphron (*Chalybion*) *bengalense*: TSUNEKI, 1967e, p. 8.

Specimens examined: 14 ♀ 26 ♂, Thailand (Bangkok, 4 ♀ 3 ♂, 26. VII, 1 ♂, 28. VII, 1 ♀ 6 ♂, 2. VIII; Ayuttaya, 2 ♂, 29. VII, 1 ♀, 3. VIII; Sara Buri, 4 ♂, 31. VII; Mae-Tang, 3 ♀ 1 ♂, 7. VIII; Doi Sked, 2 ♀ 3 ♂, 8. VIII; Lan Pang, 3 ♀ 6 ♂, 9. VIII); 1 ♂, Malaya (Kuala Lumpur, 12. VIII).

Distribution: Widely distributed over the Oriental Region.

9. *Dolichurus amamiensis* Tsuneki et Iida, 1964

Dolichurus amamiensis TSUNEKI et IIDA, 1964, p. 41; 1967c, p. 13 (♀).
Dolichurus puliensis TSUNEKI, 1967c, p. 10 (♂).
Dolichurus puliensis (♂) = *D. amamiensis* (♀), TANO et TSUNEKI, 1970, p. 40.

Specimens examined: 2 ♂, Thailand (Ayuttaya, 1 ♂, 3. VIII; Doi Sked, 1 ♂, 8. VIII).

Remarks. No note-worthy difference from the Japanese and Formosan form could be observed on the specimens. The specimen from Doi Sked was a very small individual, measuring only 4 mm.

10. *Cerceris variaesimilis* Maidl, 1926

Cerceris variaesimilis: VAN DER VECHT, 1964, p. 358; TSUNEKI, 1970, p. 20.

Specimen examined: 1 ♂, Thailand (Sara Buri, 31. VII).
Distribution: S. E. Asia, Formosa and Japan (Kyushu).

11. *Cerceris kedahae* Pagden, 1934

Cerceris kedahae PAGDEN, 1934, p. 17; VAN DER VECHT, 1964, p. 354.

Specimens examined: 15 ♂, Thailand (Chieng Mai, 13 ♂, 6. VIII; Mae-Tang, 2 ♂, 7. VIII).
Distribution: Malaya, Sumatra and Java, new to Thailand.

12a. *Cerceris pictiventris pictiventris* Dahlbom, 1845

Cerceris p. pictiventris: VAN DER VECHT, 1964, p. 354.

Specimens examined: 2 ♂, Thailand (Ayuttaya, 29. VII); 6 ♂, Malaya (Kuala Lumpur, 12. VIII).
Distribution: Known from Malaya and Java, new to Thailand.
Remarks. In the specimens of Thailand the maculae on the head are pale yellowish white, while in those of Malaysia the maculae are yellow.

12b. *Cerceris pictiventris bariana* ssp. nov.

Closely resembling ssp. *immolator* SMITH, 1864 (= *papuana* CAMERON, after VECHT, 1964) from Papuan area, having lateral marks on tergite 4, but the marks are transverse, not longitudinal, the band on tergite 5 is complete (in *immolator* medianly interrupted) and the band on tergite 6 (♂) is interrupted in middle. Further, the lateral marks on the propodeum is comparatively large. In the specimens of the typical race the marks are considerably varied in size, but those of the present subspecies are the largest of all that have been observed. ♀, unknown.

Holotype: ♂, Indonesia (Is. Bari), 14. VIII. 1971, T. TANO leg. (Coll. TANO).

13. *Cerceris latidens* Cameron, 1902

Cerceris latidens CAMERON, 1902b, p. 99 (♀); VAN DER VECHT, 1964, p. 364.

Specimen examined: 1 ♀, Borneo (Mt. Kinabalu), 19. VIII.
Distribution: Hitherto known from Borneo and Java.

14a. *Bembix borrei thaiana* Tsuneki, 1963

Bembix borrei thaiana TSUNEKI, 1963, p. 25.

Specimens examined: 10 ♀ 7 ♂, Thailand (Ayuttaya, 29. VII).
Distribution: Hitherto known from Thailand only, the typical race has been recorded from Sikkim, Burma, Tenasserim, Ceylon and Java.
Remarks. In my previous paper I dealt with the population of the species in Thailand as a local race, basing on six characters of the male. According to the observations of the above listed specimens the differences enumerated by me except that regarding the antennae are all within the variation range of the species. *B. b. thaiana* is, therefore, based on the character of the antennae only.

An aberratio. In one of the male specimens collected at Ayuttaya the size is very small (9 mm only), antennal scape carry a large white mark on the inside, the usual mesonotal U-shaped mark is twice interrupted into 4 pieces, 2 short longitudinal lines on the anterior portion and 2 small spots on the posterior portion, both are remotely separated from each other; yellow band on the propodeum are very narrow and the posteriormost one is disappeared, only leaving a small spot on each side, the yellow bands on the abdomen are much more greenish and much narrower than in others, without showing free black spots on the bands. In structure the teeth on antennal joints 6 and 7 very feeble, approaching to the state of the typical race, the punctures on the thorax are larger and sparser, metasternum with the apical furrow much shallower and apical narrowed part of sternite 7 is broader and shorter. Thus the specimen appears to belong to a different species.

However, in the essential structure of the antennae, clypeus, interantennal elevation, in the contour of the vertex and in the characters of the wing venation and of the legs there is no note-worthy difference can be observed. The same can also be said with respect to the structure of the genitalia.

Specimen: 1 ♂, Thailand (Ayuttaya), 29. VII. 1971, T. TANO leg.

14b. *Bembix borrei bariensis* ssp. nov.

In ♀ clypeus wholly except the upper margin, inner orbits comparatively broadly and scape of antennae broadly beneath yellowish white; flagellum beneath narrowly pale ferruginous, the U-shaped mark on mesonotum is interrupted at the latero-posterior corners and the posterior line is cut into two spots.

In ♂ clypeus wholly or except a narrow upper margin, scape except above and inner orbits broadly yellow, sometimes supraantennal area yellow maculated and the marks in front of the ocellar area much larger; the U-shaped mark on mesonotum as in ♀, sometimes with the posterior line intact. Antennal joints 6 and 7 almost without tooth as in typcial race, when present very weak, and tergite 7 with the lateral margins much more distinctly sinuate (Fig. 12) than in *borrei thaiana*.

Holotype: ♂, Indonesia (Is. Bari), 14. VIII. 1971, T. TANO leg. (Coll. TANO).

Paratypes: 1 ♀ 1 ♂, the same data.

15. *Bembecinus prismatica* (Smith, 1858)

Stizus prismaticus: HANDLIRSCH, 1891, p. 55; BINGHAM, 1897, p. 282.
Bembecinus prismaticus: VAN DER VECHT, 1849, p. 297; TSUNEKI, 1963, p. 24.

Specimens examined: 8 ♀ 11 ♂, Thailand (Ayuttaya, 8 ♀ 1 ♂, 29. VII; Sara Buri, 1 ♂, 31. VII; Doi Sked, 9 ♂, 8. VIII).

Distribution: Java, Sumatra, Malaya and Thailand.

Remarks. In my previous paper I gave the colorific and some other characters of the Thailand population of this species, basing on 1 ♀ 1 ♂ specimens. The observations of the much more numerous specimens before me not only could confirm the results of the previous investigation, but also enabled me to add some supplementary notes on their characters:

Clypeus in ♀ with a more or less blackish mark at base in middle, sometimes very small and obscure; in ♂ clypeus completely yellow. Labrum in ♀ at base broadly, very faintly darkened, in the usual sense it may be called wholly yellow, in ♂ usually similar, but rarely completely yellow. A mark on supraclypeal area in ♀ usually isolated from the inner orbital yellow stripes, sometimes it is intermittently connected with these, in ♂ it always turns into a broad transverse band, broadly connected with the stripes, with a very fine blackish bordering line at each end. The inner orbital stripes in ♀ considerably varied both in width and in completeness, in ♂ always complete and comparatively broad. The lateral margins of mesonotum broadly yellow striped (in this respect

the Thailand specimens differ from those described by Bingham), outer half of the stripe except the posterior fourth discoloured and semitransparent (♀♂), mesopleuron always without yellow mark (♀♂). Scutellum always carries two large oblique yellow marks and postscutellum broadly yellow banded; latero-posterior longitudinal mark on propodeum always well developed (♀♂). Large lateral marks on tergite 1 always separated from each other (♀♂), but the interspace sometimes very narrow and rarely the marks are almost contiguous with each other, medio-apical triangular mark on tergite 3 always present (♀♂), but in one male specimen very small and obscure. Lateral marks of ventral side are in ♀ on sternites 2–4 and in ♂ on sternites 2–5 present, smaller or transversely shorter posteriorly.

In fore wing cubital cell 2 always shortly petiolated as in the typical case of *B. hungaricus*, with no exception as far as the specimens are examined. Relative length to width at apex of antennal joints 3–7 in ♀: 2.9, 2.0, 1.6, 1.4 and 1.2, in ♂: 2.4, 1.7, 1.4, 1.2 and 1.0. In ♀ each joint relatively longer than in *hungaricus japonicus* and in ♂ shorter. Ocular index sense VECHT in ♀ 1.9 (43:23) and in ♂ 2.5 (41:16), length of the clypeus respectively 13 and 12.

16. *Bembecinus reversus* (Smith, 1856)

Stizus reversus: BINGHAM, 1897, p. 281.
Bembecinus reversus: VAN DER VECHT, 1949, p. 300.

Specimen examined: 1 ♀, Malaya (Kuala Lumpur, 12. VIII).

Distribution: Malaya, Sumatra and Java.

Remarks. For comparison with the following species some characters of the specimen are described. Clypeus and labrum yellow and black maculated, the mark on clypeus trapeziform and located medianly at apex, on labrum lunate in form and at base, both considerably large, supraclypeal mark triangular and remotely separated from the inner orbits, the stripes along the orbits not reaching below the base of clypeus, postscutellum transversely yellow, bands on tergites 2–4 complete and, further, tergite 5 also with a small spot on each side, sternites 2 and 3 carry a mark on each side. Antennal scape in front yellow and flagellum beneath very narrowly ferruginous, the colour apically dark brownish; yellow on legs: fore and middle femora narrowly beneath, fore tibiae and tarsi in front, middle tibiae and basal three joints of tarsi, both externally, and a lengthened mark on hind tibiae. Other yellow: a mark on nape, a line on collar, tubercles, a spot on tegulae, axillae and two

medium-sized mark on scutellum. Fore metatarsus comparatively broad, 1.6–1.7 times as long as its maximum breadth, ocular index 2.31. Cubital cell 2 subtriangular.

17. *Bembecinus nyamadanus* sp. nov.

Very closely allied to the preceding species and according to the morphological key of VAN DER VECHT (1949) it runs smoothly to *B. reversus*, but in colour it differs considerably from this and, further, fore metatarsus is much narrower and ocular index smaller. Labrum and clypeus always completely yellow, flagellum beneath broadly ferruginous yellow, postscutellum without yellow band, abdominal tergite 3 always immaculated and legs more broadly and richly yellow maculated.

♂. Length 7.5–8.0 mm. Black with the following portions yellow: Clypeus, labrum, supraclypeal area wholly, antennal scapes in front, flagella beneath broadly (apically slightly ferruginous), a large mark on nape, posterior margin of pronotal collar, tubercles, a spot on tegulae, postero-lateral corners of mesonotum, two small spots on scutellum, a lengthened mark on each side of propodeum posteriorly, two transverse marks on tergite 1, a band on 2, 4 and 5 (in paratype on 4 medially interrupted and on 5 medially narrowed and intermittent into several pieces), postero-lateral marks on sternites 2–4, smaller posteriorly, fore coxae in front largely, femora broadly beneath, tibiae except inside and tarsi except the brownish arolia of fore and middle legs, an elongate mark on hind tibiae, all tibial spurs, joint 1 posteriorly and from joint 2 to base of joint 5 completely of hind tarsi.

In structure similar to the preceding species, but relative length of IOD at vertex and at base of clypeus and the clypeal length 44.5, 16 and 15, ocular index 2.78 accordingly, relative length to width at apex of antennal joints 3–7: 2.5, 1.9, 1.6, 1.3 and 1.1. In fore wing cubital cell 2 subtriangular, but not petiolated above, sometimes with a very short space above. Fore metatarsus approximately thrice as long as wide, with usually 4 spines on outer margin, the spines uniform, nearly as long as the width of the segment. Caudal spines slender, nearly parallel-sided, the median slightly attenuate at the apical portion and rounded at the end. Punctuation as in *B. reversus* SMITH.

♀. Length 8.0–8.5 mm. In colouration similar to ♂, except the lateral marks on sternite 4 lacking. In structure also similar, except the sexual characters. Relative length of IOD at vertex and at base of clypeus and the clypeal length: 47, 21 and 16, ocular index 2.24 accordingly. Relative length to width at apex of antennal joints 3–7: 2.3, 1.9, 1.5, 1.3 and 1.03. Latero-posterior incisions of propodeum almost lacking as in ♂. Fore metatarsus 1.9–2.0 times as long as wide, with 5 spines on outer margin, the spines similar in length to the width of the segment, the apicalmost one longer and almost contiguous with the next, the spines not flattened, nor dilated, accompanied by one or two tooth-like spinules between.

Holotype: ♂, Thailand (Sara Buri), 31. VII. 1971, T. TANO leg. (Coll. TANO).

Paratypes: 1 ♀ 1 ♂, do.; 1 ♀, Ayuttaya, 3. VIII. 1971, do. (do.).

18. *Bembecinus littoralis* Van der Vecht, 1949

Bembecinus littoralis VAN DER VECHT, 1949, p. 301.

Specimen examined: 1 ♂, Thailand (Sara Buri, 31. VII).

Distribution: Hitherto known from Malaya, Sumatra and Java and new to Thailand.

Remarks. Except for that the ocular index is slightly smaller (2.67 as against 3.1–3.2) and the colouration is somewhat brighter, the male specimen before me well agrees with the description of *B. littoralis*.

Palpi wholly, antennae beneath very broadly (occupying the under half) and supraclypeal area wholly yellow. Postero-lateral marks of mesonotum extended forwards into the parategular marks which are discoloured on outer half, marks on scutellum slightly larger than that of tubercle, the band on postscutellum narrow and postero-lateral spots of propodeum very small and the ventral side of the abdomen with the lateral marks on sternites 2–5. Marks on other parts of the body as given in the original description. The bands on the dorsal side of the abdomen are very similar to those of *B. cyanescent* (RAD.) (cf. TSUNEKI, 1971c: 10). Legs brighter yellow: Coxae partly beneath, fore and middle femora beneath and fairly broadly above at apex, all tibiae except an elongate mark on inside and tarsi except the brown arolia and end joint of hind legs. IOD at postocellus and at base of clypeus relatively 40:15 (ocular index 2.6), length of clypeus relatively 13, antenno-clypeal distance nearly twice as great as oculo-antennal distance, antennal joints 3, 4, 5 subequal in length seen from beneath, 3 about 1.5 times as long as broad at apex, OOD:POD = 10:12, width of postocellus relatively 3.7, median scutal lines finely and distinctly impressed, postero-lateral incision of propodeum gently emarginate, wings with cubital cell 2 subtrapeziform, upper abscissa as long as the transverse radial vein. Length 6.5 mm.

19. *Ammatomus tanoi* sp. nov.

The present species (based on ♀ only) is very closely allied to *A. thaianus* m. In colour almost completely similar (legs broadly red, variegated with black and yellow, tarsi largely yellow), but differs in structure as follows:

Frons between anterior ocellus and middle of interantennal area finely but distinctly canaliculate, abdominal segment 1 (Fig. 13) with posterior half not 'nearly parallel-sided', vertex except the area around anterior ocellus and median part of ocellar area closely, coarsely covered with irregular-sized punctures, punctures along eyes finer and sparser, those on mesonotum deep, distinct in outline, coarse and polygonal in form, the surface subreticulate, with narrow intervals filled with micropoints, punctures on scutellum slightly smaller on the disc, broadly spaced, with interspaces closely micropunctulate, punctures on mesopleuron as large as those on scutellum, rounded and distinct, on subalar area partly confluent, but sparser downwards. Area dorsalis similar in form, medianly broadly impunctate and laterally finely and closely punctured, with intervalic parts covered with 12–13 irregularly spaced medium-sized rounded punctures, outsides the area dorsalis and upper part of posterior flattened wall sparsely scattered with similar punctures. Fine sparse punctures on abdomen also more distinct.

Some supplementary notes. Mandibles, labrum and anterior margin of clypeus bright ferruginous red, the former at base externally yellow and slightly darkened before middle. Ratio of IOD at postocelli and at base of clypeus 31:11 (ocular index 2.82), OOD:POD = 4:15 (= 1:4), OOD nearly as wide as postocellus, occiput medially with a keel-like hair line, formed of the hairs recumbent towards the median line from both sides; length of the abscissae of radial vein from base relatively 1, 2, 3.5 and 4 (that of *thaianus* 1, 2, 2.5 and 3).

♂, unknown.

Holotype: ♀, Thailand (Ayuttaya), 3. VIII. 1971, T. TANO leg. (Coll. TANO).

20. *Larra carbonaria* (Smith, 1858)

Larra carbonaria: TSUNEKI, 1967b, p. 20.

Specimen examined: 1 ♀, Indonesia (Is. Bari), 14. VIII.

Distribution: Tenasserim, Singapore, Philippines, Formosa, Ryukyus and Japan.

Remarks. In the specimen examined the mandibles wholly red, the propodeum on dorsal side formed of three longitudinal planes as given in my previous work, but the angles between the planes much weaker, somewhat approaching the character of *L. fenchihuensis* m. and the surface not reticulate as given by BINGHAM and WILLIAMS, but transversely closely rugoso-striate. The sculpture of the area is, however, considerably variable in this species as given in my paper above cited and never constant (in the original description "shagreened"). The relative length or the ratio of length to width of antennal joints as in the Formosan and the Japanese specimens.

21. *Motes larroides* Williams, 1928

Motes larroides WILLIAMS, 1928, p. 69.
Motes larroides taiwanus TSUNEKI, 1967b, p. 25.

Specimen examined: 1 ♀, Thailand (Chieng Mai, 6. VIII).

Distribution: Philippines, Singapore and Formosa.

Remarks. The specimen agrees better in characters with the Formosan race, *taiwanus* m. than with *larroides* s. str. Judging from the distribution data the Formosan race must be included within the variation range of the species, or some characters in the original description may be incorrect or incomplete, for instance, the pilose bands on the abdomen are described to be on tergites 1–4, but in the specimens from Formosa and Thailand they are invariably on tergites 1–3.

The definition of the genus *Motes* is differently used from that of the present day authors of U. S. A.

22. *Liris* (*Liris*) *aurulenta* (Fabricius, 1787)

Liris aurulenta: BALTAZAR, 1966, p. 333.
Liris (*Liris*) *aurulenta*: TSUNEKI, 1967b, p. 27.

Specimens examined: 2 ♀ 4 ♂, Thailand (Sara Buri, 1 ♂, 31. VII; Doi Sked, 1 ♀, 8. VIII; Lam Pang, 1 ♀ 3 ♂, 9. VIII).

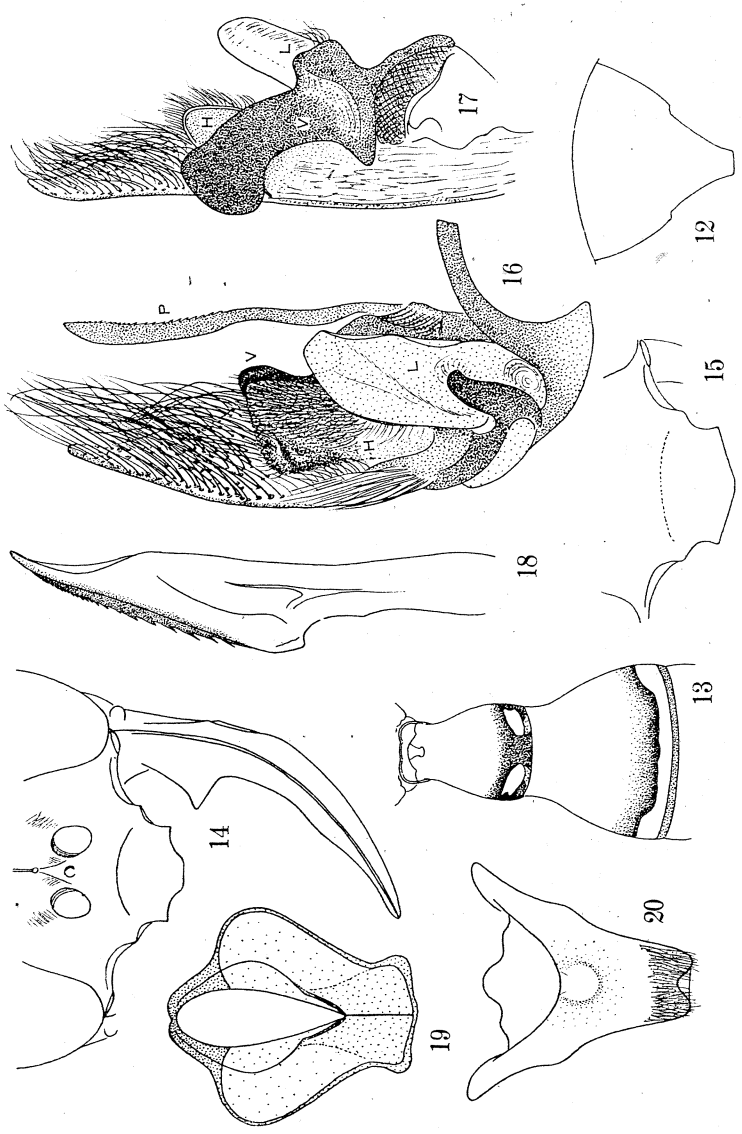
Distribution: Widely distributed from Africa, South and Southeast Asia, extending northwards to the Ryukyus and eastwards to Hawaii.

23. *Liris* (*Liris*) *nigripennis* (Cameron, 1889)

Nogotonia nigripennis CAMERON, 1889, p. 131; BINGHAM, 1897, p. 206.

Specimens examined: 2 ♂, Thailand (Chieng Mai, 6. VIII).

Supplementary notes on the characters (♂). Clypeus slightly varied in form of the anterior margin (Figs. 14 and 15), disc at base gently



12–20. 12 — *Bembix borei bariana* ssp. nov., ♂, the 7th tergite, 13 — *Ammatomus tanoi* sp. nov., ♀, abdominal segments 1 and 2; 14–20 — *Liris* (*Liris*) *nigripennis* (CAMERON), ♂: 14 — clypeus and mandible, 15 — do., the other instance, 16 — left half of genitalia seen from beneath: P — penis, V — volsella, H — haired appendage of paramere, L — lobiform appendage of basiparamere, 17 — right half of genitalia seen from inside, V, H, L — do., 18 — penis valve in lateral view, 19 — cardo of genitalia, 20 — the 8th sternite

raised and from basal third apically depressed and slightly concave, mandible long (Fig. 14), nearly as long as antennal joints 3+4+5, with a stout tooth on inner margin, antennal joint 1 strongly unicarinate, joints 3 and 4 nearly equal in length, approximately 2.7 times as long as broad at apex, joints 5–10 carrying rhinaria, on 5 very small, on 6 half the length of the segment, on 7–10 more than half of the respective segment, elliptic in form, with surface flattened and distinctly outlined, ultimate joint about thrice as long as broad at base. Mesonotum with apical margin weakly crenate, propodeum medianly longitudinally, finely and not strongly carinate, the carina reaching near the apical margin of the dorsal aspect, the surface mat and transversely sparsely (or moderately closely) striate, the striae on the lateral areas sparser, stronger, less in number and more distinct, on the disc interspaces of the striae minutely, weakly sculptured, posterior wall truncate, medianly finely canaliculate and transversely, somewhat arcuately and fairly closely striate (in one of the specimens the striae much weaker and broadly obsolete at the centre), lateral carinae distinct up to near the spiracles, sides of the segment transversely, sometimes coarsely, sometimes closely, weakly and partly obsoletely striate, metasternum apically narrower, with the sides reflected and with apex deeply incised, median carina interrupted by the scrobe towards middle. Fore femora in front at base flattened and at apex gently excavated and broadly flattened beneath, this flattened area seen from behind slightly curved and covered densely with golden pile, middle femora also broadly flattened in front and broadly excavated behind, hind femora gently roundly excavated at base behind (as a result mid and hind femora strongly keeled beneath), hind tibiae markedly tricarinate, the central carina stronger and acuter, basal tuft of hair of the longer tibial spur of hind leg moderately long, very dense, the opposing hair tuft of the metatarsus dense, much longer and gradually shorter apically. Wings fusco-hyaline, with a slight yellowish tinge and purplish lustre and darker at the apical margin. Pile on head and thorax golden, on mesonotum at the medio-anterior depressed area and at the lateral margins closer and more distinct.

Genitalia (Fig. 16, left half from beneath) very similar in structure to those of *L. aurulenta* (F.) (TSUNEKI, 1967b: 27). Paramere with a lamellate curved lobiform appendage (L in Fig. 16 and Fig. 17) at base and a densely haired one (H in the same figures) towards middle just behind the lobiform one. Volsella seen from beneath hidden behind the two appendages of paramere (Fig. 16, V), seen from outside well visible (Fig. 17, V, right side one). Penis: P in Fig. 16, seen from the side: Fig. 18,

inner and produced side serrate, the serrae fine and dense upwards or apicalwards. Cardo of genitalia: Fig. 19 (ventral view), end sternite (do.): Fig. 20. Length 14 and 16 mm.

24. *Liris* (*Dociliris*) *subtessellata* (Smith, 1856)

Liris (*Dociliris*) *subtessellata*: TSUNEKI, 1967b, p. 32.
Motes subtessellata: BALTAZAR, 1966, p. 333.

Specimens examined: 9 ♀ 15 ♂, Thailand (Bangkok, 1 ♀ 3 ♂, 26, 28. VII; Sara Buri, 6 ♂, 31. VII; Chieng Mai, 5 ♀ 1 ♂, 6. VIII; Mae-Tang, 2 ♂, 7. VIII; Doi Sked, 1 ♀ 1 ♂, 8. VIII; Lam Pang, 1 ♀ 1 ♂, 9. VIII); 1 ♂, Malaya (Kuala Lumpur, 12. VIII); 1 ♀ 1 ♂, Borneo (Mt. Kinabalu, 19. VIII).

Distribution: From eastern Mediterranean region through the Oriental Region as far north as the southern Ryukyus and to the wide range of the Pacific Islands.

Remarks. The three male specimens from Chieng Mai, Mae Tang, both Thailand and from Mt. Kinabalu (Borneo) have the hind femora markedly darkened, the red is restricted to the apical half or third of the segment.

25. *Liris* (*Dociliris*) *deplanata binghami* Tsuneki, 1967

Notogonidea deplanata, var. BINGHAM, 1897, p. 203.
Liris (*Notogonidea*) *deplanata binghami* TSUNEKI, 1967a, p. 1–6.
Liris (*Dociliris*) *deplanata binghami*: TSUNEKI, 1967b, p. 27.

Specimens examined: 1 ♀ 3 ♂, Borneo (Mt. Kinabalu, 17. VIII).

Distribution: India (high altitude), Borneo (first record), Formosa and the Ryukyus.

26. *Liris* (*Dociliris*) *laboriosa* (Smith, 1856)

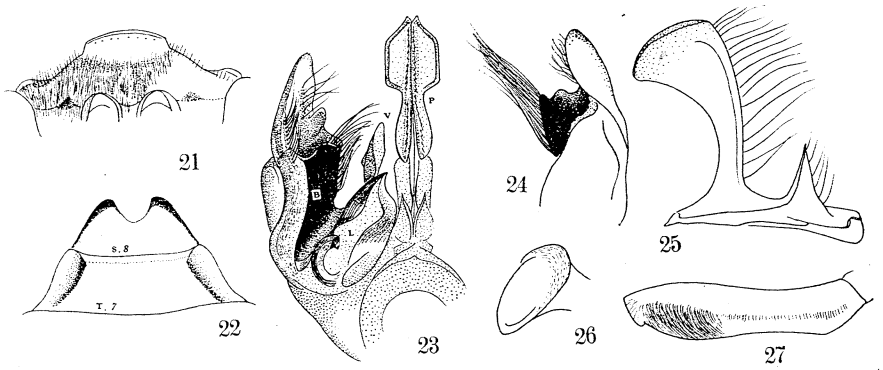
Notogonidea laboriosa: WILLIAMS, 1928, p. 72.
Motes laboriosa: BALTAZAR, 1966, p. 330.
Liris (*Dociliris*) *laboriosa*: TSUNEKI, 1967b, p. 30.

Specimens examined: 4 ♂, Thailand (Sara Buri, 3 ♂, 31. VII; Mae Tang, 1 ♂, 7. VIII).

Distribution: India, Burma, China, Philippines, Formosa and S. Ryukyus, new to Thailand.

27. *Liris* (*Dociliris*) *tanoi* sp. nov.

Closely resembling the male of *L. docilis* (SM.), can be distinguished therefrom, however, by the length relation of antennal joints 2 and 3, by the much less yellowish wings, by the more distinct medial carina on the propodeum and by the less strongly excavated fore femur. In the genital organs the paramere longer, with the black appendage slightly different in form, volsella also different in structure. Hairing on the head and thorax as in *L. docilis*, but on the propodeum and postscutellum somewhat longer, greyish white, bands of pile on the abdomen are on tergite 1–3, silverily glittering and the ventral side without particular hairing.



21–27. *Liris* (*Dociliris*) *tanoi* sp. nov., ♂, 21 — clypeus, 22 — abdominal tergite 7 and sternite 8 in dorsal view, 23 — left half of genitalia seen from beneath: L — lamellate appendage, B — black appendage, V — volsella, P — penis valve; 24 — black appendage of paramere seen from inside, 25 — right volsella seen from inside, 26 — do., seen from apex, 27 — fore femur seen from behind

♂. Length 8.0–8.5 mm. Black; mandibles apically slightly reddish, palpi and tegulae of wings dark brown, tarsal spines ferruginous; wings hyaline, with a very faint tint of yellow, apical margin darkened.

Minimum IOD at vertex as long as antennal joints 2 and 3 combined (joint 2 should be measured in the state of straight stretching or, when bent, from the constriction beneath), a fine carina in front of anterior ocellus reaching about middle of the frontal furrow which is distinct up to the antennal base. Clypeus: Fig. 21, the bevelled area very narrow, almost lacking, but the glabrous part comparatively broad, anterior margin gently rounded out, sometimes very weakly emarginate in middle, sometimes entire, the disc at base in middle gently roundly elevated;

antennal joint 1 strongly unicarinate beneath, joint 2 about half as long as joint 3, 3 seen from beneath approximately 1.5 times, from above about 1.7 times as long as broad at apex, 4 slightly longer than 3, joints 4–13 carrying rhinaria, on ultimate joint not reaching the apex and roundly ended, mesonotum with medio-anterior impression very shallow as in *docilis*, scutellum and postscutellum each with a feeble impression in middle, metasternum very similar to that of *docilis*, with apex deeply incised, with sides markedly curved up, at base in middle furrowed and on apical part medianly carinated, propodeum with lateral longitudinal carinae intermittent, on dorsal part anteriorly weaker, not reaching the spiracles and on posterior part only at posterior half distinctly keeled, no particular transverse carina between the dorsal and posterior aspects, sides of tergite 7 posteriorly incrassate and shortly produced at apex (Fig. 22), sternite 1 medianly with a fine longitudinal carina, end sternite deeply roundly incised at apex (Fig. 22). Genitalia (left half) seen from beneath: Fig. 23, basiparamere with a lamellate appendage and the apical part with a strongly haired black appendage, the latter seen from inside: Fig. 24, right volsella seen from inside: Fig. 25, seen from apex: Fig. 26, apical portion of digitus curved inwards, penis valve seen from beneath as given in Fig. 23 (similar to that in other members of subgen. *Dociliris*). Fore femur seen from behind: Fig. 27, hind femora strongly excavated beneath as in *docilis* and hind tibiae strikingly carinated on outer and posterior sides.

Head and thorax with punctures very fine and dense as in *docilis*, with the surface not shining, metapleuron with a few weak longitudinal striae, propodeum covered with well spaced, not strong, slightly rugose, transverse striae, intervals of the striae mat and in part delicately rugulose, the striae diminishing in number towards the sides and becoming stronger, posterior wall with sculpture similar to that of the lateral areas of dorsal aspect, sometimes with the striae strongly carinate and much less in number, sides of the segment obliquely, moderately closely striate.

Holotype: ♂, Thailand (Chieng Mai), 6. VIII. 1971, T. TANO (Coll. TANO).

Paratype: 1 ♂, the same place and time (Coll. TSUNEKI).

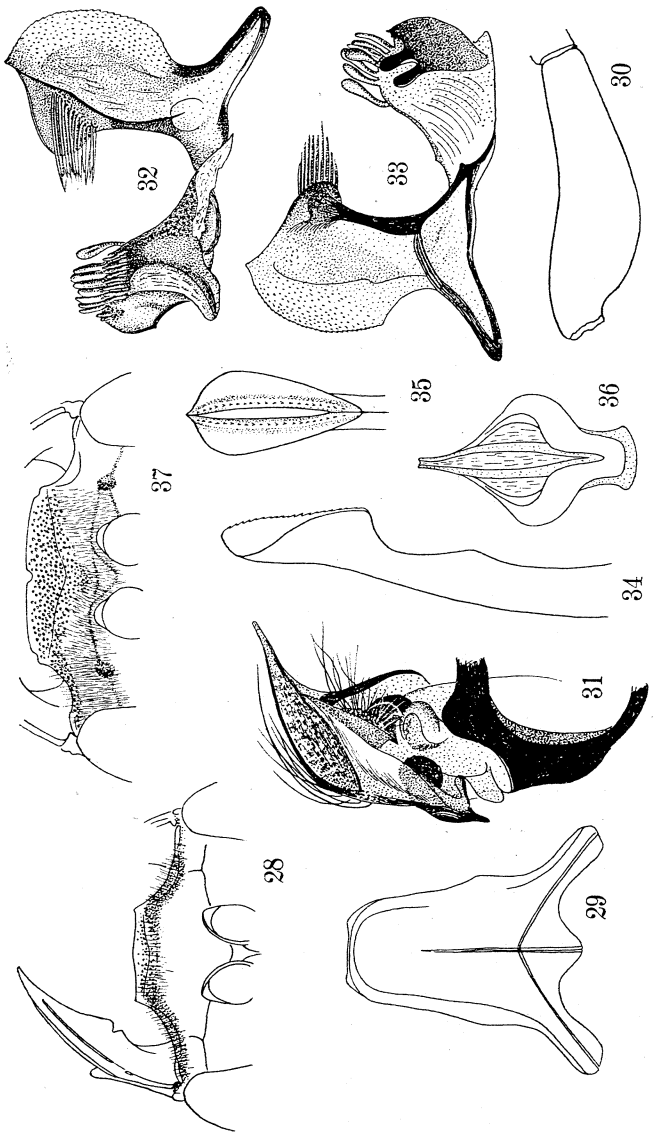
28. *Liris* (*Dociliris*) *clypeopunctata* sp. nov.

The male of this species is very close to the preceding species, but with antennal joint 3 comparatively much shorter and, together with the female, has the bevelled part of the clypeus distinct and fairly closely

punctured. As to the 2nd character the specimens are similar to *L. laboriosa* (SM.), but in the female of the present species the wings and the bodily hairs, especially those on the pygidial area, are not so yellowish, the sculpture on the propodeum is different and the body is much smaller, and in the male the structure of the fore and hind femora is markedly different.

♂. Length 6.5 mm. In colouration similar to *L. tanoi* except that the mandibles are on apical half brighter red, and in structure, punctuation and sculpture and in hairing it is also similar to this species except the following: Minimum IOD at vertex more than as long as antennal joints 2 and 3 combined (15:12, joint 2 should be measured in the condition as given regarding *L. tanoi*), joint 3 about 1.4 times as long as broad at apex (rhinaria on joints 4–13 as in *tanoi*), clypeus with anterior margin of the medial produced part nearly truncate (Fig. 28) and at the lateral corners acutely angulated, the bevelled part present, medianly broader and sparsely punctured (do.), punctures anteriorly almost lacking; the pile on the sides of mesonotum in some light appears deep brassy (pile on head in front silvery), the fine median carina of propodeum nearly reaching the apex of the dorsum, end sternite not incised at apex, but broadly subtruncate (Fig. 29), fore femur not excavated beneath, only weakly flattened (Fig. 30) and hind femur without excavation beneath, only with a narrow flattened area. Genitalia markedly different.

Some further notes. Radial vein of fore wing with abscissae in the following length relation: $4 > 1 > 3 > 2 = 5$, difference between 3 and 2 very slight, lateral carinae of dorsal and posterior aspects of propodeum complete and strong, minutely zigzaged, reaching anteriorly the apex of the impressed area behind the spiracles, dorsal surface finely longitudinally carinate in middle, the carina weaker posteriorly, but reaching near the apex of the dorsum, the surface transversely, weakly and moderately closely rugoso-striate, with interspaces mat and finely, irregularly and much more weakly rugulose, the rugose striate stronger laterally and less in number as in *L. tanoi* (in the specimen some short longitudinal distinct striae on latero-posterior portions observed), posterior wall transversely, weakly, rather sparsely striate, the uppermost carina of the wall stronger and medianly minutely depressed in a V-shape, sides obliquely, coarsely striate, but the striae broadly obsolete at the centre. Of the genitalia paramere (left side) seen from beneath: Fig. 31, the appendages not well developed, left volsella seen from inside: Fig. 32, seen from outside: Fig. 33, digitus on upper ventral side with a tuft of hairs and cuspis carrying strange spatulate lamellae and at the ventral



28–37. *Liris* (*Dociliris*) *clypeopunctata* sp. nov.; 28–36 — ♂, 37 — ♀, 28 and 37 — clypeus, 29 — abdominal sternite 8, 30 — fore femur, 31 — left paramere seen from beneath, 32 — left volsella seen from inside, 33 — do., from outside, 34 — penis valve seen from the side, 35 — do., apical portion seen from beneath, 36 — cardo of genitalia seen from beneath

end two strongly chitinized black spatulate appendages penis valve seen from the side: Fig. 34, its apical part seen from beneath: Fig. 35, basal ring or cardo: Fig. 36.

♀. Length 9.0 mm. General punctuation, hairing and pilosity and colouration as in ♂, but the mandibles dark brown at apex, reddish medial part is somewhat darker. Clypeus: Fig. 37, minimum IOD at vertex very slightly more than as long as antennal joint 3 (14:13), joint 3 approximately 2.3 times as long as broad at apex, sculpture of propodeum as in ♂, pygidial area covered with brassy hair, with apical spinules 8–9 in number, dark brown in colour. Abscissae of radial vein with relative length 4 1 2 3 5, recurrent veins at the upper ends with interspace as long as abscissa 5 of radial vein, the 2nd ended slightly before middle of cubital cell 2.

Holotype: ♂, Thailand (Sara Buri), 31. VII. 1971, T. TANO leg. (Coll. TSUNEKI).

Paratype: 1 ♀, Thailand (Lam Pang), 9. VIII. 1971, T. TANO leg. (Coll. TANO).

29. *Liris* (*Nigliris*) *albopilosa* Tsuneki, 1967

Liris (*Nigliris*) *albopilosa* TSUNEKI, 1967b, p. 38; HANEDA, 1972, p. 4.

Specimens examined: 1 ♀ 4 ♂, Thailand (Ayuttaya, 3 ♂, 29. VII; Doi Sked, 1 ♀ 1 ♂ 8. VIII).

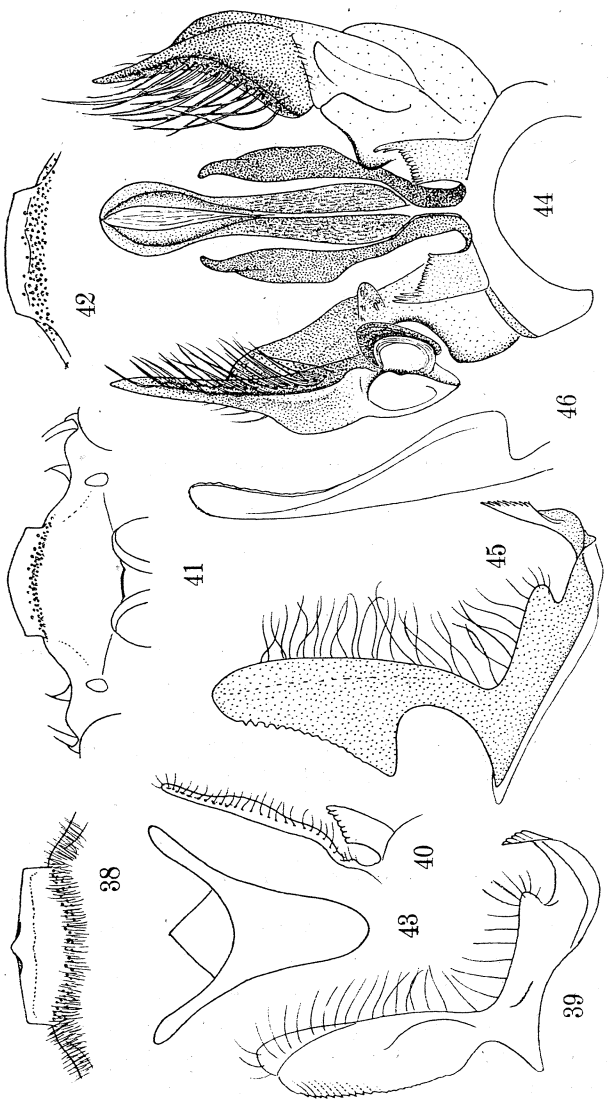
Distribution: Hitherto known from Formosa only.

Remarks. The specimens well agree in character with the Formosan population. Variation in the rhinaria on the flagellar joints of the antennae is also similar, that is to say, mostly on joints 6–12, sometimes on 7–12 and on 6, when present, the smallest. Clypeus in ♂: Fig. 38, volsella of genitalia (right side) seen from inside: Fig. 39, do. (left side) seen from beneath: Fig. 40.

30. *Liris* (*Nigliris*) *trifasciata* sp. nov.

This species (based on ♂) is very closely allied to *L. albopilosa* m., only differing in the following characters:

Silvery hairs on thorax and propodeum less long, less dense, but never short nor sparse and the surface sculpture better visible (the hair on the dorsum of propodeum recumbent towards base as in *albopilosa* and posterior wall which is slightly obliquely truncate as in this species appears nearly wholly white seen from above). The pile bands of abdomen only on tergites 1–3 and never on 4. Rhinalia on antennnal joints 6–8



38–46. 38–40 — *Liris* (*Nigliris*) *albopilosa* TSUNEKI, ♂ 41–46 — *Liris* (*Nigliris*) *trifasciata* sp. nov., ♂; 38, 41, 42 — clypeus (42 — a variation); 39, 40, 45 — volsella: 39 — right side, seen from inside, 40 — left side, seen from beneath, 45 — right side, seen from inside; 43 — abdominal sternite 8, 44 — genitalia seen from beneath, 46 — main part of penis valve seen from the side

or 9, when present on 9 restricted to the basal narrow area only, on others occupying whole the span of the respective segment. Clypeus (Fig. 41) with medio-anterior margin gently rounded out, not toothed (or without the tooth-like protuberance) in middle (distance between the lateral angle of the medial produced part and the eye as wide as the produced part). Oblique striae on the sides of propodeum less rugose (in *albopilosa* partly strongly rugose into subreticulate as a rule). Volsella of genitalia different in structure (Fig. 45, cf. Fig. 39).

Other main characters: IOD at vertex slightly longer than antennal joints 2 and 3 taken together (14:12–13), joint 3 slightly shorter than 4 and 1.7 times as long as broad at apex, clypeus more or less varied in form (Figs. 41 and 42), with the bevelled area distinct, on basal portion sparsely punctured. Genitalia seen from beneath: Fig. 44, with paramere and penis valve as in the compared species, but the volsella dissimilar, seen from beneath as in Fig. 44, seen from inside: Fig. 45, main part of penis valve seen from the side: Fig. 46, 8th sternite: Fig. 43. Radial vein of fore wing with the relative length of the abscissae more or less varied as in *albopilosa*, most usually $1 = 4 > 2 = 5 > 3$, but sometimes $3 > 2$, and 5 (transverse radial vein) distinctly obliquely truncate, recurrent veins received by cubital cell 2 always before middle, but the distance between the veins at the upper ends more or less variable. Punctures on head and thorax as in *albopilosa*. Hairs on ventral side of abdomen are on sternites 3–6, short, curved up and dense, mixing a few longer erect hairs.

♀, unknown.

Holotype: ♂, Thailand (Bangkok), 28. VII. 1971, T. TANO leg. (Coll. TANO).

Paratypes: 9 ♂, Thailand (Bangkok, 7 ♂, 26, 28. VII.; Chieng Mai, 1 ♂, 6. VIII.; Mae Tang, 7. VIII. 1971, T. TANO leg. (Coll. TANO).

Remarks. In half of the specimens from Bangkok the rhinaria are on antennal joints 6–8, in all others on joints 6–9. Punctures on mesopleuron more or less varied in size and in density, generally in the specimens from Bangkok they are somewhat finer and sparser. Dorsum of propodeum usually anteriorly somewhat coarsely and posteriorly finely rugoso-subreticulate, but sometimes moderately closely or somewhat coarsely, transversely in the main, rugoso-striate, with sparse indistinct short longitudinal carinulae scattered.

31. *Liris* (*Nigliris*) *punctata* sp. nov.

This species (♂) is apparently a mere variation of the preceding species, differing externally only in that the bevel of the clypeus is fairly closely punctured and its anterior margin is slightly different in form (Fig. 47), but internally the volsella of genitalia markedly different in structure. In the natural position between the paramere and the penis valve, seen from beneath, the upper swollen part (digitus) has its ventral side (from the structure itself the part should be called dorsal side) longitudinally, deeply furrowed, the outside edge of the furrow is serrate, medial protuberance (cuspis) is much broader (Figs. 48, 49, 50, especially 49, cf. Fig. 45). Sculpture on dorsum of propodeum as in the coarse instance of the preceding species, namely, transversely rugoso-striate, the rugae at base rather coarse and close apically, with short longitudinal rugulae scattered, the surface medianly till about middle carinated. Otherwise as in *L. trifasciata*. Length 5.5 mm. ♀, unknown.

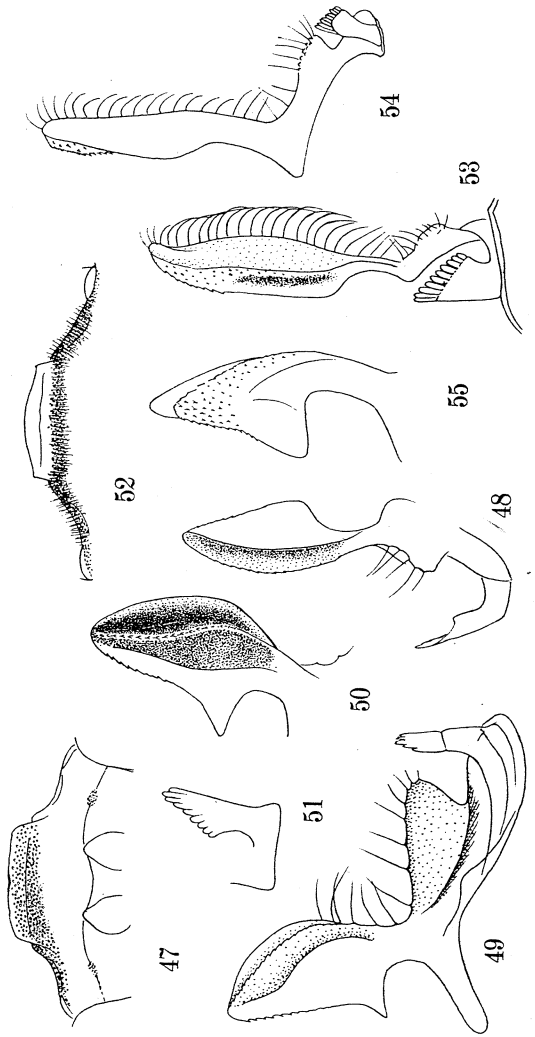
Holotype: ♂, Thailand (Mae-Tang), 7. VIII. 1971, T. TANO leg. (Coll. TSUNEKI).

32. *Liris* (*Nigliris*) *borneana* sp. nov.

The present species (based on ♂ only) is very similar in character to *L.* (*Nigliris*) *trifasciata* above described, differing externally from this in that the rhinaria on antennae are on joints 6–10 and the propodeum is irregularly, not coarsely reticulate and without the medial carina. Internally, however, the volsella of the genitalia is differing in structure and there is no doubt as to the validity of the present species.

Volsella (left side) in the natural position in genitalia seen from beneath: Fig. 53, with the glove-shaped lamella at the ventral end different in form, do. seen from outside, with the part of cuspis vertical: Fig. 54, digital part seen vertically from outside and dorsal side: Fig. 55, this part bent inwards, with outer surface slightly obliquely excavated and with the upper part scattered with small teeth. Clypeus: Fig. 52. Rhinaria on antennal joints 6–10, each occupying the full length of the respective joint, on 10 with apex rounded. IOD at vertex nearly equal to the length of antennal joints 2 and 3 united. Metasternum deeply excavated at apex in middle. Length relation among the sections of radial vein: $1 \fallingdotseq 4 > 2 \geqslant 3$, sternites 3–6 densely covered with erect curved black hair, not mixing the longer ones.

♀, unknown.



47–55. 47–51 — *Liris* (*Nigliris*) *punctata* sp. nov., ♂, 52–55 — *Liris* (*Nigliris*) *borneana* sp. nov., ♂; 47, 52 — clypeus, 48–51, 53–55 — volsella: 48, 53 — left volsella in natural position in genitalia seen from beneath, 49 — do., from outside, 50 — do., digital part seen obliquely from outside and slightly from ventral side, 51 — ventral appendage, 54 — left side seen from outside, with the part of cuspis vertical, 55 — digital part, seen vertically from dorsal and external side

Holotype: ♂, Borneo (Kota Kinabalu), 16. VIII. 1971, T. TANO leg. (Coll. TSUNEKI).

33. *Liris* (*Nigliris*) *japonica* (Kohl, 1883)

? Notogonia intermedia: CAMERON, 1903, p. 1118.
Liris (*Nigliris*) *japonica*: TSUNEKI, 1967b, p. 34.

Specimens examined: 3 ♀, Thailand (Bangkok, 1 ♀, 28. VII; Chieng Mai, 1 ♀, 6. VIII; Doi Sked, 1 ♀, 8. VIII).

Distribution: From Mediterranean region to eastern parts of Asia and broadly on the Pacific Islands, including Middle and North China, Korea, Japan including the Ryukyus, Formosa, Philippines, Borneo, Penang, Singapore and Thailand. This is the first definite record from Thailand.

Remarks. Except for the slightly smaller body size there is no difference in characters between the specimens from Thailand and from Japan. The Thailand population of this species is rather close to that of Formosa.

34. *Liris* (*Cratolarra*) *pitamawa* (Rohwer, 1919)

Notogonidea (*Cratolarra*) *pitamawa*: WILLIAMS, 1928, p. 80.
Cratolarra fuscinerva: TSUNEKI, 1963, p. 8 (Thailand, nec *Larra fuscinerva* CAM., 1900).
Motes pitamawa: BALTAZAR, 1966, p. 332.
Liris (*Cratolarra*) *pitamawa*: TSUNEKI, 1967b, p. 41.

Specimens examined: 4 ♀ 9 ♂, Thailand (Bangkok, 1 ♂, 28. VII; Sara Buri, 1 ♀ 7 ♂, 31. VII; Chieng Mai, 3 ♀, 1 ♂, 8. VIII; Mae Tang, 2 ♀, 7. VIII).

Distribution: Thailand, Singapore, Penang, Borneo, Philippines, Formosa and southern part of the Ryukyus.

Remarks. No note-worthy difference could be discovered between the specimens from Thailand and from Formosa.

Liris (*Colloliris*) subgen. nov.

♀♂. Collar of pronotum slightly thick, triangularly wedge-shaped and raised high, approximately to the level of mesonotum (as in *Nigliris*) and punctures on head and thorax very fine and dense (as in *Dociliris* or *Cratolarra*); ♀. Pygidial area on basal half smooth and polished, on apical half covered with appressed hairs and provided on apical area with a series of spinules.

Type: *Notogonidea negrosensis* WILLIAMS, 1928.

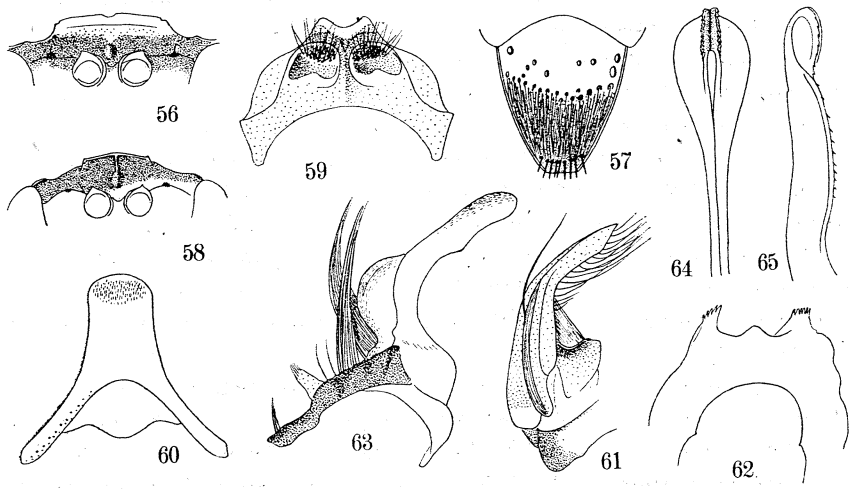
35. *Liris* (*Colloliris*) *negrosensis* (Williams, 1928)

Notogonidea negrosensis WILLIAMS, 1928, p. 74 (♂).
Motes negrosensis: BALTAZAR, 1966, p. 332.

Specimens examined: 1 ♀ 2 ♂, Thailand (Ayuttaya, 2 ♂, 29. VII; Doi Sked, 1 ♀, 8. VIII).

Distribution: Philippines, Singapore, new to Thailand and new to the Continent.

♀ (hitherto undescribed). Length 6.5 mm. Black, mandibles in middle broadly reddish, palpi and tarsi beneath of all legs dark brown. Wings hyaline, with apical half broadly clouded ("and again below stigma across to the hind margin" in the original description may be an error due to



56–65. *Liris* (*Colloliris*) *negrosensis* (WILLIAMS). 56, 57 — ♀, 58–65 — ♂. 56, 58 — clypeus, 57 — pygidial area, 59 — abdominal sternite 7, ventral view, 60 — sternite 8, do., 61 — left paramere of genitalia seen from beneath, 62 — basiparamere showing three processes on top, 63 — left volsella in natural position seen from beneath, 64 — penis valve seen from beneath, 65 — do., from the side

the blackish apical margin of the hind wing lying underneath). Minimum IOD at vertex very short, as long as antennal joint 3, frontal furrow comparatively broad and shallow, medianly with a very fine carina arising from the anterior margin of anterior ocellus. Clypeus: Fig. 56, with the bevel comparatively broad, but without the median raised line on the disc, instead a small gentle rounded elevation at base in middle (do.), antennal joint 1 acutely carinated beneath, joints 3, 4 and 5 almost equal in length, 2 about 2/3 as long as 3, 3 approximately 2.5 times as

long as wide at apex. Propodeum with dorsal and posterior aspects distinctly separated from the sides of the segment by a distinct carina at each lateral margin which reaches anteriorly near the spiracle. Pygidial area: Fig. 57. Length relation between abscissae of radial vein: $4 > 2 > 1 = 5 > 3$, 5 (transverse radial vein) distinctly sinuate, recurrent veins fairly close together at the upper ends, both received by cubital cell 2 before middle; hind tibia externally tricarinate, the carinae in front and behind weak and indistinct, the longer tibial spur of the hind leg nearly as long as the following metatarsus, with hairs at base on inside short and very close.

Punctures on head and thorax very fine and dense, on scutellum slightly sparse, mesonotum on posterior margin not crenate, metapleuron on upper third longitudinally, moderately closely striate, propodeum dull and opaque, rather finely, irregularly and not strongly reticulate, along the lateral carinae shortly, transversely striate, without the median carina, posterior wall transversely, moderately closely, not strongly striate, the uppermost stria at the verge of the inclination somewhat stronger, forming a border line against dorsal aspect, sides of the segment obliquely, closely striate.

Pile on lower frons and clypeus short, fine, not dense, only under certain light appears whitish, on thorax and propodeum similar, on abdomen forming a medianly interrupted band on tergites 1–3, not conspicuous.

Some notes on ♂. Minimum IOD at vertex as long as antennal joints 2 and 3 united, frontal furrow deeper than in ♀, the carina in front of anterior ocellus very short; clypeus: Fig. 58, almost without bevelled area, medianly obtusely carinated, the carina posteriorly enlarged into a gentle rounded elevation; metasternum narrowed apically, with the lateral margins highly raised, medianly at base excavated and then carinated, apical margin fairly deeply incised (the structure similar to that of ♀), pile bands of abdomen on tergites 1–3. Sternite 7: Fig. 59 (ventral view), sternite 8: Fig. 60 (do.). Of the genitalia the paramere seen from beneath: Fig. 61, with a lamellate process on inside near base, the top chitinized and brownish, basiparamere at the top of basal end with three processes, the laterals are strange and appear to be the end lamellae of the volsella, but they are not, they are directly produced from the basal plate (Fig. 62, in the natural condition the part is covered with cardo or the basal ring). Volsella (= *sagitta* of WILLIAMS, 1928) very elongate and strange, in the natural position and seen from beneath: Fig. 63, only partly chitinized (dotted parts), with a tuft of long stiff hairs which is sometimes divided into two groups as in Fig. 63, penis valve seen from beneath: Fig. 64, seen from the side: Fig. 65, the form is very unique. In punctuation similar to ♀, the hair on frons and clypeus slightly thicker, closer and more distinct, appearing silverily glittering, pilosity on thorax and propodeum as in ♀, pile bands on abdomen similar, on ventral side 7 alone carries a curious transverse lone of bristles, in close examination it consists of a pair of transverse tufts of stiff hairs (Fig. 59).

ON THE SPECIES OF *TACHYTES* IN THE ORIENTAL REGION

Since the Bingham's book appeared in 1897, 38 species of the genus *Tachytes* have additionally been described from the Oriental Region by Cameron, Nurse, Turner, Rohwer, Williams and myself, including some that were erroneously placed ones of other genera. These remained quite unarranged except those of the Philippines and Formosa and most of them from other regions can not confidently be grasped as to their distinctions. Especially the identification of the male examples is very difficult, because most of them are only very simply described in addition to the female, without being touched on their important sexual characters except the hair colour of the pygidial area. When the type specimens are comparatively studied actually a considerable number of them will be synonymized with some other species. Such being the case, as to the species dealt with here the stress is placed upon the characters of the specimens observed.

36. *Tachytes formosanus* Tsuneki, 1966

? *Tachytes saundersi* BINGHAM, 1897, p. 189 (♀♂).
Tachytes formosanus TSUNEKI, 1966, p. 12; 1967b, p. 44.

Specimens examined: 2 ♂, Thailand (Chieng Mai, 6. VIII).

Distribution: Known from Formosa only, new to Southeast Asia.

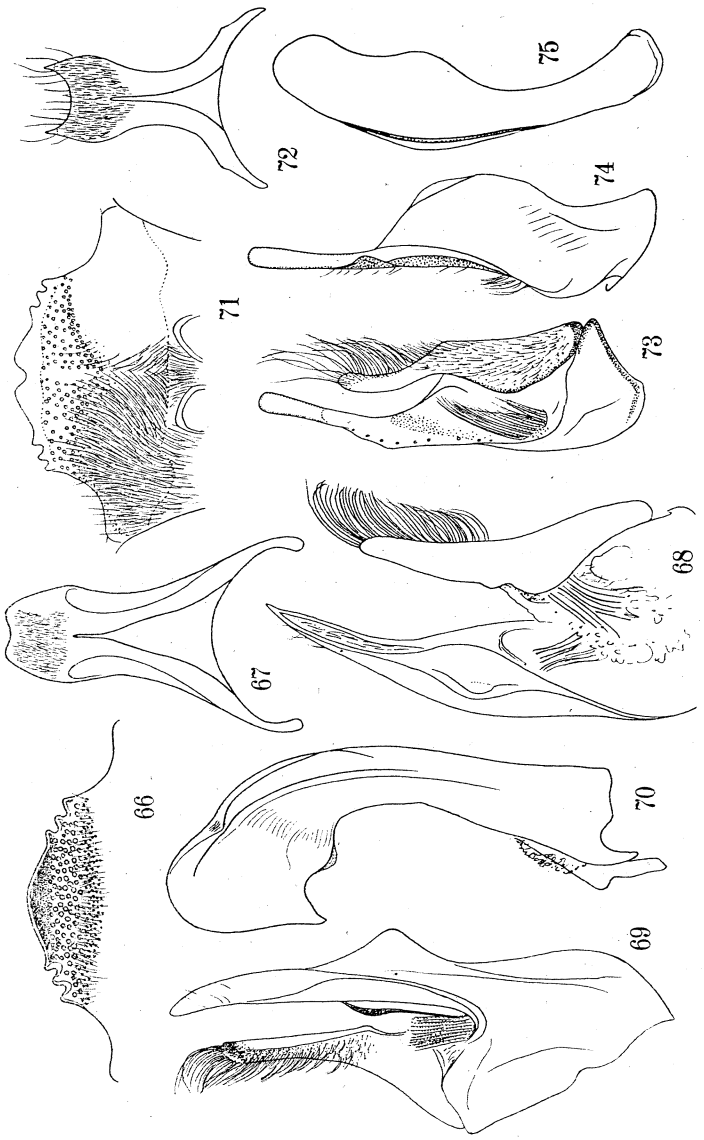
Observation. In the specimens the legs are completely black. Colour of the pubescence seems to be more or less variable. In one specimen the pubescence on the frons and clypeus deep golden, rich in the orange shade, while in the other more lemon yellowish, the pubescence on mesonotum black, with a slight tint of brownish, seen in oblique light denser and slightly brighter on the lateral and posterior margins, in general the pubescence on mesopleuron slightly lighter than on mesonotum and that on propodeum much more so than on mesopleuron. The

pile bands on the abdomen in one specimen with a slight tint of brassy, while in the other completely silvery, the bands are always on tergites 2, 3 and 4 distinct and broad, though medially narrowly interrupted, while on 1 and 5 variable. In the first specimen the band is almost absent on both tergites, only very narrowly remains at the extreme sides of the apical margins, but in the second nearly complete on 5, though nearly absent on 1. Man will say that the former is 3-banded and the latter 4-banded. The short stiff hairs on the pygidial area always silvery. Anterior margin of clypeus: Fig. 66, IOD at vertex very narrow (relatively 12), as long as antennal joint 9, antennal joint 3 seen from above (relatively 20) 2.2 times as long as wide at apex, sternite 8 seen from above or inside: Fig. 67. Of the genitalia dissected right half of paramere and volsella seen from inside: Fig. 68, do. seen from outside: Fig. 69, penis valve seen from the side: Fig. 70. Vertex longitudinally finely canaliculate in middle, the furrow on ocellar area broader, on frons a fine glittering line is observed in the pubescence between anterior ocellus and supraantennal tubercle.

Remarks. The structure of the genitalia as well as the external characters almost completely agrees with that of the Formosan specimens except that the hairs on the thorax-complex are generally more strongly blackish. On the other hand, the characters of the specimens also agree with those of *T. saundersi*, as far as the description goes. Judging from the locality of the specimens examined here it seems highly probable that *T. formosanus* is a local race of *T. saundersi* Bingham. However, there remains a problem in determining the above mentioned relationships, because the specimens of a species of the congener, now placed under the taxon, *T. sinensis* Smith, fairly well agree in characters with *T. saundersi* as well as *T. sinensis*, if the variation in colour of the pubescence is taken into consideration, although in the species of the specimens in question the structure of the male genitalia is markedly different from that of *T. formosanus*. In order to avoid the doubtfull identification I adopted here the name, *T. formosanus* which is quite doubtless to me.

37. *Tachytes dubiosus* sp. nov.

Judging from the descriptions of the known species from the Oriental Region the specimens before me seem to be very similar to *T. magellanica* Williams, 1928, known from the Philippines and from the good description of its external characters it can easily be known that there is almost no difference between the two except that in the specimens before me the



66–75. 66–70 — *Tachytes formosanus* Tsuneki, ♂, 71–75 — *Tachytes dubiosus* sp. nov., ♂. 66, 71 — clypeus, 67, 72 — abdominal sternite 8, dorsal or inner view, 68 — left paramere and volsella seen from inside, volsella somewhat parted, 69 — do., seen from outside, 70, 75 — penis valve seen from the side, 73 — left paramere and volsella seen from inside, 74 — do., seen from above or behind

pubescence on the head and thorax is golden, the mandibles are nearly wholly black and the wings are more strongly yellowish. As to the structure of the male genitalia, however, in comparison with the figures given, some important differences are certainly observed. Amongst the species described from the Indian Continent *T. celsissimus* TURNER, 1917, seems to be closely allied to the present species, but the colour of the pubescence on the frons and clypeus and the character of the 8th abdominal sternite disagree with those of this species and in these characters the specimens of the present species are rather similar to *T. sinensis* sensu TURNER (1917, p. 202)*. In the IOD at the vertex, however, the specimens are far broader than in the compared species. Basing upon the reason given in the general comment I describe the species as new in the following.

♂. Length 13–14 mm. Black; mandibles with an indistinct dark reddish patch towards middle, palpi and tegulae on posterior half bright ferruginous, fore tibiae on inside, tibial spurs and spines of all legs ferruginous; wings fairly strongly yellowish and on apical margin broadly, not strongly clouded, veins ferruginous, stigma brown and costa much darker. Pubescence on frons and clypeus golden, on temples, thorax, propodeum, tergite 1 and legs pale ferruginous, in some light with a more or less brassy shine, the short velvety pile covering the ground surface of the pubescent parts brassy, on mesonotum at the lateral and posterior margins the pubescence recumbent, forming distinct brassy bands, the pile bands on abdomen are on tergites 1–5, silvery, medianly interrupted, on 5 narrow and in some condition not well defined, the short bristles on pygidial area silvery as usual.

IOD at vertex as long as antennal joint 4, vertex broadly, fairly deeply impressed, from the impression up to the posterior edge of vertex runs a fine impressed line, ocellar area medianly more broadly furrowed, the furrow extending below on to frons and finally turns into a glittering line, reaching the top of the supraantennal elevation. OAD:WAS:IAD = 5:8:11, clypeus roundly and highly raised, with anterior margin roundly incised in middle (Fig. 71), antennal joints 2, 3, 4, 5 and 10 with relative length 6, 18, 20, 20 and 17, joint 2 globular, 3 about 2.3 times, 4 and 5 both about 2.4 times and 10 about 2.6 times as long as broad at apex, each joint subcylindric, only very feebly rounded out beneath. Scutellum and postscutellum slightly impressed in middle, propodeum

* According to TURNER *T. sinensis* ♂ has the 8th ventral segment more deeply emarginate at apex (than in *celsissimus*) and with strong teeth at the apical angles. If this is correct (the type of *T. sinensis* is the female) the specimens of East Asis which are now identified with *T. sinensis* come to be different from this species.

short, measured from the basal carina till the end of the impressed area only slightly longer than scutellum (35:30), the impressed area somewhat concave, well shining, with a small glittering rounded tubercle on medio-posterior margin which is perpendicularly inclined on posterior aspect, forming the uppermost part of the posterior wall which is broadly flattened, with a comparatively shallow, not broad furrow in middle. Sternite 8: Fig. 72, in fore wing length relation of the abscissae of radial vein: $4 > 1 > 2 \geqslant 3 > 5$. Of the genitalia left paramere and volsella seen from beneath: Fig. 73, on the upper edge of basiparamere a marked tuft of long hair present, parts of which sometimes stick to each other into a hard bundle as if to be an elongate triangular plate under the low power magnification, the paramere seen from behind or dorsal side: Fig. 74, note the small rounded protuberance on the inner margin at base of the apical slender part; penis valve seen from the left side: Fig. 75.

No particularity present regarding the punctuation and sculpture.

♀, unknown.

Holotype: ♂, Thailand (Chieng Mai), 6. VIII. 1971, T. TANO leg. (Coll. TANO).

Paratype: 1 ♂, do. (do.).

38. *Tachytes maculitarsis* Cameron, 1900

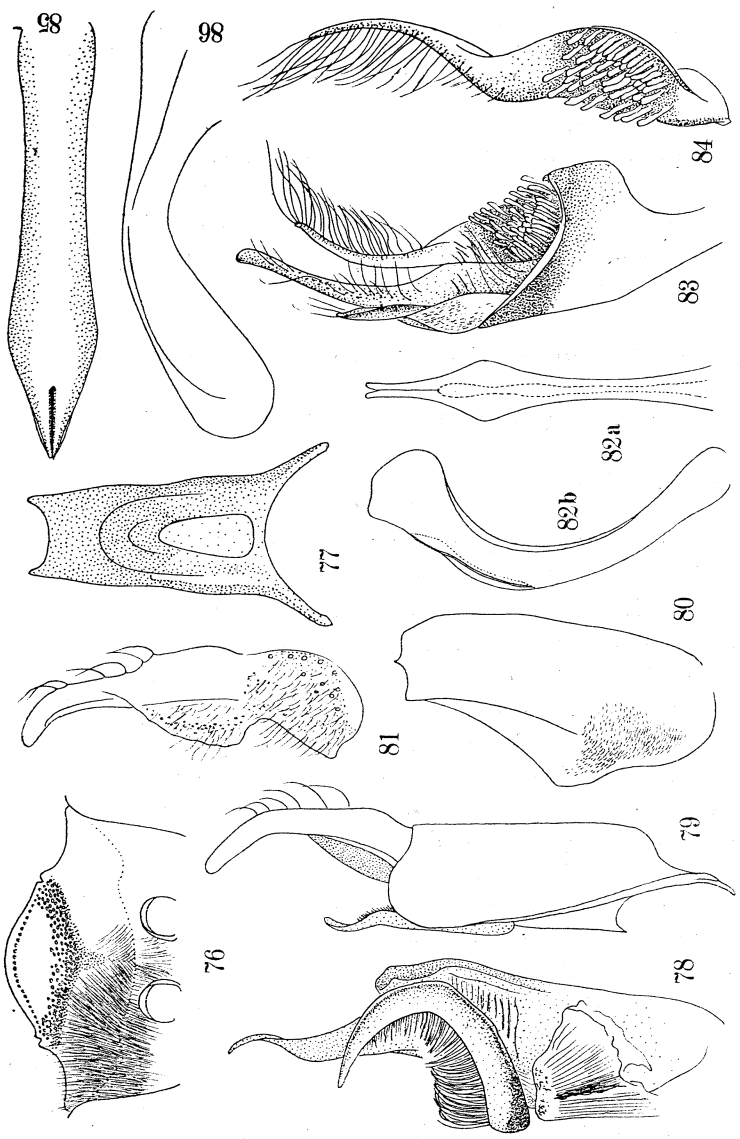
Tachytes maculitarsis CAMERON, 1900, p. 24 (♀).

Specimen examined: 1 ♂, Thailand (Pattaya, 1. VIII).

Distribution: Hitherto known from India, new to Thailand.

The type is the female, but the description well agrees with the characters of the male specimen before me, except that the palpi and fore and hind tarsi more broadly ferruginous apically and the long erected hair on thorax is not dark fuscous, but greyish white. It seems somewhat venturous to combine the specimen with the named species without any ecological or biological background and there remains some doubt as to the identification of the specimen.

♂. Length 8.7 mm. Black, ferruginous are palpi from apex of joint 2 apically, all tibial spurs, fore tarsi from apex of joint 1 wholly, middle and hind tarsi beneath, joint 4 and apices of remaining joints of hind tarsi and claws of all legs. Wings considerably yellowish, almost without clouding on apical margin, stigma and veins chestnut brown to ferruginous. Mandibles glittering black, apical 2/3 somewhat reddish; pubescence of mesonotum on lateral and posterior margins recumbent, appearing in some light to be an U-shaped brassy mark.



76–86. 76–82 — *Tachytes maculitarsis* CAMERON, ♂. 83–86 — *Tachytes fruticis taianus* ssp. nov., ♂. 76 — clypeus, 77 — abdominal sternite 8, 78 — left paramere and volsella seen from inside, 79 — do., from above, 80 — right basiparamere separated and seen from above, 81 — apical lobe of right paramere dissected and seen from inside, 82a, 85 — penis valve seen from above, 82b, 86 — do., lateral view, 83 — left paramere and volsella seen from outside, 84 — left volsella taken out and seen from inside

Relative length of IOD at vertex and at base of mandibles and of antennal joints 2, 3, 4 and 8 in dorsal view are 17, 46.5, 10, 11, 11 and 8, divergency of the inner orbits towards the mandibular bases comparatively weak, antennal joint 3 approximately 1.7 times as long as broad at apex, AOD:WAS:IAD = 11:6.5:6.5, Clypeus: Fig. 76, with dorsum considerably strongly roundly raised, with anterior margin without medial incision and provided with only two very small teeth on each side and with a broad smooth area behind the transverse line of punctures that borders the anterior margin; upper frons in front of anterior ocellus broadly roundly elevated and furrowed in middle, the furrow with a fine glittering raised line in middle that runs down till the middle of the supraantennal elevation, the elevation medianly broadly and divergently excavated and strongly incrassate on both sides of the excavation, median broad furrow on ocellar area and a Y-shaped impressed line originating from the impression on vertex distinct. Metasternum not medianly carinated (in this respect different from the female), propodeum nearly 1.5 times as long as scutellum, with a medial weak furrow and the enlarged impression at its end, both of which are transversely and finely striate and the impression at the medio-apical point distinctly tuberculate, posterior wall slightly obliquely flattened, with the medial furrow elongated triangular, deep, the surface transversely finely and closely striate, sides of the segment similarly, but obliquely striate, with the intervals of the striae microcoriaceous. Tergites 1–4 of abdomen with a comparatively broad band of silvery pile, similar but much narrowed and less conspicuous band on each of sternites 2–6. Abscissae of radial vein with relative length: $4 > 1 > 3 \geqq 2 > 5$, 5 short and roundly curved. Spines of tibiae and tarsi white as given in the original description, the longer tibial spur of hind leg distinctly longer than the following metatarsus. Of the genitalia the left paramere and volsella seen from inside: Fig. 78, do. seen from above: Fig. 79, volsella very characteristic in form and paramere easily separated into the apical and basal parts, the right basiparamere thus separated: Fig. 80, its apical part: Fig. 81 (seen from inside), penis valve in dorsal view: Fig. 82, in lateral view: Fig. 83. Sternite 8: Fig. 77. In punctuation there is no particularity.

39. *Tachytes fruticis taianus* ssp. nov.

This species was first known from Japan, then from Formosa and now from Thailand (northern highland). The specimen (♂) from Tai differs from the Japanese representative in that the pile bands on the

abdomen are not pale golden nor brassy, but mere silvery and that the punctures on the anterior glabrous part of the clypeus (except the smooth marginal area) sparser, with the interspaces not microcoriaceous and more shining. Genitalial structure similar, but the penis valve seen from the side with the apical rounded part slightly more strongly attenuated towards the middle (Fig. 86); paramere and volsella (dissected left half) seen from outside: Fig. 83, volsella taken out: Fig. 84, penis valve seen from above: Fig. 85. Length 9.5 mm.

♀, unknown.

Holotype: ♂, Thailand (Chieng Mai), 6. VIII. 1971, T. TANO leg. (Coll. TANO).

40. *Tachytes modestus* Smith, 1856

Tachytes modestus: TSUNEKI, 1964, p. 5; 1967b, p. 46.

Specimens examined: 11 ♂, Thailand (Ayuttaya, 4 ♂, 3. VIII; Chieng Mai, 2 ♂, 6. VIII; Lam Pang, 5 ♂, 9. VIII); 1 ♂, Malaya (Kuala Lumpur, 12. VIII).

Distribution: India, Burma, Thailand (first record), China, Philippines (?), Formosa, Korea and Japan.

Remarks. No difference from the Japanese specimens could be observed on the material from Thailand.

41. *Gastrosericus thailanditus* sp. nov.

? *Gastrosericus rothneyi* CAMERON, 1889, p. 147 (♀); BINGHAM, 1897, p. 216.

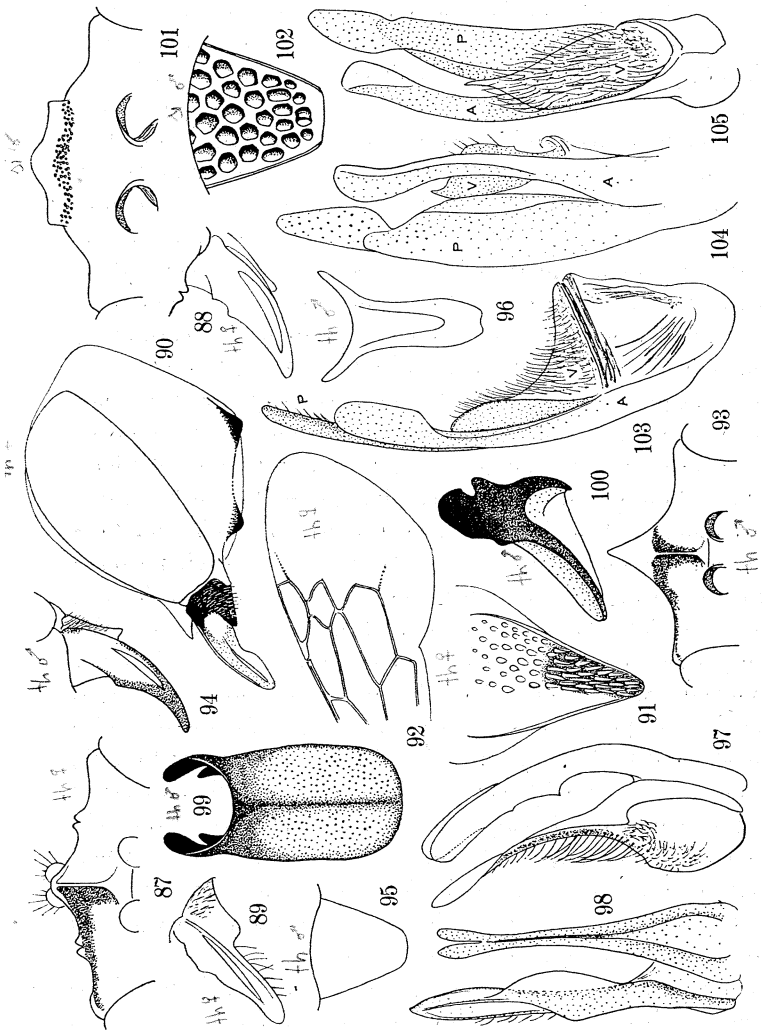
The present species is similar in many characters to *G. rothneyi* CAMERON, but differs from the descriptions of this species in the structure of the clypeus and propodeum and considerably so in colouration. Further, if the designation of the genus by BINGHAM (then it is *Dinetus*, not *Gastrosericus*) is applicable to the species compared the present species is distinctly different from *rothneyi* in the venation of the fore wing. Taking the simple descriptions of this species into consideration I remain some doubt as to the relationship between the species compared here.

♀. Length 6.5 mm. Black, mandibles medianly broadly reddish, with a yellow spot on outer side behind middle, antennal joint 1 narrowly ferruginous at apex; posterior margin of pronotal tubercles, a spot on tegulae, basal plates of both wings, apical margin narrowly of trochanters and apex and a patch at apex of the femora behind of fore and middle legs and a streak on outer margin of all tibiae lemon yellow; tibial spurs,

apices of fore tarsal joints (ultimate joints nearly wholly), spines of fore legs and claws of all tarsi light ferruginous, spines of other legs white, labrum and palpi dark brown; wings hyaline, on apical margin slightly clouded, with a beautiful bluish and purplish shine in certain light, stigma and veins dark brown. Pubescence on lower face, clypeus, temples, sides of thorax-complex, collar, sides and apical margin of mesonotum, sides of scutellum and postscutellum dense, appressed and silvery, pubescence on propodeum slightly sparser, erected or half erected, also silvery, but in some light with a slight brassy lustre, pile bands on abdomen are on tergites 1–4 (5 strongly contracted and invisible, but judging from the state of the apical margin possibly it is without the band), comparatively broad, distinct, only slightly sparse in middle and also silver in colour.

Inner orbits parallel, divergent only on lower face, ocellar elevation completely circular, without median groove, anterior ocellus wider than long, frontal furrow fine, shallow, but distinct down to middle of antennal bases, clypeus: Fig. 87, with the disc medianly distinctly carinated, labrum as given in the same figure, mandible: Fig. 88, in lateral view: Fig. 89. Head seen in profile: Fig. 90, with temple slightly narrower than eye and provided with two compressed lunate protuberances on lower margin, relative length of antennal joints 3, 4, 5 and 10 (dorsal view) approximately 6, 8, 7 and 6, joint 3 about 1.6 times, 4 and 10 both slightly less than twice as long as broad at apex, no tyloidea nor rhinaria. Prosternum with a small rounded disc-like protuberance on each postero-lateral corner, mesosternum medianly longitudinally and finely carinated, metasternum divided into two halves by a deep median furrow, the furrow posteriorly much deeper, on each half there are two longitudinal carinulae. Propodeum with dorsal side slightly longer than scutellum, without median furrow, posterior wall medianly deeply furrowed, abdomen slightly constricted between tergites 1 and 2, pygidial area: Fig. 91, posterior half alone covered with copperily glittering, thick and short bristles which appear in some light golden. Legs normal, fore metatarsus with 6 spines on outer margin, the basalmost shorter, the longer tibial spur of hind leg much longer than the following metatarsus, wing venation: Fig. 92, that the two recurrent veins are united into a short petiole before being received by cubital cell 2 is striking.

Vertex, upper frons, mesonotum and mesopleuron irregularly microreticulate, punctures forming the microreticulation uniform in size and on frons longitudinally, somewhat rugosely arranged, on mesonotum very slightly spaced and on scutellum punctures a little larger and sparser, dorsum of propodeum medianly transversely, finely and closely striate,



87–105. 87–100 — *Gastrosericus thailanditus* sp. nov.: 87–92 — ♀, 93–100 — ♂; 101–105 — *Gastrosericus siamensis* sp. nov., ♂, 87, 93, 101 — clypeus, 88, 89, 94 — mandible (89 — seen from the side), 90 — head seen in profile, 91, 95, 102 — end tergite of abdomen, 92 — fore wing venation, 96 — abdominal sternite 8, 97 — right paramere and penis valve in lateral view, 98 — do., in dorsal view, 99 — volsella, ventral view, 100 — do., in lateral view, 103 — right half of genitalia seen from inside, 104 — do., seen from above, 105 — do., seen from beneath and somewhat from inside

laterally closely punctured with hair-bearing points, posterior wall slightly largely and sparsely and the sides much more finely and closely punctured. Abdominal tergites impunctate, transversely microcoriaceous and covered with whitish pile, half mat, sternites 1 and 2 with surface similar, from 3 apically the microsculpture weaker and the surface more shining and scattered sparsely with fine punctules.

♂. Length 4.5–5.0 mm. Colouration generally similar, but mandibles basally broadly yellow, antennal joint 1 apically broadly ferruginous, apical yellow portions of femora larger and hind femora also similarly maculated, yellow streaks on the tibiae behind much larger, in full length, otherwise as in ♀. Pubescence on clypeus and lower frons silvery, on the rest of the face pale golden, pubescence on other parts of body on lower part silvery and on upper part as well as on all dorsal side pale golden. Brassy pile bands on abdomen are on tergites 1–5, very distinct; no dense pilose patch on ventral side of abdomen.

Eyes parallel, ocellar elevation slightly longitudinally lengthened, clypeus: Fig. 93, mandible: Fig. 94, antennal joints 3, 4, 5 and 10 with relative length about 4, 5, 5 and 4, joint 3 about 1.2 times, 3 about 1.5 times as long as broad at apex; head seen in profile with temple nearly a half as wide as eye, without the compressed rounded protuberance, mesosternal carina and metasternum as in ♀, but on the latter the carinula is only one on each side, pygidial area: Fig. 95, covered with delicate pile, not glossy, sternite 8: Fig. 96; wings with the venation and the bluish shine as in ♀; marginal spines of fore metatarsus usually 4, the longer tibial spur of hind leg as long as the following metatarsus. Punctuation similar, except that the transverse fine close striae on the median area of propodeum are very weak and only partly well-defined and that the ventral side of abdomen is uniformly dull and opaque all over.

As to genitalia paramere and penis valve seen from outside (with the dissected right half): Fig. 97, seen from above or dorsal side: Fig. 98, volsella seen from beneath: Fig. 99, seen from the side: Fig. 100.

Holotype: ♀, Thailand (Sara Buri), 31. VII. 1971, T. Tano leg. (Coll. Tano).

Paratypes: 4 ♂, the same data (Coll. Tano).

Remarks. In one of the male specimens collected at the same place and time fore tibiae in front and the following tarsi wholly ferruginous and middle metatarsi broadly yellowish.

42. *Gastrosericus siamensis* sp. nov.

Gastrosericus binghami: TSUNEKI, p. 3 (♀, nec CAMERON, 1897).

♂. Length 4.5 mm. Black; pale yellow are mandibles except reddish apex, antennal joint 1 broadly at apex, posterior half of pronotal tubercles, a large spot on transparent tegulae, basal plates in part of both wings, apex of femora (on fore and middle legs the mark on posterior side extended considerably towards the base) and broad streaks on tibiae behind of all legs. Palpi brown, apically paler; all tibiae in front and fore tarsi ferruginous, inside of tibiae and mid and hind tarsi dark brown, tibial spurs of fore legs ferruginous, those of mid and hind legs black, wings hyaline, irridescent, apical margin broadly smoky, in some light whole the wing showing a bluish shine, but not so strong and so beautiful as in the preceding species. Pilosity normal, on dorsal side pale golden, but the pile bands on abdominal tergites 1–5 silvery, in some light with a pale brassy shade and appear medianly interrupted, pile on the rest of the body and legs silvery, sternites 3–5 on basal half moderately closely covered with very fine ferruginous pubescence, but the pubescent area is not outlined into a particular pile patch as in *G. walthi*.

Elevation of the ocellar area slightly elongated circular, inner orbits parallel, clypeus: Fig. 101, relative length of antennal joints 3, 4, 5 and 10 in dorsal view about 5.5, 5, 4.5 and 3, joint 3 approximately 1.6–1.7 times as long as wide at apex, joint 10 as long as wide, joints 3–8 each slightly roundly depressed above and slightly rounded out beneath, in lateral view not smooth, but somewhat nodose above. Head in profile with temple slightly more than half as wide as eye, without genal tooth, mesosternum medianly longitudinally carinated, metasternum divided into two halves by a deep furrow, the furrow deeper and broader posteriorly, each half distinctly margined by a carina, propodeum medianly finely carinated, the carina not reaching the apical margin of the dorsum, posterior inclination medially deeply furrowed. Abdomen slightly constricted between tergites 1 and 2, pygidial area: Fig. 102, without the covering hair, well shining and fairly largely and closely punctured. Venation as in the preceding species, but the recurrent veins not united above into a petiole, separately received by cubital cell 2, but the ends of the veins lying close together; fore metatarsus with 4 spines on outer margin, the longer spur of the hind tibia nearly as long as the following metatarsus. The right half of genitalia seen from inside: Fig. 103 (A, penis valve; P, paramere and V, volsella), seen from above: Fig. 104, seen from beneath and somewhat from inside: Fig. 105.

Punctuation generally similar to that of *G. thailanditus*, but on the average slightly larger and slightly sparser, subreticulate and partly subrugosely arranged, this is especially marked on mesonotum and mesopleuron, metapleuron above with several longitudinal, very fine and close striae, metapleuron below and sides of propodeum finely, but distinctly and moderately closely punctulate, interspaces as large as, or somewhat smaller than, the width of punctures; dorsum of propodeum medianly broadly, transversely, finely and closely rugoso-striate, the striae posteriorly more distinct, posterior inclination transversely rugoso-punctate, abdominal tergites closely micropunctulate, the punctules mainly transversely arranged in rows, sternites except each apical margin closely micropunctulate, but on 6 and 7 smooth and polished.

At the time of description the female specimen could not be reexamined.

Holotype: ♂, Thailand (Ayuttaya), 29. VII. 1971, T. TANO leg. (Coll. TANO).

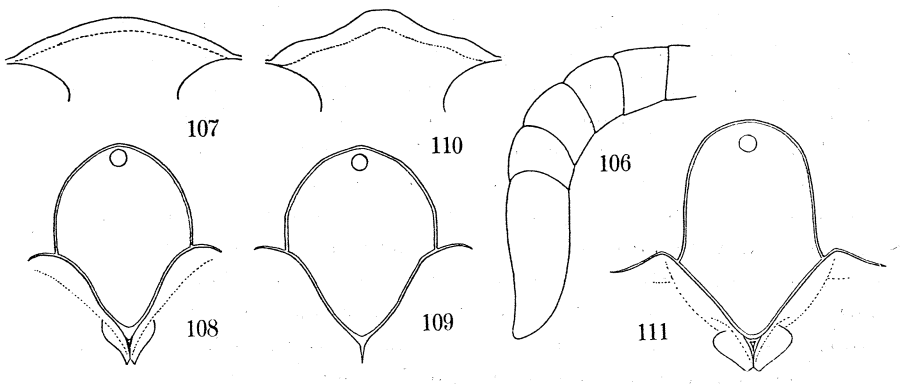
43. *Trypoxylon schmiedeknechtii* Kohl, 1906

? *Trypoxylon pileatum* SMITH, 1856, p. 377; CAMERON, 1889, p. 147; BINGHAM, 1897, p. 224.
Trypoxylon schmiedeknechtii KOHL, 1906, p. 34 (♂, Java).

Specimens examined: 2♀ 2♂, Thailand (Bangkok, 1♂, 27. VII; Ayuttaya, 1♀, 29. VII; Sara Buri, 1♂, 31. VII; Chieng Mai, 1♀, 6. VIII).

Distribution: Hitherto known from Java only, new to the fauna of Thailand.

Remarks. As pointed out by KOHL (1906) and since that time until now there has been no reliable description of *T. pileatum* Smith that is detailed enough to enable the students to identify the species. Hence, this species remains full of riddle even now. This was the reason of the new erection of KOHL's *schmiedeknechtii*, completely neglecting *pileatum*. Certainly, of the descriptions given to *T. pileatum* the only information to be of use in separating it from the closely allied congeners is that the mesonotum and scutellum are smooth and shining. In this respect it is certain that *T. schmiedeknechtii* is distinctly different from *T. pileatum*, since it has the areas mentioned sparsely, finely but very clearly punctured. But the point is whether SMITH really observed the specimens under the microscope or not. Under the rupe the mesonotum of the specimens of *schmiedeknechtii* appears certainly smooth and shining (BINGHAM's description seems largely a reproduction of the original one). However,



106–111. 106–109 — *Trypoxylon schmiedeknechtii* KOHL, ♂, 110 — *Trypoxylon subpileatum* STRAND, ♂, 111 — *Trypoxylon thaiana* TSUNEKI, ♀. 106 — apical 5 joints of antenna, 107, 110 — clypeus, 108, 109, 111 — frontal shield, 108 — a variation

as regards the other important characters no mention was made and, therefore, the erection of *schmiedeknechtii* is quite reasonable.

Nevertheless, to my mind it seems that *T. schmiedeknechtii* may be a synonym of *pileatum*, because, as suggested by the localities of the material here observed the range of distribution of that species is considerably broad and apparently it is common and in this respect it well agrees with this species. However, as given in the following section another closely allied species also occurs in sympatric. It is, therefore, too haste to take the above suggested relationships as determined.

I have a further question as to what relationships the Formosan shield-bearing *Trypoxylon*, *T. subpileatum* STRAND, has with the Indian kindreds. This species was originally described as a subspecies of *T. pileatum* without any definite knowledge on this species. In the following, therefore, the descriptions of the main characters of both sexes of *T. schmiedeknechtii* that has a high possibility to be a synonym of *T. pileatum* will be given in comparison with *T. subpileatum* of which the detailed descriptions were repeatedly published:

♀. Length 10.5 mm. Wholly black, mandibles on apical half dark reddish, palpi and tibial spurs ferruginous, tegulae semitransparent brown, posterior half of the pronotal collar discoloured, appearing pale ferruginous. Wings hyaline, veins and stigma nearly black. Very similar in general characters to *subpileatum*, and if the male were unknown, *subpileatum* would have reasonably been considered to be a geographical race of *schmiedeknechtii* (? = *pileatum*). The differences from *subpileatum* are as follows: (1) Punctures on mesonotum finer and sparser (the surface dull and opaque, with a slight bronzy shine). (2) The shield shaped enclosure on frons similar in form, but slightly narrower (ratio of length to width 26:18, in *subpileatum* 25:19). (3) Inner orbits more strongly convergent below (ratio of IODs 15:10.5, in *subpileatum* 15:13). Other apparent differences are all within the range of variation of *subpileatum*.

Some supplements. Antennal joint 3 approximately thrice, 4 about 2.3 times as long as wide at apex, abdominal petiole 5.3 times as long as its maximum width and nearly twice as long as the following tergite which is twice as long as wide at apex. The petiole from behind the stigmata gradually broadened posteriorly, with the parallel-sided part very short (as in *subpileatum*).

♂. (General characters are already given in considerable detail by KOHL). (1) Mesonotal punctures slightly larger than in ♀ and fairly distinct, but finer than in *subpileatum*. (2) Altimate antennal joint (Fig. 106) much longer, nearly as long as the 4 preceding joints united (in *subpileatum* nearly as long as 3 preceding joint combined) and with apex curved. (3) Clypeus relatively shorter, with apical margin more gently rounded out, not recurved in middle as in *subpileatum* (Fig. 107, cf. Fig. 110 in *subpileatum*). (4) Shield-shaped enclosure on frons more or less varied in form (Figs. 108, 109), but in general similar. (5) Inner orbits more strongly convergent below, ratio of IODs 18:11 (in *subpileatum* 18:14).

Judging from the characters of the male the Formosan *subpileatum* seems appropriate to be dealt with as distinct.

44. *Trypoxylon thaianum* Tsuneki, 1961

Trypoxylon thaianum TSUNEKI, 1961a, p. 384.

Specimen examined: 1 ♀, Thailand (Ayuttaya, 29. VII).

Distribution: Hitherto known from Thailand only.

Remarks. The present species is very closely allied to the preceding *T. schmiedeknechti*, but the frontal enclosure is different in form and much longer, with the lateral branches markedly extended externally till near the bottoms of the eye emarginations (Fig. 111), thorax almost without the bronzy shine, punctures on mesonotum slightly larger and stronger, on mesopleuron more distinct and stronger below (in *schmiedeknechti* mesopleuron almost impunctate), sides of propodeum broadly without oblique striae, well shining and the abdominal petiole relatively slightly shorter (this may be variable considerably). Length about 10 mm.

45. *Trypoxylon obsonator tropicale* Tsuneki, 1961

Trypoxylon obsonator tropicale TSUNEKI, 1961a, p. 383.

Specimens examined: 1 ♀ 1 ♂, Thailand (Bangkok, 1 ♂, 27. VII; Chieng Mai, 6. VIII); 1 ♀, Malaya (Kuala Lumpur, 12. VIII).

Distribution: Hitherto recorded from Thailand alone, new to Malaya.

Remarks. The character of the subspecies — interocular space is relatively narrower — is reconfirmed with the specimens. Further, in the specimens examined the frontal furrow is much deeper, with the frons on both sides of the furrow more markedly roundly elevated than in the typical specimens. This is an additional character of the subspecies.

46. *Trypoxylon tanoi* Tsuneki, 1971

? *Trypoxylon intrudens* SMITH, 1972, p. 188.
? *Trypoxylon canaliculatum* CAMERON, 1889, p. 118, 122.
Trypoxylon tanoi TSUNEKI, 1967d, p. 2, 13; 1971a, p. 17.

Specimens examined: 2 ♀, Thailand (Ayuttaya, 1 ♀, 29. VII; Lam Pang, 9. VIII).

Distribution: Formosa, new record from the Indian Continent.

Remarks. From the descriptions of the previous authors the detailed characters of *T. intrudens* SMITH and *T. canaliculatum* CAMERON can not be realized. The specimens examined here completely agree in characters with the Formosan *T. tanoi* and the occurrence of *T. tanoi* in Thailand makes me presume in a reverse manner that *T. tanoi* may be a synonym of *T. canaliculatum* CAMERON, because the locality datum supplies us with a powerful support about the synonymy. In regard to the status of *T. canaliculatum*, however, there remains also a question that it may be identical with *T. intrudens* Smith, because in the description of this species both sexes are collectively given, despite that a considerable differences must be present between the two sexes. If the male was dealt with as *intrudens* and the female as *canaliculatus* (in this species certainly so), irrespective of the designation of the authors, the descriptions, as far as they go, fairly well agree with the characters of *T. tanoi*, ♂ and ♀.

47. *Trypoxylon bilobatum* Tsuneki, 1961

Trypoxylon bilobatum TSUNEKI, 1961a, p. 385.

Specimens examined: 5 ♀, Thailand (Bangkok, 26, 27. VII).

Distribution: Thailand.

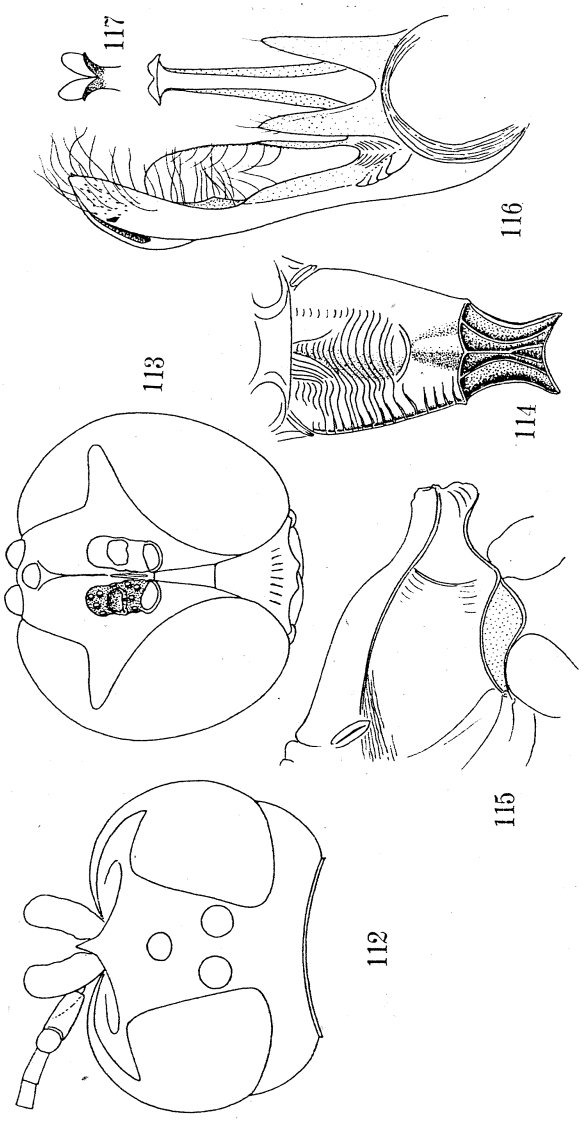
♀. (hitherto undescribed): Very similar to ♂, antennal joint 3 longer, approximately 3.5 times as long as broad at apex, ultimate joint not modified, about 2.3 times as long as broad at base. Mesonotum on posterior margin strongly coarsely crenate, the crenae longer in middle. There is an oval area between middle and hind coxae as in *T. appendiculatum* (Fig. 115) below described.

48. *Trypoxylon appendiculatum* sp. nov.

A small and very slender species, characteristic in having a peculiar appendage at the upper margin of the antennal socket.

♂. Length 6.5 mm. Black; mandibles ferruginous, with extreme base somewhat darkened, palpi, tibial spurs and tarsi dark brown to brownish black; wings slightly yellowish and weakly clouded on the apical 2/3, veins and stigma black, clypeus and supraclypeal area sparsely covered with short, pale ferruginous pile, on other parts of head and thorax-complex the hairs very scarce, only the temples, mesopleurons below and mesosternum sparsely covered with short pile.

Head seen from above (Fig. 112), thick, ocelli in an equilateral triangle, OOD:POD = 1:3, vertex behind the ocellar area slightly raised, frontal furrow fine, running down to supra-antennal carina which is laterally compressed, markedly high and nose-shaped, a pair of curious appendices at base of antennae strikingly produced. Head seen in front: Fig. 113, ratio of minimum IOD at vertex and at basal area of clypeus approximately 8:5, clypeus very gently roundly raised at base, with the marginal area broad and slightly reflected, the remarkable appendages at base of antennae arising from the upper part of the rim of the antennal sockets (do.), short sausage-shaped and broadly hollowed out beneath in middle, with the surface microgranulate and moderately grossly punctured, antennal joint 1 distinctly edged at the inside, joint 3 approximately twice, 4 about 1.5 times as long as broad at apex, from joint 4 apically completely missing. Occipital carina encircling the head completely, but not directly connected with each other at the ends, but convergently jointed with the buccal carina. Pronotum with collar medianly narrowed and laterally markedly roundly incrassate, with a minute tubercle in middle, with the transverse furrow distinct, but the posterior part not discoloured; mesonotum without medio-anterior impression, on posterior margin with about 8 strong radiating carinae, the median longer and shorter laterally, scutellum almost quadrate in form; area dorsalis on propodeum laterally marked off by the weak, not well outlined furrows, the furrow not reaching the apical margin where the area is



112–117. *Trypoxylon appendiculatum* sp. nov., ♂. 112 — head seen from above, 113 — head seen in front, 114 — propodeum, 115 — do., in lateral view, showing the oval area (dotted), 116 — genitalia (left half) from beneath, 117 — apex of penis seen vertically from beneath

bordered by a fine, transverse, somewhat curved carina, the median longitudinal impression shallow, but distinct, posteriorly markedly enlarged, posterior inclination medianly strongly impressed, the impression deeper and broader towards apex and distinctly bordered by a transverse carina before reaching there (Fig. 114), dorso-lateral edges of the segment distinctly carinated, running from stigmata till the lateral angles of the apical margin (Fig. 114), the sides of the segment also distinctly bordered at the lower margin by a carina, a part of which forms a part of the outer margin of the oval area locating between mid and hind coxae (Fig. 115, the dotted part); petiole of abdomen slender and long, nearly 5.5 times as long as its maximum breadth and as long as the two succeeding tergites united, tergite 2 about 2.2 times, 3 twice as long as broad at apex. Wing venation normal, legs slender, without any modification. Genitalia comparatively featureless (Fig. 116, left half seen from beneath), paramere with apex shortly bifurcate, dorsal margin broadly lamellate, apex of penis valve seen from beneath: Fig. 117.

Vertex and upper frons microcoriaceous, with fine, shallow punctures sparsely scattered, under 32× magnification almost unobservable, frons above antennae slightly more largely and very closely punctured, rather granulate; mesonotum closely micropunctulate, intervalic sculpture almost unobservable, with surface fairly shining, mesopleuron upwards smooth and polished, downwards finely punctured, punctures closer towards mesosternum, sculpture on propodeum: Fig. 114, sides of the segment nearly transversely, finely and closely striate, but on the central area the striae broadly weakened, with the surface well shining.

♀. Unknown.

Holotype: ♂, Borneo (Mt. Kinabalu), 17. VIII. 1971, T. Tano leg. (Coll. Tano).

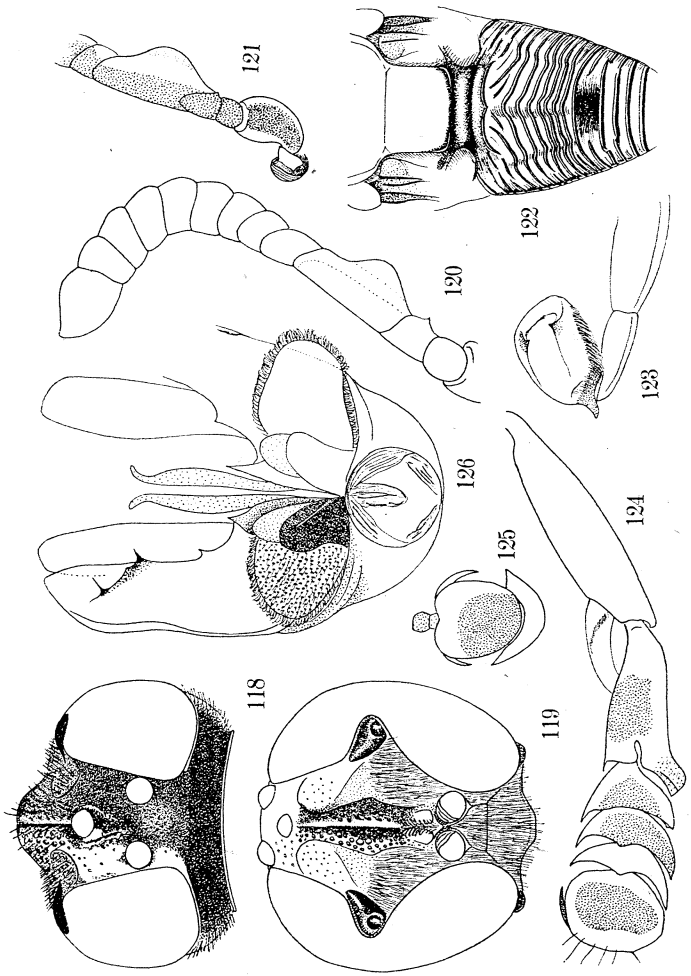
49. *Trypoxylon monstruosum* sp. nov.

Very strange species, having the abnormally configurated frons, the modified antennae and fore legs and the very slender abdomen.

♂. Length 8–9 mm. Black, with the following portions ivory white: Modified antennal joints 1 and 4, both on the external side, sometimes joints 5 and 6 partly beneath (Fig. 121), apical 4 joints of maxillary palpi, inside of fore tibiae, fore tibial spurs and fore tarsi except the black marks on joints 1, 2, 3 and 5 (Fig. 124). Inside of antennal joint 1 broadly, rest of palpi, fore tibiae externally and behind, middle tibiae in front partly, hind tibiae at base, tibial spurs and mid and hind tarsi largely pale fer-

ruginous, tegulae semitransparent brown, basal plates of wings dark brown, wings hyaline, apical margin not clouded, veins and stigma brownish black, basally paler. Clypeus and sides of frons densely covered with appressed silvery pubescence, supraantennal median carina covered with inwardly decumbent silvery pubescence growing on both sides, pubescence on head, thorax and dorsal aspect of propodeum moderately long, silky white, on temples, lateral margins of mesonotum, antero-ventral marginal area of prepectus and outer side of fore coxae fairly close, on other parts rather sparse, abdomen rather sparsely covered with short, somewhat ferruginous pile.

Head seen from above: Fig. 118, ocelli in an equilateral triangle, OOD completely null, POD about 1.5 times the diameter of postocellus, frons markedly raised in the median area and deeply furrowed in middle (Fig. 118), there is a smooth and glittering swelling at each eye incision (do.). Head seen in front: Fig. 119, supraantennal area medianly shortly keeled, frons at the dotted areas above the haired parts in the figure smooth and polished, clypeus as shown in the same figure, antennal socket with the margin at the inner and upper part extended and stretched out over the hollow, minimum IOD at vertex and near base of clypeus 10:8, distance between the bottoms of eye incisions relatively 26 (width of head 33). Antenna: Figs. 120 (from above, with scape excluded) and 121 (somewhat from base, with scape included), joint 3 at base externally shortly toothed, 4 lunately expanded externally, with the expanded part semitransparent; occipital carina completely encircling the neck, collar of pronotum long, nearly a third as long in middle as the mesonotum, laterally incrassate and rounded at the antero-lateral corners and deeply furrowed across middle, posterior part not discoloured, postscutellum only slightly wider than long (Fig. 122) and at each latero-posterior corner marginated by a curved carina (do.); structure of propodeum (Fig. 122) similar to that of *T. schmiedeknechti* or *subpileatum*, but more strongly and straightly convergent posteriorly, with lateral margins nearly wholly stoutly carinated, area dorsalis enclosed by the indistinctly outlined furrows and medianly comparatively broadly impressed, a characteristic feature is that it is at base transversely broadly raised as if to be a second postscutellum and this raised area distinctly margined posteriorly by two curved carinae (Fig. 122). Abdomen extraordinarily slender and long, segment 1 (petiole) approximately 4.7 times as long as its maximum width which is slightly narrower than IOD at vertex and as wide as tergite 2 at apex, tergite 2 about 3.5 times, 3 about 2.3 times as long as broad at apex. Genitalia: Fig. 126 (from beneath),



118–126. *Trypoxylon monstruosum* sp. nov., ♂. 118 — head seen from above, 119 — head seen in front, 120 — antennal flagellum seen from above, 121 — do., with the scape, 122 — propodeum, 123 — fore coxa seen from beneath, 124 — fore tibia and tarsus, 125 — ultimate joint of tarsus, 126 — genitalia seen from beneath

paramere, volsella and penis valve all very characteristic. Fore coxa seen from beneath: Fig. 123, at base anteriorly with two short teeth and at apex with a lamellate rectangular process (dotted), fore tarsus strikingly modified: Fig. 124, each joint markedly dilated and expanded (dotted area ferruginous to brown), apical joint vertically seen: Fig. 125, middle and hind legs slender and long, but not modified.

Vertex very sparsely punctured, shining, punctures slightly close between postocelli, the raised area of frons very coarsely punctured (Figs. 118, 119), punctures on mesonotum large and close, but shallow, not distinctly outlined and irregularly confluent to each other, on scutellum finer and weaker, mesopleuron more distinctly and somewhat more sparsely punctured, propodeum at base obliquely, then transversely, very coarsely striate (Fig. 122), sides of the segment obliquely, finely and closely striate, the striae on the central area broadly obliterated.

♀, unknown.

Holotype: ♂, Thailand (Bangkok), 27. VII. 1971, T. TANO leg. (Coll. TANO).

Paratype: 1 ♂, Thailand (Sara Buri), 31. VII. 1971, T. TANO leg. (Coll. TSUNEKI).

Remarks. In the paratype the punctures on the mesonotum and mesopleuron are finer, sparser and on the former they are not confluent; on the sides of propodeum, however, the striae are much stronger than in the holotype, though at the central area broadly evanescent.

50. *Pison punctifrons* Shuckard, 1837

Pison punctifrons: BINGHAM, 1897, p. 219; TURNER, 1916, p. 595, 625; KROMBEIN, 1949, p. 400; YASUMATSU, 1953, p. 145; TSUNEKI, 1963, p. 11.

Specimens examined: 3 ♀, Thailand (Bangkok, 2 ♀, 26. VII; Ayuttaya, 1 ♀, 3. VIII).

Distribution: India, Thailand, Malaya, Sumatra, Java, Philippines, Pasific Islands broadly, Formosa, Japan, Korea and China.

51. *Pison argentatum* Shuckard, 1837

Pison argentatum: BALTAZAR, 1966, p. 335.

Specimens examined: 1 ♀ 2 ♂, Thailand (Bangkok, 26, 27. VII).

Distribution: India, Malaya, Thailand, Burma, Singapore, Borneo, Philippines, Micronesia, Hawaii.

52. *Pison (Krombeiniellum) erythropus* Kohl, 1884

Pison erythropus: BINGHAM, 1897, p. 221.
Pison (Pisonoides) erythropus: TURNER, 1916, p. 595, 616.

Specimens examined: 2 ♀, Thailand (Bangkok, 26. VII).

Distribution: N. W. India and new to Thailand.

Remarks. In both specimens the femora of all legs are considerably broadly and the tibiae partly black.

53. *Psenulus crabroniformis* (Smith, 1858)

Mellinus crabroniformis SMITH, 1958, p. 107.
Psenulus crabroniformis: VAN LITH, 1962, p. 51; 1972, p. 169 (♀, Thailand, Philippines).

Specimen examined: 1 ♀, Malaya (Quala Lumpur, 12. VIII).

Distribution: Borneo, Java, Sumatra, Malaya (new record), Thailnad and Philippines.

Remarks. Judging from figures 59–67 of the paper by VAN LITH (1962) the specimen before me must be *crabroniformis* and not *erraticus*, because the frons is narrow and long, the subantennal transverse carina is remotely separated from the antennal sockets, though not referred to in the description.

♀ (undescribed). Length 9.0 mm. Black and shining, pale yellowish white are mandibles except the blackish apical third, antennal joint 1, flagella beneath (apically ferruginous), pronotal tubercles, a spot on tegulae and parts of fore and middle legs (apices of coxae, trochanters wholly, femora at apex and apically beneath, tibiae wholly and tarsi except slightly ferruginous apical portion). Rest of fore and middle femora, hind legs from about middle of coxae apically wholly and abdomen except the honey yellow basal half of the petiole bright yellowish red (apical spine black).

OOD:POD = 9:7, width of postocellus relatively 5, supraantennal excavation (scapal hollow) deep, IOD at postocelli, in middle of face (minimum) and anterior bases of mandibles with relative length 34, 19 and 27, length between anterior ocellus and apex of clypeus relatively 47, interantennal carina as in ♂, perpendicularly inclined upwards, facial and clypeal structure as in ♂ (VAN LITH, 1962, Fig. 66), occipital carina high and reaches below the hypostominal carina which is also high and distinct and forming a straight lower edge of the temple seen in profile, antennal joint 3 approximately 2.7 times as long as broad at apex, joint 7 about 1.3 times as long as wide, posterior wall of propodeum transversely coarsely rugoso-striate, interspaces of the rugae minutely rugulose,

medial furrow deep, its upper part narrow and smooth and lower part broader apically and transversely coarsely striate, with intervals smooth and polished, petiole (sternite 1) above longer than hind tibia (55:47), nearly twice as long as postpetiole (tergite 1, 55:30), relative width of the former 8 and of the latter 25, no pygidial area on caudal tergite. Wing venation as in ♂.

54. *Psenulus carinifrons* (Cameron, 1902)

Psen carinifrons CAMERON, 1902a, p. 288 (♂).
Psenulus carinifrons: VAN LITH, 1962, p. 103.
Psenulus carinifrons rohweri VAN LITH, 1962, p. 108.

Specimens examined: 1 ♀ 4 ♂, Thailand (Bangkok, 28. VII).

Distribution: India, Thailand (new record), Malaya, Sumatra, Java, Singapore, Borneo and Philippines.

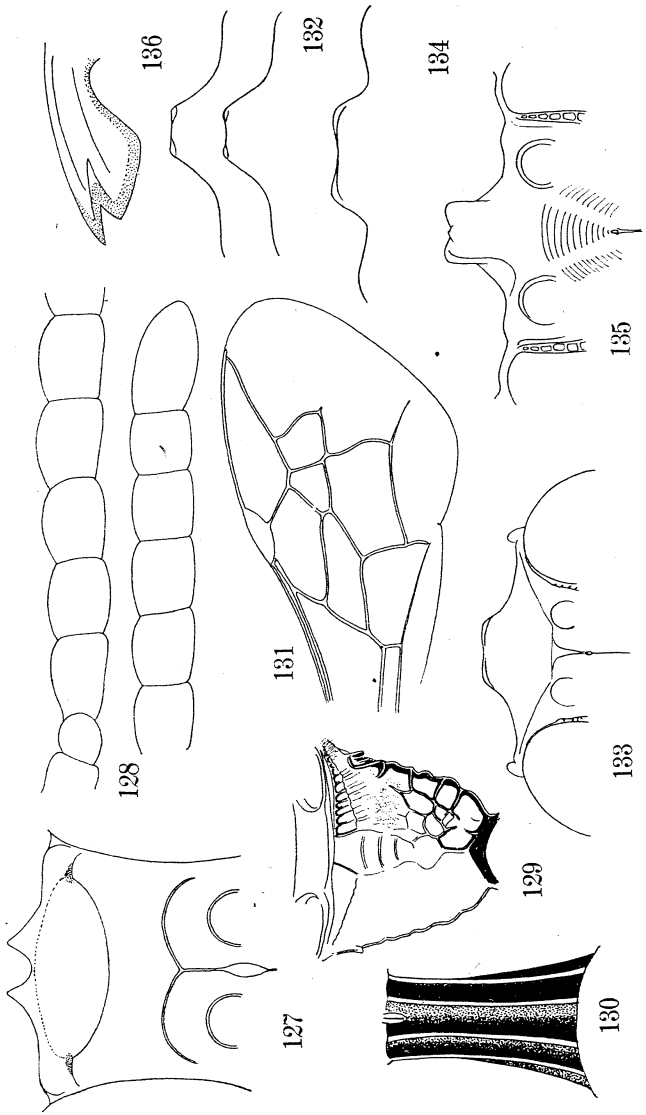
Remarks. In the female specimen examined the subantennal transverse carina is feebly defined, but the developmental degree of this carina is considerably variable according to the examination of the closely allied species, *P. iwatai*, occurring in Japan (87 ♀ 20 ♂). Similarly the sculpture on the sides of the propodeum in the male is variable. In the males from Thailand the sides are usually anteriorly obliquely (with varied density) striate and posteriorly coarsely reticulate, but the reticulation usually turns into transverse rugae below. The reddish marks of tergite 2 in the female seem to be considerably variable. In the specimen examined the marks are fairly large and distinct, well developed from each side to the ventral side.

The Japanese *P. iwatai* differs from *carinifrons* not only in the maculation, but also in that the temple in profile is parallel-sided, with the posterior margin angularly bent at the postero-ventral corner (in *carinifrons* roundly convergent below) and that the hair on the legs is much longer and more aboundant.

55. *Psenulus thaianus* sp. nov.

The specimen may be the male of some known species, but as far as informed by literature no corresponding can be discovered.

♂. Length 4.5 mm. Black (mandibles wholly black), with the following portions ferruginous: Antennal flagella beneath and ultimate joint, papli, tegulae, knees, fore tibiae and tarsi, base, apex and inner half of middle tibiae and the following tarsi, apex of tibiae and tarsi



127–136. 127–131 — *Psenulus thaianus* sp. nov., ♂, 132, 133 — *Stigmus* (*Carinostigmus*) *iwatai* TSUNEKI: 132 — ♀, 133 — ♂; 134 — *Stigmus* (*Carinostigmus*) *major* MAIDL, ♂; 135, 136 — *Stigmus* (*Carinostigmus*) *borneanus* sp. nov., ♀. 127 — lower part of face, 128 — antennal flagellum, 129 — propodeum, 130 — abdominal petiole, 131 — wing venation, 132–135 — clypeus, 136 — mandible

of hind legs. Fore femora in front dark brown, wings hyaline, stigma and veins brown to dark brown.

Head from above with sides behind eyes first roundly, then straightly and very strongly convergent posteriorly, with OOD:POD = 6:7, width of postocellus relatively 3, ratio of width of head and maximum (at anterior margin of postocellus) and minimum IOD 41, 25, 17, interantennal carina and clypeus: Fig. 127, head seen in profile with temple approximately as wide as eye and parallel-sided. Antenna: Fig. 128, without tyloidea, mesonotum with distinct prescutal furrow on anterior third, on posterior margin distinctly crenate, prescutellar furrow distinctly crenate, but not postscutellar furrow, postscutellum medianly impressed, sculpture of propodeum: Fig. 129, the minutely sinuate lateral carinae at the lateral margins markedly high and strong. Petiole of abdomen short (Fig. 130), approximately half the length of tergite 1, with dorsal furrow distinctly margined by carinae, basal impression of sternite 2 reaches about middle of the segment, laterally distinctly marked off, but not so on apical margin, sternites 2–6 covered with comparatively long brownish pubescence, without distinct fringe of hairs on any segment. Venation: Fig. 131, the longer spur of hind tibia only slightly less than as long as the following metatarsus.

Punctures on upper frons fine and close, on vertex posteriorly transversely rugoso-punctate, on mesonotum slightly larger and on the disc somewhat sparser, on mesopleuron fine and sparse, metapleuron longitudinally, finely and closely striate above, sides of propodeum obliquely, anteriorly closely and posteriorly coarsely striate, on dorso-posterior portions very coarsely and irregularly reticulate.

♀, unknown.

Holotype: ♂, Thailand (Ayuttaya), 29. VII. 1971, T. TANO leg. (Coll. TANO).

56. *Stigmus* (*Carinostigmus*) *major* Maidl, 1925

Stigmus major MAIDL, 1925, p. 77 (♀♂).
Stigmus (*Carinostigmus*) *major*: TSUNEKI, 1954, p. 11.
Stigmus (*Carinostigmus*) *monstrosus* TSUNEKI, 1963, p. 16 (♂, Thailand) (syn. nov.).

Specimens examined: 1 ♀, Thailand (Mae-Tang, 7. VIII); 1 ♀ 1 ♂, Malaya (Kuala Lumpur, 12. VIII).

Distribution: Hitherto known from Sumatra, first known from Malaya and confirmed in Thailand.

Remarks. In both sexes the propodeum is medianly longitudinally impressed; triangular area of mesopleuron enclosed with very coarsely foveolate furrows except apical angle, with a few punctures and rugae, epimeral area longitudinally finely and closely striolate, episternum posteriorly longitudinally, strongly rugoso-striate and punctate; the petiole in ♀ with the dorsal surface flattened and medianly finely, sometimes fairly acutely, sometimes rather bluntly carinate, in ♂ tricarinate above, intervals of the carinae furrowed and minutely, weakly crenulate or rugoso-striate.

57. *Stigmus* (*Carinostigmus*) *iwatai* Tsuneki, 1954

Stigmus (*Carinostigmus*) *iwatai* TSUNEKI, 1954, p. 15 (♀♂).
Stigmus (*Carinostigmus*) *thailandinus* TSUNEKI, 1963, p. 17 (♀) (syn. nov.).
Stigmus monstrosus: IWATA (nec TSUNEKI), 1964, p. 376 (Biol.).

Specimens examined: 2 ♀, Thailand (Ayuttaya, 1 ♀, 29. VII; Mae-Tang, 1 ♀, 7. VIII); 1 ♂, Malaya (Kuala Lumpur, 12. VIII).

Distribution: South China, Formosa and Thailand.

Remarks. This species is very similar in structure to *S. niger* MOTSCHULSKY presumed from the descriptions of the previous authors (e. g. the clypeus: Fig. 132 in ♀ and 133 in ♂). In this species, however, the trochanters of the legs are presumed to be black.

The reexamination of the specimens from Thailand made it clear that *S. thailandinus* m. was a synonym of *S. iwatai*, first known from the Hainan Island.

Some supplementary notes on the characters of *S. iwatai*: Epimeral area of mesopleuron longitudinally finely and closely striate, triangular area with the upper furrow only on anterior part distinct, posteriorly it is represented by a bundle of fine striae, the disc smooth and polished, only with few punctures and rugae, episternal area posteriorly longitudinally closely striate, in ♂ the striae finer, closer and somewhat rugose.

58. *Stigmus* (*Carinostigmus*) *borneanus* sp. nov.

Closely resembling *S.* (*C.*) *saigusai* TSUNEKI*, but can easily be separated therefrom by the difference in the structure of the clypeus.

♀. Length 5.0 mm. Black, with a aeneous shine on mesonotum. Mandible except apex, antennal joint 1 in front, tubercle and a touch on tegula ivory white, on mandible the colour slightly yellowish in part. Ferruginous are antennal joint 1 above, 2, 3, 4 wholly and 5 in part, apices of coxae, trochanters wholly, base and apex of femora, fore tibiae

* The type of this species is ♀, misprinted as ♂ in the original description.

nearly wholly, middle tibiae except the vague brownish mark on outside, hind tibiae at base and in front and all tarsi (hind tarsi slightly brownish). Wings hyaline, stigma and veins brownish black.

Head seen from above with sides behind eyes strongly roundly convergent posteriorly, OOD:POD = 8:3, width of postocellus relatively 2, frontal margin gently emarginate, with the frontal spine distinctly produced which is rather short and slightly enlarged apically, head seen in front with inner orbits furrowed and coarsely foveolate, the furrow comparatively less strong (as in *saigusai*), medial longitudinal carina carrying the frontal spine not reaching the anterior ocellus, the form of clypeus very characteristic (Fig. 135), mandible also exceptional in form (Fig. 136), antennal joints 2, 3 and 4 subequal in length, 3 approximately 3.5 times as long as broad at apex. Head seen in profile with temple broader than eye (5:3), with occipital carina abruptly terminated at the lower ends, thence the carinae turned inwards to go to the buccal carina as the weak raised lines. Pronotum comparatively short, medianly broadly raised, with antero-lateral corners acutely pointed, mesonotum with prescutal furrows short, not reaching middle of the scutum and weakly crenate on anterior portion, the scutum on posterior margin longitudinally, finely and closely striate, pre- and postscutellar furrows finely and less strongly crenate, general feature of propodeum as in *S. saigusai* (ref. Etizenia, 14, Fig. 27, 1966), petiole nearly as long as hind trochanter and femur united, pygidial area elongate oval, with the apex rounded.

Head and mesonotum smooth and polished, upper frons and facial basin microcoriaceous, on upper frons the surface appears longitudinally, densely microstriate and on facial basin transversely so. Mesonotum with a few small punctures scattered, on mesopleuron epimeral area above longitudinally, very finely and closely striate, below polished, also the dorso-anterior part of episternum, rest of episternum delicately microsculptured, not shining, scutellum half mat, markedly contrasted with the shining mesonotum, postscutellum longitudinally, finely and closely striate, area dorsalis obliquely striate, rest of the segment over the broad extent obliquely, finely and moderately closely striate, the striae of the segment, as well as their intervals, delicately microgranulate or microcoriaceous, not shining, metapleuron *transversely*, finely and closely striate, sides of propodeum obliquely, moderately closely striate, with intervals fairly shining. Petiole of abdomen with lateral margins finely carinated, with the intervalic dorsal aspect gently roundly raised and surface shining, rest of the abdomen also smooth and polished.

♂, unknown.

Holotype: ♀, Borneo (Mt. Kinabalu), 17. VIII. 1971, T. TANO leg. (Coll. TANO).

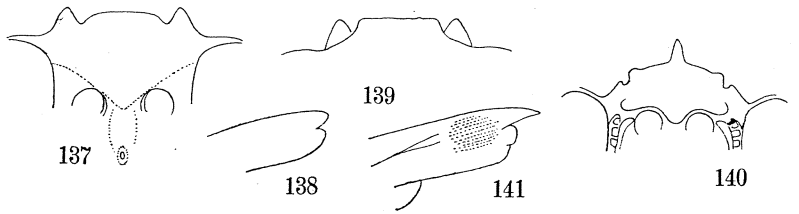
59. *Passaloecus siamensis* Cockerell, 1931

Passaloecus siamensis COCKERELL, 1931, p. 37 (♀); YASUMATSU, 1934, p. 112.

Specimens examined: 2 ♀ 1 ♂, Thailand (Bangkok, 1 ♀ 1 ♂, 27. VII; Mae-Tang, 1 ♀, 7. VIII).

Distribution: Known only from Thailand.

Remarks. In the original description is given "no tubercle or keel on head", but in the specimens (♀♂) examined there is always a tubercle or spine above the insertions of the antennae, sometimes corn-shaped,



137–141. 137–139 — *Passaloecus siamensis* COCKERELL: 137, 138 — ♀, 139 — ♂; 140, 141 — *Passaloecus barabbas* PAGDEN, ♀; 137, 139, 140 — clypeus, 138, 141 — mandible

sometimes elongated, with apex slightly enlarged and incised in middle, carina weak and short, but present (the scapal hollow very deep and when the scapes are folded in it the character is difficult to observe). Clypeus in ♀: Fig. 137 and in ♂: 139, mandible in ♀: Fig. 138. Lateral teeth of the clypeus are hardly visible unless the mandibles are opened or the place is denuded of hairs (in ♂ the hair dense and silvery). Antennal flagellum in ♀ with basal two segments bright ferruginous, with the rest ferruginous beneath, apically gradually darker. Mesopleuron with two longitudinal crenate furrows, the upper shorter.

Differing from the closely allied *sumatrensis* MAIDL, placing the frontal process out of account, in that the frontal median furrow is completely absent, mesonotum is medio-anteriorly markedly impressed, without the scutal grooves. Sculpture on the propodeum is also different: The broad median furrow (area dorsalis?) weakly margined on each side by an irregularly sinuate carina, the furrow at base coarsely, irregularly reti-

culate and on the remaining portion sparsely, weakly and transversely striate, outside the furrow the surface sparsely and obliquely striate, only near the lateral carinae showing a trend to reticulation which is posteriorly distinct and coarse.

♂. Length about 4 mm. Similar to ♀, but antennal joint 1 white in front and ferruginous above, joints 2–10 completely ferruginous yellow, fore and middle femora ferruginous yellow, without blackish area, only partly brownish.

60. *Passaloecus* (*Polemistus*) *barabbas* Pagden, 1933

Passaloecus (*Polemistus*) *barabbas* PAGDEN, 1933, p. 93 (Malaya, ♀♂).

Specimens examined: 3 ♀ 5 ♂, Thailand (Bangkok, 1 ♀ 3 ♂, 28. VII; Ayuttaya, 2 ♂, 29. VII; Cheng Mai, 2 ♀, 6 .VIII).

Distribution: Hitherto known from Malaya, new to Thailand.

Remarks. This monstrous species is well described and illustrated by the original author with the biology and we can identify the species without difficulty.

61. *Vechtia rugosa* (Smith, 1857)

Vechtia rugosa: LECLERCQ, 1957b, p. 106; TSUNEKI, 1963, p. 40 (Thailand).

Specimens examined: 9 ♀ 19 ♂, Thailand (Bangkok, 9 ♀ 15 ♂, 27. VII, 2. VIII; Ayuttaya, 4 ♂, 29, VII, 3. VIII).

Distribution: Widely distributed over the southeastern parts of the Asiatic Continent, through Borneo to the Philippines.

62. *Dasyproctus buddha* (Cameron, 1889)

Dasyproctus buddaha: LECLERCQ, 1958, p. 40, 41, 60; 1963, p. 15; TSUNEKI, 1963, p. 38; 1968, p. 18.

Specimens examined: 4 ♀ 11 ♂, Thailand (Bangkok, 3 ♀ 10 ♂, 27. VII, 2. VIII; Maetang, 1 ♀ 1 ♂, 7. VIII).

Distribution: India, Ceylon, Malaya, Thailand, Philippines and Formosa.

Remarks. Of the male specimens examined eight have abdominal tergites 2–7 yellow maculated (2–6 on each side and 7 in the middle), in a half of which the marks on tergite 2 are only slightly smaller than those on 3, while in the other half markedly smaller. In two males among the rest tergite 2 is completely immaculated and in the remaining one, captured at Mae Tang and with the usual body size, the marks are confined to tergites 3 and 4 only and both very small. But the female collected together with the male has the similar maculation as in others collected in Bangkok. This shows that the abdominal maculae in the male is likely to vary as compared with the female.

63. *Dasyproctus ceylonicus* Saussure, 1867

Dasyproctus ceylonicus: LECLERCQ, 1956, p. 162; 1963, p. 17.

Specimens examined: 10 ♀ 33 ♂, Thailand (Bangkok, 1 ♀ 15 ♂, 27. VII, 2. VIII; Sara Buri, 2 ♀ 7 ♂, 31. VII; Pattaya, 1 ♂, 1. VIII; Mae Tang, 6 ♀ 1 ♂, 7. VIII; Lam Pang, 1 ♀ 9 ♂, 9. VIII).

Distribution: Ceylon, India, Malaya, Thailand, Java, Philippines and Formosa.

Remarks. The male specimens are typical in maculation, but in one from Bangkok tergite 2 (and of course 3 also) is immaculated and in the other from the same locality the maculae on the tergite are very small.

64. *Piyuma prosopoides* (Turner, 1908)

Piyuma prosopoides: LECLERCQ, 1951, p. 51; 1954, p. 210; 1956, p. 1–4; 1957a, p. 350; 1963, p. 58; TSUNEKI, 1963, p. 39; 1968, p. 14.

Specimens examined: 2 ♀, Thailand (Lam Pang, 9. VIII).

Distribution: Australia, S. E. Asia, Borneo, Philippines and Formosa.

Remarks. During the reinvestigation of the species of *Piyuma* PATE, I confirmed my belief that *P. prosopoides* TURNER, 1908, *dentipleuris* CAMERON, 1908, *marklingi* WILLIAMS, 1928, and *iwatai* YASUMATSU, 1942 (= *koxinga* PATE, 1944), are conspecific, forming a cline among them. I further proceeded to believe that the first three are closer together to each other than to the last and *iwatai* alone should be treated as a separable subspecies*.

The specimens from Thailand before me have the maculation as given in my previous paper (1963), except that the legs are more broadly

* Markedly different in the colour of the antennae and the legs and in the much acuter carinae of the pygidial area. But the greyish white colour of the type of *iwatai* seems to be unnatural — possibly due to fading through the preserving medium —, because the topotypical specimens (3 ♀) and others from Formosa (3 ♀ 2 ♂) collected by me show the maculae always lemon yellow.

bright-maculated* and that a spot on the tegula and the basal plates of the wings are also yellow. The medial and the lateral carinae of the pygidial area are distinct, but less acutely raised than in the specimens from Formosa. A considerable variation in colour within the population of this species in Thailand seems to suggest that the so-called different subspecies or species of this group occurring in S. E. Asia and Australia, differing mainly in colouration, may be included within the variation range of a single species of *prosopoides*. However, the *selangori*-group of the genus is considered to form the other cline, including *selangori* s. str. and races *accepta* and *butuana*.

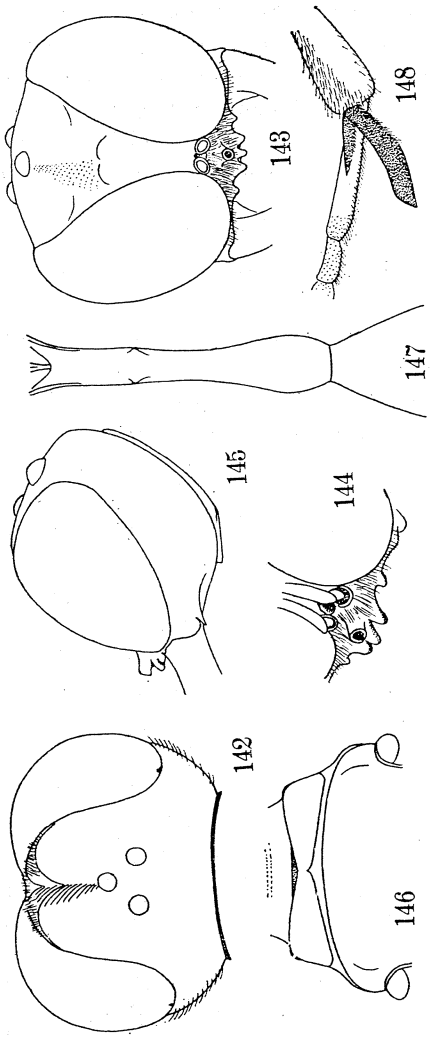
65. *Eupliloides tanoi*, sp. nov.

The new species belongs to the group having the median lobe of the clypeus provided with a markedly porrect tubercle and the mesonotum not deeply impressed medio-anteriorly.

♂. Length 5.5 mm. Black and shining, yellow are collar of pronotum, axillae of mesonotum, scutellum and postscutellum; white are a spot at base on outer side of fore and middle tibiae, fore and middle tarsi except apical one or two joints respectively, hind tibiae at base broadly and the following metatarsi; ferruginous are mandibles except apex, antennal joints 1 and 2, humeral tubercles, tegulae and fore trochanters and tibiae in front, with the apical spurs. Fore legs except tarsi, middle tibiae in front and rest of tarsi dark brownish, antennal flagella brownish black, abdominal segments 1 and 2 both at base with a slight shade of brownish. Wings hyaline, apically more or less smoky, costa, subcosta and stigma black, other veins dark brown, all basally paler. Pubescence on clypeus dense, appressed and silvery, on temples, mesopleuron and legs considerably close, recumbent or half recumbent and silvery or silky white, on other parts of head and thorax sparse and silky white. Abdomen from tergite 3 apically and from apical half of sternite 4 apically covered fairly closely with whitish pubescence, on sternite 2 hairs slightly thick, erected and sparse.

Head seen from above: Fig. 142, with vertex gently roundly elevated, OOD:POD = 7:5, width of postocellus relatively 3.5, frontal furrow deep, deeper and broader anteriorly and at the upper edge of scapal hollow in a deep impression. Head seen in front: Fig. 143, with inner

* Apex and apical half beneath and behind of femora and outer side of tibiae of fore and middle legs, and basal 2/3 of hind tibiae yellow; fore tarsi, mid and hind tarsi except apical two joints pale greyish white, rest of tarsal joints pale ferruginous.



142–148. *Eupliloides tanoi* TSUNEKI, sp. nov., ♂. 142 – head seen from above, 143 – head seen in front 144 – clypeus seen obliquely from the side, showing the curious appendage, 145 – head seen in profile, 146 – pronotum, 147 – petiole of abdomen, 148 – hind tibial apical spurs, with two basal joints of tarsus, seen from inside

orbits strongly convergent towards clypeus, the minimum IOD located at above the antennal sockets which are contiguous to the eye margins, clypeus with anterior margin 5-dentate, the disc with a curious thick cylindric protuberance (Fig. 144) which is truncate and hollowed at apex, antennal joint 1 slender and long, approximately as long as joints 2–7 combined, bluntly unicarinate in front, the carina somewhat acuter upwards, joints 3, 4, 5 by degrees shorter apically, 3 about twice, 5 about 1.3 times, as long as wide at apex, 7 equal in length to width. Head seen in profile: Fig. 145, with temple much less in width than eye, with occipital carina suddenly and angularly ended at apex; collar of pronotum comparatively broad and thick (Fig. 146), with surface only gently elevated (almost flattened) and slightly impressed near antero-lateral corners, the corners rounded, but shortly margined by a transparent carina, posterior margin behind the yellow mark discoloured and impressed into a weak transverse furrow, scutellum and postscutellum nearly flattened, pre- and post-scutellar furrows broad and very coarsely foveolate, prosternal tubercles at the latero-posterior corners pointed at apex, anterior oblique furrow of mesopleuron broad and deep, coarsely crenate, precoxal tooth not strong, but well-defined, connected by a short carina with the margin of mesocoxal socket, metasternum raised at the margins and deeply incised at apex, with a weak carina in middle. On propodeum area dorsalis nearly semicircular, marginated with a very fine, sparsely crenate furrow, the furrow anteriorly rather obsolete, the encircled area at base transversely and in middle longitudinally furrowed, the furrow at base coarsely crenate, posterior inclination medianly above with a deep oval impression, with the lateral margins strongly carinated, the carinae extended upwards and forwards, gradually lowering, and weakly reaching near the spiracles. Petiole of abdomen: Fig. 147, sternite 8 as far as visible from outside quadrate in form. Femora of legs not particularly incrassate, fore tibial spurs not modified, only with a row of microscopic short hairs on inner margin, but the base of fore metatarsi distinctly provided with a curved comb brush; tibial spurs of middle legs also short and comparatively thick, those of hind legs seen from inside: Fig. 148.

Head and thorax smooth and polished, vertex almost impunctate, only near the verge to anterior inclination with a few scattered punctures, on thorax punctures very small and very sparsely scattered; area dorsalis glabrous, smooth and polished, outside the area sparsely scattered with fine hair-bearing points, posterior side smooth upwards, transversely striated and microwrikled towards middle and on posterior portion

medianly longitudinally, shortly carinated and laterally broadly impressed and smooth and shining, sides largely smooth and shining, anteriorly weakly and postero-ventrally strongly, both obliquely striate; petiole impunctate, polished, remaining tergites and sternites moderately closely micropunctulate, sternite 2 with scattered large distinct punctures.

♀, unknown.

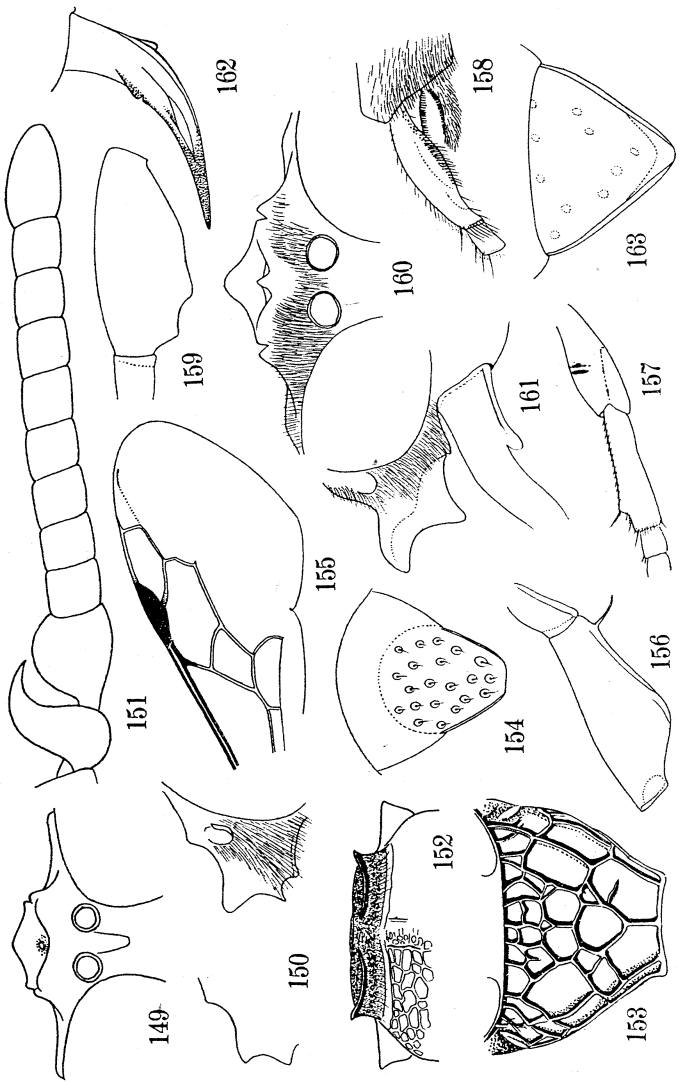
Holotype: ♂, Thailand (Ayuttaya), 29. VII. 1971, T. TANO leg. (Coll. TSUNEKI).

66. *Encopognathus* (*Encopognathus*) *kinabalensis* sp. nov.

In the punctuation of mesonotum similar to *E. chapraensis* TURNER or *E. gombaki* LECLERCQ, but differs from both of them in the structure of the clypeus and in the sculpture of the propodeum.

♂. Length 4.5–5.0 mm. Black; yellow are mandibles except extreme base and apex, antennal joint 1 except inside and above, apical portion of fore and middle femora, fore and middle tibiae (inside pale ferruginous and partly brownish), hind tibiae on outside and all tarsi except ultimate joints. Nape broadly, pronotal tubercles and postscutellum ivory white. Tegulae and apical two segments of abdomen reddish orange, posterior margin of pronotal collar slightly brownish. Wings hyaline, apex very narrowly smoky, stigma and veins black to dark brown. Clypeus and genae densely covered with silvery pubescence, pubescence on dorsal side of body pale ferruginous, short and sparse, that on the sides silvery and sparse, on abdominal tergites 4 and 5 and on apical discoloured margins of sternites 3–5 slightly close, that on ferruginously coloured areas more ferruginous and mixed with a few thick hairs.

Head from above ocellocular area and in front of anterior ocellus broadly impressed, frontal impressed marks large, oval in form, mat, just in front of ocellar area close to the eye and obliquely located, ocelli in a low isosceles triangle, OOD:POD = 9:6, width of postocellus relatively 4 (vertically seen), ocelli uniform, frontal medial furrow considerably deep, but disturbed in outline by coarse punctures; head seen in front with inner orbits strongly convergent below, with minimum IOD somewhat above the antennal sockets which are very close, but not contiguous, to the eyes, interantennal elevation flatly inclined upwards, elongate and covered with silvery pile, clypeus: Fig. 149, with disc gibbous-conical, fairly acutely pointed on top, seen in profile: Fig. 150 (A and B), mandible normal to the genus, occipital carina accompanied by a crenate furrow, ending before reaching hypostomial carina; antenna (joints 2–12) seen



149–163. *Encopognathus* (*Encopognathus*) *kinabalensis* sp. nov.: 149–159 – ♂, 160–163 – ♀. 149, 160 – clypeus, 150a, b, 161 – do., seen in profile, a and b variation, 151 – antenna, 152 – pronotum and anterior part of mesonotum, 153 – propodeum, 154, 163 – pygidial area, 155 – fore wing venation, 156 – fore femur seen from behind, showing the basal spine, 157 – fore tibia and metatarsus, seen in front, 158 – do., seen from inside, 159 – middle femur seen from behind, 162 – mandible

in front: Fig. 151, pronotum: Fig. 152, with antero-lateral corners acutely pointed, tubercels also pointed on top (Fig. 152), mesonotum with prescutal sutures comparatively highly keeled, but not striking due to the coarse sculpture on both sides of the keels, on posterior margin strongly crenate, the crenae formed of the raised lines between the coarse foveae, a similar but less marked row of smaller foveae on posterior margin of scutellum, postscutellum marginated by a finely sinuate transverse lamellate carina. Propodeum in dorso-posterior view: Fig. 153. On mesopleuron epicnemial area is sectioned by a crossing rough row of foveae into two parts, upper part margined by an acute but not highly raised carina, lower part meets with the other of the other side, margined posteriorly by the acetabular carina which is laterally obsolete and higher medially, from the middle of the carina starts the median longitudinal mesosternal carina which is at once highly raised into a triangular lamellate process and soon declining before reaching the middle of the sternum; from just in front of mesocoxae a distinctly foveolate furrow runs across mesosternum, a precoxal transverse carina present as a posterior marginal edge of the coarsely punctate part of the pleuron, metasternum with lateral margins highly reflected, narrowed apically, with a short carina at base in middle. Abdominal tergite 1 as long as wide at apex, with lateral margins acutely edged, tergite 2 also acutely edged at the lateral margins on anterior half, but therefrom apically the tergites normally rounded at the sides, pygidial area: Fig. 154, fore wing venation: Fig. 155, the form of the cubital cell constant, the vein of accessory cell weak, only apically more or less strong and curved along the wing margin, but the cell is not closed. Fore femora near base beneath spined, the spine not thick, but considerably long (Fig. 156), fore tibial spur short and thick, fore metatarsus seen in front: Fig. 157, seen from inside: Fig. 158, middle femur seen from behind: Fig. 159, hind legs not modified, with longer tibial spur less than as long as the following metatarsus.

Punctures on upper side of head irregular in size, generally close, the larger ones with bottom rugulose, oculocellar areas sparsely punctured, with intervals of the punctures polished, punctures on ocellar area, in front of anterior ocellus and on occiput fine and close, on frontal swelling on both sides of frontal furrow coarse, close, irregular and rugosely arranged, but in some specimens on lateral portions of the area sparse, scapal hollow transversely rugoso-striate; clypeus on discal gibbosity and on anterior margin glabrous, smooth and polished; punctures on mesonotum coarse, irregular in form, on anterior part close, on medial part trans-

versely irregularly rugoso-subreticulate, on posterior part punctures sparse, with intervals finely, weakly rugulose or coarsely longitudinally rugosostriate or weakly sparsely punctate and polished, scutellum sculptured as on posterior part of mesonotum, mesopleuron very coarsely irregularly rugoso-subreticulate, metapleuron longitudinally coarsely striate, with intervals dull. Sculpture of propodeum: Fig. 153, sides smooth and polished, sometimes with oblique, fine and close striae on marginal areas. Abdominal tergite 1 finely, rather sparsely (intervals slightly larger than points) punctured, apical marginal area of tergite 1, tergite 2 nearly wholly and tergite 3 except apical margin transversely, very closely microstriate, half glossy, apex of tergite 3 and tergites 4 and 5 moderately sparsely, rather finely punctured, pygidial area sparsely and coarsely punctured, ventral side smooth and polished, on sternite 2 and on apical margins of the succeeding sternites sparsely punctured.

♀. Length about 5 mm. Very similar to ♂, except the following: Antennae simple, relative length of joints 3, 4 and 5 approximately 3, 2 and 2, 3 about 1.7 times as long as wide at apex, 4 as long as wide; legs normal, rather robust, on mesosternum acetabular carina and median lamellate projection absent, pygidial area narrower at apex. Punctures on upper side of head small, almost uniform in shape and size, on ocellar area, occiput and on upper part of anterior frons slightly smaller and much closer, scapal hollow smooth, almost without striae. Otherwise as in ♂.

Holotype: ♂, Borneo (Mt. Kinabalu), 17. VIII. 1971, T. TANO leg. (Coll. TANO).

Paratypes: 1 ♀ 3 ♂, ditto. (1 ♂, Coll. TSUNEKI, others Cool. TANO).

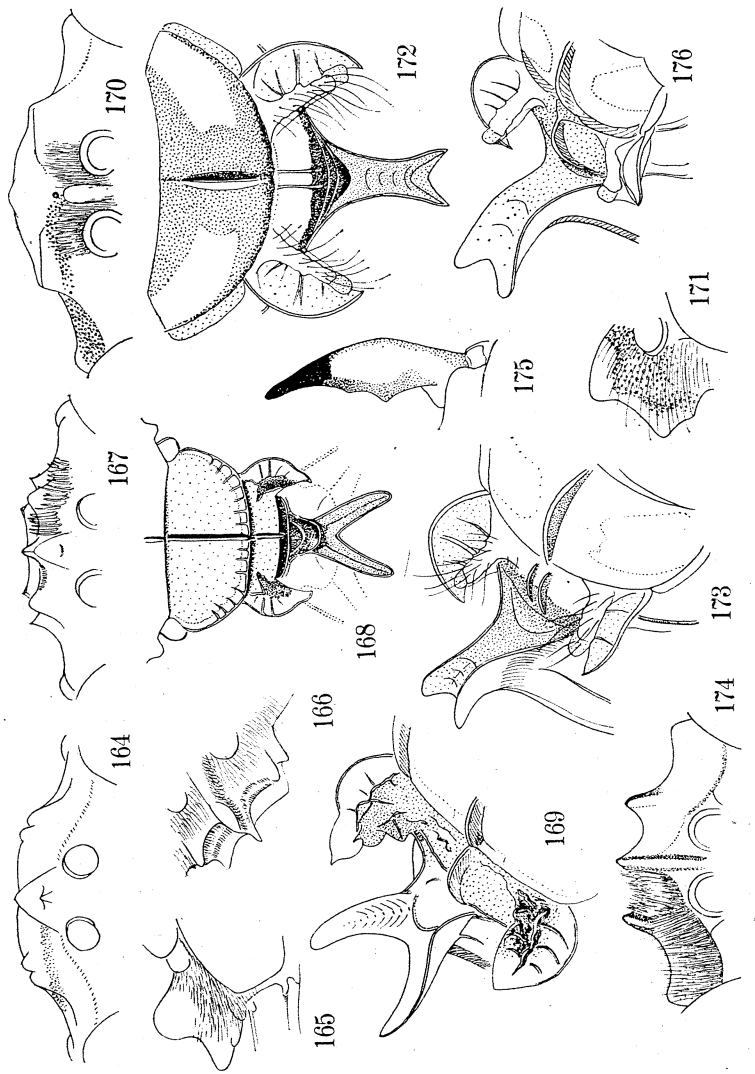
Remarks. In the male specimens the sculpture on the head above and on the mesonotum is considerably markedly variable. Also the form of the anterior margin of the clypeus is not constant. Clypeus in ♀ seen in front: Fig. 160, in profile: Fig. 161. Mandible: Fig. 162 and in 161, pygidial area: Fig. 163.

67. *Oxybelus lamellatus thaianus* Tsuneki, 1961

Oxybelus andalsiacus thaianus TSUNEKI, 1961a, p. 391.

Specimens examined: 2 ♂, Thailand (Ayuttaya, 29. VII).

Distribution: Known from Thailand only, the nominate species is widely distributed from the West Palaearctic Region to the Oriental Region as far north as Formosa.



164–176. 164–165 — *Oxybelus thailanditus* TSUNEKI, ♀, 166–169 — *Oxybelus malaysianus* sp. nov., ♂, 170–176 — *Oxybelus ayuttayanus* sp. nov.: 170–173 — ♀, 174–176 — ♂; 164, 166, 167, 170, 174 — clypeus, 165, 171 — do., seen in profile, 168, 172 — scutellum, postscutellum, lamellae and mucro, 169, 173, 176 — do., seen obliquely from the side, 175 — mandible

68. *Oxybelus thailanditus* Tsuneki, nom. et stat. nov.

Oxybelus transiens thaianus TSUNEKI, 1963, p. 42 (nec 1961a).

Specimens examined: 1♀ 1♂, Thailand (Bangkok, 1♀, 27. VII; Doi Sked, 1♂, 8. VIII).

Distribution: Thailand.

Remarks. The differences of the present species from *O. transiens* TURNER enumerated when it was described as one of its subspecies are considered sufficient enough to raise it to a distinct species.

♀ (hitherto unknown). Similar to ♂, except the following differences:

Clypeal form as given in Figs. 164 (frontal view) and 165 (lateral view). Scutellum with two large yellow marks. Pygidial area present, nearly equilateral triangle in form, ferruginous red and covered with short coppery bristles. IOD at postocellus, in middle of face and at bases of mandibles relatively 25, 20 and 35. Length 4.5 mm.

69. *Oxybelus malaysianus* sp. nov.

If the description "the two acute and moderately long spines" means the state of the mucro as in the present species, this seems closely allied to *O. furcifer* TURNER, 1917. But. if so, the present species still differs from this in the lateral dentation of the abdomen (♂) and in the form of the lamella and somewhat also in colouration (♀♂).

♂. Length 4.5 mm. Black, with the following portions yellow: Mandibles except apical third (black) and inner margin (brown), antennal joint 1 wholly, 2 beneath, pronotal tubercles, a spot on tegulae, basal plates of hind wings, a narrow transverse line on each side of tergites 1–5 (interspaces about twice as broad as the lines), apex and apical 2/3 beneath of fore and middle femora, all tibiae except inside, all tarsi (apically slightly ferruginous) except arolia. Antennal flagellum beneath, tegulae (transparent) and fore and middle femora in front ferruginous; palpi and pygidial area dark brown; lamellae transparent and slightly darkened, radii in part yellowish; wings hyaline, stigma and veins black.

Relative length of IOD at postocelli and in middle of face (minimum) 25 and 17, OOD:POD = 10:3, clypeus not formally tricarinate, the medial line bluntly elevated, the elevation impressed near spex (Fig. 166), anterior margin: Fig. 167, the margin thick, forming a distinct polished underside (Figs. 166, 167); mandible with a short tooth on inner margin. Head seen in profile with temple slightly narrower than eye, with an oblique carina from above middle to posterior corner of mandibular base, occipital carina with lower ends slightly angulated; anterolateral corners of pronotal collar shortly pointed, lower longitudinal sinuate carina of mesopleuron between the precoxal carina and the lower end of epicnemial carina not in a line connected, but parallel towards middle and disappeared there (constant?). Lamellae simple and mucro stoutly bifurcate (Figs. 168 and 169). Lateral teeth of abdominal tergites are on segments 3–6, tergite 6 with a further pair of teeth on the disc, the area between them slightly raised, pygidial area distinctly margined by carinae, slightly narrowed apically, with apex gently emarginate, venation normal.

Punctures on head and thorax moderately fine, dense and deep, on mescopleuron coarse and irregular, lateral rounded areas and posterior triangular area to the mucro largely smooth and polished, lateral areas of posterior wall transversely, sides of the segment longitudinally (slightly obliquely), both coarsely striate, on the latter the striae obsolete at the central area. Abdominal tergites finely and closely, sternites slightly more largely and sparsely punctured.

♀, unknown.

Holotype: ♂, Malaya (Kuala Lumpur), 12. VIII. 1971, T. TANO leg. (Coll. TANO).

70. *Oxybelus ayuttayanus* sp. nov.

? *Oxybelus ruficornis* SMITH, 1856, p. 388 (♀); BINGHAM, 1897, p. 317 (♀).

The female of the specimens examined well agrees in character with *O. ruficornis* SMITH, as far as the descriptions go, except that the clypeus can not be said to have a median carina, that the legs are without the ferruginous tint and that the pygidial area is black. Such differences as mentioned may be sufficient enouth to separate the specimens from *ruficornis* at the species level. Further, from the present knowledge of classification of the members of this genus the descriptions are too simple and it seems a venture to identify the specimens on the basis of such descriptions.

♀. Length 5 mm. Colouration* and sculpture as in *O. ruficornis* SMITH,

* Black, with the following portions ivory white: Mandibles on basal half, scapes in front, collar, tubercles, a spot on tegulae, greater part of basal plates of wings, a large spot on each side of scutellum, postscutellum except transparent lamellate part, lateral ridges of scutellum and postscutellum, large lateral marks on tergite 1, medianly narrowed bands on tergites 2–4, apex and apically beneath of fore and middle femora, tibiae externally, tarsi except arolia. Fore tibiae in front and fore tarsi slightly ferruginous, apices of basal four joints of mid and hind tarsi brownish, antennal flagella except joints 2–5 ferruginous red, wings hyaline, veins pale brown.

Clypeus seen in front: Fig. 170, seen in front: Fig. 171, medial longitudinal elevation ending far before reaching anterior margin. Scutellum, postscutellum with its lamellae and the mucro at the base of propodeum: Fig. 172, do. seen obliquely from the side: Fig. 173, lamella bifurcate at apex, but the inner lobe not pointed at apex and only on apical part lamellate, scutellum medianly stoutly carinated, postscutellum with a pair of carinae in middle (Figs. 172, 173).

♂. Length 4.5 mm. Colouration generally as in ♀ except that the colour of the marks yellow (though slightly whitish), postscutellum without the maculae, bands on tergites 2–5 medianly distinctly interrupted (in ♀ completely banded, though slightly narrowed in middle), hind tibiae at base externally only yellowish and tarsi brownish behind, with basitarsi more broadly, and arolia wholly, dark brown. OOD:POD = 1:3 (as in ♀), IOD at postocelli, in middle of face (minimum) and at anterior bases of mandibles relatively 27, 20 and 30 (in ♀ 31, 28, 33, viz. face broader), antennal joint 1 relatively 11 (in ♀ 13), clypeus: Fig. 174, the hair between median and lateral teeth very dense, but not long, mandible: Fig. 175. The oblique carinae on temple below weak, carina on anterior margin of collar high and reflected, but not toothed on antero-lateral corners, mesonotum medianly longitudinally carinated, the carina shortly interrapted in middle, scutellum and postscutellum also carinated longitudinally in middle (Fig. 176), lamellae and mucro generally similar (do.). Lateral teeth of abdomen only feebly defined on tergites 5 and 6 only, pygidial area margined by carinae, with apex feebly emarginate (nearly truncate). Sculpture on mesopleuron coarser than in ♀, on the area below scrobal furrow punctures larger, irregular in form and partly rugosely confluent, the pleuron separated from the mesosternum by a longitudinal carina (in ♀ the carina lacking). Propodeum sectioned by carinae as usual, and transversely coarsely striate except the areas around the mucro where partly rugose or rugoso-reticulate, with surface shining (in ♀ largely shining, with aculpture weaker than in ♂). Abdominal tergites finely and closely punctured, sternites more largely and more sparsely punctured.

Holotype: ♂, Thailand (Ayuttaya), 29. VII. 1971, T. Tano leg. (Coll. Tano).

Paratype: 1 ♀, the same data (do.).

Remarks. There is some doubt as to the combination of the two sexes of the present species. It is mainly based on the difference in the mesopleural and postscutellar carinae and in the colour tone of the maculae.

STRESZCZENIE

Materiał stanowiący podstawę niniejszego opracowania pochodzi z kilku krajów południowo-wschodniej Azji, od Syjamu po Borneo. Obejmuje on 70 gatunków (w tym 19 nowych); ze względu na niedokładność opisów w starszym piśmiennictwie wiele gatunków zostało scharakteryzowanych w sposób odpowiadający nowoczesnym wymogom. Autor wyróżnia ponadto 1 nowy rodzaj.

Asahigaoka, 4-15
Mishima, Japan 411

REFERENCES – PIŚMIENNICTWO

Baltazar, C. R., 1966, A catalogue of Philippine *Hymenoptera* (with a bibliography 1758–1963), Pac. Ins. Monogr., **8**, Honolulu, 488 p.

Bingham, C. T., 1897, Fauna of Brit. Ind. *Hym.*, I. London, 579 p.

Cameron, P., 1889, *Hymenoptera* Orientalia, or contribution to a knowledge of the *Hymenoptera* of the Oriental Zoological Region. Pt. I. Mem., Proc. Manchester Lit. Phil. Soc., Ser. 4, **2**: 91–152.

Cameron, P., 1890, Idem. Ibid., **4**; 239–283.

Cameron, P., 1900, Descriptions of new genera and species of aculeate *Hymenoptera* from the Oriental Zoological Region, Ann. Mag. Nat. Hist., Ser. 7, **5**: 17–41.

Cameron, P., 1902a, Descriptions of new genera and species of *Hymenoptera* collected by Major C. G. Nurse at Deesa, Simula and Ferozepore, J. Bombay Nat. Hist. Soc., **14**: 267–273.

Cameron, P., 1902b, On the *Hymenoptera* collected by Mr. Robert Shelford at Sarawaku, and on the *Hymenoptera* of the Sarawaku Museum, J. Str. Asia. Soc., **37**: 29–131.

Cameron, P., 1903, Descriptions of nineteen new species of *Larridae*, *Odynerus* and *Apidae* from Barrackpore, Trans. Ent. Soc. Lond., 1903: 117–132.

Cockerell, T. D. A., 1931, Descriptions and records of *Hymenoptera*, Ann. Mag. Nat. Hist., **10**: 37–41.

Handlirsch, A., 1891, Monographie der mit *Nysson* und *Bembex* verwandten Grabwespen, VI. Sitz.-Ber. Akad. Wiss. Wien, Mathem.-naturw., **101**: 801–1079.

Haneda, Y., 1972, *Sphecidae* collected in Formosa in 1971, Life Study, **17**: 1–7.

Iwata, K., 1964, Bionomics of non-social wasps in Thailand. Nature and Life in Southeast Asia. III: 323–383.

Kohl, F. F., 1884, Die Gattungen und Arten der Larriden Autorum, Ver. zool.-bot. Ges., Wien, **34**: 171–454.

Kohl, F. F., 1890, Dien Hymenopterengruppe der Sphecinen. I. Monographie der natürlichen Gattung *Sphex* Linné (sens. lat.), Ann. natürh. Hofmus., Wien, **5** (2): 78–194; **5** (3): 317–461.

Kohl, F. F., 1906, Zoologische Ergebnisse der Expedition der kaiserichen Akademie

der Wissenschaften nach Südarabien und Sokotra in Jahre 1898–1899. Hymenopteren, Denkschr. k. Akad. Wiss. Math.-Naturw. Kl., **71**: 1–133 (11 Taff.).

KROMBEIN, K. V., 1949, The aculeate *Hymenoptera* of Micronesia. I. *Scolidae*, *Mutillidae*, *Pompilidae* and *Sphecidae*, Proc. Hawn. Ent. Soc., **13**: 367–410.

LECLERCQ, J., 1951, Notes systématiques sur quelques Crabroniens (*Hymenoptera, Sphecidae*) américains, orientaux et australiens, Bull. Ann. Soc. R. Ent. Belg., **87**: 31–56.

LECLERCQ, J., 1954, Monographie systématique, phylogénétique et zoogéographique des Hyménoptères Crabronien etc., Liège, 371 p.

LECLERCQ, J., 1955, Revision des *Crossocerus* du sous-genre *Eupliloides* PATE, 1946 (*Hym. Sphecidae, Crabroninae*), Bull. Ann. Soc. R. Ent. Belg., **91**: 300–304.

LECLERCQ, J., 1956, Les *Dasyproctus* (LEPELETIER DE ST.-FARGEAU, et BRULLÉ, 1834) du sud-est asiatique et de l'Océanie, Bull. Ann. Soc. R. Ent. Belg., **92**: 217–235.

LECLERCQ, J., 1957a, Crabroniens du sud-est asiatique, nouveaux ou peu connus. I. Genre *Rhopalum* KIRBY, *Piyuma* PATE et *Crossocerus* subg. *Eupliloides* PATE, Ibid., **43**: 348–358.

LECLERCQ, J., 1957b, Sur le genre *Vechtia* (PATE, 1944), lignée orientale de Crabroniens evolués, Ent. Ber., **17**: 106–107.

LECLERCQ, J., 1958, Exploration du Parc National de l'Upemba etc. Fasc. 45. *Hymenoptera Sphecoidea* (*Sphecidae* 11. Subfam. *Crabroninae*), Inst. Parcs Nat. Congo Belg.: 1–114.

LECLERCQ, J., 1963, Crabroniens d'Asie et des Philippines (*Hymenoptera*, *Sphecidae*), Ibid., **99**: 1–82.

LITH, J. P. VAN, 1962, Contribution to the knowledge of the Indo-Australian *Pseninae* (*Hymenoptera*, *Sphecidae*). Pt. II. *Psenulus* KOHL, 1896, Zool. Verh., **52**: 1–118.

LITH, J. P. VAN, 1972, Contribution to the knowledge of Oriental *Psenulus* (*Hymenoptera*, *Sphecidae*, *Psenini*), Tijdschr. Ent., **115**: 153–203.

MAIDL, F., 1925, Fauna sumatrensis (Beitrag Nr. 11), *Sphegidae*, Ent. Mitt., **14**: 376–392.

MAIDL, F., 1926, Neue indomalyische *Cerceris*-Arten, Zool. Meded., **9**: 221–238.

PAGDEN, H. T., 1933, Two new Malayan Sphecoids, Trans. Ent. Soc. Lond., **81**: 93–101.

PAGDEN, H. T., 1934, Biological notes on some Malayan aculeate *Hymenoptera*. II, with descriptions of new species, J. Fed. Mal. Str. Mus., **17**: 467–486.

PATE, V. S. L., 1943, On the taxonomy of the genus *Encopoganthus* (*Hymenoptera*: *Sphecidae*: *Pemphilidini*), Lloydia, **6**: 53–76.

PATE, V. S. L., 1946, On *Eupliloides*, an Oriental subgenus of *Crossocerus* (*Hymenoptera*: *Sphecidae*: *Pemphilidini*), Proc. Ent. Soc. Wash., **48**: 53–60.

RAMAKRISHNA AIYAR, T. V., 1916, A catalogue of new wasps and bees (*Fossores*, *Diploptera* and *Antophila*) described from the Indian region since 1897, J. Bombay Nat. Hist. Soc., **24**: 539–560.

SMITH, F., 1856, Catalogue of Hymenopterous insects in the collection of the British Museum. IV. *Sphecidae*, *Larridae* and *Crabronidae*, London.

SMITH, F., 1958, Catalogue of the Hymenopterous insects collected at Sarawaku, Borneo, Mount Ophilr, Malacca and at Singapore, by Mr. A. R. WALLACE, J. Proc. Linn. Soc. Lond., **2**: 42–130.

TSUNEKI, K., 1961a, Some Fossorial *Hymenoptera* collected by the Osaka City University Biological Expedition to Southeast Asia, 1957-58, Nature and Life in S. E. Asia, **1**: 383–393.

TSUNEKI, K., 1961b, Studies on *Cerceris* of North Eastern Asia, Mem. Fac. Lib. Arts, Fukui Univ., Ser. II, **10**: 1–72.

TSUNEKI, K., 1963, *Chrysididae* and *Sphecidae* from Thailand (*Hymenoptera*), Etizenia, **4**: 1–50.

TSUNEKI, K., 1964, The genus *Tachytes* PANZER of Japan and Korea, Etizenia, **5**: 1–11.

TSUNEKI, K., 1966, Contribution to the knowledge of the *Larrinae* fauna of Formosa and the Ryukyus (*Hymenoptera*, *Sphecidae*), Etizenia, **17**: 1–15.

TSUNEKI, K., 1967a, A note on *Liris* (*Notogonidea*) *deplanata* (KOHL, 1883), with a description of the male, Etizenia, **10**: 1–6.

TSUNEKI, K., 1967b, Studies on the Formosan *Sphecidae*. I. The subfamily *Larrinae* (*Hymenoptera*), Etizenia, **20**: 1–60.

TSUNEKI, K., 1967c, On some *Ampulicidae* from Formosa (*Hymenoptera*), Etizenia, **21**: 1–13.

TSUNEKI, K., 1967d, Studies on the Formosan *Sphecidae*. II. The subfamily *Trypoxyloninae* (*Hymenoptera*), Etizenia, **22**: 1–21.

TSUNEKI, K., 1967e, Studies on the Formosan *Sphecidae*. IV. The subfamily *Sphecinae*, with special reference to the genus *Ammophila* in Eastern Asia (*Hymenoptera*), Etizenia, **26**: 1–24.

TSUNEKI, K., 1968, Studies on the Formosan *Sphecidae*. V. The subfamily *Crabroninae* (*Hymenoptera*), with a key to the species of *Crabronini* occurring in Formosa and the Ryukyus, Etizenia, **30**: 1–34 (with 10 Pls.).

TSUNEKI, K., 1971a, Studies on the Formosan *Sphecidae*. X. Revision of and supplement to the subfamily *Trypoxyloninae* (*Hymenoptera*), Etizenia, **54**: 1–19.

TSUNEKI, K., 1971b, Studies on the Formosan *Sphecidae*. XIII. A supplement to the subfamily *Pemphredoninae* (*Hym.*), with a key to the Formosan species, Etizenia, **57**: p. 1–21.

TSUNEKI, K., 1971c, *Sphecidae* aus der Inneren Mongolei und dem nördlichen China (*Hym.*), Etizenia, **58**: 1–38.

TSUNEKI, K., et T. IIDA, 1964, The first record of the genus *Dolichurus* in Japan, with description of a new species (*Hymenoptera*, *Sphecoidea*, *Ampulichidae*), Akitu, **11**: 41–43.

TSUNEKI, K., et T. TANO, 1970, *Dolichurus puliensis* is the male of *D. amamiense*. Life Study, **14**: 40.

TURNER, R. E., 1916, Notes on the wasps of the genus *Pison*, and allied genera, Proc. Zool. Soc. London, 1916: 591–627.

TURNER, R. E., 1917, On a collection of *Sphecoidea* sent by the Agricultural Research Institute, Pusa, Bihar, Mem. Dept. Agr. Ind., Ent. Ser., **5**: 173–203.

VECHT, J. VAN DER, 1949, On Indo-Australian *Bembecinus*, with special reference to the species occurring in Java (*Hym.*, *Sphec.*), Treubia, **20**: 289–307.

VECHT, J. VAN DER, 1957, The *Sphecoidea* of the Lesser Sunda Islands (*Hym.*) I. *Sphecidae*, Ver. Naturf. Ges. Basel, **68**: 358–372.

VECHT, J. VAN DER, 1961, *Hymenoptera Sphecoidea* Fabriciana, Zool. Verh., **48**: 1–85.

VECHT, J. VAN DER, 1964, The *Cerceris* of Java (*Hymenoptera Sphecoidea*), Zool. Meded., **29**: 348–368.

VECHT, J. VAN DER, et K. V. KROMBEIN, 1955, The subspecies of *Sphex sericeus* (= *S. aurulentus* AUST. nec FABR., 1787) (*Hymenoptera*, *Sphecidae*), Idea, **10**: 33–43.

VECHT, J. VAN DER, et F. M. VAN BREUGEL, 1968, Revision of the nominate subgenus *Sceliphron* LATREILLE (*Hymenoptera*, *Sphecidae*), Tijd. Ent., **111**: 185–255.

WILLIAMS, F. X., 1928, The *Larridae* of the Philippine Islands, Bull. Exp. St. Hawn. Sug. Pl. Ass., Ent. Ser., **19**: 61–111.