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CHRYSIDIDAE AND SPHECIDAE FROM THAILAND
(HYMENOPTERA)
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CHRYSIDIDAE AND SPHECIDAE FROM THAILAND
(HYMENOPTERA)*

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Synopsis

TSUNEKI, Katsuji (Fukui Univ., Japan). Chrysididae and Sphecidae from Thailand (Hymenoptera). *Etizenia*, No. 4, pp. 1-50 (1963).

Three species of Chrysididae and 57 species of Sphecidae collected mainly in Thailand are recorded, including the following new species and subspecies :

New species : *Chrysis cupreidorsus*, *Tachytes manjikuli*, *T. astatiformis*, *Liris litoralis*, *L. tachytoides*, *Trypoxylon nagamasae*, *T. funatui*, *T. crassifrons*, *Stigmus monstrosus*, *S. thailandinus*, *Nysson chiengmaiensis*, *Ammatomus yoshikawai*, *A. thianus*, *Cerceris bituberculata*, *C. maculiceps*, *C. nagamasa*, *C. spiniventris*, *Rhopalum tongyaii*, *Encopognathus thianus*, *Oxybelus nigriventris*.
New subspecies : *Larra sanguinea aeripilosa*, *Liris liroides thianus*, *L. robustus planatus*, *Hoplisoides punctatus manjikuli*, *Bembix borrei thiana*, *Philanthus basalis clypeatus*, *Cerceris rybyensis thiana*, *C. fukaii basiferruginea*, *Ectemnius dugensis wattanapongsirii*, *Oxybelus transiens thianus*.

The material used in the present investigation was collected in the main by Dr. K. Iwata and Dr. K. Yoshikawa during their stay in Thailand from January to June, 1961, and sent to me for identification. I heard that the material does not represent all of their collection of the families dealt with here, but it is sufficient to make us presume the interesting fauna and yet unexplored state of the region. In studying the material I was deeply impressed that many interesting species are included that are considered unable to be captured unless the collectors are well trained experts of Hymenoptera. For their careful and toilsome collection I pay my deepest respect and would thank them for giving me a chance of investigation of the material which is most valuable when we attempt the phylogenetic study of Sphecine wasps, especially of Larrinae of Japan.

In carrying out the present investigation I am much indebted to Mr. S. Sato of the Central Library of Hokkaido University and to Miss N. Kikuchi of the Botanical Institute of Tokyo Kyoiku University in obtaining literature. Dr. J. P. van Lith, Lotterdam, kindly took trouble for me in copying an important paper which otherwise could not be accessible in Japan, to whom I express my heartiest gratitude.

The specimens comprise 3 species of Chrysididae and 54 species of Sphecidae, of the latter 12 species belong to Larrinae, 6 to Trypoxyloninae, 3 to Pemphredoninae, 2 to Sphecinae, 4 to Nyssoninae, 2 to Bembecinae, 8 to Philanthinae and 10 to Crabroninae, including 20 species and 10 subspecies new to science, as given in the above synopsis. Types are preserved in the Entomological Laboratory, Hyogo Agricultural University, Sasayama.

RECORDS AND DESCRIPTIONS OF THE SPECIES

I. Family CHRYSIDIDAE

1. SUBFAMILY CHRYSIDINAE

1. Genus *Chrysis* Linné, 1761

1. *Chrysis (Trichrysis) cyanea* Linné, 1761

Chrysis cyanea Linné, Faun. succ. Ed. II. p. 414, 1761.

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? *Chrysis (Trichrysis) singalensis* Mocsáry, Monogr. Chrysid., p. 324, 1889 (Ceylon).

? *Chrysis singalensis*: Bingham, Faun. Brit. Ind., Hym. II, p. 453, 1903.

Specimen: 1 ♀, Thailand (Saraburi), 12. IV. 1961, K. Iwata leg.

Remarks. The example examined completely agrees in character with the original description of *C. singalensis* Mocsáry and from that of Bingham it differs in that the punctures on the abdomen are smooth within, roundly concave, glittering and not rugulose. On the other hand, it agrees completely in the essential characters with *C. cyanea* L. which occurs widely in the Palaearctic region.

Chrysis cyanea is a species considerably varied in the characters such as punctuation, tone of the blue colour, sinuation of the lateral carinate margin of the pronotum, curvature of the propodeum in the lateral view, medial carinae on the abdominal tergites, state of impression of the medial line of the pronotum and on both sides of the medial elevation of the 3rd abdominal tergite, and apical teeth of the caudal segment. *C. singalensis* is considered a form of *C. cyanea* having the pronotal lateral margins strongly sinuate and the abdomen carrying a distinct carina on the 2nd tergite.

2. *Chrysis (Chrysis) fuscipennis* Brullé, 1846

Chrysis fuscipennis Brullé, Hist. Nat. Ins., Hym., 4, p. 38, 1846; —: Buysson, Jour. Bombay Nat. Hist. Soc., 10, p. 472, 1896; —: Bingham, Faun. Brit. Ind., Hym., II, p. 467, 1903.

Chrysis (Tetrachrysis) fuscipennis: Mocsáry, Monogr. Chrysid., p. 370, 1889.

Chrysis (Chrysis) fuscipennis: Tsuneki, Nature & Life S.E. Asia, I, p. 376, 1961.

Specimen: 1 ♀, Thailand (Prew), 25. VI. 1961, K. Iwata leg.

3. *Chrysis (Pentachrysis) cupreidorsus* sp. nov.

Very closely allied to the common species, *C. lusca* Fabr., differs from it in the frontal transverse carina not incised in the middle, in the frontal area not enclosed by carinae and markedly in coloration. In coloration it resembles *C. imperiosa* Sm., but the postscutellum is not triangular in the dorsal view and the upper front is without the area enclosed by the carinae.

♀. Length 9.0 mm. Metallic green, with golden effulgence in certain light on clypeus, sides of face, temples below, sides of thorax-complex, basal impressed area of abdomen and legs except tarsi. Bronzy cupreous: Pronotum largely, mesonotum, scutellum, postscutellum medianly, sides of tergites 1 and 2 (both anteriorly turning into bluish green). Bronzy: Apical margin of tergite 2, supra-foveae and apical margin of tergite 3. Purple (not violet): Ocellar region, 3 maculae on pronotum, median lobe and adjacent regions of lateral lobes of mesonotum, scutellum medianly, medio-anterior area of postscutellum and series of foveae. Violaceous blue: Sides of postscutellum, greater part of tergites 1 and 2 and base of tergite 3. Antennae black, joint 1 wholly, 2 and 3 above green, tarsi of legs black. Wings fairly clouded, especially darkened on anterior portion of radial cells. Cavitas facialis closely covered with long whitish pubescence.

Head above OOD subequal to POD, frontal transverse carina nearly straight, not deeply incised in middle as in *C. lusca*, carina to enclose the frontal area only partly obsoletely defined. Head seen in front with cavitas facialis nearly as long as broad (ratio of length between frontal carina — base of antennae and minimum interocular width 36:34), frontal carina not reaching eyes, with lateral portions bent forwards, clypeus medianly gibbous-convex, on top longitudinally carinate, anterior margin roundly emarginate, genae convergent below, as long as antennal joint 7, antennal joint 3 thrice as long as wide at apex. Pronotum transverse, dorsal surface both transversely and longitudinally arched upwards, medianly distinctly impressed, lateral margin carinate and fairly strongly sinuate (anterior and posterior portions roundly produced sideways and median region emarginate); mesopleuron with normal transverse and longitudinal crenate

furrows, the latter with 2 large polished foveae on posterior end, lower extremity triangular, with apex not raised as in *lusca*; scutellum gently convex, postscutellum slightly longer in middle than at sides, in the same level as scutellum and with a small deep excavation at base in middle; propodeal teeth with outer margins slightly divergent posteriorly, apical angle about 60°, apex pointed. Base of abdomen normally trisulcate, tergite 2 with medial carina not strong, latero-posterior angles about 100°, with apex nearly acute; tergite 3 comparatively short, twice as wide as long, at base transversely impressed, ante-sereis of foveae incrassate, medianly less strongly carinate, foveae large, 12 in number, distinctly separated from each other by carinae, series slightly impressed, apical margin comparatively short, as long as serial impression, penta-dentate, the teeth short, broad, equidistant, with apex nearly acute, sides of apical margin convergent posteriorly, very slightly sinuate. Wings and legs without particular characters.

Cavitas facialis transversely striate, mixing few weak points, on the sides finely punctate-reticulate. Punctures on head and thorax rounded, close, subreticulate, on ocellar region somewhat smaller, on mesonotum posteriorly and on scutellum slightly larger and with more or less interspaces, (generally punctures uniform in size on each area and partly mixing small points on the intervals), scutellum medio-anteriorly smooth and polished, on mesopleuron posterior epicnemium polished, with sparse punctures, sides of propodeum obliquely closely striate. Punctures on abdomen smaller than on mesonotum, rounded, with intervals slightly smaller than points, mixing a few minute points, on tergite 3 sparser, weaker, apical margin with sparse smaller weaker punctures, sternites minutely coriaceous, opaque.

Holotype : ♀, Thailand (Muangfang), 16. III. 1961. K. Iwata leg.

II. Family SPHECIDAE

1. SUBFAMILY LARRINAE

1. Genus *Gastrosericus* Spinola, 1838

1. *Gastrosericus binghami* Cameron, 1897

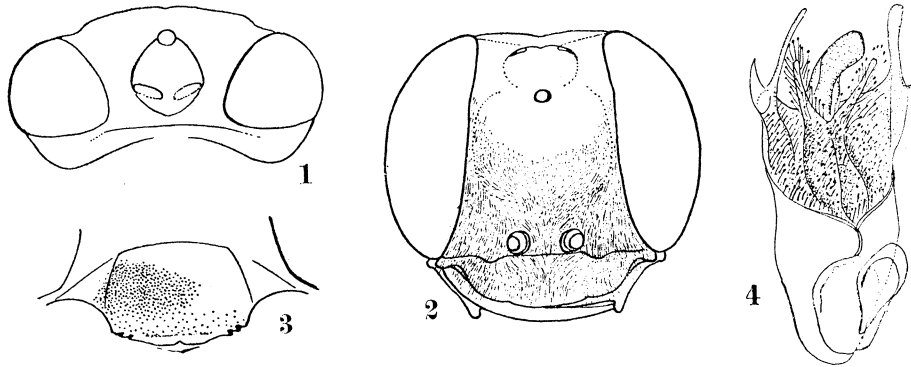
Gastrosericus binghami Cameron, Mem. Manchester Lit. Phil. Soc., 41 (13), p. 22, 1897 (♂).

Except for some characters that are considered due either to the sexual difference or to the individual (or local) variation, the underdescribed specimen well agrees in character with the original description of *G. binghami* Cameron (♂) and was referred to the other sex of this species.

Differences which are considered due to the secondary sexual characters : (1) Structure and colour of the clypeus (c. f. Kohl's description on *G. wallii* Spin.), (2) characters of the pygidial area and (3) pilosity on the abdomen. (Further, the structure of the antennae must be different, but such is not given in the original description.) Differences which may be due to the individual (or local) variation : (1) Sculpture on the propodeum and (2) size of the body.

♀. Length 7.0 mm. Black, densely covered with short brassy pubescence on frons, clypeus, temples, sides and posterior portion of mesonotum, mesopleuron, sides of scutellum and of postscutellum, propodeum, apical margin broadly of tergites 1-5 except each median region and legs except hind femora. Pubescence on antennal scape in front, mesopleuron below, mesosternum and legs rather appearing silvery, that on vertex, remainder of mesonotum, scutellum, postscutellum, sides of propodeum and rest of abdomen somewhat sparser, on antennae much sparser, and grayish white. Pygidial area without hair, polished; from apical portion of sternite 2 posteriorly the surface glabrous and shining. Pale yellow are : Mandibles at base externally, humeral angles, tegulae

(honey yellow), base of wings, apices of femora, and tibiae wholly (internally brownish) of all legs. Ferruginous to brown: Mandibles (apex darker), apical margin of clypeus, antennal scapes at apex, wing veins, tarsi of legs (front tarsi paler and hind tarsi darker). Antennal flagella and pygidial area brownish black.



Figs. 1-4. 1. *Gastrosericus binghami* Cameron, ♀, head seen from above. 2. *Ibid.*, seen in front. 3. *Tachytes astuti* Nurse, ♂, clypeus. 4. *Ibid.*, genitalia.

Head seen from above (Fig. 1) with ocellar region gently roundly raised and enclosed by fine impressed lines, post-ocellar area impressed. Head seen in front (Fig. 2) with inner orbits divergent towards clypeus, ratio of interocular distances at vertex and at clypeal base 1 : 2 (measurement 20 : 39), frons broadly roundly raised, ratio between oculo-antennal and interantennal distances 9 : 7. Clypeus: Fig. 2, anterior margin without hair, polished; outer incision of mandibles at 1/4 from base, very distinct; antennal joint 3, 4, 5 and 6 progressively slightly shorter, joint 3 about 2.3 times as long as wide at apex. Mesonotum anteriorly steeply sloped, with medio-anterior impressed line feeble; furrow between scutellum and postscutellum lunate and very deep; propodeum with dorsal and posterior aspects subequal in length, the former provided with a fine median carina irregular in outline, and the latter with a fine groove which is enlarged and deepened near top; pygidial area triangular, about 1.5 times as long as wide at base, polished, with about 8 medium-sized punctures scattered. Head, thorax and abdomen finely and densely punctured, punctures on scutellum slightly larger and sparser, those on abdominal tergites, finer, glabrous portions of sternites impunctate, shining.

Specimen: 1 ♀, Thailand (Chiengmai), 6. V. 1961, K. Iwata leg.

Distribution: India (Barrackpore) and Thailand (the first record).

2. Genus *Tachytes* Panzer, 1806

1. *Tachytes astuti* Nurse, 1909

Tachytes astuti Nurse, Jour. Bombay Nat. Hist. Soc., 19, p. 513, 1909 (♂).

Specimen: 1 ♂, Thailand (Prew), 18. VI. 1961, K. Iwata leg.

Supplementary description: Ratio of interocular distance at vertex and length of antennal joint 3 approximately 4 : 3 (measurement 17 : 12); clypeus: Fig. 3. Vertex medianly longitudinally gently *keeled*, covered with punctures bearing short pale golden hairs, areas along inner orbits also with sparse punctures bearing yellowish hairs which are long, interspace minutely alutaceous. Head and thorax yellowish bronzy black, pubescence pale golden, on frons, clypeus, posterior margin of pronotum and sides of mesonotum dense and appressed, other parts of thorax with soft long erect hairs, the same mixing also on frons, pile on temples and pronotum silvery. Propodeum

on dorsal aspect minutely irregularly (but uniform in size) rugoso-reticulate, with an inclination of transversely rugoso-striate, median carina or furrow absent, in length nearly a half as large as mesonotum, apical tuberculate wedge transversely finely rugoso-striate, posterior aspect slightly concave-vertical, medianly above with deep and comparatively broad furrow, from which a fine shallow groove runs to the apex, the surface finely alutaceous with medium-sized very shallow obsolete punctures scattered, only below the tuberculate wedge transversely finely and closely striate. Hairs on pygidium silvery, mixed with black ones. Length of the specimen 12.0 mm. Genitalia : Fig. 4.

Distribution : India (Jubbulpore, Mt. Abu, Rangoon) and Thailand (the first record).

2. *Tachytes manjikuli* sp. nov.

This species seems most closely related to *T. opulenta* Nurse (1909), but is easily separable therefrom by the silvery banded abdomen. It also resembles *T. rufipalpis* Cameron (1904) as far as the description goes, but differs from it at least in the pilosity of antennal scape and in the venation relating to the 2nd cubital cell. (As to this species the description regarding the ocelli is strange and doubtful.)

♂. Length 13.5 mm. Black with a little tint of yellowish bronzy. Palpi apically, mouth parts, spurs and spines of legs and apex of pygidial area ferruginous, wings flavohyaline, veins ferruginous, costa, subcosta and stigma slightly darker. Pile on clypeus, frons, temples (posteriorly silvery), posterior margin of pronotum, sides and apex of mesonotum, lateral impressions of scutellum and legs pale golden, dense and mainly appressed; on mandibles at base externally rather silvery, on the remainder of thorax-complex long, soft, somewhat sparse and yellowish, on pleurae mixed with short golden appressed hairs, on the areas densely covered with the pile the surface invisible. Abdomen covered with black velvety pile, with apical margins of tergites 1-4 adorned with silvery pile; pygidial area covered with short stiff silvery hairs, mixed with black ones, on apical portion the hairs turn ferruginous.

Head above with interocular space about half the length of antennal joint 3 (measurement 18 : 8), the latter as long as 4 and 2.5 times as long as 2 or its own apical width. Vertex with a fine impressed line from the post-ocellar impression, not reaching the top where the surface slightly raised. Head in front with interantennal distance as great as antennal socket and 1.7 times as great as oculo-antennal distance. Clypeus : Fig. 5. Mesonotum medio-anteriorly slightly impressed, anterior scutal carinae reaching 1/3 of the segment, on both sides about the length of 3rd antennal joint apart another short distinct longitudinal carinae defined; dorsal aspect of propodeum half the length of mesonotum, medianly very feebly impressed, the impressed line ending at apex in a subtriangular impression which is gradually raised towards apex and slightly wedged out, posterior inclination slightly concave-truncate, medianly with a furrow which is broader and deeper above middle. Pygidial area nearly equilateral triangular with apex rounded. Metatarsal spines of front legs 5 in number including the apical one. In fore wing relative length of abscissae 1-5 of radius : 4, 2, 4, 8, 1; abscissae of cubitus in cell 2: 2, 3, 5. Genitalia : Fig. 6, closely resembling that of the preceding species, but the squamal process on outer margin longer.

Vertex minutely alutaceous, with sparse but distinct punctures, punctures along inner orbits slightly finer and closer; punctuation of clypeus : Fig. 5. Mesonotum, scutellum and mesopleuron very minutely and closely punctured-subreticulate, propodeum on dorsal aspect minutely irregularly (but uniform in size) rugoso-reticulate, on medio-posterior tuberculate wedge and posterior aspect transversely rugoso-striate, sides of the segment postero-dorsally obliquely very finely closely and feebly rugoso-striate, rest of the segment minutely alutaceous. Punctures on abdomen as usual.

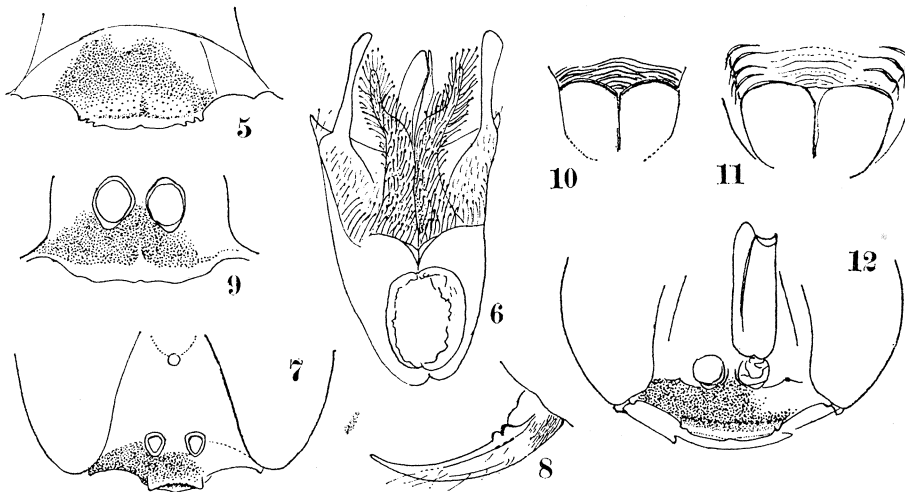
Holotype: ♂, Thailand (Chantaburi), 21. VI. 1961, K. Yoshikawa leg.

3. *Tachytes astatiformis* sp. nov.

Belonging to the group of *tarsatus* Sm. and *ceylonicus* Cam., differing from them chiefly in the punctuation and pilosity of the body.

♂. Length 8.6 mm. Black with two basal segments of abdomen red; palpi, veins and tegulae of wings, apical margin of each abdominal segment, tibial spurs, ferruginous; middle of mandibles, apices of tibiae and tarsi of legs dark brown, the latter apically paler; spines of tibiae and tarsi whitish, in some places with a tint of yellowish. Pilosity silvery, on frons, clypeus, outer base of mandibles, temples, posterior margin of pronotum and pygidial area dense and appressed; on sides and apex of mesonotum, sides of scutellum and medianly interrupted abdominal bands slightly sparser but appressed; on mesopleuron, lateral portions of dorsal aspect of propodeum and posterior portion of its sides longer, on the area last said and mesopleuron the pile erected, on lateral portions of propodeum transversely appressed; on ocellar region, vertex, disc of mesonotum, scutellum, disc of propodeum and on abdomen the pile short, sparse and the surface sculpture well visible, especially so on mesonotum.

Head from above with eyes large and interocular space narrow, the latter approximately 1/20 as wide as head (measurement 4 : 78); ocellar region distinctly elevated with well-defined median furrow which after reaching post-ocellar impression continued to vertex as a fine impressed line. Head seen in front with face triangular, relative width at base of clypeus (under the same scale as used above) 42, antenno-ocular space, socket of antenna and interantennal space with relative width 10, 6 and 6. Clypeus: Fig. 7, anterior marginal area thin, depressed and smooth, somewhat lobiform, with a few punctures on the posterior border, disc gently roundly raised, but



Figs. 5-12. 5. *Tachytes manjikuli* sp. nov., ♂, clypeus. 6. Ibid., genitalia. 7. *Tachytes astatiformis*, ♂, clypeus. 8. *Cratolarra fuscinerva* (Cameron), ♀, mandible. 9. Ibid., clypeus. 10. *Liris robustus planatus* subsp. nov., ♀, posterior aspect of propodeum. 11. Ibid., ♂, ibid. 12. *Liris tachyoides* sp. nov., ♀, clypeus.

steeply convex near the posterior portion; antennal joints 2-5 with relative length approximately 5, 10, 9 and 9 (thus interocular distance at vertex slightly smaller than the length of the 2nd joint or half the 3rd of antenna). Postscutellum medianly comparatively broadly furrowed, propodeum medianly at apex flattened and then slightly roundly protruded into a wedge, posterior aspect truncate, with fine median groove which is enlarged and deepened into a pit below the wedge;

dorsal and posterior aspects of the segment in the lateral view subequal in length. Abdominal tergites 1-6 with posterior portion comparatively broadly depressed. Front tibiae without spine except a few at apex. In the fore wing venation relative length of abscissae of radius : $4 > 1 = 3 > 2 > 5$; abscissae of cubitus in 2nd cubital cell : $1 = 2 = \text{half of } 3$.

Ocellar region distinctly punctured, with interspaces partly greater, partly smaller than points, on narrow vertex punctures sparse, with a few micropoints mixed; mesonotum and scutellum bearing medium-sized rounded shallow punctures, on central area intervals larger than points, on peripheral regions smaller, but the punctures distinctly separated, not reticulate nor subreticulate, postscutellum more finely and more closely punctured; punctures on mesopleuron closer than on mesonotum, each puncture shallower on its own posterior part, thus the surface appearing in some light feebly transversely rugose. Sculpture on propodeum characteristic, at base with a strong transverse carina curved along the posterior margin of postscutellum, a narrow area just behind the carina coarsely crenate and irregularly, not smoothly margined posteriorly by less strong carina, the remainder and the greater part of the dorsal aspect obliquely, rather sparsely and weakly ruguloso-striate, with intervals minutely but distinctly reticulate, the rugae slightly stronger and more distinct on the median region, medio-apical flattened surface of the wedge polished, with very feeble rugae, and intermittently encircled by the rugose carinae, on the median region just in front of the wedge carinae run in concentric triangles with the wedge at the bottom centre; posterior aspect transversely finely rugoso-striate, intervals finely punctured, sides of the segment obliquely closely striate. Abdominal tergites minutely and feebly punctured with hair-bearing points, interspaces partly as wide as, partly wider than points, apical margin of each segment rather broadly impunctate and polished.

Holotype : ♂, Thailand (Chiengmai), 9. V. 1961, K. Iwata leg.

3. Genus *Tachysphex* Kohl, 1883

1. *Tachysphex bengalensis* Cameron, 1889

Tachysphex bengalensis Cameron, Mem. Manchester Lit. Phil. Soc., 4 (2), p. 144, 1889; — : Bingham, Faun. Brit. Ind., Hym. I, p. 193, 1897; — : Turner, Mem. Dept. Agr. Ind., Ent. Ser., 5 (4), p. 198, 1917; — : Williams, Bull. Exp. Stat. Hawaii. Sug. Pl. Ass., Ent. Ser., No. 19, p. 92, 1928; — (?) : Williams, Nature & Life S.E. Asia, I, p. 399, 1961.

Specimen : 1 ♂, Thailand (Bangkok), 28. IV. 1961, K. Iwata leg.

Distribution : India, the Philippines and Thailand (the first record).

Remarks. The specimen studied may represent the male of the wasps identified by F. X. Williams (1961) with *T. bengalensis* with a query. It shows a slight difference in character from the descriptions of the previous authors :

(1) Main trend of sculpture on propodeum longitudinally rugoso-striate, at base coarsely and at apex more finely so, interspaces of striae crossed by short transverse rugae, giving the surface minutely irregularly and incompletely reticulate appearance, medio-posterior elevation of the segment rather gentle, posterior aspect just below the elevation broadly and deeply excavated, with median furrow well marked off by carinae on both sides, the surface transversely, somewhat arcuately coarsely striate, with the uppermost stria stout, separating the area from the dorsal aspect of the segment; latero-posterior portions of dorsal aspect transversely coarsely striate, the striae forming a series with those on both side of the posterior aspect; sides of the segment obliquely closely striate.

(2) Interocular distance at vertex slightly smaller than the combined length of antennal joints 2, 3 and 4 (ratio 17 : 21, relative length of the three joints approximately 5, 7 and 9).

(3) Pile on frons slightly brass-golden upward.

Clypeus on anterior margin in middle slightly roundly produced and beveled, with its sides acutely bordered by a short carina extended from behind and distinctly angulated at the corners.

I can not actually compare the specimen with *T. bengalensis* from other regions, but judging from such different characters it may represent a geographical race.

4. Genus *Larra* Fabricius, 1793

1. *Larra sanguinea aeripilosa* subsp. nov.

(*Larra sanguinea* Williams, Bull. Exp. Stat. Hawaii. Sug. Pl. Ass., Ent. Ser., p. 67, 1928. The Philippines).

The specimen (♂) collected in Thailand differs from the original description of the nominate race in the following point :

(1) Pilosity brassy, not silvery.

(2) Mandibles not reddish even in part. The rounded protuberance before the incision on lower margin with apex whitish. Tegulae black, honey yellow outwardly.

(3) Punctures on mesonotum medium-sized, not coarse.

Pilosity abundant and long, brassy, densely covering the head throughout, fairly close on thorax-complex, but the sculpture well visible in the view parallel to the hair direction. Piles adorning posterior margin of abdominal tergites also brassy. Structure of clypeus as figured in the original description. Character of frons was (not given in detail in the description) the same as in the similar Indian species, *L. fuscipennis* Cam. In punctuation also rather similar to this species. Sculpture on propodeum : Rather finely sparsely punctured on the disc, on the lateral areas somewhat closely so, at base more finely more closely obliquely rugoso-punctate, no median longitudinal carina, but the median region over a certain width transversely very feebly rugose, the rugae defined only in oblique light. Basal three abdominal segments red. Length 13 mm.

Holotype : ♂, Thailand (Chiengmai), V. 1961, K. Iwata leg.

Remarks. Although the haired area is more restrictedly given in the description and the colour of the abdomen slightly differs in extension the Indian species, *L. fuscipennis* Cam., 1889 seems to me conspecific with *L. sanguinea*. They may be at most in the racial relationship with each other. If this presumption is proved true the former specific trivial name should be adopted.

5. Genus *Cratolarra* Cameron, 1900

Cratolarra Cameron, Ann. Mag. Nat. Hist., Ser. 7, Vol. 5, p. 34, 1900. (Type : *Cratolarra femoralis* Cameron India)

Notogonidea (*Cratolarra*) : Williams, Bull. Exp. Stat. Hawaii. Sug. Pl. Ass., Ent. Ser., No. 19, p. 80, 1928.

The characters of the genus must be altered as designated by F. X. Williams (1928) :

The general characters of front, clypeus, mandibles, inner orbits, claws, abdomen and pilosity are quite *Liris*-like, but the structure of the prothorax and the pilosity of the pygidial area are quite otherwise, rather *Larra*-like. The top of pronotum approximately level with mesonotum and produced posteriorly in a wedge-shape, but is separated from the latter by a deep furrow. Pygidial area bare, polished, with punctures scattered.

I attach importance to the two characters above mentioned and placed *Cratolarra* at the generic rank. Besides the *Cratolarra femoralis* the following Indian species at least are probably assigned to the present genus : *Larrada rufipes* Smith, *Larra nigriventris* Cameron, *Larra nana*.

Bingham (?), *Larra fuscinerva* Cameron, *Larra iridifrons* Cameron, *Larra longicornis* Cameron (?).

1. *Cratolarra fuscinerva* (Cameron, 1900)

Larra fuscinerva Cameron, Ann. Mag. Nat. Hist., Ser 7, Vol. 5, p. 26, 1900.

? *Notogonidea* (*Cratolarra*) *pitamawa* Rohwer, Bull. Exp. St. Hawaii. Sug. Pl. Ass., Ent. Ser., No. 14, p. 7, 1919; — : Williams, *ibid.*, No. 19, p. 80, 1928.

Specimens examined : 1 ♀, Thailand (Me Fack), 17. V. 1961, K. Yoshikawa leg. ; 1 ♀, *ibid.* (Chiengmai), 22. V. 1961, K. Iwata leg. : 1 ♀, Cambodia (Siemreap), 7. VI. 1961, K. Iwata leg.

Distribution : India, Thailand, Cambodia and the Philippines (?).

Remarks. *L. fuscinerva* Cam. (first known from Allahabad) may be a variation of *L. nigri-ventris* Cam. widely distributed in Indian region, since the differences between them reckoned up by the original author are considered variable ones and moreover very slight in degree.

Supplementary descriptin : Mandible : Fig. 8. Ratio of interocular distances at vertex, at frontal swelling and at base of clypeus 16, 28 and 36; inner orbits run parallel for a short distance at the level of antennal sockets. Clypeus : Fig. 9. Relative length of antennal joints 2, 3, 4 and 5 approximately 7, 14, 14, 14, joint 3 about 2.7 times as long as wide at apex. Pronotum not so flatly depressed against mesonotum as in species of *Liris*, but has a certain thickness on top, appearing as an incrassate transverse ridge which is markedly produced posteriorly into a wedge with its median region approximately level with mesonotum and with the sides inclined below, its anterior aspect obliquely truncate; interval between pro- and mesonotum deeply grooved. The structure shows an intermediate state between the characters of *Liris* and *Larra*. Propodeum with length ratio between dorsal and posterior aspects nearly 3 : 2, median groove on the former very feeble, that on the latter deep and distinct. Pygidial area elongate triangular, with apex comparatively broadly truncate, lateral margin carinated and gently rounded, the surface polished with sparse punctures along lateral margins.

6. Genus *Liris* Fabricius, 1804

1. *Liris* (*Notogonidea*) *subtessellata* (Smith, 1856)

Larrada subtessellata Smith, Cat. Hym. Brit. Mus., IV, p. 277, 1856 (♀).

Larrada exilipes Smith, *ibid.*, p. 278 (♂).

Notogonia subtessellata : Cameron, Mem. Manchester Lit. Phil. Soc., 4 (2), p. 130, 1889; — : Bingham, Faun. Brit. Ind., Hym. I, p. 202, 1897; — : Maidl, Ent. Mitt., 14 (5/6), S. 382, 1925.

Notogonidea luzonensis Rohwer, Bull. Exp. Stat. Hawaii. Sug. Pl. Ass., Ent. Ser., 14, p. 9, 1919.

Notogonidea subtessellata : Williams, *ibid.*, 19, p. 76, 1928.

Motes subtessellatus : Williams, Nat. & Life S.E. Asia, I, p. 399 (Thailand).

Specimen : 1 ♀, Thailand (Patalung), 12. VII. 1961, K. Yoshikawa leg.

Distribution : India, Burma, Ceylon, the Philippines and Thailand.

2. *Liris* (*Notogonidea*) *liroides thaiana* subsp. nov.

(*Notogonidea liroides* Williams, Bull. Exp. Stat. Hawaii. Sug. Pl. Ass., Ent. Ser., 19, p. 72, 1928.

.... The Philippines)

The underlisted specimen well agrees in characters with the original description and figures of *Notogonidea liroides* Will. excepting that the disc of the propodeum without a wide shallow trough for its apical portion and the size is slightly smaller. Besides, the sculpture seems fairly different. These are considered due to local variation. Some supplementary notes (♀) :

Punctures on head and mesonotum minute and dense, subreticulate, on scutellum sparse, with intervals larger than points. Propodeum coarsely irregularly rugoso-reticulate, the reticula-

tion medio-posteriorly slightly finer and weaker, the surface covered with long pubescence, median carina reaching about middle of dorsal aspect, posterior aspect truncate and provided with median furrow; sides of the segment obliquely closely rugoso-striate, anteriorly partly rugoso-subreticulate. Front tibia without spine on the dorsal surface, with 3-4 spines at apex and a single one beneath beyond middle. Apical spines of pygidial area 5 in number, not long, parallel, recumbent, the bristles short, suberect and brassy.

Holotype: ♀, Thailand (Me Fack), 17. V. 1961, K. Yoshikawa leg.

3. *Liris (Notogonidea) litoralis* sp. nov.

In structure this species nearly completely agrees with the specimen preceded, but the pilosity of the head and thorax is remarkably different. It is not long, not thick nor silvery (except on lower frons and clypeus); on vertex and dorsal surface of thorax-complex very fine, short and pale brownish, on sides of thorax and propodeum, and on legs grayish white, also fine. Such characters are not considered to fall within the individual variation.

Some closely related species were described by Cameron (1903) from Barrackpore. e.g. *anthoracinus*, *piliventris*, *indicus*, but the present species differs from any of them either in the wing venation, structure of the metasternum or in the sculpture of head and thorax, especially of propodeum.

Holotype: ♀, Thailand (Seashore of Chantaburi), 16. VI. 1961, K. Iwata leg.

4. *Liris (Notogonidea) robusta planata* subsp. nov.

(*Notogonidea robusta* Williams, Bull. Ex. Stat. Hawaii. Sug. Pl. Ass., Ent. Ser., 19, p. 79, 1928 The Philippines, Borneo and Singapore)

Differs from the nominate race in that the divergent arcuate carinae on the posterior aspect of the propodeum are less convex (Figs. 10 and 11), the median carina on the disc of the segment ends at about 2/3 (in ♂ 4/5) from the base and the bristles on the pygidium are comparatively long and erected. By the first mentioned character the species can easily be separated from the near relative, *L. robustoides* (Williams).

Holotype: ♀, Thailand (Muangfang), 15. III, 1961, K. Iwata leg.

Paratype: 1 ♂, Thailand (Chiangmai), May, 1961, K. Iwata leg.

5. *Liris (Notogonidea) tachyoides* sp. nov.

Pilosity on the thorax and abdomen is quite *Tachytes*-like and can easily be distinguished from other species of the genus.

♀. Length about 14 mm. Frons, clypeus, temples and bases of mandibles externally densely covered with appressed silvery pile and the surface sculpture is hardly visible, except the narrow apical margin of clypeus. Vertex somewhat sparsely, pro- and mesonotum, scutellum, postscutellum, mesopleuron, sides of propodeum and legs densely covered with short glittering pile, the pile in some light silvery and in some light with a tint of brassy, viewed vertically the surface appears rather bronzy, posterior margin of pronotum silverily shining, mesonotum according to the hair lying direction vaguely divisible into 6 longitudinal areas that shine differently in the light, giving the place somewhat longitudinally striped appearance; pile on propodeum greyish white, long, close, on dorsal aspect lying from the median line sideways, with lateral marginal areas velvety, on posterior aspect lying radiately from the middle above. Abdomen densely covered with short glittering black velvety pile, opaque, apical margins of the basal three tergites glittering silvery. Pile on tarsal joints also velvety, somewhat yellowish. Pygidial area densely covered with brassy hairs, basally paler and apically slightly darker, mixed with scattered long bristles, apical spines 5 in number, short and acute, obliquely erected.

Wholly black including mandibles and apical margin of clypeus; head, thorax and legs in some light with bronzy shimmer, underside of tibiae and tarsi glittering ferruginous. Wings with a decided tinge of yellow with apical margin narrowly clouded, veins yellow, stigma brown. Interocular distance at vertex and at base of clypeus with ratio of 22 : 51 (nearly 2 : 5), relative length of 3rd antennal joint under the same scale 17, it is 2.3 times as long as broad at apex, joints 4 and 5 slightly longer than each preceding joint. Oculo-antennal space about 1.5 times as wide as antennal socket, the latter twice as wide as inter-antennal space; clypeus : Fig. 12, anterior margin narrow, impunctate, but not particularly inclined inwards; carina on antennal scape not reaching base. Mesonotum medianly gently impressed, disc of scutellum flattened, propodeum medianly carinated, the carina not reaching apex, medio-apical region slightly raised, but not wedged out into a tubercle, posterior aspect slightly concave-truncate, with a median furrow which is deepened just below the top of the aspect. Pygidial area triangular, approximately 1.5 times as long as wide at base, with the sides gently arched and with apex truncate, no impunctate area at base. On sternite 2 medio-basal carina not acute; metasternal process with sides subparallel and rounded at apex which is deeply narrowly incised in middle. Front tibiae without spine on outer margin. In fore wing abscissae of radius (numbered from base to apex) in the following length order : $4 > 1 > 2 = 3 > 5$.

Head and thorax very minutely, very densely punctulate, altaceous, clypeus with scattered punctures on posterior border of the apical polished margin, propodeum transversely finely closely and feebly punctate-striate, on basal portion mixing some longitudinal rugae, on postero-lateral regions with a few short transverse coarse carinae, posterior aspect bordered above by a gently curved carinae which is more roundly arched upwards in middle, on lateral margins transversely coarsely carinated, the carinae forming a series with those on the dorsal aspect, rest of the surface transversely finely, not strongly striate. ♂, unknown.

Holotype : ♀, Thailand (Bangkok), 26. III. 1961, K. Iwata leg.

2. SUBFAMILY TRYPOXYLONINAE

1. Genus *Pison*, Jurine, 1808

1. *Pison* (s. str.) *argentatum* Shuckard, 1837

Pison (*Pisonitus*) *argentatus* Shuckard, Trans. Ent. Soc. London, 2, p. 79, 1837.

Pison (*Pisonitus*) *argentatum* : Kohl, Verh. z.b. Ges. Wien, 34, p. 186, 1884.

Pison argentatus : Smith, Cat. Hym. Brit. Mus., 4, p. 314, 1856.

Pison argentatum : Saussure, Gr. Hist. Madag., 20, p. 1, p. 528, 1892; — : Bingham, Faun. Brit. Ind., Hym., I, p. 220, 1897; — : Kohl, Bull. Sci. Fr. -Belg., 46, p. 86, 1912; — : Maidl, Ent., 14 (5-6), p. 390, 1925.

? *Pison fuscipalpis* Cameron, Proc. Zool. Soc. London, 11 (11), p. 27, 1901.

Specimens : 1 ♀, Thailand (Saraburi), 12. IV. 1961, K. Iwata leg.; 1 ♂, (Saraburi), 1. V. 1961, K. Iwata leg.; 1 ♂, (Chiengmai), 4. V. 1961, K. Kamoi leg.; 1 ♂, (Bangkok), 20. IV. 1961, K. Iwata leg.

Distribution : Africa (Mauritus), Madagascar, India, Sumatra and Thailand (the first record).

2. *Pison* (s. str.) *suspiciosum* Smith, 1857

Pison suspiciosus Smith, Jour. Proc. Linn. Soc. London, 2, p. 104, 1857.

Pison suspiciosum : Kohl, Verh. z. b. Ges. Wien, 34, p. 188, 1884; — : Cameron, Mem. Manchester Lit. Phil. Soc., 4 (2), p. 118, 1889; — : Bingham, Faun. Brit. Ind., Hym. I, p. 219, 1897.

Specimens : 1 ♀, Cambodia (Siemreap), 7. VI. 1961, K. Iwata leg.; 1 ♀, Thailand (Chieng-

mai), 11. V. 1961, K. Iwata leg.; 1 ♂, (Muaglek), 25. VI. 1961, H. Funatu leg.

2. Genus *Trypoxylon* Latreille, 1802

1. *Trypoxylon obsonator tropicale* Tsuneki, 1961

Trypoxylon obsonator tropicale Tsuneki, Nature & Life S.E. Asia, I, p. 383, 1961.

Specimen: 1 ♂, Thailand (Nabon), 15. VI. 1961, K. Iwata leg.

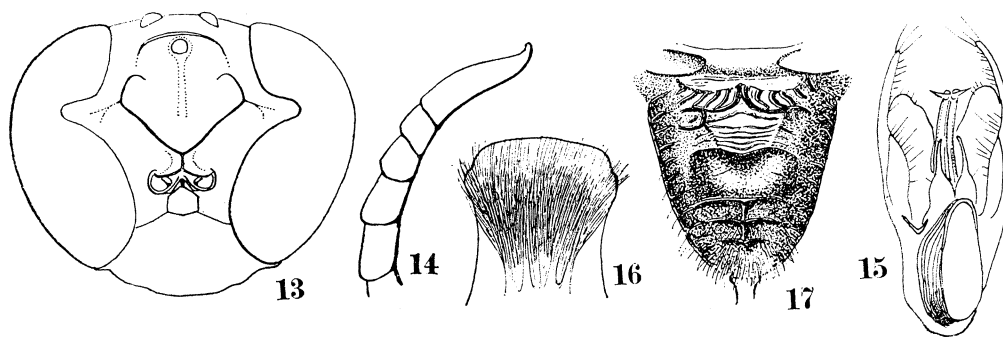
Distribution: Thailand and probably widely over Indo-Malayan region.

Remarks. The specimen from the type locality possesses a less strong carina on the tubercle above the base of the antennae. But the tubercle does not turn into a carina as a whole. In this respect it can be separated from the allied *bicolor* Smith.

2. *Trypoxylon nagamasae* sp. nov.

This species is very characteristic in the form of the frontal shield and can easily be distinguished from all the known species of the genus. It is also distinct in the sculpture of the propodeum.

♂. Length 8.0 mm. Black. Mandibles largely (at base and apex darker), palpi, tegulae of wings, knees, front and mid tarsi, hind tarsi apically brown to dark brown; lateral portions of the apical glabrous margin of clypeus honey yellow, tibial spurs and hind tarsi basally pale brown. Wings without apical clouding, veins and stigma dark brown. Clypeus, lower frons, temples, mesopleuron and propodeum except area cordata covered with silvery pubescence. Head from above OOD = POD = postocellus across > front ocellus across; ratio of interocular space at vertex and at clypeus 4:3 (measurement 17 : 13). Head seen in front: Fig. 13, frontal shield with outward and inward branches from the lateral carinae, the area above the inward branches depressed towards anterior ocellus and medianly bluntly furrowed, the area below the branches very gently



Figs. 13-17. *Trypoxylon nagamasae* sp. nov., ♂. 13. Head seen in front. 14. Apical five joints of antenna. 15. Genitalia. 16. Eighth ventral plate. 17. Propodeum.

concave, outward branches towards eye incision only bluntly elevated, not distinctly carinated; joint 3 of antenna nearly twice as long as wide at apex, ultimate joint slightly more than as long as preceding three joints combined, with apex distinctly bent (Fig. 14). Pronotum with a deep furrow across middle, behind this the surface discoloured, dark brownish, antero-lateral corners slightly incrassate and rounded; mesonotum medio-anteriorly gently impressed; propodeum with area cordata indistinctly outlined by blunt furrows and medianly broadly gently impressed, remaining area slightly longer than the area and distinctly inclined behind middle, on posterior area at base a large excavation from which runs a furrow up to apex. The structure of the segment not well observed owing to the coarse striae and abundant silvery pile. Abdominal segment 1 slender and long, 5.5 times as long as wide at apex, completely petioliform and gradually broadened

towards apex, ratio of width in middle and at apex 4 : 10, stigmata located at about 1/4 from base. Genitalia : Fig. 15 and 8th ventral plate : Fig. 16.

Vertex and frontal shield with minute ground coriaceous sculpture and scattered with fine aciculate punctures; mesonotum half-mat carrying fine and very sparse points, and provided with a few short transverse striae on antero-lateral areas, scutellum punctured as on mesonotum; mesopleuron below and mesosternum somewhat more grossly and more closely punctured, metapleuron impunctate and polished; propodeum (Fig. 17) at base very coarsely obliquely striate, area cordata on medial broad shallow impression coarsely transversely striate, with intervals of striae shining, on the disc the surface mat and also transversely striate, lateral carinae separating the sides from the dorsal aspect complete and strong, intervalic regions between the carinae and lateral furrows of the area and between the carinae and medial furrow of the posterior area very strongly and coarsely costated with 7-8 short transverse carinae; the sides of the segment distinctly transversely somewhat arcuately striate, excepting the anterior portions. ♀ Unknown.

Holotype : ♂, Thailand (Chiengmai), 8. V. 1961, K. Iwata leg.

3. *Trypoxylon funatui* sp. nov.

This species belongs to the group that possesses the frontal shield, but is distinct in that the shield is incomplete in outline (Fig. 18).

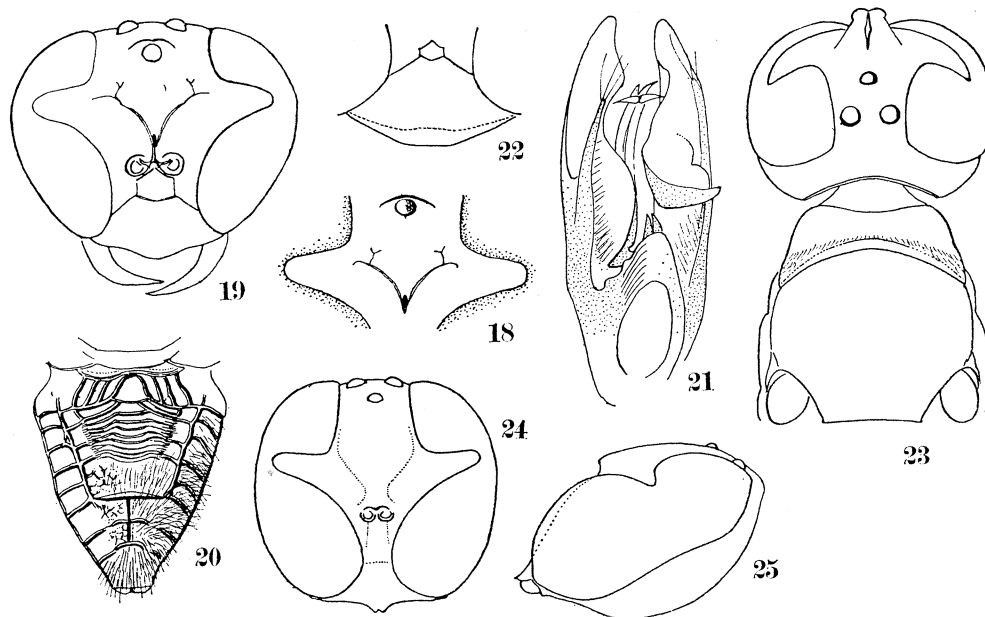
♂. Length 9.3 mm. Black. Mandibles except extreme base, palpi, wingtegulae, knees, tibial spurs, tarsi (with vague paler rings), ferruginous. Wingveins dark brown, basally ferruginous. Pilosity silvery white, normal.

On head OOD : POD nearly 1 : 2, ocelli uniform, slightly larger than OOD. Head seen in front : Fig. 19, ratio of ocular distance at vertex and at base of clypeus 4 : 3, frontal shield with lateral carinae partly obsolete (Fig. 18), with the surface depressed towards anterior ocellus and medianly more impressed, a little inside of the lateral carina at the level of outward branch-carina a small tubercle is defined which is crested by a very small Y-shaped ridge, one of the arms of which reach the lateral carina of the shield. Clypeus as given in Fig. 19, antennal joints 3, 4, 5 and 6 subequal in length, joint 3 1.5 times as long as wide at apex (widest view), ultimate joint slightly longer than preceding three joints taken together and gently bent*. Pronotum not incrassate on each side, transversely feebly furrowed across middle, posterior area of which discoloured, honey yellow; mesonotum medio-anteriorly with two distinct short grooves, on mesopleuron episternal vertical groove roundly arched posteriorly, the groove slightly broadened upwards; mesosternum medianly broadly, fairly deeply grooved, Propodeum (Fig. 20) with area cordata inverted trapezoid in form, distinctly encircled by furrows, the disc raised and broadly longitudinally impressed in middle, posterior portion obliquely inclined, forming about 150° with area cordata in the lateral view and with a fine coarsely crenate groove in middle. Abdominal segment 1 long, petiolate, 7 times as long as wide at apex, 11 times as long as wide in middle, but slightly less than as long as 2 following segments united (ratio 5 : 6), with stigmata located at about 1/4 from base, inner margin of stigmata gently tuberculate and the area before the tubercles flattened, with median region longitudinally clavately impressed. Legs and wing venation without special character. Genitalia : Fig. 21, squama longitudinally split up into two lobes, the outer slender, slightly stick-like, the inner with a triangular appendage on the inner margin near base which is folded up transversely on itself.

Vertex shining, sparsely very finely feebly punctured, frontal shield slightly more grossly closely and aciculate punctured, punctures finer towards middle. Mesonotum, scutellum and mesopleuron glossy, carrying sparse fine punctures, intervals far larger than points, punctures on

* In the specimen the joint is flattened on the outside, probably by desiccation.

mesopleuron slightly larger. Area cordata on propodeum polished, at base very coarsely longitudinally (slightly obliquely) striate, remaining area transversely striate, the striae branched on both sides of the median longitudinal impressed area and finer and closer, remainder of the upper aspect transversely very coarsely striate; the sides of the segment separated from the upper aspect by the longitudinal very distinct carinae, the surface transversely strongly, fairly closely striate all over excepting antero-ventral regions where the striae rather sparse. Abdomen closely covered with very minute hair points, not glossy.



Figs. 18-25. 18. *Trypoxylon funatui* sp. nov., ♂, frontal shield. 19. Ibid., head seen in front. 20. Ibid., propodeum. 21. Ibid., genitalia. 22. Ibid., ♀, clypeus. 23. *Trypoxylon crassifrons* sp. nov., ♀, head, pro- and mesonotum. 24. Ibid., head seen in front. 25. Ibid., seen in profile.

♀. Similar to ♂, except sexual characters, but with the following further differences :

OOD : POD=1 : 3, OOD half the diameter of postocellus; clypeus (Fig. 22) more distinctly and roundly convex at base, with anterior glabrous fringe wider; antennae with 3rd joint slightly longer than 4th, three times as long as wide at apex, joints 4 and 5 subequal in length, 6 slightly shorter. Pronotum with lateral portions somewhat incassate, mesonotum without medio-anterior short impressed lines, area cordata on propodeum with lateral furrows not so deep as in ♂ and transverse striae not branched on the lateral regions (constant?). Length 9.5 mm.

Holotype : ♂, Thailand (Muaglek), 29. VII. 1961, H. Funatu leg.

Paratype : ♀, Ibid.

4. *Trypoxylon crassifrons* sp. nov.

This species has characters in the structure of the frons, pronotum and propodeum, in the form of the head and in the remarkably large eyes and is easily separable from other known species.

♀. Length 8.5 mm. Besides the normal pubescent portions the posterior discoloured zone of pronotum and lateral and posterior margins of mesonotum fairly closely covered with silver white pubescence. Black. Whitish yellow (with a slight tint of ferruginous) are : Mandibles (apically brown), humeral angles, front legs from apex of femora to ultimate tarsal joint, mid legs from

apex of femora to basitarsus, (hind legs from femora apically lacking) and all tibial spurs. Ferruginous : Apices of basal three joints of antennae, wingtegulae, articulations of legs, mid tibiae in front vaguely. Mid tarsi deep brown; wings hyaline without apical clouding, veins dark brown.

Head and pronotum seen from above : Fig. 23. Vertex narrow, eyes large, OOD very small, almost none, POD slightly smaller than postocellar diameter, anterior ocellus smaller than posterior one; frons without shield, medianly broadly incrassate at the usual place of shield, with anterior extremity between antennal insertions roundly bilobate, from between the lobes runs a median furrow up to anterior ocellus, the furrow not deep, broad triangle in cross section and united with the depression in front of the anterior ocellus. Head seen in front : Fig. 24; relative distance between eyes at vertex and at base of clypeus nearly 3 : 1, the latter distance as great as the length of 8th antennal joint; clypeus (Fig. 24) bluntly bidentate on anterior margin in middle; relative length of antennal joints 1-5: 10, 6, 9, 8, 8. Head seen in profile : Fig. 25. Pronotum (Fig. 23) with antero-lateral portions incrassate and rounded, medianly gently tuberculate and with posterior depressed zone discoloured (ambur yellow); mesonotum without medio-anterior impression, ratio between width at the widest part, at posterior margin and length in middle 26:14:24, scutellum nearly quadrate (ratio of length to width 7.0 : 7.5), at base with non-crenate furrow; propodeum elongate trapezoid with ratio of width at base and apex and length in middle 16, 6 and 30, with lateral lines nearly straight, area cordata not distinctly bordered laterally, defined by a slight elevation and difference of sculpture, but distinctly margined posteriorly by a large impression, with median impressed area broadened posteriorly, on posterior aspect median furrow originating from the impression behind area cordata shallow and disappearing far before apex, posterior aspect occupies 2/3 of total length of the segment, not inclined up to about its middle, thence only gently inclined towards abdomen, dorsal and posterior area of the segment completely separated from the sides by a very fine carina on both lateral margins, the sides also marginated by a similar fine carina on the ventral border. Abdominal segment 1 long, petiolate, articulated to propodeum with the same width as its apex, ratio of width in middle, at apex and total length 6, 10, 47, at apex slightly constricted, relative length and width at apex of segments 2 and 3 respectively 26 : 12 and 25 : 15, segments 1, 2 and 3 bearing a small rounded impression at apex in middle (which is very characteristic, but uncertain whether such is a constant structure or the structure due to desiccation).

Vertex and frons fairly closely very minutely punctured, not glossy, pronotum glossy with close fine points, mesonotum scutellum mat, mesopleuron with a slight shine, finely and closely punctured; area cordata with anterior third obliquely finely striate, remaining portions finely transversely striate, dorsal and posterior aspects outside area cordata transversely finely closely, somewhat rugosely striate, with antero-lateral portions without striae, granulate; sides of the segment largely polished, with transverse (somewhat oblique) close fine striae partly defined. Abdomen practically impunctate, but not glossy.

Holotype : ♀, Thailand (Bangkok), 6. IV. 1961, K. Yoshikawa leg.

3. SUBFAMILY PEMPHREDONINAE

1. Genus *Psenulus* Kohl, 1896

1. *Psenulus carinifrons* (Cameron, 1902)

Psen carinifrons Cameron, Jour. Bombay Nat. Hist. Soc., 14, p. 287, 1902.

Psenulus (*Neofoxia*) *xanthognathus* Rohwer, Proc. U.S. Nat. Mus., 37, p. 660, 1910.

? *Psenulus scutellatus* Turner, Ann. Mag. Nat. Hist., Ser. 8, 10, p. 54, 1912.

Psenulus carinifrons: Lith, Zool. Verh. Leiden, 52, p. 103, 1962.

Psenulus carinifrons xanthognathus: Lith, *ibid.*, p. 104.

Psenulus carinifrons rohweri Lith, *ibid.*, p. 108.

Specimen: 1 ♂, Thailand (Pakpanang), 14. VII. 1961, K. Iwata leg.

Distribution: India, Sumatra, Malaya, Java, Borneo and the Philippines. This is the first record from Thailand.

Remarks. The specimen from Thailand has the abdomen black in colour and should be included within the category of subsp. *rohweri* Lith. But the ventral portion of its second segment (which is rufous up to shortly beyond its middle in *carinifrons* s. str.) is brownish. I therefore placed it within the specific category without assigning to any subdivision.

2. Genus *Stigmus* Panzer, 1804

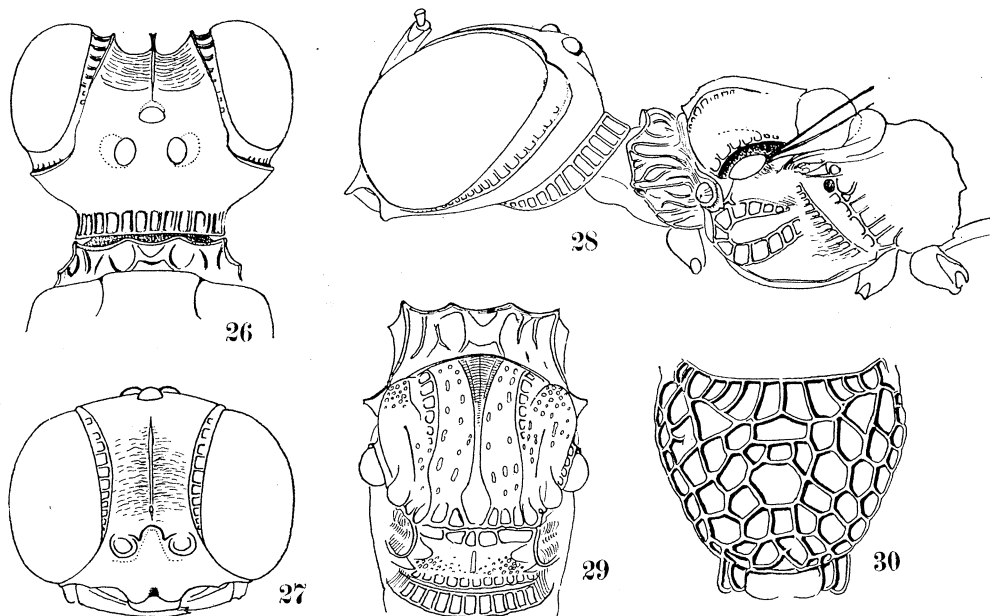
1. *Stigmus (Carinostigmus) monstrosus* sp. nov.

Very deeply excavated face, very broad coarsely crenate outer-orbital and occipital furrows, extraordinarily rough sculpture of pro-, mesonotum and scutellum are characteristic of this species, so that it can easily be distinguished from any known species of the subgenus.

♂. Length 5.8 mm. Black and shining. Mandibles except apices opaque, yellow, slightly brownish, not semitransparent glossy as in most of the allied species; humeral angles ivory white. Semitransparent glossy ferruginous: Palpi, antennae (apically gradually darkened), tegulae, wing veins basally and posteriorly, coxae (basally blackish), trochanters of all legs, front femora (externally dark brownish), tibiae and tarsi, mid tibiae and tarsi. Antennae apically, mid femora, hind legs from femora apically dark brown.

Head from above: Fig. 26, outer orbital furrows broad, with hind marginal carina distinct, occipital furrow also very broad, both coarsely crenate; OOD:POD:OCD=6:4:9, outer margin of postocelli deeply excavated, frontal median carina ending in a hollow in front of anterior ocellus, not reaching the ocellus. Head seen in front: Fig. 27, inner orbits gently roundly convergent towards clypeus, inner orbital carinae and median carina stout and high, lower frons deeply cylindrically impressed, clypeus in middle gently raised and produced anteriorly, with apex medianly roundly emarginate; antennal joints 2, 3 and 4 with relative length approximately 4, 4 and 6; head seen in profile (Fig. 28) rather grotesque owing to the large eye, broad and strongly carinated outer-orbital and occipital furrows; in the middle level of temple each furrow and the interspace subequal in width. Thorax from above: Fig. 29, pronotum trisinate and strongly carinate in front with lateral corners produced in a tooth, in length as large in middle as occipital furrow and 1/3.5 the distance between the antero-lateral teeth, the surface very coarsely foveolate, foveae 7 in number, median 3 larger, central one raised on the greater part of the area; mesonotum convex, divided into 4 areas by 3 rough and coarse longitudinal furrows, two outer ones each including a deep coarsely crenate scutal furrow anteriorly, median furrow broadened in front, not deep, including up-turned triangular area which is distinctly bordered on both sides by a carina and transversely finely and closely striate, the furrow narrowed toward middle and again broadened posteriorly and ends in a large fovea. Usual furrows on the lateral margins of the segment narrow, normally crenate, not reaching apex where the surface raised as a rounded discal projection (Fig. 29), intervallic areas between the furrows sculptured by coarse punctures, not well outlined, shallow sometimes elongate, sometimes confluent, in some place in front the surface transversely striate, on posterior margin very coarsely deeply foveolate; scutellum with coarsely crenate deep furrow in front and medianly a fine longitudinal impressed line, disc sparsely scattered with medium-sized, indistinctly outlined shallow punctures, posterior margin with a fine crenate furrow; postscutellum on anterior and pos-

terior margins carinate and the surface wholly longitudinally very distinctly striate. Lateral surface of pronotum longitudinally irregularly striate (Fig. 28), mesopleuron with coarsely crenate horizontal, vertical and oblique furrows, all abnormally broad, the horizontal one posteriorly tapering, intervals polished, with sparse fine punctures, posterior margin coarsely crenate, postero-lateral region longitudinally irregularly rugulose; metapleuron deeply impressed and coarsely foveolate, uppermost fovea especially deep. Propodeum (Fig. 30) provided with basal transverse and median longitudinal furrows, both very strongly and coarsely crenate, other parts also strongly coarsely and rather regularly reticulate, the sides of the segment also reticulate, the reticulation turning anteriorly into irregular longitudinal or oblique striae. Petiole as long as hind femur, but shorter than hind tibia (ratio 25 : 29), in the lateral view distinctly curved upwards at 1/4 from base, dorsal surface minutely and feebly rugulose and medianly weakly impressed, ratio of minimum width near base, maximum width at apex and length from above 3, 5 and 25. In hind wing discoidal and cubital nervures united in a single sinuate line, showing no protuberance of the tip of the discoidal nervure.



Figs. 26-30. *Stigmus monstrosus* sp. nov., ♂. 26. Head and pronotum in the dorsal view. 27. Head seen in front. 28. Head and thorax in the lateral view. 29. Thorax seen from above. 30. Propodeum.

Vertex and upper frons smooth and polished; lower frons between medial and lateral carinae transversely finely striate, clypeus impunctate, not so shining as on vertex, with sparse pubescence, temples at the underside of head longitudinally (parallel to outer orbit) rugoso-striate; abdomen impunctate and polished.

Holotype: ♂, Thailand (Muangfang), 14. III. 1961, K. Iwata leg.

2. *Stigmus* (*Carinostigmus*) *thailandinus* sp. nov.

This species (♀) is very characteristic in the form of the clypeus and in the sculpture of the propodeum and can easily be known from other species of *Carinostigmus*.

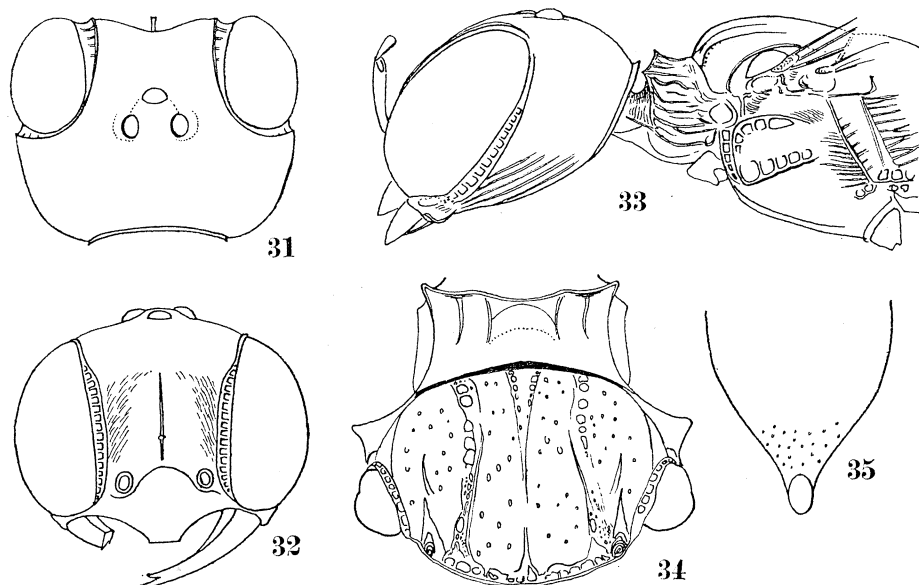
In my key to the Eurasian species (1954) it can be inserted as follows :

- 6 Clypeus fairly deeply incised at apex in middle, propodeum with a large smooth space on each side

- of medial furrow of posterior slope 7
- Clypeus truncate or very feebly emarginate at apex in middle, with sides pointed, propodeum with a large smooth space on each side of medial furrow of posterior slope 8
- Clypeus truncate at apex in middle, with the sides not pointed, propodeum without the smooth space as above (trochanters of all legs ferruginous) *thailandinus* sp. nov.

♀. Length 6.5 mm. Black and shining, with the following portions glossy ferruginous: Mandibles (slightly darker) except apex, antennae (apically gradually darker, ultimate joint rather brownish black), tegulae, base of wings and veins (anteriorly darker), apex of coxae, trochanters and tarsi of all legs, base and apex of front and mid femora, front and mid tibiae except darker inside, base of hind tibiae. Front and mid femora broadly, hind tibiae and tarsi dark brown, hind femora rather black, slightly brownish. Humeral angles ivory white.

Head seen from above (Fig. 31) thick, deeply emarginate in front, frontal spine slightly broader towards apex, apex feebly emarginate, ocellar area slightly elevated, with outsides of the postocelli impressed, OOD : POD : OCD = 8 : 4 : 11. Head seen in front : Fig. 32. Lower frons markedly and concavely inclined towards median carina, which is fine, indistinctly reaching anterior ocellus, at base of antennae low triangular in the lateral view, with a short spine on top; clypeus in middle raised towards apex, ratio of interantennal distance and oculo-antennal distance 6 : 2, inner orbital carinate furrow not deep, but the carina strong and high; antennal joints 2, 3 and 4 subequal in length, joint 3 approximately 2.5 times as long as broad at apex. Head seen in profile : Fig. 33, occipital carina not toothed at end, but gradually terminate, its buccal encircling very obsolete. Pronotum depressed below the level of mesonotum, seen from above : Fig. 34, with length in middle nearly 1/3 the distance between antero-lateral teeth, humeral angle conical; pronotum in the lateral view : Fig. 33; mesonotum markedly convex, with anterior scutal sutures



Figs. 31-35. *Stigmus thailandinus* sp. nov., ♀. 31. Head seen from above. 32. Ibid., seen in front. 33. Head and thorax in the lateral view. 34. Pro- and mesonotum. 35. Pygidial area.

foveolate, not reaching middle of the segment (Fig. 34), median suture weak, defined in oblique light only, its base broadened and provided with a median elevation that separates the area in two parts, crente furrows on the lateral margins narrow, not strongly outlined, posterior marginal

region crenate; scutellum medianly longitudinally gently impressed, at base with a deep transverse crenate furrow, posterior suture deep and also crenulate; mesopleuron : Fig. 33, anterior vertical furrow margined in front with a strong carina, accompanying the other furrow just in front of it, locating on the outer border of epicnemial area, lower oblique furrow distinct, upper horizontal one defined only on anterior portion. the furrows comparatively broad and coarsely foveolate; metapleuron deeply impressed over whole the length. Propodeum at base (the place corresponding to area cordata) broadly impressed and strongly coarsely crenate, median furrow deep, well margined and narrowed posteriorly, running up to 2/3 from above of the posterior inclination. Petiole long, as long as hind tibia, in the lateral view fairly strongly bent at 1/3 from base, from the bending point posteriorly slightly gradually broadened in the dorsal view; pygidial area : Fig. 35. In hind wing discoidal and cubital nervures completely united into a single waved line, showing no trace of junction between them (in most other species apex of discoidal nervure slightly produced from the connecting point).

Vertex and upper front impunctate and polished, lower frons very minutely ruguloso-coriaceous, on lateral portions obliquely finely closely striate, inner orbital furrows rather weakly foveolate, clypeus polished, with scattered hair-bearing medium-sized distinct punctures on apical portion; temples distinctly striate, crenation of outer orbital furrows not strong and obsolete upwards. Pronotum anteriorly carinate and transversely impressed, medianly with a raised area and provided with a few very feeble incomplete carinae, sculpture of the lateral aspect : Fig. 33; mesonotum sparsely scattered with medium-sized aciculate punctures, scutellum impunctate, postscutellum longitudinally fairly closely striate, the striae medianly indistinct. Sculpture on propodeum strong and coarse, carinate striae comparatively high and distinct, basal furrow longitudinally, median furrow transversely striate, the latter on posterior inclination smooth, not crenate; remainder of the segment very coarsely strongly reticulate, the meshes obliquely elongate on dorsal aspect and finely rugulose within, not shining, on anterior portion of the sides the reticulation dissolved into oblique striae. Petiole longitudinally finely ruguloso-striate on anterior portion, abdomen impunctate and polished, only on caudal segment sparse fine punctures defined.

Holotype : ♀, Thailand (Muangfang), 16. III. 1961, K. Iwata leg.

Remarks. This species may represent the female of *S. monstrosus* described in the foregoing pages, since both the specimens were collected in the same place and at nearly the same date and, moreover, they show a considerable coincidence in some characters. But the differences between them are so great, even if the sexual dimorphism is taken into consideration, that I hesitate to allocate them under the same specific category. In order to obtain the final conclusion a thoroughgoing collection or a biological observation must be carried out.

4. SUBFAMILY SPHECINAE

1. Genus *Sphex* Linné, 1758

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

Sphex lineola Lepeletier, Hist. nat. Ins. Hym. III, p. 353, 1845 (♂).

Sphex (Sphex) aurulentus auct., nec Fabricius.

As to the detailed synonymic relationships and references see Vecht and Krombein (1955).

Specimen : 1 ♂, Thailand (Prew), 21. VI. 1961, K. Iwata leg.

Distribution : Eastern coast of S. and C. China, Burma, Thailand, Malaya, Sumatra, Bangka Island, Riouw Archipelago, Krakatau Island, Indo-China, Formosa, Southern portions of the Ryukyu Islands.

2. *Sphex* (*Sphex*) *cinerascens* Dahlbom, 1845

Sphex cinerascens Dahlbom, Hym. Eur., I, p. 25, 1845; —: Kohl, Ann. k.k. naturh. Hofmus. Wien, 10, p. 52, 1895; —: Cameron, Mem. Manchester Lit. Phil. Soc., 11, p. 24, 1898.

Sphex xanthopterus Cameron, ibid., 4 (2), p. 23, 1889; —: Kohl, Ann. k.k. naturh. Hofmus. Wien, 5 (3), p. 389, 1890; —: Bingham, Faun. Brit. Ind., Hym. I, p. 246, 1897; —: Cameron, Mem. Manchester. Lit. Phil. Soc., 48 (11), p. 24, 1898; —: Iwata, Nature & Life S.E. Asia, I, p. 398, 1961.

Specimen: 1 ♀, Thailand (Fang Hoikai), 29. III. 1959, Ikoma leg.

5. SUBFAMILY NYSSONINAE

1. Genus *Nysson* Latreille, 1802

1. *Nysson chiengmaiensis* sp. nov.

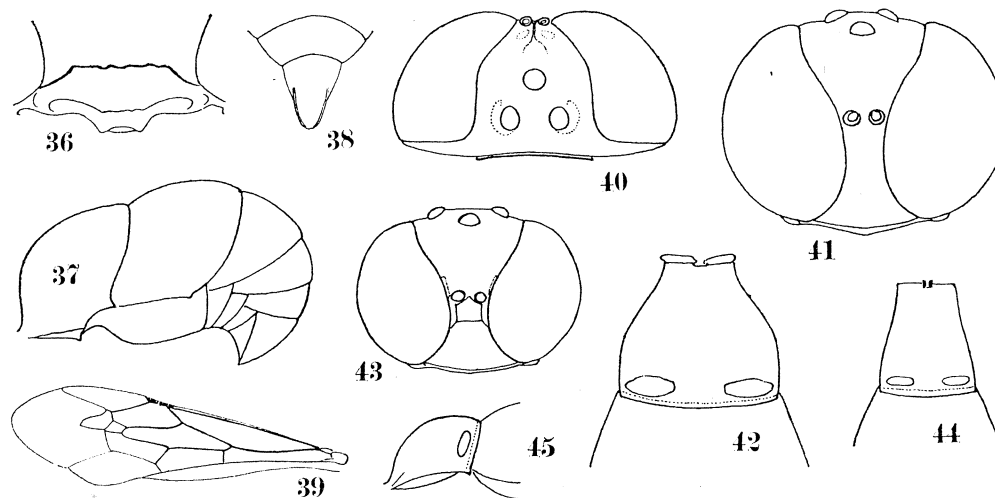
Eleven species of *Nysson* have been described from the Oriental region: *N. basalis* Sm., 1856; *doriae* Grib., 1884; *rugosus* Cam., 1890; *erythropoda* Cam., 1890; *nanus* Handl., 1898; *violaceipennis* Cam., 1904; *horne* Strand, 1913; *excavatus* Turn., 1914; *dubitatus* Turn., 1914; *decoratus* Turn., 1914; *dutti* Turn., 1921. The present species is distinct in having the hind wing anal cell ending just at the origin of the cubital nervure. In the key of Handlirsch (1887) it runs up to No. 9 and there stops. Among the known Indian species it somewhat resembles *N. excavatus* Turner (♂), but differs from it not only in the hind wing venation, but also in the form of the clypeus, frontal tubercle and in the sculpture of the area cordata.

♀. Length 5.7 mm. Closely covered with short white pile, the pile on face and clypeus silvery. Black. Yellow: Medianly broadly interrupted band on pronotum, propodeal spines, 2 lateral markings on tergites 1-4 (maculae on 1 large, on 2 and 3 transverse and narrow, and on 4 vestigial), front tibiae except inner margin, mid and hind tibiae externally. Bright ferruginous: Mandibles except apices, flagella beneath on basal half, humeral angles posteriorly, tegulae, postero-lateral protuberances of mesonotum and articulations of legs. Antennal scapes amber yellow at apex. Front tibiae internally and tarsi fuscous brown.

Head above with OOD subequal to POD, inner orbital emarginations at upper frons very slight; head in front with relative distances between eyes at vertex and at clypeus approximately 2:1 (measurement 33:18), clypeus: Fig. 36, interantennal tubercle flattened, medianly in front gently impressed, the sides reflectingly raised, no carina defined on frons; antennal joints short, joint 3 as long as wide at apex, joints 4-9 wider than long, ultimate joint about twice as long as wide at base; occipital carina complete, both reaching beneath head and there connected with each other by another short carina running just behind the buccal cavity, lower extremity of temple also distinctly carinated between basi-posterior end of mandible and the end of occipital carina. On thorax postero-lateral protuberances of mesonotum rounded at apex, scutellum with relative length to width about 2:3, with lateral margins arcuately carinated, postscutellum lunate, distinctly raised above the level of the lateral areas, also margined by carina and feebly roundly incised at apex in middle; propodeum with dorsal surface short, only slightly more than as long as postscutellum, at once inclined into posterior slope which is flattened, with lateral spines comparatively stout and long. Apical angle of the medial protuberance of 2nd sternite in the lateral view rounded (Fig. 37), pygidial area: Fig. 38. Hind tibiae spinose on outer margin, venation of fore wing: Fig. 39.

Frons and vertex with close micropoints, on frons rather sparsely and on vertex fairly closely mixed with medium-sized punctures, on post-ocellar area subreticulate. Mesonotum slightly more

closely punctate-reticulate, on latero-anterior regions with some micropoints, on medio-anterior portion punctures finer and partly subrugose, on scutellum anteriorly coarse and posteriorly fine and irregular, on postscutellum intervals finely wrinkled; punctuation on mesopleuron as on mesonotum,



Figs. 36-45. 36. *Nysson chiengmaiensis* sp. nov., ♀, clypeus. 37. Ibid., lateral view of abdomen. 38. Ibid., pygidial area. 39. Ibid., fore wing. 40. *Ammatomus yoshikawai* sp. nov., ♀, head. 41. Ibid., seen in front. 42. Ibid., the 1st abdominal segment. 43. *Ammatomus thaianus* sp. nov., ♀, head seen in front. 44. Ibid., the 1st abdominal segment. 45. Ibid., ibid., in the lateral view.

area cordata enclosed by carinae, very coarsely reticulately (apparently longitudinally) striate, intervallic spaces minutely wrinkled, not shining; metapleuron and antero-ventral portion of propodeal side glossy, the former with medium-sized punctures on lower portion. Abdominal tergites with close micropoints, mixed with medium-sized aciculate punctures, intervals on an average smaller than points on tergite 1, as large as points on the rest, pygidial area very closely longitudinally subrugosely reticulate.

Holotype: ♀, Thailand (Chiengmai) 14. III. 1961, K. Iwata leg.

2. Genus *Ammatomus* Costa, 1859

1. *Ammatomus yoshikawai* sp. nov.

In form this species is close to *Ammatomus alipes* (Bingham, 1897), but differs from it at least in the punctuation of the area cordata on the propodeum, in the structure of the clypeus and in the colour pattern of the mesonotum. In the general characters of the punctuation and in the mat surface of the body this species seems similar to *Ammatomus handlirschii* (Morawitz, 1890), but the punctures are distinctly sparser and, moreover, the structure of the first abdominal segment is different.

♀. Length 8.0 mm. Black and wholly half-mat owing to the very minute sculpture and short dense cinereous pubescence, with the following portions yellow: Palpi, mandibles at base externally, clypeus, supra-clypeal area and its sides up to eyes, extending narrowly upwards along inner orbits to slightly above base of antennae, 1st joint of antennae wholly, a line on pronotum (broadly interrupted in middle), humeral angles, postero-lateral corners of mesonotum, postscutellum broadly, 2 spots on abdominal tergite 1, a medianly attenuate band on 2 and 3, a medianly incrassate one on 4 and 5, front and mid femora beneath and on apical portions, all

tibiae except inner margin more or less, all tarsi except apices of mid and hind legs. Mouth parts, apical 3 joints beneath of antennae, tegulae in part, insides of front and mid tibiae ferruginous. Wing veins dark brown.

Head from above (Fig. 40) with ocelli located in a nearly equilateral triangle, slightly wider at base, anterior one slightly larger than the posterior, OOD : POD = 1 : 2, frons inclined towards median longitudinal line, the line reaching anterior ocellus. Clypeus : Fig. 41, not convex, level with supra-clypeal area, but markedly roundly inclined inwards near apical margin, the margin narrowly membranous, honey yellow, slightly angulate in middle, ratio of interocular distance at postocelli and at base of clypeus 32 : 10; antennae clavate with joint 3 as long as 1 or as long as 4 and 5 taken together, and about 4 times as long as wide at apex; area cordata on propodeum large, enclosed with fine impressed lines, in form nearly orthogonal isosceles triangle with the sides gently rounded; the 1st abdominal segment not long, but slightly constricted at apex (Fig. 42) with apical margin membranous; pygidial area broad triangular with apex rounded and with sides carinated. Venation of wings and characters of legs as in *A. coarctatus* Spinola, but the relative length of abscissae of radius and cubitus slightly different : Abscissae 1 and 3 of radius relatively longer than in *coarctatus*, 1 more than half as long as 2, 3 distinctly longer than 4; abscissa 3 of cubitus shorter, nearly 1/3 as long as 2.

Vertex on ocellar region and sides of anterior ocellus punctured with medium-sized shallow points, the points show somewhat zonal distribution (Fig. 40), clypeus with about 7 gross, hair-bearing punctures scattered. Thorax-complex wholly scattered sparsely with moderate-sized shallow punctures, thus area cordata not smooth, moreover not shining but half-mat, differing in these respects from the closely allied *alipes*. On both sides of area cordata the surface impunctate, but not shining. Abdominal tergites and sternites with sparse fine punctures scattered, minute altaceous ground sculpture transversely arranged on terite 1, but longitudinally so on the rest of the tergites, each sternite with an ante-apical row of sparse gross hair-bearing punctures, tergites 4 and 5 also with apical fringe of stiff hairs. Pygidial area densely covered with dark brown hairs.

Holotype : ♀, Cambodia (Siemreap), 12. VI. 1961, K. Yoshikawa leg.

2. *Anmatomus thaianus* sp. nov.

The present species is somewhat similar to *A. lenis* (Nurse, 1903) in the coloration, especially of the legs, but is easily separable therefrom by the smaller body, the relatively shorter 1st abdominal segment and the different punctuation of the area cordata at least. In sculpture it seems resembling *A. coarctatus mavromoustakisi* Beaumont known from the Island of Cyprus, but differs from it in the longer basal abdominal segment, and in the different colour pattern of the abdomen and legs.

♀. Length 7.0 mm. Black and shining. Vertex, clypeus, sides of thorax-complex and posterior aspect of propodeum covered with comparatively dense white pubescence, pubescence on clypeus silvery and somewhat longer, mixing a few much longer hairs. Yellow are : Clypeus, supra-clypeal area, inner orbital lines occupying whole the space of sides of supra-clypeal area below and extending narrowly upwards to above insertions of antennae, mandibles at base externally, antennal joint 1 except a short streak above, 2 beneath wholly and 3 beneath on basal half, a narrow line on pronotum, humeral angles, postero-lateral corners of mesonotum, a short band on postscutellum, 2 elongate spots on tergite 1 and a narrow band on 2-4 (on 2 and 3 laterally enlarged). Legs : Apex of all coxae, all trochanters wholly, front femora above, mid and hind femora except beneath, brownish red; front and mid tibiae except basal 2/3 of external sides and base of hind tibiae pale brown, apical portion of hind tibiae much darker; apical regions (broadened beneath) of anterior 4 femora and the external streak on tibiae of the same pairs cream yellow; tarsi dirty white with

a tint of pale brownish; hind tarsal joints with each apex brownish and distal joint except base black. Antennae brownish black, beneath ferruginous; wingveins also brownish black.

Head seen from above with OOD $1/4$ as long as POD, ocellar region slightly raised; head in front the length ratio of interocular distances at postocelli and at base of clypeus 40 : 10, frons before anterior ocellus broadly impressed and at above antennal sockets with a pit, but no distinct furrow in the median line, clypeus distinctly convex at base, raised above the level of supra-clypeal area, the latter pentagonal, slightly depressed and comparatively distinctly defined from the surroundings; clypeus : Fig. 43, with apex narrowly membranous, pale brown in colour. Antennae clavate, joint 3 approximately 4.5 times as long as wide at apex, subequal in length to joint 1, or 3 and 4 combined. Mesonotum without anterior scutal furrows, propodeum with area cordata large, nearly equilateral triangle in form and marginated by fine impressed lines, apical portion already inclined to unite the posterior aspect, the latter flattened, not furrowed but carinated in middle. Abdomen comparatively slightly slenderer than in *A. coarctatus*, segment 1 (Fig. 44 and 45) nearly parallel-sided in the dorsal view, feebly constricted at apex and nearly half as wide as segment 2 (ratio 24 : 44); pygidial area triangular, comparatively broad and with apex rounded, the surface densely covered with brownish black hairs. In fore wing relative length of abscissae 1-4 of radius approximately 1, 2, 2.5, 8.

Vertex on ocellar region (except middle of postocellar line) fairly closely punctured with medium-sized points, mesonotum more grossly punctured, punctures not deep, shallow, posteriorly not well-outlined, becoming larger and closer on posterior and lateral regions, on the disc intervals larger than points (generally slightly larger, sparser and shallower than in *A. coarctatus mavromoustakisi* Beaum.), punctures on scutellum slightly smaller but deeper than on mesonotum, well margined, uniform in distribution with intervals as large as points, on mesopleuron much smaller sparser, but well-outlined, on propodeum similar on mesopleuron, but area cordata medianly (except base) and apically broadly impunctate and polished, posterior inclination practically impunctate, very sparsely and finely punctured. Abdomen with sparse fine punctures, those on tergite 1 distinct, on the rest shallow and indistinct in outlines, tergites and sternites 3-5 with apical row of sparse somewhat gross hair-bearing punctures, segment 6 also sparsely scattered with hair-bearing punctures. Sternites 2-4 smooth on basal half.

Holotype : ♀, Thailand (Chiengmai), 1. V. 1961, K. Iwata leg.

3. Genus *Hoplisoides* Gribodo, 1888

1. *Hoplisoides punctatus manjikuli* subsp. nov.

(*Hoplisus punctatus* Kirschbaum, Stett. ent. Ztg., 14, p. 43, 1853. *Hoplisoides punctatus* : Beaumont, Mitt. Schweiz. Ent. Ges., 25 (3), p. 219, 1952.)

From the adjacent regions of Thailand other probable subspecies of *H. punctatus*, namely *feae* (Handlirsch, 1888) from Palon and *impiger* (Bingham, 1897) from Tenasserim have been known. The present subspecies is very close to both of them, but differs from either of them still in the punctuation of the abdomen, in the colour of the legs and in the immaculate mesopleuron. The characters, together with some other less important ones, are of use for separating the race from the nominate form.

♀. Length 8.2 mm. Closely covered with short brownish pubescence. Lemon yellow : Mandibles except apical half, labrum, clypeus except dark brown apical margin, a broad streak along inner orbits of eyes extending upwards to about $2/3$ of eye length from below, a narrow line along middle of outer orbits and scapes of antennae in front broadly. Orange yellow : Pronotum, humeral angles, a spot on tegulae, a patch on postero-lateral corners of mesonotum, posterior

half of postscutellum, apical bands on tergites 1-4 (those on 1, 3, 4 not reaching the sides and attenuating laterally, the band on 2 nearly reaching the sides), 2 lateral patches on sternite 3, 2 lateral spots on distal portion of femora and base externally of tibiae of front legs and an inner apical spot of femora and tibiae externally of mid legs. Inside of metatarsi and terminal tarsal joints of front legs yellowish white. Antennal flagella beneath ferruginous; apex of tergite 5 medianly and apical portion of end segment dark brown. Remaining portions of front tarsi, apex of each joint of mid tarsi and hind tarsal joints 2-4 at base pale yellowish brown. Front femora apically, greater part of mid and hind femora, front tibiae externally and mid and hind tibiae internally dark brownish red; mid and hind tibiae posteriorly broadly black. Veins of wings dark brown, stigma ferruginous, radial cell wholly, upper 2/3 of 2nd cubital cell and upper 2/5 of the 3rd nearly black, the dark maculae on wings very conspicuous.

Punctuation on head and thorax generally similar to the case in the nominate race, on mesonotum slightly coarser and closer, on abdomen much weaker and sparser.

Holotype: ♀, Thailand (Chiengmai), 6. V. 1961, K. Iwata leg.

Remarks. The species of *Hoplisoides* hitherto known from the Indian or its adjacent regions are *pictus* Smith, *feae* Handlirsch, *impiger* Bingham *capitatus* Nurse, *intrudens* Nurse and *remotus* Turner (c.f. Turner, 1917). Further, *orientalis* Handlirsch (= *tricolor* Smith) may belong to the genus. According to the original descriptions, as far as they go, some of the above listed species may fall within the specific attergory of *punctatus* Kirschbaum.

The systematic position of the specimen dealt with here was determined upon the view that *H. feae* is a subspecies of *H. punctatus*. If stress is placed upon the punctuation of the abdomen, as done by Handlirsch, it should be considered a subspecies of *feae* Handlirsch.

4. Genus *Bembecinus* Costa, 1859

1. *Bembecinus prismaticus* (Smith, 1858)

Larra prismaticus Smith, Jour. Linn. Soc. London, p. 103, 1858.

Stizus prismaticus: Cameron, Mem. Manchester Lit. Phil. Soc., 4 (3), p. 244, 1890: —: Handlirsch, Sitz. Akad. Wiss. Wien, 101, p. 55, 1892; —: Bingham, Faun. Brit. Ind., Hym. I, p. 282, 1897; Jour. Bombay Nat. Hist. Soc., 12, p. 106, 1898.

Bembecinus prismaticus: Iwata, Nature & Life S.E. Asia, I, p. 399, 1961.

In the descriptions hitherto given no mention has been given as to the secondary sexual characters of this species. On this occasion the characters of the antennae, face, legs etc. and the ventral plates in the male will be described:

- 1) Antenna (Fig. 46): Apical 2 joints beneath narrowly excavated, brownish and smooth, joints 1 and 2 beneath only yellow (in ♀ antenna beneath wholly yellow).
- 2) Inner orbits markedly convergent towards clypeus, ratio of interocular distance at vertex and at clypeus 38 : 12 (in ♀ 37 : 20).
- 3) Hind femur seen in front: Fig. 47 a, apical portion beneath excavated.
- 4) No carina nor tubercle on ventral plates, sternite 7 broadly roundly emarginate at apex (in ♀ straight); sternite 8 trispinose as usual, median spine about as long as hind tarsal joints 2 and 3 taken together.
- 5) Genitalia: Fig. 48.
- 6) Coloration: As given in Bingham's description (1897). But the yellow maculae on thorax seems somewhat better developed. They are more broadly developed in ♀ than in ♂, especially the spot on postero-lateral angles of mesonotum extended along the lateral margins up to anterior end of tegulae as a broad stripe; but completely lacking maculae on mesopleuron in both sexes of

the specimens.

Specimens: 1 ♀, Thailand (Chiengmai), 1. V. 1961, K. Iwata leg; 1 ♂, *ibid.*, 22. V. 1961, K. Iwata leg.

5. Genus *Bembix* Fabricius, 1775

1. *Bembix borrei thaiana* subsp. nov.

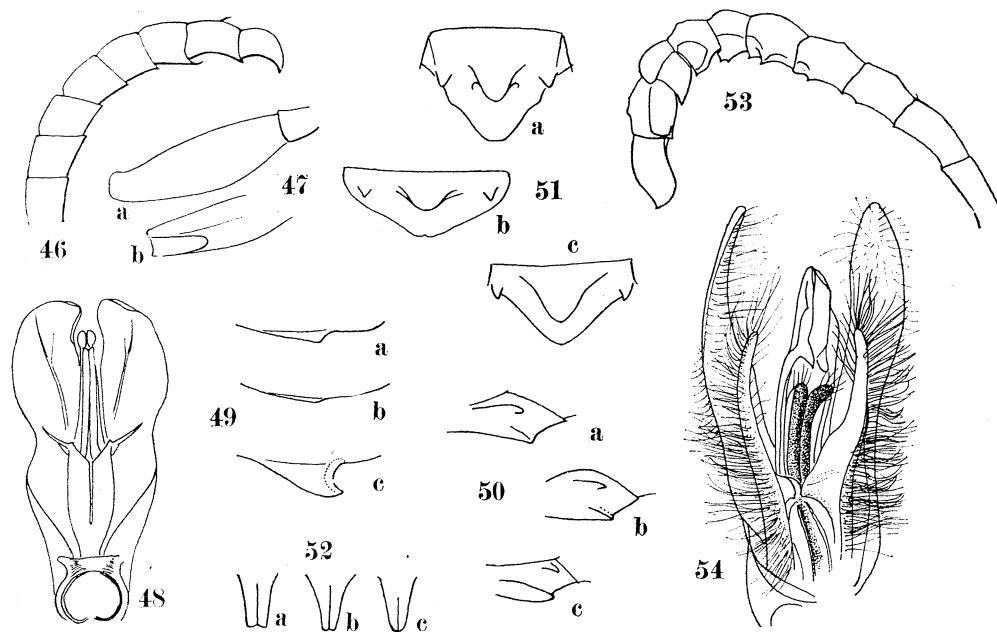
(*Bembix borrei* Handlirsch, Sitz. Akad. Wiss. Wien, Cl. M.-N., 102 (1), p. 866, 1893).

This subspecies differs from the nominate race in the following points (comparison with 2 specimens from Coimbatore, South India):

- ♂. 1) The medial protuberances on sternites 2 and 6 much less developed.
 2) Short spine-like bristles on tergite 6 much less strong and less marked.
 3) Apex of sternite 7 incised.
 4) Serrae on posterior margin of mid femur smaller and irregular.
 5) Antennal joints 6-8 each with a short tooth (in *borrei* s. str. the tooth defined on joints 6-9).

- 6) Yellow maculae on head (especially inner orbital stripes) more broadly extended.

Sternite 2 in the lateral view: Fig. 49 (a type, b paratype, c *borrei* s. str.); sternite 6 in the lateral view: Fig. 50 (a, b, c, *ibid.*); the same in the ventral view: Fig. 51 (a, b, c, *ibid.*); sternite 7 seems variable in form, in the ventral view: Fig. 52 (a, b, c, *ibid.*, d, a variation in *borrei* s. str.); antenna: Fig. 53, with marked excavation on joints 10-12 beneath, but with similar but smaller one on joints 6-9 also (this is also the case in the nominate race, though quite neglected in the descriptions of the previous authors). Genitalia: Fig. 54, similar in structure



Figs. 46-54. 46. *Bembecinus prismaticus* (Smith), ♂, antenna. 47. *Ibid.*, hind femur; a, seen in front, b, seen from beneath. 48. *Ibid.*, genitalia. 49-54. *Bembix borrei thaiana* subsp. nov., ♂; a, holotype; b, paratype; c, *borrei* s. str. 49. The 2nd ventral segment in the lateral view. 50. The 6th ventral segment in the lateral view. 51. *Ibid.*, seen from beneath. 52. The 7th ventral segment. 53. Antenna with apical portion in the ventral view. 54. Genitalia.

but darker in colour than in the nominate race.

Holotype: ♂, Thailand (Bangkok), 28. IV. 1961, K. Iwata leg.

Paratype: 1 ♂, Thailand (Chiengmai), 1 V. 1961, K. Iwata leg.

Remarks on variation: The two specimens examined are considerably different from each other in the protuberances of the abdominal sternites as shown in the figures above given. Further they differ also in the colour tone of the body. The specimen from Bangkok is rather bright orange yellow, while that captured in Chiengmai pale greenish yellow. It is uncertain, however, these differences are based on the individual variation or on the geographical variation, since the material is too scanty. Judging from the different heights, different climatic conditions accordingly, of the two localities, it seems more probable that the latter presumption is true. Therefore, it is not unreasonable to divide them further into two subspecies.

6. SUBFAMILY PHILANTHINAE

1. Genus *Philanthus* Fabricius, 1790

1. *Philanthus basalis clypeatus* subsp. nov.

Similar to *basalis* Smith and *dentatus* Cam. in general characters, but differs more or less in the colour of the legs and in the pattern of the maculation, from *basalis* also in the structure of the clypeus (as to *dentatus* difference of the sex prevents the precise comparison).

♂. Length 8.5 mm. Black with the following yellow or whitish yellow: Mandible except apex (more whitish), maculae on face (Fig. 55), 2 small spots on vertex, a broad streak on temple, a band on pronotum, humeral angles posteriorly, a patch behind it on mesopleuron, post-scutellum, tegulae of wings, a large lateral spot on posterior aspect of propodeum, a band on tergites 2-5, a lateral patch on sternites 3 and 4, all coxae beneath, a macula from beneath to apex of front and mid femora, all tibiae externally. Tarsi of legs brownish yellow, apically more brownish. Antennae beneath (apically darker), tergite 1 wholly, 2 and 3 at extreme base, front femora in front, apices of mid and hind femora, ferruginous red.

Head seen in front: Fig. 55, seen from above OOD:POD = 2:3, seen in profile with gena in middle about as long as antennal joint 4. Joint 3 of antennae long, as long as joints 4 and 5 united. Scutellum anteriorly sparsely and slightly grossly punctured, with intervals polished; area cordata marginated roundly by a narrow semicircular impunctate and polished line, medianly grooved, apical portion smooth and polished, just below the polished area the posterior aspect concavely hollowed. Abdominal segments from the 2nd apically minutely coriaceous, mat, other portions punctured as in the nominate race.

Holotype: ♂, Thailand (Chiengmai), May. 1961, K. Iwata leg.

Remarks. *Ph. basalis* and *dentatus* may belong to the group of *rutilans*, but less developed in the structure of the gena and the 3rd antennal joint. The present subspecies is more closely related in the structure of the clypeus to Palaearctic *rutilans* Spinola than to the nominate race.

2. Genus *Cerceris* Latreille, 1802

1. *Cerceris rybyensis thaiana* subsp. nov.

(As to the nominate race see de Beaumont, 1950, and Tsuneki, 1961)

? *Cerceris kashmirensis* Nurse, Ann. Mag. Nat. Hist., 7, 11, p. 524, 1903.

? *Cerceris rybiensis*!: Turner, Jour. Bombay Nat. Hist. Soc., 21, p. 800, 1912.

The specimens examined were but 2 (♀♀) and the general tendency of variation could not be grasped. But the following characters seem worthy of separating them from the European

representative as a geographical race :

1) Antennal joints relatively shorter, that is to say, in each joint ratio of length to width slightly smaller as compared with nominate race. Moreover, joint 3 only very slightly longer than 4. In colour more broadly light ferruginous.

2) Pronotum flattened, not transversely raised above, the character is more or less varied in the original race, but generally it is roundly raised across middle, especially markedly so at the lateral areas.

3) Sculpture on area cordata seems variable; in the holotype almost smooth and polished, with minute points scattered, but the median and lateral furrows strongly crenate (as in *rybyensis* : Turner, 1912), while in the paratype posterior portion transversely coarsely but not strongly striate, the striae formed by a few indistinct furrows, with micropoints on the non-furrowed area. General tendency seems not obliquely striate as in the nominate race, but transversely so.

4) Punctuation generally much coarser. In this respect close to the Japanese race (*C. r. japonica* Ashm. Especially as to the punctures and rugae on area pygidialis the difference is very marked.

5) Apical dark clouding (external to radial cell) of fore wing is so strong and distinct that they are easily separable from the nominate race.

Coloration similar, but both specimens bear a yellow spot behind eye and one of them 2 yellow spots on posterior aspect of propodeum. Sternites 2-5 carry a large macula on each side, sometimes fused into a broad band. Size slightly smaller : 9.5 and 8.0 mm.

Holotype : ♀, Thailand (Chiengmai) 16. V. 1961, K. Iwata leg.

Paratype : 1 ♀, the same place, 14. III. 1961, K. Iwata leg.

2. *Cerceris fortinata* Cameron

Cerceris fortinata Cameron, Ann. Mag. Nat. Hist., 10, p. 57, 1902 (♂); — : Turner, Jour. Bombay Nat. Hist. Soc., 21, p. 801, 1912 (♀, ♂).

Cerceris aurcobarba Cameron, Ann. Mag. N. H., Ser. 7, 15, p. 221, 1905 (♂).

Specimen : 1 ♀, Thailand (Chiengmai), 14. III. 1961, K. Iwata leg.

Distribution. India and Thailand.

Remarks. This species is most closely allied to the Palaearctic species, *C. hortivaga* Kohl, and may be a subspecies of this. But, (1) body smaller, (2) area cordata very distinctly finely longitudinally striate (in *hortivaga* striation incomplete and sculpture varied, but main direction of striae when defined seems transverse or oblique), (3) clouding of antero-apical portion of forewing more marked, (4) area pygidialis slightly more attenuate posteriorly, (5) anterior depression of clypeus somewhat different, and (6) basal platform of sternite 2 not transverse, subpentagonal, with the apical point reaching about half of the incassate area of the segment (Fig. 56).

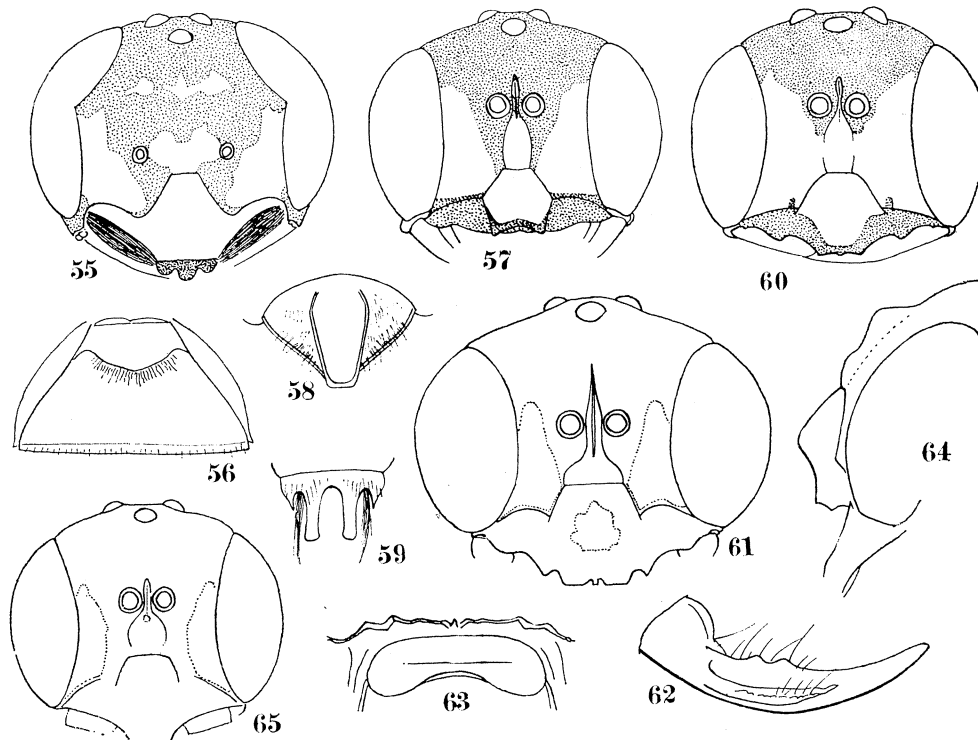
Basing chiefly on the last described character *fortinata* was treated here as a separate species. The specimen from Thailand more broadly blackish on the leg : Front and mid tibiae except in front, hind tibiae and tarsi, brownish black; mid tarsi apically brownish. Further in the specimen ratio of OOD to POD nearly 3 : 2 (according to Turner, 1912, 2 : 1). The ventral plate of abdominal segment 2 : Fig. 56.

3. *Cerceris fukaii basiferruginea* subsp. nov.

(*Cerceris fukaii* Rohwer, Proc. U.S. Nat. Mus. 39 (1794), p. 482, 1911.)

Among the known Indian species, *Cerceris vischnu* Cameron (1890) (syn. *C. dorosa* Nurse) seems closest to the examples here studied. It differs, however, from these in the relative length of antennal joints, ocellar location, venation relative to 1st recurrent nervure and in the form of apical margin of clypeus. As to *fukaii* Rohwer known from Formosa, the examples do not always

well agree in character with the original description (δ), or with the brief addition by E. Strand (1913) (φ). But the detailed redescription and figures by Giner Mari (1943) made it possible to combine the specimens with the species. They are slightly different from the Formosan species chiefly in the coloration, in the form of the pygidial area and somewhat in the sculpture.



Figs. 55-65. 55. *Philanthus basalis clypeatus* subsp. nov., δ , head seen in front. 56. *Cerceris fortinata* Cameron, φ , the 2nd ventral plate. 57-60. *Cerceris fukaii basiferruginea* subsp. nov. 57. Head seen in front (φ). 58. Pygidial area (φ). 59. Abdominal sternite 6 (φ). 60. Head seen in front (δ). 61-65. *Cerceris bituberculata* sp. nov. 61. Head seen in front (φ). 62. Mandible. 63. Labrum seen from beneath. 64. Clypeus seen in profile. 65. Head seen in front (δ).

φ . Coloration : Generally similar in pattern to the nominate race, but with some differences. Black. Palpi, antennae from apex of joint 1 to ultimate joint, abdominal segment 1 wholly, basal sides of tergite 2 and base of sternite 2 (including basal platform), caudal segment, apical margin of each sternite, trochanters, knees of hind legs, apical 3 joints of hind tarsi, ferruginous. Yellow are : Mandibles except apex, clypeus on the area of medial appendage except apical margin, supraclypeal area, 2 large maculae along lower inner orbits, a spot on interantennal carina, antennal joint 1, 2 large spots on pronotum, wing tegulae, postscutellum, a macula at base in middle of tergites 2, tergites 3 (medianly broadly triangularly incised in front) and 5 (anteriorly roundly emarginate), lateral maculae on sternite 3, apex of coxae, front and mid femora except the black from base to upper middle, tibiae and tarsi of anterior four legs, hind tibiae except apical third, and hind tarsi basally. Wings hyaline, apical margin broadly clouded, especially strongly so at the area external to radial cell, veins dark brown.

Morphology : Head in front : Fig. 57. Interantennal carina thin and high, clypeal appendage (lamina) gently raised towards apex, with the surface flattened, the area of the apical black margin liberated, sides of the liberated portion nearly 1/4 as long as wide at its apical margin.

Apical margin of the clypeus proper with 2 short teeth, one just below (rather behind) each latero-apical angle of the appendage (just as illustrated by Giner Mari), the space below the free part of the appendage fairly deeply excavated, the appendage relatively much wider than in the figure by Giner Mari. Antennal joint 3 slightly longer than 4 and 1.3 times as long as wide at apex, abdominal tergite 1 very slightly longer than wide, pygidial area : Fig. 58. Platform at base of sternite 2 subcircular, with apex shortly pointed, reaching more than half of the incrassate region of the segment (incrassation less in degree), sternite 6 : Fig. 59.

Punctuation : On vertex, mesonotum and propodeum reticulate, on mesonotum partly confluent longitudinally, on propodeum with more or less interspace, on scutellum punctures slightly smaller and sparser. Area cordata very coarsely obliquely striate, with median crenate comparatively broad burrow which is marginated on both edges by blunt carinae. Punctures on tergite 1 fairly close, intervals at base larger, posteriorly smaller than points, on 2 and 3 intervals partly larger partly smaller than points, at base impunctate.

♂. Antennal flagella beneath markedly paler, tergite 1 black, sides only ferruginous, basal platform on sternite 2 ferruginous, nearly pentagonal in form, with apex reaching half of the incrassate region of the segment, abdominal bands similar, but tergite 6 also yellow, roundly incised in front; trochanters of legs yellow. Head seen in front : Fig. 60, with lower portion more broadly yellow, with golden hairs very closely and distinctly covering the apical black area, clypeus very slightly convex, with apical margin broadly produced in middle and shortly tridentate as given by Giner Mari. First abdominal segment distinctly longer than broad (ratio nearly 3 : 2); punctuation as in ♀.

Holotype : ♀, Thailand (Lampoon), 2. V. 1961, K. Iwata leg.

Paratype : 1 ♂, *ibid.*

4. *Cerceris bituberculata* sp. nov.

This species belongs to the group of *C. sobo*, known from Japan and Korea, and is characterized in having two small tubercles instead of the basal platform on the 2nd abdominal sternite (♀♂). The female is also distinct in that the clypeus is subconically elevated at the centre and the first tergite of the abdomen bears a pinna-like process on each side near apex.

♀. Length 10.0 mm. Black with the following portions lemon yellow : Mandibles at base externally, clypeus on the central tubercle, two large maculae along inner orbits, scapes in front broadly, two transverse maculae on pronotum, tegulae, postscutellum, a short vague transverse line at base of tergite 1, apical band on 3 (occupying half of the segment and attenuate medianly), two indistinct spots on 4 and a narrow band on 5, two lateral patches on sternite 3, apical portion of all femora, front and mid tibiae except inner face, an external streak on hind tibiae, tibial spurs, tarsi of front and mid legs. Antennae dark brown, beneath and apex pale ferruginous. Pubescence sparse and short, on face and clypeus silvery, on dorsal aspect of thorax and abdomen and sides of ventral segments slightly brownish, on the remainder greyish white. Wings hyaline, radial cell and its external area markedly clouded.

Head above with OOD : POD = 12 : 8 (postocellar diameter 6), elevation of ocellar region slight, head seen in front : Fig. 61, relative width of oculo-antennal and interantennal spaces and antennal socket 10, 6, and 5, clypeus subconically raised at the centre, its anterior margin : Fig. 61; labrum (Fig. 63) folded back beneath mouth, with anterior portion transversely furrowed to receive mandible; mandible with 2 blunt teeth on inner margin toward middle (Fig. 62); clypeus seen in profile : Fig. 64. Antennal joint 3 in the narrowest (broadest) view nearly 2 (1.7) times as long as wide at apex. Pronotum anteriorly slightly concave-truncate, with upper border carinated, the carina in the median region runs on the dorsal aspect (leaving the anterior border)

and narrowly interrupted in middle, on the sides it extended downwards to above base of procoxa, latero-dorsal maculated areas raised and also bluntly transversely carinated. On propodeum area cordata triangular, convex, well margined by comparatively broad furrows and divided by the median shallow groove, apex of the area grossly and deeply foveolate and polished, thence a fine groove extended to posterior inclination, which is truncate, with marginal areas rounded, not bordered by carinae. Abdominal segment 1 broader than long, anteriorly truncate, posteriorly margined with erected membranous carina (the carina not so high as in ♂), on each side before apex with a pinna-shaped elevation of sclerite, with inside foveolate, polished and directing posteriorly. Pygidial area subrectangular, longitudinally elongate with sides and apex gently rounded and carinated. 2nd ventral segment without basal platform, instead with 2 short blunt tubercles a short distance behind the posterior lateral corners of 1st sternite. In fore wing 2nd cubital cell with 1st abscissa of cubitus about 2/3 as long as the 2nd.

Vertex reticulated with medium-sized punctures, punctures on frons sparser, mixed with finer points, on clypeus shallow, irregular and also mixed with micropoints, on its lateral lobes very minute and dense, on mesonotum slightly larger, close, partly longitudinally confluent, with intervals turn into longitudinal rugae, carrying a few micropoints, on scutellum sparse, also partly confluent, with intervals coarsely longitudinally rugose; area cordata longitudinally coarsely striate, median portion mixed with fine rugose-striae, median furrow posteriorly sparsely crenate, sides of the segment anteriorly obliquely very minutely and very closely rugoso-striate. Abdominal tergites coarsely reticulate, on tergites 2 and 3 punctures slightly sparser, on 4 much sparser and shallower, but the intervals smaller than points, on 5 very shallow and feeble; pygidial area irregularly rugulose.

♂. Length 6.5 mm. Similar in colour to ♀, but maculae on clypeus, pronotum, tergites 2, 4 and 5 lacking; while tergite 6 bearing a lunate yellow band which is anteriorly rounded; a spot at base of interantennal carina yellow; tibiae and tarsi more broadly black (hind tibiae wholly blackish, front and mid tarsi brownish towards apex).

OOD : POD = 10 : 9 (postocellus 4); head seen in front : Fig. 65, median lobe of clypeus gently roundly raised, with apex truncate and medianly provided with a short tooth, lateral corners angulate, thus forming a bluntly tridentate margin. Joint 3 of antenna 1.5 (1.3) times as long as wide at apex, apical 3 joints carinated beneath. Pronotum similar, but the median part of anterior transverse carina indistinct, mingling with carinulae between punctures. Area cordata nearly equilateral triangle in form, margined by broad furrows, the disc not so highly raised as in ♀, but convex, the surface longitudinally very coarsely furrowed and carinated, the furrows 7 in number including the median one which is not crenate. Abdominal tergite 1 from above wider than long, with lateral margins rounded, without pinna-shaped protuberances, apical margin provided with transparent broad membranous fringe vertically erected, pygidial area very slightly more than as long as wide (ratio 12 : 10), with lateral margins rounded and with apex truncate. Ventral segment 2 bituberculate as in ♀, but the basal area somewhat elevated without distinct outline. Punctuation similar to ♀, but generally slightly coarser, especially markedly so on clypeus.

Holotype : ♀, Thailand (Muangfang), 16. III. 1961, K. Iwata leg.

Paratype : ♂, Thailand (Lampoon), 2. V. 1961, K. Yoshikawa leg.

5. *Cerceris maculiceps* sp. nov.

This species also belongs to the group of *C. sobo*, having two tubercles instead of the basal platform on the 2nd sternite of the abdomen. It is also characteristic in having the clypeus tridentate at the anterior margin (♂) and in the maculation of the body and wings.

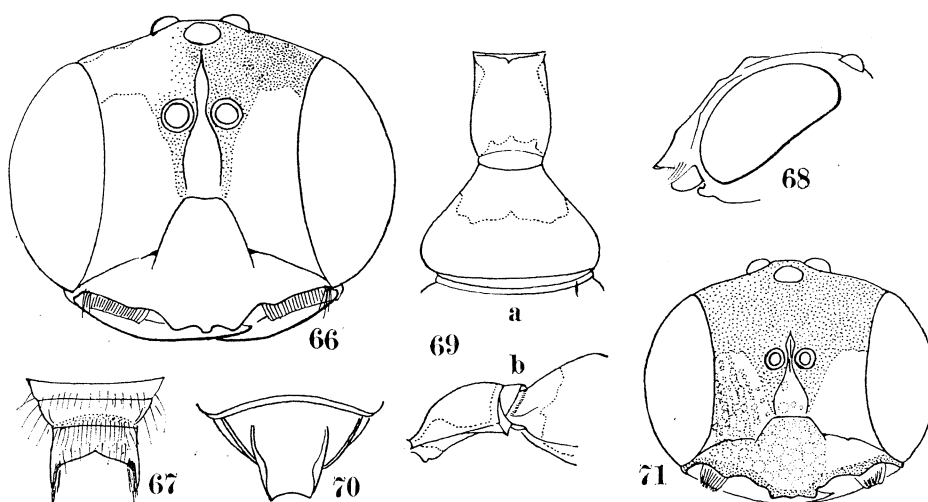
♂. Length 8.8 mm. Black. Yellow are : Clypeus except black margin, mandibles except apex, supraclypeal area, interantennal carina (fringed with honey yellow membrane), a large macula along lower inner orbit, a narrow transverse curved band connecting eyes by running arcuately a little distance behind ocellar area, a widely opened V-shaped macula on each upper temple, with its inner arm running parallel and somewhat close to occipital margin, with the outer arm reaching close to eye near top, crossing longitudinally the temple, 2 spots medianly just before occipital margin, broad band on pronotum medianly narrowly interrupted, tegulae except inside and semitransparent membranous margin, broad band on scutellum and postscutellum, 2 very large maculae occupying a greater part of posterior aspect of propodeum, a large macula on upper area of mesopleuron, a lateral longitudinal line enlarging anteriorly of tergite 1, base of 2, medianly attenuate band on 3, 5 and 6 (on 5 narrow), 2 irregular spots on pygidial area and legs except following black or dark brown portions : Base of coxae, base to upper 3/4 of femora and a patch on inside of tibiae of anterior two pair, femora (with a short yellow streak near apex externally), apex and apical 2/3 of outer margin of tibiae, and tarsi (dark brown) of hind legs. Abdominal segments 1 and 2 wholly, ante-apical narrow band on 4, the same on sternites 5 and 6 and caudal segment wholly pale brownish red. Antennae dark brown, beneath pale ferruginous, front and mid tarsi apically ferruginous. Wings hyaline, apex of fore wings markedly blackish, veins and stigma ferruginous, partly blackish. Hairs on clypeus anteriorly somewhat close, silvery; on temples, upper side of thorax-complex, abdominal segment 1, sternite 2 and incrassate region of the following sternites long and slightly brownish; sides of thorax, posterior aspect of propodeum long and whitish; on dorsal aspect of abdomen short and brown to blackish; everywhere not dense; lateral hair bands on anterior margin of clypeus ferruginous, with a tint of golden.

Head from above comparatively thick, relative width to length in middle approximately 2 : 1 (measurement 84:40), OOD : POD = 12 : 9, ocellar region fairly elevated. Head seen in front : Fig. 66, median lobe of clypeus gently convex, with apex bluntly tridentate, supraclypeal area below flattened, gradually raised upwards, interantennal carina broadly fringed with honey yellow membrane, seen in profile isosceles triangle with top rounded. Antennal joint 3 slightly longer than 4, about 1.7 times as long as wide at apex, ultimate joint 1.5 times as long as penultimate joint, slightly curved, with apex obliquely truncate (in the lateral view), joints 10-13 beneath carinate, carina well defined on each apical portion. Pronotum from above slightly widened and incrassate towards sides, with lateral margins roundly convergent anteriorly, anterior aspect at first vertical, then slightly concavely inclined. Propodeum in the lateral view rounded, without distinct border between dorsal and posterior aspect, area cordata occupying only 2/5 of the total arc, in form it is equilateral triangle and bordered distinctly by comparatively broad furrow, the disc slightly convex, but not raised above the surface of the lateral areas which are gently roundly raised, from apex of triangle area a furrow extended to posterior aspect, soon enlarging in an apical large triangular impressed space which is smooth and polished. Abdominal tergite 1 longer than wide (ratio 28 : 25, length measured from upper edge of anterior vertical inclination), with maximum width at 1/4 from apex, without medio-apical fovea, apical margin broadly fringed with honey yellow membrane obliquely erecting; tergite 2 with sides straightly divergent posteriorly, apical 1/5 parallel, apical margin also with honey yellow membrane, not so broad as in 1; pygidial area rectangular, relative length to width about 3 : 2, well margined by carinae, apical carina membranous and gently emarginate; sternite 2 slightly raised at base, without defined border, but with a well-defined tubercle on each side; sides of incrassate region of sternites 4, 5 and 6 not posteriorly produced. Sternite 7 : Fig. 67. In cubital cell 2 of forewing

abscissa 1 of cubitus approximately $1/3$ as long as abscissa 2.

Upper frons somewhat longitudinally rugoso-reticulate, clypeus sparsely punctured with apically densely haired region punctures fine and close; vertex, pro- and mesonotum coarsely reticulate scutellum and propodeum punctured-reticulate, but with more or less interspaces between punctures, area cordata very coarsely longitudinally striate, with lateral furrows coarsely crenate giving an obliquely striated appearance posteriorly, metapleuron horizontally and anterior region of the sides of propodeum obliquely coarsely striate. Punctures on abdomen posteriorly weaker as usual, subreticulate, everywhere the punctures larger than intervals, on tergites 4 and 5 mixing a few micropoints; punctures on sternite 2 very feeble and obsolete, distinct only on latero-posterior portions.

Holotype: ♂, Thailand (Patalung), 11. III. 1961, K. Yoshikawa leg.



Figs. 66-71. 66. *Cerceris maculiceps* sp. nov., ♂, head seen in front. 67. Ibid., the 7th and 8th ventral plates. 68. *Cerceris nagamasa* sp. nov., ♂, head seen in profile. 69. Ibid., a, the 1st and 2nd abdominal segments; b, the same in the lateral view. 70. Ibid., pygidial area. 71. *Cerceris spiniventris* sp. nov., ♂, head seen in front.

6. *Cerceris nagamasa* sp. nov.

This species seems closely allied to *C. lapcha* Cameron (1905), especially well resembles in the characters of the pygidial area, general sparse punctuation of the body, the nearly polished area cordata of the propodeum, and if it is the other sex of *C. latibalteata* Cameron (1904), as presumed by R. E. Turner, also in the form of the pronotum. But the present species differs from the latter species at least in that the clypeal margin is toothed in the middle, the basal segment of the abdomen is only about twice as long as broad, and the yellow maculae of the body and the legs are much more broadly extended.

♂. Length 7.3 mm. Black, sparsely covered with pale yellow pubescence, the pubescence on clypeus slightly close and silvery white, lateral hair bands on anterior margin of clypeus golden, externally longer, forming with its apical margin approximately a straight line with the medial produced margin of the clypeus. Yellow are: Mandibles except apices, clypeus, lower frons wholly up to about $3/4$ of eye from below (excepting the median area including antennal sockets), interantennal carina (macula broadened on upper portion and reaching anterior ocellus), scapes of antennae except apical pale brown, a broad band arising from each side of buccal cavity and extending upwards through outer orbit to vertex where both are attenuate and with a narrow

interruption between them, pronotum wholly, 2 confluent patches on mesonotum before apex, wing tegulae, scutellum, postscutellum, 2 very large maculae covering greater part of propodeum (except area cordata, median broad line on posterior aspect and anterior and ventral portions of the sides), propleuron nearly wholly, 2 large subtriangular maculae on prosternum, 2 large maculae on mesopleuron, of which the lower extending downwards, covering whole the meso- and metasterna; abdominal tergite 1 on the sides (enlarged anteriorly) and narrow apical margin, tergite 2 on basal half, 3 and 6 nearly wholly, narrow band on 4 (narrowest) and 5; sternite 1 except base, 2 and 3 nearly wholly, 4-6 on posterior lateral short bands (on 6 nearly confluent) and caudal segment wholly; front coxae in front broadly, apices of mid coxae, hind coxae except outer streak, trochanters of all legs, front femora except base externally, mid femora except outer side, outer streak on hind femora, tibiae and tarsi of front and mid legs (the latter apically pale brownish) and hind tibiae on inner side. Antennae and hind tarsi dark brown, the former beneath ferruginous, wings hyaline, apex clouded, especially darkly so on anterior half of radial cell and the area external to it.

Head from above with relative width to length in middle nearly 2 : 1, OOD : POD = 10 : 8, seen in profile : Fig. 68, median lobe of clypeus gently roundly raised, with apex honey-yellow membranous and bluntly tridentate, supraclypeal area gently raised upwards, interantennal carina nearly lunate in the lateral view, almost wholly membranaeus, antennal joint 3 about 1.3 times as long as 4 and 2.2 times as long as wide at apex, no carina on any joint. Pronotum characteristic in form, transverse, steeply sloped in front and gently roundly raised across middle, with antero-lateral corners rounded and slightly more incrassate on the sides than in middle, with no trace of median incision nor furrow (apparently present on account of the narrow interruption of the yellow band) and no trace of anterior carinate edge which only arising from the sides and running down arcuately and very stoutly on propleuron, ending far above procoxa; scutellum about half as long as mesonotum and twice as long as pronotum in middle, propodeum from above subcircular, in the lateral view roundly inclined posteriorly without distinct border between dorsal and posterior aspects, area cordata isosceles triangle in form, marginated by fine grooves, with apical angle nearly 90° and attaining approximately a half of the segment, without accompanying the distinct apical fovea (but the area slightly impressed), the disc gently roundly raised, raised above the level of the lateral area and feebly grooved in middle, from apex of the triangular area a broad shallow furrow extended up to apex of the segment. Mesopleuron above the horizontal furrow markedly roundly raised, no tooth before mesocoxa. Abdominal segment 1 (Fig. 69) longer than wide, relative length to width 27 : 20 (measured from the upper edge of anterior inclination, if measured from base in maximum length 33 : 20, under eye measurement about 3 : 2), apical margin very broadly honey yellow transparent, not erected, but smoothly extended posteriorly (relative length in middle 6), tergite 2 as shown in Fig. 69, pygidial area : Fig. 70. Second ventral segment without platform, but with very feeble tubercles defined with some difficulty, apical margin of the following sternites broadly membranous, honey yellow, apex of sternite 6 broadly shallowly triangularly incised.

Punctures on vertex close, medium-sized, but with more or less interspaces, on upper front closer, longitudinally rugosely confluent, on lower front sparser, mixed with micropoints, on clypeus and supraclypeal area slightly finer and much sparser, on mesonotum sparse but distinct, slightly elongate and posteriorly shallower, partly longitudinally confluent, with abundant micropoints scattered between, on scutellum and propodeum rounded with indistinct outline, sparser, area cordata polished, with lateral marginal regions obliquely, not strongly crenate, with disc and posterior impressed area sparsely scattered with micropoints. Anterior inclination of pronotum

transversely arcuately finely rugulose. Abdominal tergite 1 distinctly punctured with medium-sized points, intervals partly as large as, partly larger than punctures, from tergite 2 posteriorly punctures shallower, scratched in outline and sparse, scattered on posterior half of each tergite, on 6 outline rather obsolete; pygidial area sparsely punctured. Abdominal sternites almost impunctate, only with a few punctures scattered on the sides.

Holotype: ♂, Thailand (Chantaburi), 18. VI. 1961, K. Iwata leg.

Remarks. From the specimen the right fore wing and the left antenna from the 6th joint apically are lost.

7. *Cerceris spiniventris* sp. nov.

The present species (♂) is similar to *C. mellicula* Turner* known from Karachi in possessing the lateral spines on the 6th ventral plate of the abdomen, but is markedly different from it in the punctuation and coloration. In such characters together with others this species somewhat resembles *C. erronea* Giner Mari known from S. E. China, but differs therefrom in the character of the ventral spines. Apparently the species is similar to European *C. rubida*, but the ventral spines are lacking in this species.

♂. Length 6.2 mm. Black, sparsely covered with greyish white pubescence, hair bands on anterior lateral margin of clypeus pale ferruginous, each convergent apically. Ochreous yellow: Clypeus except anterior margin rather broadly, supra clypeal area, interantennal carina thinly on top, mandibles except brownish apical portion, a patch at apex of scape beneath, 2 spots on pronotum, tegulae externally, posterior band on postscutellum, 2 comparatively remote spots at base of tergite 2, a band on tergite 3 which is broadly emarginate in front, tergite 6 except base, apices of mid and hind coxae, a streak on inner apical portion of front femora, tibiae and tarsi of anterior 4 legs, hind tibiae on basal half, hind metatarsi wholly. Antennae beneath dark ferruginous; pygidial area apically, end joint of mid tarsi, apical 4 joints of hind tarsi brown to pale brown. Wings hyaline, radial cell anteriorly and the area external to the cell much darker, veins and stigma dark brown.

Head from above with relative length to width 28 : 55 (= 1 : 2), OOD : POD = 10 : 8, head seen in front : Fig. 71, median lobe of clypeus gently convex, with anterior margin truncate and provided with 3 blunt teeth, supraclypeal area flattened and gently raised upwards, interantennal carina fringed with transparent membrane, suddenly and steeply inclined on upper side, thence a fine carina extending upwards, reaching near anterior ocellus; antennae comparatively short and somewhat clavate, joint 3 slightly longer than 4 and about 1.5 times as long as wide at apex, joint 6 nearly as long as wide, subsequent joints wider than long except ultimate one which is slightly bent and obliquely truncate at apex, no carina on any joint. Pronotum transverse, slightly broader at sides, with lateral margins convergent towards head, anterior margin carinate, with a further carina across middle; mesopleuron without tubercle; propodeum from above approximately semicircular, with area cordata equilateral triangular, markedly convex, with bordering furrows steep on outer margin, median furrow broad, but shallow, with a distinct apical fovea, on posterior aspect medial furrow ill-defined on account of the very coarse punctuation, but the area slightly irregularly impressed. Tergite 1 as long as wide, with anterior inclination without upper carina, apical 1/4 distinctly constricted, apical fringe membranous, semitransparent, fairly broad, obliquely erected, stigmata distinctly produced towards sides; tergite 2 with lateral margins divergent in nearly straight lines up to 2/3 from base of the segment, thence running subparallel

* As to the number and location of the ventral spines of the abdomen there is a difference between the characters designated in his key and the description (Turner, 1912).

and rounded; pygidial area subrectangular, relative length to width 11 : 8, apical margin very slightly roundly produced. Sternite 2 without basal platform, nor lateral tubercles; lateral portions of each sternite considerably incrassate, on sternite 6 a stout tooth produced from such an incrassate portion a short distance from the lateral extremity.

Punctuation very strong and coarse, on vertex reticulate, with 4 meshes on OOL, on upper frons rugoso-reticulate, on lower frons and clypeus reticulation especially coarse, clypeus with anterior black margin with close micropoints only, each bearing a hair. Anterior aspect of pronotum transversely arcuately rugose, the disc coarsely irregularly sculptured. Mesonotum very coarsely reticulate (with 8 meshes between anterior and posterior margins), with a more or less interspaces polished. Scutellum, mesopleuron, propodeum except the sides anteriorly coarsely reticulate, punctures as gross as on mesonotum, area cordata at base and on marginal furrows coarsely crenate, on median broad furrow transversely costate, disc (which is very narrow) feebly coarsely crenate, on median broad furrow transversely costate, disc (which is very narrow) feebly coarsely crenate and scattered with micropoints. Abdominal tergites coarsely strongly reticulate, on pygidial area reticulation somewhat irregular, shallower, with more or less interspaces; sternite 2 coarsely sparsely punctured, punctures at base much sparser and slightly smaller, on other sternites lateral incrassate areas strongly but sparsely punctured, rest of the portions sparsely more finely punctured, glossy.

Holotype : ♂, Thailand (Chiengmai), 2. V. 1961, K. Yoshikawa leg.

7. SUBFAMILY CRABRONINAE

1. Genus *Rhopalum* Kirby, 1829

1. *Rhopalum* (*Rhopalum* sec. *Rhopalum*) *tongyaii* sp. nov.

Up to the present eight species belonging to the subgenus *Rhopalum* (section *Rhopalum*) have been known to occur in the Oriental Zoological Region, namely, *petiolatum* Nurse, 1912 (India); *iridescens* Turner, 1917 (Kashmir); *simaluense* Maidl, 1925 (Sumatra); *domesticum* Williams, 1928 (Philippine); *sumatrae* Leclercq, 1950 (Sumatra); *tsunekiense* Leclercq, 1957 (Malacca); *kedahense* Leclercq, 1957 (Malacca) and *oriolum* Leclercq, 1957 (Malacca). The present species differs from any of the above listed species as well as the species from other region either in the form of clypeus (in due consideration of the sexual dimorphism, if necessary), antennae, pronotum, abdominal petiole, legs or in coloration. In the general characters this species is rather close to *succineicollare* Tsuneki known from Japan (the male captured has not as yet been described), but differs from it also in the structure of the clypeus.

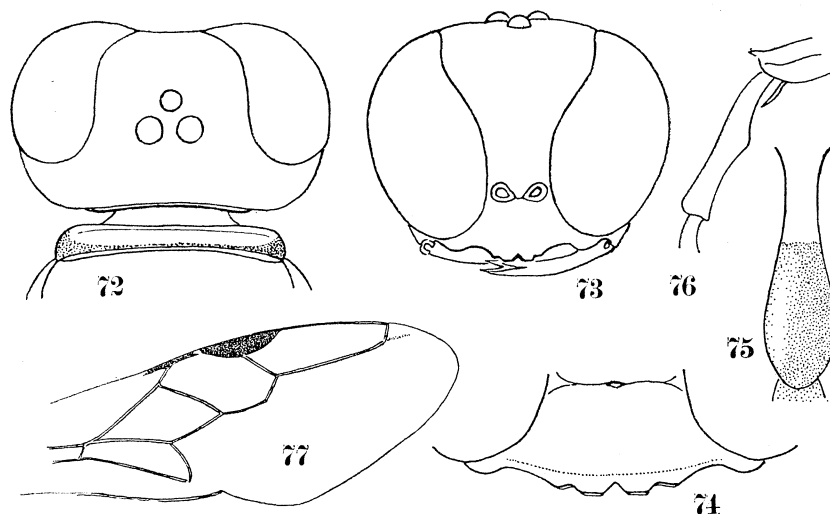
♂. Length 4.5 mm. Black with the following portions pale yellowish or pale brownish white : Antennal joint 1 wholly and 2 except above, apex of interantennal tubercle, pronotum, humeral angles, basal half of abdominal petiole except extreme base, front and mid legs (except front femora above and mid femora above and beneath) and coxae and basal broad ring of tibiae of hind legs. Ferruginous : Mandibles, antennal flagella beneath except apical third, tegulae of wings, apical margin of each tergite of abdomen narrowly, apical tergite and apical two sternites. Wing veins and stigma brownish black. No yellowish red on abdomen.

Head seen from above : Fig. 72, ocellar region slightly impressed, only raised between postocelli, with a feeble impressed line in front of median ocellus, OOD : POD = 5 : 1.5; head seen in front : Fig. 73, areas along inner orbits, interantennal tubercle and clypeus covered with silvery pile, distance between eyes at antennae 2/3 times as long as antennal scape, interantennal tubercle elongate triangle in shape, pointed towards clypeus, with the sides gently curved and raised towards apex. Clypeus : Fig. 74, mandibles bifid at apex, with lower tooth slightly longer

than the upper. Head seen in profile with eye 1.5 times as thick as temple, occipital carina fine and weak, gradually terminating at apex. Relative length of antennal joints 21, 7, 4, 5, 6, 7, 5, 5, ... 5, 8; joint 6 gently excavated beneath, more feebly so than in usual species of the same section, joints 7-12 slightly nodose, ultimate joint wedge-shaped (constant? or due to desiccation?). Pronotum well developed, incrassate, with antero-lateral corners rounded (Fig. 72). Are cordata defined by the lack of pubescence, medianly thoroughly grooved, posterior aspect with median lenticular excavation, lateral carinae defined only on apical portion. Petiole (Fig. 75) as long as hind trochanter and femur combined, widest at about 3/4 from base. Front legs normal mid metatarsi long, as long as the following 2 joints united and slightly modified: Fig. 74 (lateral view), hind tibiae gradually incrassate towards apex (not claviform) with upper margin straight and lower and outer margins gently curved. Wing venation: Fig. 77.

Vertex, upper frons, mesonotum and scutellum very minutely weakly and rather sparsely punctured (intervals larger than points), glossy, mesopleuron on lower portion more sparsely scattered with similar fine points, area cordata at base very shortly crenate, disc smooth and polished, remaining areas of dorsal and posterior aspect covered with very fine hair bearing punctures. Abdomen practically impunctate, on tergites 5 and 6 hair-points somewhat more distinct.

Holotype: ♂, Thailand (Chantaburi), 20. I. 1961, K. Yoshikawa leg.



Figs. 72-77. *Rhopalum (Rhopalum) tongyai* sp. nov. ♂. 72. Head and pronotum. 73. Head seen in front. 74. Clypeus. 75. Abdominal petiole. 76. Mid metatarsus. 77. Fore wing venation.

2. Genus *Encopognathus* Kohl, 1896

1. *Encopognathus (Encopognathus) thaianus* sp. nov.

This species is considered closely allied to *Encopognathus argentatus* (Lepelletier et Brullé, 1834) known from India and South China, and may be included within the same specific category. I have, however, no audacity to identify the specimen with this species, since the descriptions hitherto made are very simple and superficial. Moreover, in so far as they go, a certain degree of differences can be admitted as to the bodily punctuation at least.

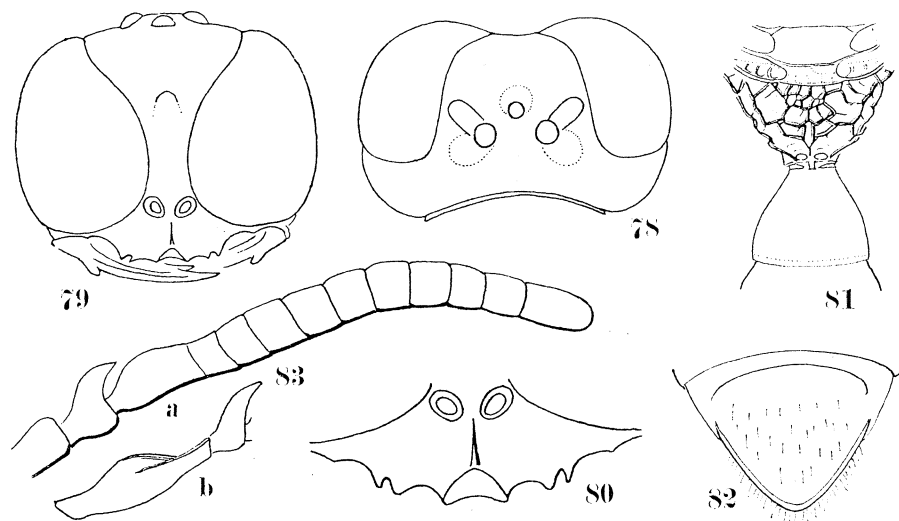
♀. Length 6.7 mm. Black, with the following portions cream yellow: Scapes of antennae

wholly, humeral angles, medial raised area of postscutellum and posterior margins of its lateral impressed areas, apex of front femora, front and mid tibiae except inside, hind tibiae externally (except apex), tarsi except apical one or two brownish segments. Mandibles at base honey yellow, turning to glossy brown or dark brown towards apex. Posterior margin of pronotum, tegulae of wings, posterior margins of abdominal tergites 1-5, membranous, semitransparent brown; apical segment wholly light ferruginous. Wing veins pale brown, anteriorly darker, costa, subcosta and stigma black or nearly. Body glossy with the following portions completely mat : Propodeum (except anterior portion of the sides), upper half of metapleurron, foveal bottoms on mesopleuron, base broadly of tergite 2. Also the densely punctured areas or hairy areas not shining.

Head seen from above : Fig. 78, OOD : POD = 7 : 9, frontal impressions just in front of oculocellar area, large, not acutely outlined, with the surface microscopically coriaceous except posterior margin. Head seen in front : Fig. 79, with all the characters of the subgenus, facets of eyes markedly larger anteriorly, clypeus on anterior margin not merely triple-incised, its structure : Fig. 80, very closely resembles that of *E. braunsii* Marcet (cf. Kohl, 1915, p. 321). Relative length of antennal joints 1-5, 11, 12: 17, 4.5, 6, 4, 3... 3.5, 6, ultimate joint gradually tapering apically. Pronotum transverse, narrow, not extending posteriorly on both sides, with anterior margin (except middle) carinate, and antero-lateral corners angulate, shortly pointed; humeral angles cornical, mesonotum with prescutal lines carinated, nearly a quarter as long as the segment, on mesopleuron precoxal carina distinct, attaining upwards nearly half of the area. On propodeum area cordata not distinctly delimited due to the general coarse carinae on the dorsal aspect (Fig. 81), posterior aspect with a deep longitudinal central excavation more than twice as long as wide and distinctly furrowed at the bottom; carinae separating the sides from the dorsal and posterior aspects distinct. Legs normal, mid and hind tibiae strongly spinose. Abdomen between tergites 1-2 and 2-3 slightly constricted (well defined in the lateral view), tergite 1 thoroughly and 2 except apical portion acutely carinated on the sides, but sternite 2 gently convex; pygidial area : Fig. 82, lateral carinae semitransparent, amber in colour. In forewing transverse cubital and recurrent veins received respectively by the radial- and cubital cell both in the middle of the lower abscissa, transverse cubital vein as long as distal abscissa of radial cell, and forming a distinct angle at about 2/3 from the lower base, distal abscissa of radial cell (transverse radial vein) also forming an angle of about 120° with the lower abscissa.

Upper front rather uniformly finely but distinctly, fairly closely punctured, with interspaces on the average larger than points, punctures on vertex slightly grosser and closer (larger than intervals), but sparser on oculocellar areas; lower front along inner orbits, small supra-antennal area and clypeus (except apical margin) covered with silvery pile. Mesonotum punctured as on vertex, but anteriorly more closely and posteriorly more sparsely so, on antero-lateral regions punctures irregular in size (generally slightly grosser), mixing transverse rugae separating the punctures in the form of rugoso-punctuation, posterior margin coarsely crenate. Scutellum longitudinally more closely irregularly rugoso-reticulate, postscutellum with a somewhat lunate carina on posterior margin of the central raised area, the carina medianly sinuate, the lateral impressed areas coarsely longitudinally striate. Mesopleuron generally coarsely but irregularly (in size) reticulate, metapleurron coarsely longitudinally striate. Sculpture on propodeum : Fig. 81, without punctures between the rugose carinae, sides of the segment impunctate and on anterior portion polished. Punctures on abdomen very fine, moderately close, on tergites 4 and 5 somewhat larger, on tergite 1 defined only on apical half. Opaque areas on sternite 2 very large, not opaque, but defined by the vague outline, pygidial area flattened, polished, scattered sparsely with about 25 medium-sized punctures.

♂. Length 5.3 mm. General structure as in ♀. But antenna deformed (Fig. 83), joint 1 expanded laterally on apical half, 2 (pedicel) apically incrassate and distal portion produced anteriorly in the horn-shape, 3 large and long, somewhat dilated and extremely narrowed at base, slightly more than as long as 2 following joints united, from joint 4 apically antenna normal, ultimate joint as long as 2 preceding joints put together; segmentation of the middle portion of



Figs. 78-83. *Encopognathus (Encopognathus) thaianus* sp. nov. 78 and 79. Head (♀). 80. Clypeus (♀). 81. Propodeum (♀), with scutellum and 1st abdominal segment 82. Pygidial area (♀). 83. Antenna; b, basal 2 joints (♂).

flagellum defined only with some difficulty. Clypeus similarly built as in ♀, but less produced anteriorly. Pronotal latero-anterior angles acuter, nearly rectangular. Legs without modification. Head above punctate-reticulate, punctures moderate in size; mesonotum, scutellum and mesopleuron strongly coarsely irregularly (both in size and form) reticulate, with fine rugae on the bottom of the reticulate punctures. Other parts of thorax-complex sculptured as in ♀. Abdomen practically impunctate. Pygidial area similar in form to ♀, with the surface slightly reflected near the apex. In forewing-venation recurrent vein received by the cubital cell slightly before middle in one of the specimens, but such may be a trifling variation.

Holotype : ♀, Thailand (Nabon), 16. VII. 1961, K. Yoshikawa leg.

Paratypes : 2 ♂♂, Thailand (Prew), 18. VI. 1961, K. Iwata leg.

3. Genus *Dasyproctus* Lepeletier et Brullé, 1834

1. *Dasyproctus buddha* (Cameron, 1889)

Rhopalum buddha Cameron, Mem. Manchester Lit. Phil. Soc. 4 (2), p. 18, 1889.

Crabro buddah : Cameron, *ibid.*, 4 (3), p. 270, 1889; — : Bingham, Faun. Brit. Ind., Hym., I, p. 323, 1897.

Crabro (Rhopalum) brooki Bingham, Jour. Linn. Soc. Lond., p. 444, 1896 (teste J. Leclercq) As to other synonyms — *Crabro taprobane* Cameron, 1898; *iridieus* Cameron, 1893; *musaeus* Cameron, 1903; *testaceipalpis* Cameron — see Leclercq, 1950 and 1956.

Dasyproctus buddha : Turner, Ann. Mag. Nat. Hist., 8 (10), p. 376, 1912; — : Leclercq, Bull. Inst. R. Sci. nat. Belg., 26 (15), p. 11, 1950; Monogr. Crabro., p. 258, 1954; Bull. Ann. Sci. R. Ent. Belg., 92, p. 147, 1956; Bull. Soc. Sci. Liège, 26 (1), p. 52, 1957; Expl. Parc Nat. Upemba, Hym. Sphec., II, Crabr., p. 40, 41 et 60, 1958; — : Tsuneki, Ins. Matsum., 22 (3-4) p. 97, 1959.

Specimen : 1 ♀, Thailand (Pakpunang), 14. VII. 1961, K. Iwata leg.

Distribution : India, Burma, Thailand, Cochinchina, Malaya, Sumatra, Java, the Island of Bali, Borneo, Celebes, the Philippines and Formosa.

Remarks. The specimen examined was adorned with a pair of yellow maculae on tegites 2, 3, 4 and 5 of the abdomen. Further, tergite 5 was narrowly yellow-banded at apex.

2. *Dasyproctus pentheri* Leclercq, 1956

Dasyproctus pentheri Leclercq, Bull. Ann. Sci. R. Ent. Belg., 92, p. 160; Bull. Soc. R. Sci. Liège, 26, p. 55, 1957; Expl. Parc Nat. Upemba, Hym., Crabr., p. 45, 1958.

Specimen : 1 ♀, Thailand (Prew), 23. VI. 1951, K. Iwata leg.

Distribution : Ceylon, Java, Thailand (the first record).

Remarks. The example above listed rather better agrees in characters with that of Java than that of Ceylon, especially in the form of the clypeus. In coloration the yellow markings are completely absent from the first abdominal segment. But it bears a yellow ring at the apex of the hind femur. Interocular carina at the anterior edge of the upper frons is triangularly, fairly deeply incised seen from above and the apical margin of the scutellum is distinctly crenulate.

4. Genus *Piyuma* Pate, 1944

1. *Piyuma prosopoides* (Turner, 1908)

Synonymic relationships. Judging from the original descriptions and especially from the papers published by J. Leclercq (1951, 54, 56 and 57) it seems better to treat the following species as conspecific, since they differ from one another only in the trifling characters of the colour or striation of certain parts of the body, and besides such characters are considered considerably varied within the same region (but the subspecific relationship among them remains still undetermined):

Piyuma prosopoides (Turner, 1908) from Australia and British New Guinea, *P. dentipleuris* (Cameron, 1908) from Borneo, *P. marklingi* (Williams, 1928) from the Philippines, *P. iwatai* (Yasumatsu, 1942) from Formosa and *P. koxinga* Pate, 1944 from Formosa, Sumatra and Malaya.

According to the nomenclatorial rule I retained from among them the Turner's specific trivial name.

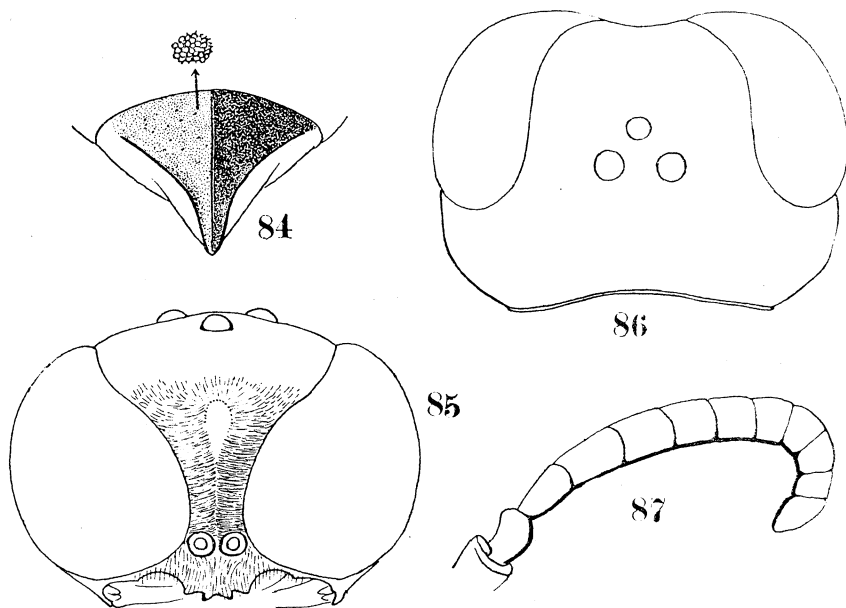
The specimen from Thailand : 1 ♀, Bangkok, 5. V. 1961, K. Iwata leg. (during the wasp was collecting gum substance for her nest partitioning material).

Remarks. The specimen slightly differs in the sculpture of the propodeum and somewhat also in colour from the descriptions of *prosopoides* Turner and from *koxinga* Pate as follows :

(1) Propodeal sculpture : Area cordata on propodeum (not distinctly margined by carinae or grooves, defined only by the difference of sculpture) nearly completely smooth and polished. At base coarsely but not strongly crenate and in middle with fine groove, from the middle of which short oblique less strong striae run towards disc, but soon disappeared. Outside the cordate area the surface finely moderately closely punctured, mixing a few feeble transverse (slightly oblique) striae, giving in certain light appearance that the place is punctate-striate. Posterior aspect below the middle of central large excavation (that is to say, below the branches of the lateral carinae) transversely distinctly striate; the sides of the segment smooth and polished on central broad area, remaining portions finely closely obliquely striate. (Metapleura also finely somewhat more strongly longitudinally striate.) In this respect the character of the specimen seems to represent an intermediate state between those of *prosopoides* Turner (s. str.) and *koxinga* Pate. (2) Coloration : Closest to that of *prosopoides* Turner (s. str.), but the legs are somewhat more broadly black : Coxae, trochanters and femora of all legs black, except the

yellow maculae from underside obliquely to apical portion of front femora and of underside broadly of mid femora; inside of tibiae of front and mid legs dark brown, apical 2/5 of hind tibiae black; tarsi brownish. Other yellow portions: Scapes of antennae wholly, pronotum wholly except posterior margin, humeral angles, anterior 2/5 of scutellum (but postscutellum black, a difference from the description of *prosopoides*). Antennae except scapes, palpi, tegulae, apex of caudal segment light brown; tibial spurs slightly brownish. (3) Structure. In so far as described well agrees with the species above given. In comparison with *koxinga* the specimen differs in the relative length of the ultimate joint of the antenna only. It is less than as long as the two preceding joints combined, but distinctly longer than the penultimate joint. Pygidial area: Fig. 84.

Remarks. According to J. Leclercq (1954, 56) specimens bearing the characters of *P. koxinga* Pate have been collected from Formosa, Sumatra and India. The fact makes it difficult to consider the present specimen as representing a geographical race. The difference shown by the example, therefore, must have little connection with the locality.



Figs. 84-87. 84. *Piyuma prosopoides* (Turner), ♀, pygidial area. 85-87. *Ectemnius* (*Thyreocerus*) *dugensis wattanapongsirii* subsp. nov. ♀. 85 and 86. Head. 87. Antenna.

I take this opportunity to refer to the fact that *Crossocerus* (*Crossocerus*?) *leclercqi* Tsuneki, known from Towada, Japan, belong to a genus other than *Crossocerus*, which is very close to *Piyuma* and seems to represent an intermediate status between this and *Crossocerus*. Details will be published in another paper.

5. Genus *Vechtia* Pate, 1944

1. *Vechtia rugosa* (Smith, 1857)

Crabro rugosa Smith. Jour. Linn. Soc. Zool., 2, p. 106, 1857.

Crabro bucephalus Smith, ibid., p. 86, 1864.

Crabro spinifrons Bingham, Faun. Brit. Ind., Hym. I, p. 327, 1897; —: Maidl, Ent. Mitt., 14, p. 390, 1925; —: Schultess, Rev. Suiss. Zool., 42, p. 293, 1935; —: Van der Vecht, Ent.

Med. Nederl. Ind., 5, p. 78, 1939.

Vechtia spinifrons: Pate, Amer. Midl. Nat., 31 (2), pp. 377-379, 1944; —: Leclercq, Bull. Ann.

Soc. Ent. Belg., 87 (1-2), p. 52, 1951; Monogr. Crabro., p. 218, 1954; Ent. Berich., 17, p. 106, 1957.

Vechtia rugosa: Leclercq, Monogr. Crabro., p. 218, 1954; Ent. Berich., p. 107, 1957.

Specimens examined: 1 ♂, Thailand (Chiengmai), 1. V. 1961, K. Iwata leg.; 2 ♂♂, ibid. (Bangkok), 6. IV. 1961, K. Yoshikawa leg.

Distribution: India (Tenasserim), Malaya, Sumatra, Java, Thailand, Cochin-China, widely distributed over South East Asia

6. Genus *Ectemnius* Dahlbom, 1845

1. *Ectemnius (Thyreocerus) dugensis wattanapongsirii* subsp. nov.

(*Ectemnius (Thyreocerus) dugensis* Leclercq, Bull. Ann. Soc. R. Ent. Belg., 94, p. 105, 1958)

There is no doubt that a female specimen studied here belongs to the group of *Ectemnius (Thyreocerus)*. But its forewing venation is so exceptional and bewildering that one cannot be led to the genus *Ectemnius* according to the key of Leclercq (1954). The recurrent nervure is received by the cubital cell at 2/3 from the base, thus the first abscissa of the cubitus comes to be twice as long as the 2nd. I at first considered the subgenus forming the first record from the Oriental Region. But the literature showed that a species of the same subgenus was already described from Java by Leclercq and besides it is very close in characters to the specimen before me. Detailed comparison with the description, however, made it clear that the specimen from Thailand is to be assigned to another subspecies, since it markedly differs from the Javanese specimen in the sculpture of the thorax-complex.

♀. Length 7.3 mm. Head seen in front: Fig. 85; from above: Fig. 86; frontal impressions narrow, long, located along the inside of eye, antenna: Fig. 87, scape distinctly bicarinate, the carinae membranous at the margin. Pronotum with a transverse carina medianly incised and laterally continued to the carina at anterior margin of humeral angles, it is further interrupted by two impressions located one on each side close to the antero-lateral corners; transverse precoxal carina on mesopleuron defined, but not long; pygidial area normal to the genus.

Upper frons finely and very closely punctured, punctures slightly sparser on oculo-cellular area and on vertex posteriorly; mesonotum finely and closely punctate-striate, striae mainly lengthwise, but on antero-lateral portions obliquely arcuate. The disc and vertex covered with close short black pile mixed with sparse long pale brown one, the former giving in certain light an appearance of close fine transverse striation, especially on medio-anterior area. Scutellum slightly more coarsely (posteriorly finely) and postscutellum finely longitudinally striate. Mesopleuron longitudinally finely closely punctate-striate, striae diminished and punctures sparse and finer below and posteriorly; metapleuron longitudinally more coarsely striate. Area cordata transverse, with postero-lateral corners broadly rounded, on the sides well marked off, but less distinctly so at the apex, at base coarsely crenate, on the disc obliquely finely very feebly indistinctly striate, posterior aspect and sides horizontally very finely closely and quite regularly striate. Abdominal tergites distinctly, fairly closely punctured with medium-sized points (intervals on an average larger than points). Sternite 2 sparsely moderately grossly punctured, following segments each with an ante-apical row of gross punctures bearing long hairs.

Black, with the following portions yellow (nearly the same as in the nominate form): Scapes of antennae, pronotum, humeral angles, axillae and antero-lateral spot of scutellum, postscutellum, a transverse macula on each side of tergites 1-4 (on 1 very small, on 3 slightly smaller) and a broad band on 5 across middle, a streak on outer margin of front and hind tibiae. Antennal joint 2 wholly and flagella beneath, tibial spurs and tarsi of all legs pale brown; flagella above,

wingtegulae, wingveins, pygidial area, apex of tibiae brown to dark brown.

Holotype: ♀, Thailand (Chantaburi), 23. VI. 1961, K. Komai leg.

7. Genus *Oxybelus* Latreille, 1796

1. *Oxybelus transiens thaiianus* subsp. nov.

(*Oxybelus transiens* Turner, Mem. Dept. Agr. Ind., Ent. Ser., 5 (4), p. 191, 1917)

Although the nominate race is known by the female example only, the differences shown by the specimens before me are considered beyond the scope of the sexual characters. I therefore dealt them as representing a geographical race respectively. Of the European species this race is most closely allied to *O. 14-notatus* Jurine, but is slightly larger, more robustly built, without the brassy lustre on the head and mesonotum, and with quite different structure of the mucro. The differences from the nominate race other than sexual characters are as follows:

(1) Mucro much longer and longer than wide at apex.

(2) Scutellum not almost smooth, but wholly punctate-reticulate.

(3) Coloration is considerably different, especially as to the ferruginous areas (e.g. mandibles, clypeus, antennae, femora etc.); scutellum, coxae, trochanters not yellow.

♂. Length 5.7 mm. (Paratype 4.0 mm.) Black, mandibles except apex, antennal joints 1 and 2 wholly, pronotum, humeral angles, wing tegulae* largely, posterior margin of lateral areas of scutellum, squamae (semitransparent), a transverse macula on each side of tergites 1-5, front and mid femora beneath extending to apex, tibiae except inner streak and tarsi of all legs (pulvillus black), yellow. Apical margin of clypeus, apical portion of antennae, sometimes posterior margin of lateral areas of postscutellum and apex of coxae ferruginous. Mucro apically lamellate, slightly amber yellow.

Head above OOD : POD = 1 : 3, head seen in front with frons comparatively narrow, ratio of width in middle (minimum width) and length between anterior ocellus — base of antennae 17:30 (eye width 16). Anterior margin of clypeus with duplicate structure, outer margin tridentate, inner margin pentadentate, interval grooved, ferruginous and polished (Fig. 88, seen obliquely from beneath), median keel in the lateral view with anterior margin straight; ultimate joint of antenna with apex obliquely truncate (constant?); scutellum margined by carinae, lateral carinae membranous, transparent, disc also medianly carinate, postscutellum medianly with high carina, its top semitransparent; squamae and mucro: Fig. 89. Mucro extraordinarily broad, with its width at base half the length of scutellum and divergent towards apex, extreme apex slightly roundly convergent and apical margin deeply roundly incised. Abdominal tergite 1 feebly roundly impressed on dorsal aspect as in *14-notatus*; latero-posterior spines on tergites 2-6 not long, semitransparent, those on 2 less erected, tergite 6 with another pair of short teeth on inner apical margin.

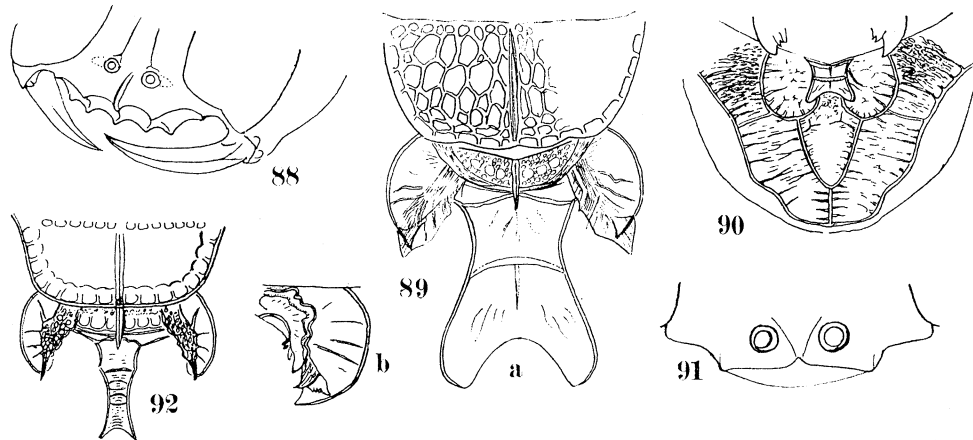
Vertex, upper frons, mesonotum, scutellum finely reticulate, partly somewhat rugose, the reticulation progressively larger posteriorly and on scutellum rather coarse; lower frons finely closely punctured, punctures anteriorly sparser, on the area above antennal sockets completely lacking, on temples also sparser and weaker below. Mesopleuron moderately grossly rugoso-reticulate. Mucro finely irregularly feebly rugulose in middle, other portions smooth (in the holotype a strong transverse carina across middle, in the paratype the carina lacking). Sculpture on propodeum seen from behind: Fig. 90, a distinct glittering area behind each squama. Punctures on tergite 1 as large as those on vertex, close, subreticulate, on tergites 2-4 sparser

* Tegula itself pale amber yellow, with a yellow spot on anterior portion, extreme base of wing which is usually hidden under the tegula is ferruginous yellow.

(intervals larger than points) and more minute on basal and apical portions, on tergite 5 slightly finer closer and weaker, tergite 6 transversely rugoso-reticulate, 7 (pygidial area) at base rugoso-punctate, at apex impunctate. Sternites finely and somewhat sparsely punctured, apical region of each segment impunctate and polished; no fringe of particular hairs on any sternite.

Holotype: ♂, Thailand (Chiengmai), 2. V. 1961, K. Yoshikawa leg.

Paratype: 1 ♂, captured with the holotype.



Figs. 88-92. 88. *Oxybelus transiens thaianus* subsp. nov. ♂, clypeus seen obliquely from beneath. 89 a. Ibid., Squamae and mucro; b. squama seen obliquely from behind. 90. Propodeum. from behind. 91. *Oxybelus nigriventris* sp. nov., ♀, clypeus. 92. Ibid., squamae and mucro.

2. *Oxybelus pictiscutis* Cameron, 1908

Oxybelus aurifrons Cameron (nec Smith, 1856), Jour. Bombay Nat. Hist. Soc., 14, p. 287, 1902 (♂, though designated as ♀ by the author).

Oxybelus pictiscentis Cameron, ibid., 18, p. 302, 1908; —: Aiyar, ibid., 24, p. 559, 1917.

Oxybelus pictiscutis: Turner, Mem. Dept. Agr. Ind. Ent. Ser., 5, p. 190, 1917.

Oxybelus (Oxybelus) pictiscentis: Pate, Phil. Jour. Sci., 64, p. 392, 1937.

Specimens examined: 2 ♂♂, Thailand (Muangfang), 16. III. 1961, K. Iwata leg.

Remarks: This species is easily distinguishable from other known Oriental species by its golden pubescence on the frons and by the yellow mucro.

The specific trivial name in the original paper 'pictiscentis' is obviously a misprint of *pictiscutis* and was already emended by R. E. Turner (1917). According to the Nomenclatorial Rule I followed Turner's emendation. Turner in the same paper suggested that *aurifrons* Cam. was the male of this species and referred to its homonymic relationship and Pate (1937) adopted his opinion.

In the specimens examined here the scutellum carries two large yellow maculae, but the postscutellum is immaculated.

3. *Oxybelus nigriventris* sp. nov.

This species seems very close to *O. nigrifulus* Turner (1917) known from Assam, but differs from it in the structure of the clypeus and in the colour of the mandibles, pronotum, squamae, etc. Both the species are, as pointed out by Turner in connection with his *nigrifulus*, very close congeners of the European species, *O. nigripes* Oliv. However, they can easily be distinguished by the form of the propodeal mucro.

♀. Length 4.0 mm. Black with a brassy lustre on head, thorax and abdomen. Mandibles

except apical fourth (glossy brown), humeral angles, bases of wings and sometimes a minute spot on each side of tergite 1 yellow. Labrum, articulation of antennal joints 1 and 2, apical half of flagellum (darkened towards base), apical portion of caudal segment, tibiae in front and tarsi of front legs, all tibial spurs, mid and hind tarsi distally ferruginous. Antennal flagella above, front tibiae externally and mid and hind tarsi basally dark brown. Tegulae of wings semitransparent brownish. (Pronotum, squamae, posterior margin of lateral areas of scutellum and post-scutellum, abdomen black)

Head above with ocellar region slightly raised and postocellus inclined outwards, OOD : POD = 1 : 3, ocellular area with punctures sparser and without brassy lustre, head seen in front with inner orbits divergent, gently upwards and strongly downwards, ratio of ocular distance at vertex, middle face (minimum width) and anterior base of mandibles 23, 22 and 29; frons above base of antennae impressed for receiving scapes, smooth and shining except middle, interantennal distance : antenno-ocular distance = 5:6, clypeus medianly from interantennal area downwards to the end of the punctured area distinctly raised, nose-like, in the lateral view the upper ridge nearly straight and suddenly inclined anteriorly; the anterior margin broadly, slightly roundly produced, with marginal area inclined and impunctate, the sides of this area at the juncture with the punctate area dentate (Fig. 91). Antennae normal. Humeral angles seen from above with apex acutely pointed. Scutellum with marginal and median carinae, the latter extending to post-scutellum. Squamae and mucro : Fig. 92. Basal impression of tergite 1 not reaching the dorsal aspect of the segment; pygidial area comparatively broad triangular, with apex narrowly rounded. Legs and wing venation without particular characters.

Ocellar region moderately closely finely punctured, post-ocellar area densely transversely rugosely punctured, punctures on frons sparse (intervals on an average larger than points), anteriorly finer, weaker and sparser; on mesonotum punctures slightly larger than on head, intervals as large as points, but anteriorly closer, posterior margin coarsely crenate, scutellum punctured as on mesonotum, with marginal regions furrowed and coarsely crenate; propodeum behind squamae largely foveolate, the fovea with few transverse carinulae and the surface partly weakly rugulose; transverse striae on the lateral portions of the dorsal aspect strong, on posterior aspect weak, finer, somewhat rugulose; the sides of the segment longitudinally (anteriorly obliquely) striate, the striae posteriorly split into finer weaker and closer branches. Punctures on abdominal tergites minute and very close, on tergite 1 anteriorly sparser and much finer, tergite 5 with gross hair-bearing punctures on ante-apical margin, pygidial area longitudinally grossly rugoso-punctate and covered with short stiff brownish hairs. Sternites smooth and polished, with sparse fine punctures scattered. Frons, clypeus, temples, sides of thorax covered with silvery hairs, hairs on vertex, mesonotum and scutellum pale brownish.

Holotype : ♀, Thailand (Muangfang), 16. III. 1961, K. Iwata leg.

Paratype : 1 ♀, the same place, the same date, K. Yoshikawa leg.

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