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## The Fauna of British India, Including Ceylon and Burma. Hymenoptera-Vol. 1. Wasps and Bees.

C. T. Bingham

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G. E. Bohart

THE FAUNA OF BRITISH INDIA,

INCLUDING

CEYLON AND BURMA.

PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF  
STATE FOR INDIA IN COUNCIL.

EDITED BY W. T. BLANFORD.

**HYMENOPTERA.—Vol. I.**  
WASPS AND BEES.

BY  
LIEUT.-COLONEL C. T. BINGHAM.

Milneson's Insect  
312051  
National Museum

LONDON  
TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

CALCUTTA: THACKER, SPINK, & CO.      BOMBAY: THACKER & CO., LIMITED

BERLIN:  
E. FRIEDLÄNDER & SOHN, 11 CARLSTRASSE  
1897.

Manuscript 1897  
331-407  
R. L. Inger

9

Hymenoptera-Vespidae-Eumeninae

Property of G. E. BOHART

Wings hyaline at base, remainder fuscous; the nervures, stigma, and tegule black.

"Hab. India." No measurements are given. I have failed to identify this species.

592. *Crabro nana*, *Can. Men. Manch. L. Pk. Soc.* (4) iii, 1890, pp. 270 & 274.

♀. Head and thorax minutely but sparsely punctured, shining; clypeus and the sinus of the eyes densely pilose; the front above the base of the antennæ enclosed by two lateral slightly divergent and one transverse furrow midway between the anterior ocellus and the base of the antennæ; a minute depression between the posterior ocelli; mesonotum anteriorly with two medial parallel, longitudinally impressed, short lines, and a deep circular small fovea on each side of them; median segment with a well-marked enclosed triangular space, the apex of the triangle reaching to the apex of the segment; the enclosure rugose, coarsely above and finely at the apex; abdomen smooth, shining, slightly pruinose. Black, the pile on the clypeus and face silvery; the scape of the antennæ in front, the posterior margin of the pronotum, the tubercles, and the apex of the femora, the tibiae and tarsi of the legs bright yellow; wings hyaline, nervures testaceous.

"Hab. Barrackpore, Bengal. ♀. Length  $3\frac{1}{2}$ ; exp. about 6 mm. ♂ unknown. Type in coll. Rothney.

593. *Crabro nitidus*.

*Oxybelus nitidus*, *Can. Men. Manch. L. Pk. Soc.* (4) iii, 1890, pp. 270 & 281.

♀. Head, thorax, and abdomen smooth and shining; clypeus broadly convex; the front excavate, glabrous, a shallow depression from the posterior ocelli to the eyes on each side; eyes hairy; median segment with a few short stout longitudinal carinae at base enclosed by two convergent carinae, which are continued as a single carina to the apex of the segment; mesopleural furrow crenulate; metapleuræ excavate at base. Black, the clypeus and cheeks covered with dense silvery pile; the thorax and the pygidial area on the apical segment with a thin soft pale pubescence; the mandibles at base, clypeus, scape of the antennæ, a line on the pronotum, the tubercles, tegule, a spot at each lateral angle of the scutellum, a line on the postscutellum, and a lateral spot on the 1st, 2nd, 4th, and 5th abdominal segments yellow, the spots on the 2nd and 4th segments large; legs variegated with yellow; wings hyaline.

"Hab. Barrackpore, Bengal. ♀. Length 7; exp. 12 mm. ♂ unknown. Type in coll. Rothney.

### TRIBE "DIPLOPTERA.

#### Family EUMENIDÆ.

Tongue elongate, projecting beyond the mandibles or folded back against the sternum, the median part bifid at apex and with a lateral lamina surmounted by a cornuous point at top of each of the divisions; head variable, wider or narrower than the thorax; antennæ geniculate or arched, stout or filiform, 12-jointed in the ♀, 13-jointed in the ♂; eyes reniform, the inner orbits having a sinus or emargination; thorax broad, more or less square in front, the posterior lateral angles of the pronotum reaching the base of the wings; legs generally slender and feebly armed, the intermediate tibiae with one spine at apex, the claws dentate. Wings when at rest with a longitudinal fold; fore wing with one elongate radial cell, and, owing to the extension of the cubital nervule to the margin of the wing, four cubital cells, the 2nd cubital cell receiving both, or the 2nd and 3rd cells each receiving one, of the recurrent nervures, the 1st discoidal cell considerably longer than the 1st submedian cell. Abdomen very variable.

#### Key to the Genera.

- A. First abdominal segment long and narrowed into a petiole.
- a. Petiole broad and flattened in the middle, narrow at base and apex; labial palpi 3-jointed, maxillary palpi 6-jointed. ZETHUS, p. 332.
  - b. Petiole not narrowed at apex; labial palpi 4-jointed, maxillary palpi 6-jointed. EUMENES, p. 333.
  - a. Mandibles long, pointed, with out distinct teeth; antennæ inserted high up in the middle of the face. LAUCUS, p. 348.
  - b. Mandibles short, truncate, dentate at apex; antennæ inserted very low down on the face. MONTEUCUMA, p. 349.
- B. First abdominal segment not narrowed into a long petiole, either pseudo-ovoid or only slightly narrowed.
- a. Second cubital cell not petiolate.
    - a'. Labial palpi 4-jointed, not plumed.
    - a''. Apical 3 points of maxillary palpi very small; united, equal in length to the 2nd joint. RHYSCHUM, p. 351.

\* The 2nd and following abdominal segments in the *Diploptera* are strongly retractile and often withdrawn after death within the 2nd segment; therefore, to ensure greater accuracy, all measurements of length are from the front of the head to the posterior margin of the 2nd abdominal segment.

- ♂. Apical 3 joints of maxillary palpi  
very small; united, distinctly  
longer than the 3rd joint ..... OXYBERUS, p. 360.  
♀. Labial palpi 5-jointed, plumose ..... PTEROSCHIZUS, p. 373.  
A. Second cubital cell petiolate ..... ALANTOR, p. 374.

### Genus ZETHUS.

- Wasps*, pt., *Fabr. Ent. Syst. Suppl.*, p. 283 (1798).  
*Zethus*, *Fabr. Syst. Vic.*, p. 282 (1804).  
*Eumenes*, pt., *Latr. Hist. Nat.* xiii, p. 344 (1805).  
*Epipona*, pt., *Spin. Gay, Chile*, vi, p. 248 (1851).  
*Calligaster*, *Sauss. Mon. Grsep. 2d*, p. 22 (1852).

Type, *Z. czerulopensis*, Fabr.

*Range*. Neotropical and Oriental regions.

Head somewhat wider than the thorax, emarginate posteriorly; mandibles oblique at the apex, with large terminal teeth, short;

scarcely forming a beak, the apices slightly crossing one over the other; antennae inserted about the middle of the face, massive, the middle joints of the flagellum the thickest; clypeus broader than high; ocelli placed in a triangle somewhat anteriorly on the vertex. Thorax

oval, pronotum anteriorly truncate; the median segment posteriorly steeply sloped; legs slight, short. Wings rather long and narrow;

radial cell of fore wing short, not reaching beyond the apex of the 3rd cubital cell, shortly appendiculate; 1st cubital cell equal to the 2nd and 3rd united on the cubital nerve, 2nd cubital cell at top about one-fourth of its length measured on the cubital nerve, 3rd broader at top than it is on the cubital nerve.

Abdomen: the 1st segment produced into a petiole, which is attenuate at base and apex, broad and vertically flattened in the middle; base of 2nd segment shortly petiolate; remaining segments forming with the 2nd a broad oval, rarely withdrawn inside it.

I have always found the species of this genus solitary, but have never come across the nest. Forbes ('A Naturalist's Wanderings in the Eastern Archipelago,' p. 72) states that the Javan species, *Z. cyanopterus*, makes a large communal nest like the social wasps.

#### Key to the Species.

- a. Legs bright ferruginous ..... *Z. ceylonicus*, p. 331.  
b. Legs black ..... *Z. dolosus*, p. 333.



Fig. 91.—*Zethus dolosus*, ♀. 1.

594. *Zethus ceylonicus*, Sauss. *Nouva Reise, Hym.* p. 5.

♀. Head, thorax, and abdomen closely and somewhat coarsely punctured and pubescent, the pubescence short, not very dense, rather sparse and thin on the scape of the antennae, the thorax, and legs; mesonotum with two longitudinal divergent grooves, anteriorly slightly widening and not quite reaching the margin; median segment almost vertically under the postscutellum, with a broad shallow median groove, having a narrow impressed line down the middle, and transversely striate; abdomen—the petiole long, grooved above, the rest of the segments subglobose. Black and shining, the pubescence fuscous, a narrow line on the posterior angles of the pronotum not continued to the front, a minute spot under it, the tegulae and costal and medial nerve of the fore wing at base, and the trochanters, femora, tibiae, and tarsi of all the legs bright ferruginous; wings fusco-hyaline with a purple effulgence.

*Hab.* Barrackpore, Bengal; Ceylon. ♀. Length 17; *exp.* 28 mm.

595. *Zethus dolosus*, n. sp.

*Zethus cyanopterus*, Blösch (see *Sauss.*) *Jour. Bomb. N. H. Soc.* p. 244, ♀.

♀. Head, thorax, and abdomen shining, punctured, thinly pubescent; clypeus broad, convex, arched anteriorly, the punctures fine and shallow; front and vertex more coarsely punctured; the tegulae and sides of the median segment glabrous; mesonotum with two parallel impressed lines on the disc; scutellum medially longitudinally grooved; median segment with a medial broad sulcation, which within is finely reticulate and bears a longitudinal carina along the middle, the apex with two obtuse teeth; petiole densely punctured on the broadened portion and bearing an obscure medial longitudinal carina above; 2nd abdominal segment finely and sparsely punctured, 3rd broadly smooth and impunctate at base and narrowly along its apical margin, the middle finely and closely punctured; remaining segments with a few scattered punctures. Black; the pubescence fuscous; the flagellum of the antennae dull opaque black; wings fusco-hyaline, darker along the costal margin of the fore wing.

*Hab.* Burma (Pegu Hills); Tenasserim. ♀. Length 15-16; *exp.* 28 mm. ♂ unknown.

### Genus EUMENES.

- Wasps*, pt., *Linn. Faun. Svec.* p. 415 (1761).  
*Sphex*, pt., *Christ. Naturg. Ins.* p. 315 (1791).  
*Eumenes*, *Latr. Hist. Nat.* xiii, p. 344 (1805).

Type, *E. coarctata*, Linn.

*Range*. Both hemispheres.

Head flat; eyes large, prominent, the sinus in their inner orbits narrow; ocelli in a broad triangle on the vertex; antennae of moderate length, the scape long, the flagellum incrassate in the female, the apex in the male hooked, curved or spirally rolled, inserted in

the middle of the face; clypeus of variable shape, generally pyriform or subpyriform and longer than broad; mandibles long, flat, pointed, forming by their junction a more or less acute beak, or crossing one over the other; maxillary palpi with six, labial

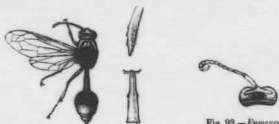


Fig. 92.—*Eumenes petiolata*, ♀. 1.

Fig. 93.—*Eumenes petiolata*, ♂. Head and antenna.

palpi with four joints. Thorax a little longer than broad, subglobose; median segment short, nearly vertical, divided medially by a broad and at apex deep groove; legs slender, the apex of posterior pair not reaching the apex of the abdomen. Wings—the radial cell of the fore wing reaching well out towards the apex of the wing, the 1st cubital cell on the cubital nerve equal to or longer than the 2nd and 3rd united; the 2nd strongly narrowed towards the top; the 2nd transverse cubital nerve oblique, wavy; the cubital nerve extended to the margin of the wing. Abdomen—the 1st segment extremely narrowed, forming a lengthened petiole; the 2nd sometimes narrowed at base; the 2nd and following segments united, pyriform.

Most if not all of the species of this genus make little rounded cells of clay for nests, provisioning these with caterpillars as food for their larvae. *Eumenes conica*, *flavipicta*, and *diversa* are very bold insects, coming into houses and constructing their nests on the walls, against the punkah, on the legs and bottom of chairs, tables, &c., and permitting close inspection of their nest-building operations without showing any alarm or irritation.

#### Key to the Species.

- A. Median segment oblique, not vertical, grooved down the middle, the groove not broadened below.
- a. Apex of median segment quadridentate.
- a'. Petiole shorter or equal to the thorax and median segment united.
- a". Colours black and yellow, petiole of abdomen sometimes ferruginous . . . . . *E. quadrigibba*, p. 330.
- b'. Colours ferruginous red and yellow . . . . . *E. leucivirata*, p. 337.
- b". Petiole distinctly longer than thorax and median segment united . . . . . *E. depressa*, p. 337.

- A. Apex of median segment simple, not dentate . . . . . *E. indiana*, p. 338.
- B. Median segment convex, vertical, with a slight groove down the middle, groove not or scarcely broadened at apex.
- a. Abdomen up to apex of 2nd segment punctured and granular in appearance.
- a'. Second abdominal segment without a lateral yellow spot.
- a". Legs black, variegated with yellow . . . . . *E. architecta*, p. 330.
- b'. Legs ferruginous . . . . . *E. humbertiana*, p. 339.
- b". Second abdominal segment with a lateral yellow spot . . . . . *E. punctata*, p. 339.
- b". Abdomen smooth, slightly shining . . . . . *E. affinis*, p. 340.
- C. Median segment convex, vertical, with a well-marked groove down the middle, widening at apex into a deep A-shaped hollow.
- a. Petiole long, gradually widening to the apex, longer, never shorter than the thorax and median segment united, medially with well-developed prominent lateral 'uberules'.
- a'. Large, robust; length over 25 mm.
- a". Second and following abdominal segments wholly black above; 2nd segment sometimes with a lateral red spot at base . . . . . *E. circumalis*, p. 340.
- b'. Second abdominal segment wholly black, following segments red . . . . . *E. austhara*, p. 341.
- c'. Second abdominal segment red or blackish at base, apical half and following segments yellow . . . . . *E. petiolata*, p. 341.
- d'. Second abdominal segment red at base, apical half and following segments black . . . . . *E. dimidiatipennis*, p. 342.
- b". Smaller, more slender; length under 25 mm.
- a". Second abdominal segment red at base, with a black transverse medial band, the apical third yellow.
- a'. Sides of the median segment posteriorly red; fore wing always with a subapical fuscous spot . . . . . *E. curvica*, p. 342.
- b'. Sides of the median segment yellow posteriorly; fore wing without a subapical fuscous spot . . . . . *E. gracilis*, p. 343.
- b". Second abdominal segment red at base with a black transverse medial band, apical margin and following segments red . . . . . *E. conica*, p. 343.
- c'. Second abdominal segment red at base with a medial black band, apical margin yellow, following segments red . . . . . *E. elegans*, p. 344.

- ♂. Second abdominal segment red at base, no black band, apical half yellow, following segments red. . . . . *E. edwardsii*, p. 344.
- ♂. Petiole very long, half as long again as the thorax and median segment united, narrow linear.
- ♂. Large, robust; length over 23 mm.
- ♂. Colour black, with abundant yellow markings.
- ♂. Disc of mesonotum with two yellow hook-like marks back to back. . . . . *E. flavipicta*, p. 345.
- ♂. Disc of mesonotum with two short lines and two transverse curved marks above them yellow. . . . . *E. arcuata*, p. 346.
- ♂. Disc of mesonotum entirely black.
- ♂. Colour entirely black; clypeus and space between antennæ in ♂ marked with yellow. . . . . *E. blanchardi*, p. 347.
- ♂. Smaller and very slender, length 12 mm.; black with a few yellow markings. . . . . *E. curvata*, p. 347.
- ♂. Median segment comparatively longer, not vertical, depressed below the level of the post-scutellum, and distinctly laterally compressed; of very small size, length 7-8 mm. . . . . *E. levis*, p. 347.
- ♂. . . . . *E. exigua*, p. 348.

506. *Eumenes quadrispinosa*. *Swain. Mon. Guép. Sol. Suppl.* p. 134, ♀, pl. vii, figs. 2, 2g; *Smith, Cat. v.* p. 23.

♀. Head and thorax lightly and very sparsely punctured, the punctures on each side of the front somewhat closer, on the thorax very shallow and scattered; abdomen densely pruinose and opaque; clypeus broadly pyriform, convex, the apex sharply incised; median segment with a broad medial longitudinal furrow, with two sharp teeth on each side of it at apex; petiole stout, broad at apex, about as long as the remaining abdominal segments, the medial tubercles small but distinct and lateral. Black, the head yellow, the mandibles, a transverse line on the vertex, and the apical ten joints of the flagellum of the antennæ black, the last fulvo-ferruginous beneath; pronotum yellow, the posterior angles black; the tubercles, a spot at the base of the mesopleura, two parallel lines on the disc of the mesonotum, the tegule except a spot on the middle, the lateral angles of the scutellum, a line on the post-scutellum, a spot above, and a large spot below on each side on the median segment, two contiguous spots on the apex of the petiole above, a band (emarginate anteriorly) on the posterior half of the 2nd abdominal segment, and the remaining segments yellow, the last black at base when exerted; legs black, variegated with yellow; the petiole of the abdomen ferruginous; wings deep flavo-hyaline,



Fig. 94.—*Eumenes quadrispinosa*, ♀.

with the extreme apex of the fore wings fuscous and the costal border darker in colour. The above is the description of the type specimen. The commoner variety has much less yellow on the head, and the broad band on the posterior half of the 2nd abdominal segment is reduced to an elongate oval spot on each side; the petiole also is black, not ferruginous.

♂ similar, slighter, the scape of the antennæ black with a streak of yellow anteriorly.

*Hab.* Mussorie, N.W. Himalayas; Sikkim; Calcutta; Central India; Madras; Burma; Tenasserim. ♀. Length 21-23; exp. 40-43 mm. ♂. Length 18-20; exp. 34-36 mm.

507. *Eumenes depressa*. *Swain. Mon. Guép. Sol. Suppl.* p. 135, ♀; *Smith, Cat. v.* p. 23.

♀. Vertex and front closely and finely punctured, thorax in front with a few scattered punctures; the post-scutellum, median segment, and abdomen smooth and impunctate, the 2nd and following segments of the last densely pruinose; clypeus slightly convex, broadly subpyriform in the female, narrower in the male, deeply emarginate anteriorly; median segment with a broad medial furrow and four blunt teeth at apex. Black; the clypeus, a vertical streak above it, the emargination of the eyes, a line on the inner orbits not reaching the vertex, the cheeks, a broad line on the pronotum, two hook-shaped marks back to back on the disc of the mesonotum, a spot on the mesopleura, the tegule, a square spot at each lateral angle of the scutellum, the sides posteriorly of the median segment, two elongate spots or streaks on the petiole above, two contiguous spots at its apex, these spots bent at right angles and continued along the sides at the apex of the petiole, a large oval spot on each side of the 2nd abdominal segment, and transverse anteriorly emarginate or foveolated bands on the apical margins of segments 2, 5, yellow; legs black variegated with yellow, a small round black spot on the yellow of the tegule, and a larger one on the yellow on each side of the median segment; wings fuscous-hyaline with a fulvous tinge, slightly purplish along the costal margin of fore wing; the wings in the male paler than in the female.

*Hab.* India (Nessau and Smith); Tenasserim. ♀. Length 20; exp. 40 mm. ♂. Length 16; exp. 30 mm.

508. *Eumenes brevisstrata*. *Swain. Mon. Guép. Sol. Suppl.* p. 136, pl. vii, fig. 1, 5; *Smith, Cat. v.* p. 23.

♀. Head, thorax, and abdomen nearly smooth, the few punctures on them widely scattered; clypeus oval, raised flat above the anterior margin, with two projecting teeth; front between the antennæ subtuberculate, with an elongate narrow depression above; median segment quadridentate at apex, medially furrowed; post-scutellum subangular posteriorly; petiole not particularly long, broad at apex. Red; the clypeus, an irregular mark on the front,

extending to the sinus of the eyes and emitting a streak along the orbits towards the vertex, the cheeks and back of the head, the pronotum anteriorly, two parallel longitudinal lines on the disc of the mesonotum, a spot at the lateral angles of the scutellum, and the posterior half of the 2nd and following abdominal segments, yellow; legs variegated with yellow; wings flavo-hyaline, dull not iridescent.

♂ similar, smaller and sligher; the apex of the median segment sometimes yellow.

*Hab.* Sikhim; Calcutta; Madras. ♀. Length 18-20; exp. 42 mm. ♂. Length 17; exp. 40 mm.

599. *Eumenes indiana*. *Savus. Mon. Guip. Sol. Suppl. p. 130, ♀, pl. vii, fig. 3; Smith, Cat. v, p. 28.*

♀. Head, thorax, and abdomen sparsely punctured, shining; clypeus large, nearly hexagonal, slightly convex, its anterior margin incised; thorax depressed; median segment with a medial longitudinal furrow posteriorly, the sides obliquely truncate, smooth; petiole of abdomen with an obscure tubercle on each side of the middle underneath. Test-black; a spot on the front, another above the base of the mandibles, the scape of the antennæ anteriorly, and the base of the mandibles, the posterior margins of the basal two abdominal segments yellow, the band on the basal segment or petiole interrupted in the middle, that on the 2nd interrupted on each side above; apex of the mandibles, the tegulae, and knees fulvous red; wings fusco-hyaline, suffused with violet.

♂ similar, smaller; the clypeus, a spot above it, a line in the emargination of the eyes, a line behind the eyes at top, the posterior margin of the pronotum, a spot on the tegulae posteriorly, another margin on each lateral angle of the postscutellum, and a third on either side at the extreme apex of the median segment, yellow; the side at the extreme apex of the posterior margins of the basal two segments complete; legs variegated with yellow.

*Hab.* India or Africa? (Savus); Tenasserim. ♀. Length 14.5; exp. 28 mm. ♂. Length 12; exp. 24 mm.

600. *Eumenes humbertiana*. *Savus. Noctua-Reise, Hym. p. 6, ♀, ♂.*

♀. Vertex of the head, the thorax, petiole and 2nd segment of the abdomen somewhat strongly and closely punctured; the clypeus and the 3rd and following abdominal segments smooth, the clypeus and the 3rd and following abdominal segments smooth, the clypeus and the 3rd and following abdominal segments with its apex ending in two blunt teeth; the mandibles long and slender; the thorax globose, nearly as wide as long; the petiole of the abdomen long, slender at base, widened, with the sides nearly parallel from beyond the middle. Black; the extreme apex of the clypeus, the apical half of the mandibles, the tegulae, and the femora, tibiae, and tarsi of the legs ferruginous; the apex of the posterior tibiae and the tarsi fuscous; a narrow twice-interrupted line on the margin of the postscutellum, a spot under each wing, two contiguous spots on the pronotum, a spot on each side of the median segment at base, sometimes another

on each side of the apex, and the margin of the petiole posteriorly yellow; wings dark fuscous with a purple effluence.

♂ similar; the clypeus emarginate at apex, not bidentate.

*Hab.* Pundaloya (Greece), Ceylon. ♀. Length 15; exp. 28 mm. ♂ slightly smaller.

601. *Eumenes architectus*. *Smith, Jour. Linn. Soc. iii (1859), p. 29, ♀, ♂.*

♀♂. Head, thorax, and abdomen finely and densely punctured, obscurely pubescent; sides convex, broader below than above, the apex deeply, the clypeus slightly emarginate; the median segment rounded posteriorly and bulging; petiole of abdomen long, subcylindrical, longer than the head and thorax united, the 2nd segment large and very broad. Black; clypeus in the male yellow, in the female black; a clavate spot between the antennæ, an obscure very short line behind the eyes at top, a narrow line on the pronotum, another, medially interrupted, on the postscutellum, a spot on each side behind the tegulae, and a narrow line on the apical margins of the petiole and of the 2nd segment of the abdomen, yellow; legs black variegated with yellow; wings fusco-hyaline with a coppery effluence.

*Var.* The yellow markings entirely wanting.

*Hab.* Tenasserim; Celebes. ♀♂. Length 11-12; exp. 23 mm.

The type from Celebes has more yellow about it, but many of the co-types from Celebes are like the Indian form described above.

602. *Eumenes punctata*. *Savus. Mon. Guip. Sol. p. 37, ♀, ♂; Smith, Cat. v, p. 24.*

♀. Head and thorax punctured, thinly pubescent, abdomen more densely punctured, granular; clypeus coffin-shaped, apex depressed and deeply incised; antennal carina short, clavate; median segment roundly truncate posteriorly, with a slight medial vertical sulcation. Black; the pubescence on the head and thorax short, soft, fuscous; two spots at the base of the clypeus, the antennal carina, the posterior margin of the pronotum broadly, the tegulae, postscutellum, the apices of the femora, the tibiae and tarsi, the posterior margins of the petiole and of succeeding four segments of the abdomen, and spot on each side of the 2nd segment, yellow; the yellow band on the petiole and on the 2nd segment deeply emarginate anteriorly; wings hyaline suffused with brown.

♂ similar, only the petiole of the abdomen granular, 2nd and



FIG. 95.  
*Eumenes punctata*, ♀. 1.

succeeding segments punctured, shining; clypeus entirely yellow; the yellow band on the pronotum narrow.

*Hab.* Kumaon; Sikkim; Burma; Tenasserim. ♀. *Length* 13; *exp.* 20 mm. ♂. *Length* 11; *exp.* 20 mm.

603. *Eumenes affinisima*, *Sauss. Mon. Guép. Sol.* p. 37, ♂; *Smith, Cat. v.* p. 21.

*Eumenes mangrovinia*, *Smith, Trans. Zool. Soc.* vii, p. 180, ♂, pl. xx, figs. 3, 3a.

♀. Head, thorax, and petiole of abdomen coarsely punctured, rugulose; clypeus coffin-shaped, the apex deeply incised, the antennal carina short; the front with an indistinct furrow below the anterior ocellus; median segment roundly truncate posteriorly, deeply furrowed down the middle. Black; the clypeus, the posterior margin of the pronotum, the tegule, the postscutellum, the apices of the femora, the tibiae and tarsi of the legs, a transverse band on the posterior margins of abdominal segments 1-5 in female, 1-6 in male, and a spot on each side of the 2nd segment, yellow; wings hyaline, lightly fuscous along the costal margin of the fore wing.

*Var.* A line on the cheeks behind the eyes at the top, two spots on each side of the median segment, and a spot on each side of the petiole in the middle yellow.

*Hab.* Mainpuri, N.W.P. (Horse); Tenasserim. ♀. *Length* 10-11; *exp.* 20-22 mm. ♂. *Length* 10; *exp.* 19 mm. I have followed Saussure in separating this species from the European *E. ponsiformis*, but the two are very closely allied, if not identical.

604. *Eumenes circinalis*, *Fabr. Syst. Pflz.* p. 290; *Sauss. Mon. Guép. Sol.* p. 47, pl. x, fig. 7, ♀; *Smith, Cat. v.* p. 22.

♀. Head and thorax closely punctured, abdomen smooth, the petiole shining; clypeus long, pyriform, lightly emarginate at apex; antennal carina well-marked, branching into a narrow fork above the base of the antennae; median segment furrowed down the middle, the furrow broad at apex; petiole not particularly long, the medial lateral tubercles well developed, almost spinose. Black; the clypeus, the inner orbits, the antennae, the pronotum except its posterior angles, two oval spots on the mesonotum anteriorly, a spot on the mesopleura at base, the sides of the median segment, a V-shaped mark on the petiole, the sides of the petiole at apex, and the apical four ventral segments, red; legs red variegated with black; wings deep flavo- or fulvo-hyaline, darkening towards the base.

♂ similar, clypeus yellow.

*Var.* The petiole, except for a subapical band, and a spot on each side of the base of the 2nd segment red.

*Hab.* India (*Saussure* and *Smith*); Burma; Tenasserim. ♀. *Length* 25; *exp.* 50 mm. ♂. *Length* 23; *exp.* 45 mm.

605. *Eumenes zanthura*, *Sauss. Mon. Guép. Sol.* p. 46, ♀; *Smith, Cat. v.* p. 21.

♀. Head and thorax pubescent, abdomen densely pruinose; the clypeus convex, subovate, the sides anteriorly roundly emarginate, the apex in the middle truncate; median segment with a medial vertically-impressed line ending in a deep triangular hollow; petiole of abdomen suddenly widened from the middle to the apex, the medial tubercles beneath large and well-developed. Black, the pubescence fuscous; two broad lines on the clypeus, an abbreviated line along the inner orbits below the emargination of the eyes, the scape, and basal three or four joints of the flagellum of the antennae above, a spot between their bases, a line behind the eyes, a large patch on each side of the pronotum, the femora, tibiae, and tarsi of the legs, the petiole of the abdomen, except a narrow subapical band above, and the apical four segments red; wings fulvous, hyaline.

♂ similar; the clypeus is shorter and narrower, the sides and apex as well being deeply emarginate; the clypeus is also wholly red, the line on the inner orbits yellow; the petiole of the abdomen is more shaded with black, and the basal three ventral segments have their apical margins narrowly red.

*Hab.* India (*Saussure* and *Smith*). ♀. *Length* 25-27; *exp.* 45 mm. ♂. *Length* 23; *exp.* 45 mm. I have seen no Indian specimen of this species; those in the British Museum are labelled "New Caledonia."

606. *Eumenes petiolata*.

*Vespa petiolata*, *Fabr. Sp. Luc.* i, p. 467; *Ent. Syst.* ii, p. 278.

*Eumenes petiolata*, *Fabr. Syst. Pflz.* p. 284; *Sauss. Mon. Guép. Sol.* p. 47, ♀; *Smith, Cat. v.* p. 23.

♀. Head and thorax with close shallow punctures, petiole smooth, the rest of the abdomen with the surface finely longitudinally aciculate; clypeus pyriform, its apex truncate; pronotum anteriorly transverse; median segment with a medial longitudinal furrow; petiole broadening towards the apex, slightly flattened. Head yellow, a broad black band between the apex, slightly flattened, antennae reddish brown; pronotum and mesonotum anteriorly yellow, the latter posteriorly black; scutellum and postscutellum reddish brown; sides of the thorax and legs black variegated with reddish brown; median segment reddish brown, with a narrow medial vertical black line; the sutures between the scutellum, postscutellum, and median segment black; petiole and basal third of the 2nd abdominal segment reddish brown, the former black at base and with a subapical black band, the middle of the latter black, its posterior third and the remaining abdominal segments yellow; wings deep flavo- or fuscio-hyaline.

♂ similar, but slighter and generally darker; the 5th and 6th abdominal segments at base and the whole of the anal segment black.

A variety, which is most common, has the posterior portion of



the mesonotum and the flanks and legs reddish brown, with some black markings.

*Hab.* Throughout India, not ascending the hills above 2000 feet; Burma; Tenasserim; Ceylon; China; the Malayan subregion. ♀. Length 25-27; *exp.* 24-28 mm. ♂. Length 23-25; *exp.* 45-49 mm.

607. *Eumenes dimidiatipennis*, *Sinns. Mon. Grupp. Sud. p.* 51, ♀ ♂; *Smith, Cat. v.*, p. 25.

♀. Head, thorax, and abdomen smooth and shining; clypeus oval, convex, anterior margin transverse; antennal carina large, very short, with a very short fork above the base of the antennæ; scutellum with a short medial longitudinal carina at base, and the median segment with a medial longitudinal furrow, indistinct at base, widening and deepening into a triangular hollow at apex. Obscure dull red, the vertex, the apex of the antennæ, a mark on each side, and another at the apex of the mesonotum, the base of the petiole, and the apical half of the 2nd and the whole of the following abdominal segments black; wings ferruginous, with nearly the apical half of the fore wing fuscous, having a purple effulgence.

♂ similar, but smaller and sligher; the head black, the orbits of the eyes red; mesonotum black, a black spot on the mesopleura.

*Var.* ♀. Entirely red, with no black markings.  
*Hab.* Bombay; Malabar; Karachi; Ahmadabad, Punjab; extending into Arabia and Africa. ♀. Length 24-27; *exp.* 52 mm. ♂. Length 22-25; *exp.* 48-50 mm.

608. *Eumenes curvica*.

*Vespa curvica*, *Fabr. Mant. Ins.* 1, p. 253.

*Eumenes curvica*, *Fabr. Syst. Pict.* p. 286; *Sinns. Mon. Grupp. Sud.* p. 50, ♀ ♂; *Smith, Cat. v.*, p. 22.

♀. Clypeus and the cheeks behind the eyes smooth; front and vertex of the head and the thorax with close fine but shallow punctures; abdomen smooth, slightly shining; mandibles long, having a tooth at apex, and more or less toothed on the inner side; anterior clypeus strongly convex, but flattened in the centre, its anterior margin transversely truncate at the apex, oblique at the sides, the front between the antennæ raised and prominent, with a broad short furrow at the base of the prominence; mesonotum anteriorly with a medial longitudinal line carina, interrupted at the apex, but continued over the scutellum; median segment with a medial furrow broadening and deepening rapidly at apex; petiole as long as the head and thorax united, broadening at apex, beneath with two small tubercles in the middle and small depressions and



Fig. 96.—*Eumenes dimidiatipennis*, ♀. 1.

grooves at apex. Head yellow; a broad band between the tops of the eyes across the vertex black; antennæ light reddish; pronotum, pro- and mesopleura, and postscutellum yellow, mesonotum for the most part black; scutellum, median segment, and legs light reddish; the anterior tibiae and tarsi yellow; petiole of abdomen and base of the 2nd abdominal segment light reddish, the petiole and 2nd segment with a subapical band black, followed by a band of yellow, the yellow on the latter occupying the apical half of the segment, remaining segments yellow, with their bases (when drawn out) black; wings flavo-lyaline, with their apical margins broadly light fuscous, and a narrow subapical spot on the fore wing dark fuscous, nervures and tegulae yellow.

♂ similar, but more slender; anal segment, two spots on the 2nd ventral segment, and the posterior legs black.

*Var.* The head, except the black transverse band on the vertex, and the mesonotum light reddish.

*Hab.* Throughout India generally; Burma and Tenasserim. ♀. Length 18-20; *exp.* 34-37 mm. ♂. Length 16-18; *exp.* 28-32 mm.

609. *Eumenes gracilis*, *Sinns. Mon. Grupp. Sud.* p. 57, ♀ ♂.

*Eumenes curvica*, *Smith (see Fabr.)*, *Cat. v.*, p. 22, ♀.

♀. Closely allied to and resembling *E. curvica*, *Fabr.*, but constantly more slightly built, with comparatively a broader clypeus, a longer petiole, and darker wings. In colour it differs considerably, and is very constant to type.

I have seen no specimens that could be said to form links between the two species. Black; the clypeus and front up to the sinus of the eyes, a line on the cheeks, the pronotum, a large spot on the mesopleura, the postscutellum, the sides of the median segment posteriorly, a narrow subapical band on the petiole, and the posterior margins of the 2nd and following abdominal segments broadly yellow; the scutellum and the remaining parts of the petiole and 2nd segment red, the scutellum sometimes yellow; a band on the petiole and on the middle of the 2nd segment, with the bases of the remaining segments, black; antennæ and legs reddish, each of the former with a spot of black at its apex.

♂ similar but sligher; anal segment black.

*Hab.* Egypt; Senegal (*Sinns.*); Sikim; Burma; Tenasserim. ♀. Length 17-19; *exp.* 32-36 mm. ♂. Length 16-18; *exp.* 28-30 mm.

610. *Eumenes conica*. (Pl. II, fig. 9.)

*Vespa conica*, *Fabr. Mant. Ins.* 1, p. 253; *Edw. Syst.* ii, p. 278.

*Eumenes conica*, *Fabr. Syst. Pict.* p. 285; *Sinns. Mon. Grupp. Sud.* p. 52, ♀ ♂; *Smith, Cat. v.*, p. 22.

♀. Head, above the antennæ, and thorax closely and lightly



Fig. 97.—*Eumenes gracilis*, ♀. 1.

punctured; abdomen smooth and shining, with the surface minutely aciculate; clypeus pyriform, its apex truncate, the space between the antennæ raised and parting into two divergent striæ towards the ocelli; pronotum transverse anteriorly; median segment with a medial vertically-impressed line, widening at the apex of the segment into a deep hollow; petiole subcylindrical, considerably thickened towards the apex; 2nd segment of the abdomen constricted at base, and having a wide, somewhat deep channel on its ventral side. Head yellow, the mandibles and antennæ reddish, a broad transverse band across the apex between the tops of the eyes black; thorax and abdomen dark red, the legs paler (sometimes yellowish); a medial longitudinal line on the mesonotum anteriorly, a transverse narrow line at its apex, the base of the 2nd abdominal segment, and a short transverse medially interrupted band on its middle above, black; wing dark fuscous or fuscous-hyaline, with a slight purplish effulgence.

♂ similar, but smaller and slighter; the apex of the clypeus emarginate; the scape of the antennæ in front yellow; the cheeks black, with a narrow yellow line next the outer orbits; the base in the middle above of abdominal segments 3-5 and the anal segment black.

*Hab.* Throughout the plains of India, Burma, and Ceylon, extending to China and the Malayan region. ♀. Length 25-25; exp. 40-44 mm. ♂. Length 18-20; exp. 38-40 mm.

*E. saundersii*, Nietn., from the brist. notice given of it in the Trans. Ent. Soc. 1834, pp. 60-62, I take to be the above species.

611. *Eumenes elegans*, *Suss. Mon. Guép. Sol.* p. 58, ♀; *Smith, Cat.* v, p. 25.

♀. Head and thorax thinly pubescent; clypeus shining, anteriorly emarginate. Ferruginous: a band between the eyes on the vertex, the mesonotum, the base of the petiole, and a broad band on the 2nd abdominal segment black; the posterior angles of the petiole and a band on the apical margin of the 2nd abdominal segment yellow; legs ferruginous; wings hyaline, ferruginous at their base, brownish fuscous with violet effulgence on their apical two-thirds.

*Hab.* Djidda, Arabia: India (*Saunders*). ♀. Length 20; exp. 38 mm. ♂ unknown.

I have not seen this species in any Indian collection, nor is it in either of the two collections I have examined from Aden.

612. *Eumenes edwardsii*, *Suss. Mon. Guép. Sol.* p. 60, ♀; *Smith, Cat.* v, p. 22.

♀. The vertex of the head and the mesonotum rather closely, pronotum, scutellum, and postscutellum more sparsely punctured;

median segment and abdomen smooth, the former slightly pubescent; clypeus convex, about twice



Fig. 98.

*Eumenes edwardsii*, ♀.

as long as broad, anteriorly emarginate with a small tooth on each side; vertex of head and front rather flat; petiole of abdomen almost linear, without tubercles beneath. Ferruginous red; the clypeus, mandibles, and labrum, a short line on the middle of the pronotum, a streak on each side on the middle of the petiole, two subsapical spots on the same above, and a broad band on the posterior margin of the 2nd abdominal segment yellow; the clypeus with silvery pile; the vertex of the head, the mesonotum, and the middle of the petiole above more or less black; legs with a yellow streak on the tibia; 3rd and following abdominal segments a brighter ferruginous red than the rest of the body; wings hyaline, lightly ferruginous along the costal margin of the fore wing and with a very faint fuscous spot in the radial cell of the same.

♂ similar, the sinus of the eyes yellow, the mesonotum entirely black.

*Hab.* Bombay: North-West Provinces; Burma; Tenasserim. ♀. Length 16; exp. 25 mm. ♂. Length 16; exp. 20 mm.

613. *Eumenes flavopicta*, *Blauch, Dict. Univ. Hist. Nat. Ins. Hym.* pl. II, fig. 2; *Suss. Mon. Guép. Sol.* p. 65, ♀; *Smith, Cat.* v, p. 22.

♀. Head and thorax with large shallow, rather widely placed punctures, except on the disc of the mesonotum, where they are closer and deeper, with a tendency to run into longitudinal striæ; abdomen opaque, the surface finely aciculate; clypeus subpyriform, the apex widely truncate, raised at base and sides and then suddenly flattened and depressed; petiole of abdomen long, gently broadening towards the apex, slightly vertically compressed along its length. Black, shining; the head yellow with a black somewhat oval-shaped mark on the vertex, or in a common form black with the clypeus, the front, the sinus of the eyes, and a line behind them yellow; thorax with the pronotum in front, the tegulae (except a spot in the middle, sometimes absent), a small spot before and behind each of them, two scythe-shaped marks back to back on the mesonotum, a transverse rectangular mark on the scutellum, a curved line on the postscutellum, the median segment, and the flanks yellow, the last with a broad oblique line, and the median segment with a medial vertical line broadening above, black; legs yellow and black; abdomen with two spots at the base, two lateral in the middle, and a subsapical band on the petiole,

a broad bar with irregular markings at base of 2nd segment, another broad subapical bar on its posterior margin, and broad transverse medially interrupted subapical bands on the remaining segments, yellow; beneath the abdomen is black, the 2nd ventral segment with a yellow spot on each side; wings dark flavo-hyaline, with a slightly fuscous tinge and purplish effluence.

♂ similar, but slighter, with comparatively a larger petiole.  
*Hab.* Sikkim; Bengal; Malabar; Mysore; Madras; Ceylon; Burma; and Tenasserim. ♀. Length 23-25; *exp.* 46-50 mm. ♂. Length 19-22; *exp.* 45-48 mm.

614. *Eumenes arcuata*.

*Vespa arcuata*, *Fahr. Syst. Ent.* p. 371; *id. Ent. Syst.* II, p. 370.  
*Eumenes arcuata*, *Fahr. Syst. Pz.* p. 257; *Sens. Mon. Græp. Sol.* p. 63, ♀; *Smith, Cat. v.* p. 29.

♀. Vertex of the head and the thorax with fine but shallow punctures; petiole and abdomen smooth, the surface finely aciculate; the clypeus pyriform, the apex sharply truncate; pronotum anteriorly transverse; the median segment with an impressed medial vertical line; the petiole long, narrow, only slightly broadening towards the apex; the base of the following abdominal segment constricted. Head and thorax black; the clypeus, the space between the antennæ, a line behind the eyes, the pronotum in front, two curved spots and two parallel longitudinal lines on the disc of the mesonotum, a broad outer border to the tegulae, a spot on each side on the scutellum, a broad line on the posterior margin of the post-scutellum, and a broad oblique line on the flanks under the base of each wing yellow; legs black, variegated with yellow; median segment yellow, with a broad medial mark, in the shape of a Maltese cross, black; abdomen black, two small lateral spots at the base of the petiole, and two about the middle, with a subapical band at the apex of the same above, two large pyriform spots near the base of the 2nd segment, and subapical bands on the posterior margins of the 2nd and following segments, yellow; these bands interrupted narrowly above and broadly below; the 2nd segment has also two minute lateral spots on the middle beneath; wings very light brownish or fuscio-hyaline.



FIG. 90.

*Eumenes arcuata*, ♀. 1.

♂ similar, but smaller and slighter, with the anal segment entirely black. The depth of the yellow markings varies in different individuals.  
*Hab.* Throughout India, Burma, and Ceylon, not extending up the Himalayas to any height, but spread generally through the

Indo-Malayan region as far as New Guinea. ♀. Length 24-29; *exp.* 40-52 mm. ♂. Length 19-21; *exp.* 36-38 mm.

615. *Eumenes bharhardi*, *Sens. Mon. Græp. Sol.* p. 60, ♀; *Smith, Cat. v.* p. 22.

♀. Closely allied to and resembling *E. arcuata*; differing chiefly in the head and thorax being totally devoid of the yellow markings present in that species; the clypeus is smaller, its apex angularly emarginate, not truncate, and the petiole more filiform.  
*Hab.* India, Pondichery (*Sensu* and *Smith*). ♀. Length 23-26; *exp.* 41-44 mm. ♂. Length 20-21; *exp.* 36 mm.

616. *Eumenes curvata*, *Sens. Mon. Græp. Sol. Suppl.* p. 145, ♀; *Smith, Cat. v.* p. 25.

♀. Head and thorax with fine close but shallow punctures; abdomen entirely impunctate, smooth and shining; clypeus oval, strongly convex, widely but only slightly emarginate anteriorly; front between the antennæ subtergulate, with an impressed medial line from the anterior ocellus to the apex of the convexity; median segment with a shallow impressed line from base leading to a deep triangular hollow at the apex; petiole long, filiform, with only an indication of the two tubercles in the middle below. Entirely of an intense black; wings dark fuscous, with a beautiful rich purple effluence.

♂ similar, smaller and slighter, the wings somewhat lighter in colour; in some specimens a broad line down the middle of the clypeus and a triangular spot above it are yellow.

*Hab.* Burma; Tenasserim; the Philippines. ♀. Length 24-29; *exp.* 48-52 mm. ♂. Length 20-21; *exp.* 40-45 mm.

617. *Eumenes lenis*, n. sp.

♀. Head, thorax, and petiole of abdomen finely and somewhat closely punctured; 2nd and following segments of the abdomen smooth, highly polished, shining; clypeus scutiform, narrower above than below, the apex slightly emarginate, the sides oblique, the medial furrow on the slope of the median segment obscure, above distinct and widening into a triangular hollow at apex; petiole of abdomen very long, about twice the length of the head and thorax united, filiform; base of 2nd abdominal segment with a short petiole, the medial tubercles on the petiole beneath small, obscure; legs very slender. Black, the clypeus and apex of the median segment with a thin, short, hoary pubescence; the base of the clypeus, a spot above it between the bases of the antennæ, a transverse spot above that, a line on the pronotum, a spot in front of and two spots behind the tegulae, a spot at the lateral angles of the post-scutellum, an elongate spot on each side at the apex of the median segment, the anterior and intermediate tibiae, and a narrow subapical line on the posterior margins of the petiole and 2nd segment of the abdomen, yellow;

tarsi rufo-fuscous; wings fusco-hyaline, darkest along the costal margin of the fore wing.

*Hab.* Hangoon, Burma. ♀. Length 12; *exp.* 19 mm. ♂ unknown.

618. *Eumenes exigua*, Sauss. *Mém. Guép. Sol. Suppl.* p. 160, ♂; Smith, *Cat. v.* p. 22.

♀. Head, thorax, and the basal half of the petiole of the abdomen closely and finely punctured; rest of the abdomen smooth, impunctate, but not shining; head remarkably orbicular; clypeus nearly circular, slightly convex, its anterior margin not incised; antennae inserted low down just above base of clypeus; pronotum transverse, slightly recurved along anterior margin and bearing a spine on the anterior lateral angles; median segment much depressed, with a medial deep longitudinal furrow from base to apex; petiole long, clavate, with a subapical constriction. Black: the front, the emargination of the eyes, the clypeus, the pleurae, and sides and apex of the median segment with short silvery pubescence; the clypeus except a narrow margin anteriorly, a broad line on the pronotum, the margins of the tegulae, two spots on the apex of the scutellum, the anterior and intermediate tibiae and tarsi above, a spot at the base of each posterior tibia above, and narrow transverse bands on the margins of the petiole and of the 2nd abdominal segment, yellow; wings hyaline, shaded with fuscous.

*Hab.* India (Sassure and Smith); Burma; Tenasserim. ♀. Length 8; *exp.* 14 mm. ♂. Length 7; *exp.* 13 mm.

#### Genus LABUS.

*Labus*, Sauss. *Nocturo-Rein.* *Hym.* p. 3 (1867).

Type, *L. spiniger*, Sauss.

*Range.* The Oriental region.

"Mandibles short truncate, apex dentate but not along the inner margin, folded horizontally close to the clypeus, forming a very short beak. Maxilla subelongate; palpi with 6 joints. Labium sub-elongate, palpi with 4 joints. Pronotum small, wide, anteriorly angular and toothed, posteriorly narrowed and arched. Legs slender, tarsi elongate, 1st joint of the tarsi longest. Wings normal. Second cubital cell not petiolate, but angular towards the radial cell, produced and truncate towards the base of the wing; receiving both recurrent nerves, the 1st recurrent nerve continuous with the lower margin of the cell.



Fig. 100.

*Labus humbertianus*, ♀, ♂.

Radial cell wide, truncate or bluntly rounded at apex. Abdomen with a very long petiole, which is linear, only slightly dilated at the apex." (Stress.)

619. *Labus humbertianus*, Sauss. *Nocturo-Rein.* *Hym.* p. 4, ♀ ♂, pl. 1, fig. 2 (wing).

♀. Head, pro- and mesonotum, scutellum, and basal half of the petiole of the abdomen above coarsely and closely, median segment and 2nd abdominal segment very sparsely and finely punctured, the 3rd and following segments of the abdomen smooth; clypeus convex, bidentate anteriorly; median segment with a deep and broad sulcation, bidentate at apex. Black, with obscure silvery pile; the pronotum anteriorly, the lateral angles of the scutellum, and the apical margins of the petiole and of the 2nd abdominal segment, yellow; legs, the posterior tibia at base yellow; wings fusco-hyaline, tegulae yellow, nervures black.

♂ similar; the scape of the antennae in front and the middle of the clypeus yellow.

*Var.* ♀ resembling the ♂ in colouring, the tibiae of all the legs above yellow.

*Hab.* Ceylon; Burma; Tenasserim. ♀ ♂. Length 8-9; *exp.* mm.

#### Genus MONTESUMIA.

*Eumenes*, pt. *Fabr. Syst. Pcz.* p. 288 (1804).

(*Myrmex*, pt. *Spin. Ann. Soc. Ent. Fr.* 2, p. 127 (1841).

*Montesumia*, Sauss. *Mém. Guép. Sol.* p. 87, pl. v, fig. 3 (1852).

Type, *M. murina*, Sauss., and *M. rufidentata*, Sauss.

*Range.* Neotropical and Oriental regions.

Head large, concave posteriorly; mandibles moderately long, narrow, the teeth on the inner margin rounded; antennae inserted about the middle of the face; clypeus broadly pyriform. Thorax

not narrowed anteriorly; truncate, with the head closely approximate, oval posteriorly, with a rounded steep slope; legs stout, of moderate length. Wings long and broad; radial cell in fore wing deep, the apex acute and on a level with the apex of the 3rd cubital cell; 1st cubital cell one-fourth as long again, measured on the cubital nervure, as the 2nd and 3rd united; 2nd segment constricted at top, 3rd wider above than on the cubital nervure. Abdomen

(in the Oriental species) petiolate, the petiole much broadened at the apex; 2nd segment very large; remaining segments much smaller, often withdrawn telescopically inside the 2nd.



Fig. 101.—*Montesumia burmanica*, ♀.

## Key to the Species.

- a. Head, thorax, and abdomen black, immaculate..... *M. indica*, p. 350.  
 A. Head, thorax, and abdomen black with yellow markings.  
 a'. Markings few and slight; wings dark... *M. burmanica*, p. 350.  
 A'. Markings numerous and moderately broad, wings light brownish hyaline. *M. imparida*, p. 351.

620. *Montezuma indica*. (Pl. II, fig. 10.)

*Syns. Mon. Guép. Sol. Suppl.* p. 167, ♀, pl. ix, fig. 4; Smith, Cat. v, p. 41.

♀. Head, thorax, and abdomen finely punctured; the vertex and front with rather a coarse granular appearance, the thorax and abdomen more sparsely punctured than the head; clypeus flat, anteriorly truncate, the margin transverse; median segment rounded posteriorly, with a medial deep longitudinal groove, the apex emarginate on each side; petiole of abdomen flat in the middle, coarsely longitudinally striate. Jet-black and shining; the clypeus in the middle, a line on the scape of the antennae in front, the apex of the median segment on each side, and a spot on the apical joint of all the tarsi, orange; wings deep fuscous brown, with a coppery and purple effluence.

*Hab.* Sikkim (rare); Java. ♀. Length 23-25; exp. 50-54 mm.

621. *Montezuma burmanica*, n. sp.

♀. Closely allied to and resembling *M. indica*, Stassure, but smaller, different in sculpture, and with a few slight yellow markings. Head, thorax, and abdomen punctured, the punctures on the head finer and closer than on the thorax, those on the abdomen widely spaced and confined to the basal two segments and apical margins of the 3rd and 4th, the bases of these two segments and the 5th and 6th smooth; clypeus large, convex, the apex depressed and emarginate; the front between the antennae subtriangular; scutellum large, with a broad, smooth, shining, medial longitudinal carina; median segment finely rugose, the sides obliquely truncate, smooth, with a few indistinct oblique striae, a wide, deep, medial longitudinal furrow runs from base to apex of the segment; petiole with an obtuse tubercle on each side beneath close to the middle, and a medial longitudinal furrow on the apical half above. Jet-black; a minute spot between the bases of the antennae, another behind the eyes, an abbreviated narrow line on the posterior margin of the pronotum in the middle, and a transverse narrow line on the posterior margin of the basal two abdominal segments, yellow; the line on the basal segment interrupted in the middle, that on the 2nd segment interrupted broadly on each side; legs black, a yellow line on the anterior tibia above, and the knees and apical joint of the tarsus obscurely brown red; wings fuscous with a purple effluence, the posterior wing hyaline at base.

♂ similar, but smaller; a triangular spot at the base of the clypeus, another above it, and a minute spot in the emargination of the eyes yellow; the yellow markings on the anterior tibia and on the abdomen absent.

*Hab.* Tenasserim. ♀ Length 16; exp. 30 mm. ♂ Length 12; exp. 24 mm.

622. *Montezuma imparida*, n. sp.

♀. Head, thorax, and abdomen punctured, the punctures fine, sparse and shallow on the head and thorax, somewhat denser and deeper on the abdomen; clypeus broadly pyriform, convex, flat in the middle, the apex lightly emarginate; mesonotum with a longitudinally-impressed line on the disc; median segment divided down the middle by a broad furrow; petiole of abdomen with a medial shallow furrow on its apical half. Black, shining; a spot above it, the scape of the antennae in front, a line on the inner orbits entering the emargination of the eyes and running to the vertex, a broad line behind the eyes not reaching the vertex, the sides of the pronotum broadly but not reaching the posterior angles, a spot at the base of the mesopleure, the tegulae, a spot in front and another behind them, two parallel longitudinal lines on the mesonotum, the lateral angles of the scutellum, a line on the postscutellum, the apical half of the median segment, a transverse band on the apical margin of the petiole, a much broader band, deeply emarginate in the middle anteriorly, on the 2nd and 3rd segments, this band with a narrow band on the apical margin of the side, and a square mark in the middle of the apical margins of the 4th and 5th segments, yellow; legs black, variegated with reddish nervures dark brown, tegulae with a spot of black in the middle.

*Hab.* Burma (Pegu Hills); Tenasserim. ♀. Length 14; exp. 27 mm.

## Genus RHYSCHUM.

Vespa, pt., *Fabr. Ent. Syst.* ii, p. 265 (1763).

Polistes, pt., *Fabr. Syst. Pict.* p. 273 (1801).

Rhyschium, *Spinola, Ins. Lio.* i, p. 84 (1806).

Alcyonon, pt., *Guv. Voy. Belanger, Zool.* p. 203 (1824).

Rhyschium, *Syns. Mon. Guép. Sol. Suppl.* p. 170 (1824).

Type, *R. scutatum*, Fabr.

*Range.* Both hemispheres.

Head variable, generally as broad as the thorax; eyes reniform, the inner orbits being deeply emarginate; clypeus pyriform, longer than broad; mandibles long, somewhat narrow, inner margin oblique, with blunt teeth; labial palpi thick, of four joints, the apical joint very small; maxillary palpi of six joints, basal joint somewhat thick, the rest slender, basal three subsqual, apical three

united about equal in length to the third joint; antennæ filiform; ocelli three, complete, round, placed in a broad triangle on the vertex.



Fig. 102.

*Rhyacion flaviventris*, ♀. 1.

1. mandible; 2. maxilla; 3. claw.

Thorax ovate; pronotum short in front, the lateral angles carried posteriorly to the base of the wings; mesonotum large, generally broadly egg-shaped, posteriorly broader than in front; postscutellum prominent as a rule; median segment vertical, depressed beneath the postscutellum, the sides bulging, often produced posteriorly and dentate, the apex of the segment generally concavo-truncate; legs slender, short, the intermediate tibia with one apical spine, the claws unidentate beneath. Wings long, broad, and ample; fore wing with the radial cell moderately large, slightly appendiculate; three cubital cells, the 1st, measured on the cubital nervure, as long as or longer than the 2nd and 3rd united, the 2nd irregularly triangular, with the apex of the triangle truncate, receiving the 1st recurrent nervure before and the 2nd recurrent nervure after the middle; 3rd cubital cell quadrate. Abdomen pseudosessile, never petiolate; basal segment cup-shaped, or only slightly constricted and narrowed.

The species of this genus are solitary or in pairs, never in social communities. The Indian species come freely into houses, building little round shells of clay for nests, and provisioning these with caterpillars. Occasionally an already existing cavity is made use of, and the aperture closed with a clay lid.

#### Key to the Species.

- A. Basal segment of abdomen slightly constricted, the apex distinctly narrower than the base of the 2nd segment.
- a. Clypeus nearly as broad at apex as at base, not marked with yellow.
- a'. Legs black, intermediate and posterior femora blood-red; wings hyaline at base.
- b. Legs orange-brown, femora concolorous; wings not hyaline at base . . . . .
- b. Clypeus much narrower at apex than at base, marked with yellow (♀) . . . . .
- B. Basal segment of abdomen cup-shaped, not constricted nor distinctly narrower than the base of the 2nd segment.
- a. Wings deep ferruginous yellow.
- a'. Wings fuscous brown for one-third or more of their length from base; basal segment of abdomen entirely black.

*R. erythropus*, p. 353.

*R. mitteri*, p. 354.

*R. cypripennæ*, p. 354.

- a'. Second and following segments of abdomen broadly bordered posteriorly with reddish brown . . . . . [p. 354.]  
*R. hamorrhoidalis*.
- b'. Second and following segments of abdomen entirely black . . . . .  
*R. atrum*, p. 355.
- b'. Wings only slightly fuscous at base; basal segment of abdomen entirely reddish brown or black at base, broadly bordered with reddish brown . . . . .  
*R. brassicum*, p. 355.
- A. Wings fuscous or fusco-hyaline.
- a'. Wings entirely deep fuscous brown with a purple effulgence; abdomen without yellow transverse bands.
- a'. Abdomen dull orange-brown.
- b'. Basal abdominal segment black . . . . .  
*R. mellei*, p. 356.
- b'. Basal abdominal segment orange-brown, with a transverse black marginal band . . . . .  
*R. abdominalis*, p. 357.
- c'. Abdomen entirely black . . . . .  
*R. argentatum*, p. 358.
- c'. Abdomen black, sides of segments 2-3 marked with orange-red . . . . .  
*R. hengelium*, p. 359.
- B. Wings fuscous along the costal margin of fore wing, hyaline or fusco-hyaline posteriorly; abdomen black.
- a'. Median segment with the sides produced posteriorly, angular and dentate . . . . .  
*R. nitidulum*, p. 357.
- b'. Median segment with the sides rounded posteriorly, not angular . . . . .  
*R. metallicum*, p. 358.
- c'. Wings fusco-hyaline; abdomen black with transverse yellow bands: ♀ only known.
- a'. Clypeus black; basal two abdominal segments with narrow yellow medially interrupted bands . . . . . [p. 359.]  
*R. flavovariegatum*.
- b'. Clypeus yellow; abdominal segments 1-5 with broader yellow bands not medially interrupted . . . . . [p. 360.]  
*R. flaviventris*.

#### 623. *Rhynchium erythropus*, n. sp.

♀. Head, thorax, and abdomen shining, very closely, evenly, and somewhat coarsely punctured, the bases (ordinarily not seen) of the 2nd and following segments of the abdomen broadly smooth; clypeus shield-shaped, raised, broadly flat down the middle, broadly truncate and slightly emarginate anteriorly; a very short trident-shaped carina between the antennæ; abdomen with the basal segment distinctly narrower than the 2nd. Intense black, two small spots immediately above the base of the antennæ, a line on the outer side of the scape of the latter, and the apical joint of the fore tarsi above, yellow; the intermediate and posterior femora blood-red; the sides and the truncated apex of the median segment with a little thin short hoary pubescence; wings fusco-hyaline with a rich purple effulgence, the base clear hyaline.

*Hab.* Tenasserim. ♀. Length 14; *exp.* 34 mm. Type in the British Museum.

624. *Rhynchium mölleri*, n. sp. (Pl. II, fig. 11.)

♀. Head, thorax, and abdomen densely punctured, the punctures shallow and not so well marked at the bases of the abdominal segments, which when drawn out have the extreme base smooth; clypeus slightly raised, broad, wedge-shaped, the apex transverse, slightly and widely emarginate; antennal carina short, very fine and narrow; postscutellum not very prominent; median segment depressed beneath it, vertical, concavo-truncate posteriorly, with a medial vertical carina and faint oblique striae on the face of the truncation, the sides not angularly produced back; abdomen with the basal segment distinctly narrower than the 2nd, its apical margin slightly constricted. Head black, the clypeus fulvous red, two spots between the antennae yellow, the antennae and the greater part of the thorax and median segment brownish red; the mesonotum anteriorly, a broad irregular U-shaped mark on its disc, the sutures between the scutellum, the postscutellum, and median segment, with the sides of the thorax, except the tubercles, black; legs red; wings light cupreous brown and iridescent.

*Hab.* Sikkim. ♀. Length 14-16; *exp.* 30-33 mm. ♂ unknown. Type in coll. British Museum.

625. *Rhynchium cupreipennis*, *Bisph. Jour. Bomb. N. H. Soc. viii*, p. 387, ♀, pl. 4, fig. 3.

♀. Head, thorax, and abdomen coarsely and very closely punctured, the punctures with a tendency to run into striae on the thorax; clypeus priform, truncate anteriorly, with two minute teeth; postscutellum prominent; median segment depressed vertically under the postscutellum, concavo-truncate, the sides produced and sharply angular, the truncation with a medial vertical carina and fine oblique striae; abdomen with the basal segment narrower than the 2nd, the latter both long and broad, the posterior margins of all the segments narrowly smooth. Black; the clypeus, except a black mark in the middle, a large round spot above it on the front, the antennae, a broad stripe behind the eyes, the apex of the anterior femora, the tibiae and tarsi, the inner side of the intermediate and posterior femora, and the last joints of the tarsi orange-yellow; the inside of the tibiae and tarsi of the posterior legs clothed with rich golden pubescence; wings cupreous brown with bright iridescent tints in certain lights, nervures and tegulae black.

*Hab.* Tavoy, South Tenasserim. ♀. Length 14; *exp.* 34 mm. ♂ unknown. Type in coll. British Museum.

626. *Rhynchium haemorrhoidale*.

*Vespa haemorrhoidalis*, *Fabr. Syst. Ent.* p. 306.

*Olivierus dimidiatus*, *Gutr. Voy. Bélanger, Zool.* p. 503, *Atlas*,

*Ins.* pl. iv, fig. 4.

*Rhynchium haemorrhoidale*, *Saunders, Mon. Guép. Sol.* p. 109.

*Rhynchium parentissimum*, *Saunders, Mon. Guép. Sol.* p. 111.

*Rhynchium haemorrhoidale*, *Saunders, Mon. Guép. Sol. Suppl.* p. 172;

*Smith, Cat. v.* p. 44.

♀. Head and thorax very finely and closely punctured, abdomen more coarsely punctured, especially along the posterior portions of the segments; clypeus raised, somewhat fat above, pyriform, ending anteriorly in a narrow point, which is lightly emarginate; postscutellum prominent, projecting posteriorly; median segment depressed vertically beneath the postscutellum, concavo-truncate posteriorly, the sides bulging and angularly produced, the punctures on them running into transverse striae, the truncation finely, transversely striate; abdomen with the basal segment not narrowed. Black; the clypeus, the front except a black triangular mark, the prothorax, the tegulae, and the posterior margin narrowly of the 1st and more broadly of the 2nd and following abdominal segment deep brownish red; antennae and legs black, sometimes more or less brownish red; wings deep yellow, brownish fuscous for nearly half their length from base.

♂ similar, but the clypeus and a transverse spot above it yellow, the antennae and anterior tibiae and tarsi fulvous or orange-red.

The above are the common forms, but the amount of red and black varies greatly in specimens from different localities.

*Hab.* Barrackpore, Bengal; Madras; Bangalore; Ceylon; Burma; Tenasserim; Java; Cape of Good Hope (*Smith*). ♀. Length 16-18; *exp.* 40-44 mm. ♂. Length 12-14; *exp.* 28-31 mm.

627. *Rhynchium atrum*.

*Rhynchium atrum*, *Saunders, Mon. Guép. Sol.* p. 109, ♀ ♂.

*Rhynchium atrum*, *Smith, Cat. v.* p. 44.

♀. Closely resembles some varieties of *R. haemorrhoidale*, but is always darker, and the posterior margin of the mesonotum and the scutellum are always impunctate and highly polished; the clypeus is grooved longitudinally near the apex, and the wings are sometimes slightly infuscated at apex and not at all at base. Some varieties have the clypeus, a spot between the antennae, and the occiput and cheeks brownish red, others are entirely black.

♂ has the clypeus yellow.

*Hab.* India (*Saunders and Smith*); South Tenasserim, extending into the Malayan region as far south as New Guinea. ♀. Length 18-20; *exp.* 36-42 mm. ♂. Length 17; *exp.* 30 mm.

628. *Rhynchium brunneum*.

*Vespa quinquecostata*, *Fabr. Ent. Syst.* ii, p. 261.

*Vespa brunnea*, *Fabr. Ent. Syst.* ii, p. 261.

*Vespa carnatica*, *Fabr. Ent. Syst. Suppl.* p. 201.

*Rhynchium brunnum* et *carnaticum*, *Saunders, Mon. Guép. Sol.* p. 112,

♀ ♂.

*Rhynchium brunneum* et *carnaticum*, *Smith, Cat. v.* p. 44.

♀. Head, thorax, and abdomen rather finely and sparsely punctured, the punctures shallow on the bases of the abdominal

segments, coarse and somewhat more dense on the apical margins of segments 2-5 above; clypeus strongly convex, pyriform, the apical third with a broad medial vertical groove, the extreme apex truncate or lightly incised; the scutellum and postscutellum smooth and shining, the latter gibbous, oblique and narrow; the median segment very short, depressed below the postscutellum, concavo-truncate posteriorly, the sides rounded, not angularly produced back, face of the truncation lightly transversely striate. Brownish red; a spot between the antennæ, a vertical line on the front, a large triangular spot on the mesonotum in front, a line along its apex, the median segment in the middle posteriorly, the basal half of the legs, the basal two-thirds of the 1st, and the basal half of the 2nd abdominal segment black; wings ferruginous-hyaline, deeper and darker towards the base.

♂ similar, the median segment more deeply concavo-truncate, the sides produced posteriorly and armed with two stout spines, the apical margins of abdominal segments 2-5 much more coarsely punctured, the clypeus and scape in front from a light fuscous red to a bright yellow.

Varieties have the black markings more or less developed, or even altogether wanting (var. *arabica*).

Hab. Throughout India, Burma, Tenasserim, and Ceylon, extending to Malacca, Sumatra, and Borneo to the South-east, and to Afghanistan and Persia to the North-west. ♀. Length 17-20; esp. 37-41 mm. ♂. Length 12-15; esp. 20-25 mm.

#### 620. *Rhyssium molyi*.

*Rhyssium molyi*, *Suess. Mon. Græp. Sol.* p. 116, ♀.

*Rhyssium molyi*, *Suess. Mon. Græp. Sol. Suppl.* p. 172, ♂; *Smith, Cat. v.*, p. 45.

♀. Head and thorax closely and strongly, abdomen more finely and sparsely punctured, the punctures on the abdomen shallow; clypeus broadly pyriform, the apex with a short medial groove and two teeth; postscutellum prominent, projecting posteriorly, with the margin roughened and irregular; median segment vertical, concavo-truncate posteriorly, the truncation with a medial vertical groove impunctate but finely obliquely striate; abdomen with the basal segment not narrowed. Black; a spot between the antennæ and a line on the scape in front yellow, the apex of the flagellum beneath and the apical joints of all the tarsi fulvous red; the 2nd and following segments of the abdomen obscure orange-red, sometimes the apical margin of the 1st segment narrowly orange-red, or the base of the 2nd segment black; wings fuscous with a purple effulgence.

♂ similar; the clypeus and the front half of the scape of the



Fig. 103.—*Rhyssium brassicae*, ♀. 1.

antennæ bright yellow; the legs somewhat lighter in colour; the abdomen in some specimens with a band of dusky stains down the middle of the 2nd and following segments.

Hab. Allahabad; Barrackpore; Pegu Hills, Burma; China. ♀. Length 17-19; esp. 37-40 mm. ♂. Length 14-16; esp. 34 mm.

#### 630. *Rhyssium abdominalis*.

*Vespa abdominalis*, *Hüb. Meg. Ent. i.* p. 102.

*Vespa transversa*, *Fabr. Syst. Piez.* p. 257.

*Rhyssium dichotomum*, *Suess. Mon. Græp. Sol.* p. 116, ♀ ♂.

*Rhyssium transversum*, *Suess. Mon. Græp. Sol.* p. 117, ♀.

*Rhyssium abdominalis*, *Suess. Mon. Græp. Sol. Suppl.* p. 172.

*Rhyssium dichotomum*, *Smith, Cat. v.* p. 45.

♀. Head and thorax densely punctured, granular; abdomen opaque, impunctate except for an irregular subapical band of coarse punctures on the posterior margins above of the 2nd-5th segments; clypeus convex, very broadly pyriform, the apex with two short acute teeth; postscutellum and median segment posteriorly truncate, the latter vertical, the sides bulging, the lateral lower angles dentate posteriorly; the basal segment of the abdomen cup-shaped, not narrowed. Head and thorax black; abdomen a dull orange-red, the basal segment with a transverse black apical band above, the 2nd segment with or without a transverse black spot in the middle of its apical margin above; wings dark fuscous with a purple effulgence.

♂ similar, smaller; the clypeus and sometimes a line on the front of the scape of the antennæ yellow; all the segments of the abdomen more or less dull black in the middle of their apical margins.

Hab. Throughout India, not ascending the hills to any elevation; Pegu, Burma. ♀. Length 15-17; esp. 33-37 mm. ♂. Length 12-14; esp. 29 mm.

#### 631. *Rhyssium nitidulum*.

*Vespa nitidula*, *Fabr. Ent. Syst. Scopul.* p. 202.

*Rhyssium nitidulum*, *Suess. Mon. Græp. Sol.* p. 105, ♀ ♂.

*Rhyssium nitidulum*, *Smith, Cat. v.* p. 43.

♀. Head and thorax very coarsely and closely punctured; abdomen smooth and satiny, with a few scattered shallow punctures and a subapical transverse line of the same, but somewhat coarser on the 2nd and 3rd segments; beyond the row of punctures the apical margins of the segments are depressed, smooth and shining; clypeus pyriform, the apex angularly incised, the sides on either side of the apex oblique and emarginate; scutellum and postscutellum gibbous; median segment strongly ridged along the sides; the sides flat, obliquely finely striate; the posterior face of the segment strongly concavo-truncate, with the sides produced back and spined. Black, somewhat thickly covered with silvery pile, which is very dense on the clypeus, the face in front, the



sides of the thorax, and on the abdomen; wings deep fuscous, with a purple effulgence broadly along the costal margin of the fore wing, the rest fusco-hyaline.

♂ similar, the base of the clypeus yellow.  
*Hab.* Barrackpore, Bengal; Burma. ♀. Length 13-14; cap. 27-29 mm. ♂. Length 13; cap. 27 mm.

#### 632. *Rhynchium metallicum*.

*Rhynchium metallicum*, *Sauss. Mon. Grupp. Sol.* p. 114, ♀ ♂.

*Rhynchium metallicum*, *Smith, Cat.* v, p. 43.

♀. Head and thorax coarsely and closely punctured; abdomen satiny, smooth, and with sparse, fine shallow punctures; clypeus

broadly pyriform, the apex truncate and slightly emarginate; scutellum and postscutellum slightly sloped, not oblique, the latter not gibbous; median segment short, concavely truncate posteriorly, the sides not produced, rounded. Black, covered with more or less of a thin silvery pile, especially on the clypeus, the front, cheeks, sides of the thorax, the



Fig. 104.

*Rhynchium metallicum*, ♀.

median segment, the legs, and the sides of the abdomen; wings fusco-hyaline, broadly dark fuscous with purplish effulgence along the costal margin of the fore wing.

♂ similar, but with two oblique yellow spots sometimes joining and forming a band along the base of the clypeus.  
*Hab.* Barrackpore; Rangit Valley, Sikkim; Calcutta; Madras; Pegu Hills, Burma; Tenasserim. ♀. Length 12-13; cap. 25-26 mm. ♂. Length 10-11; cap. 25 mm.

#### 633. *Rhynchium argentatum*.\*

*Vespa argentata*, *Fabr. Spet. Pev.* p. 290.

*Rhynchium argentatum*, *Sauss. Mon. Grupp. Sol.* p. 115, ♀ ♂.

*Rhynchium argentatum*, *Smith, Cat.* v, p. 43.

♀ ♂. Closely allied to and resembling *R. metallicum*, but constantly larger, the median segment slightly more rounded posteriorly, the silvery pile entirely absent, and the wings dark fuscous with a purple effulgence, not fusco-hyaline on the posterior half.

♂ the entire clypeus and the scape in front is yellow.  
*Hab.* Sikkim; Malabar; Shw-vary Hills, Madras. ♀. Length 14-15; cap. 28-32 mm. ♂ slightly smaller.

\* The following species is described by Saussure from "Tranquebar," but has not so far as I know, been procured of late years, and it may not be Indian.

*R. CARONAEUM*, *SERRA. Ann. Soc. Ent. Fr.* 1857, p. 317.

"*Sat parvum, nigrum, depressum, ubique dense punctatum, clypeo truncato, postscutello lato emutato, metasterno valde impresso, supra costis nullis, abdomine convexo, basi valde truncato, suturis indistinctis, alis nigro-violaceis.*"  
 "Longueur totale 13 mm, aile 10 mm."

#### 634. *Rhynchium bengalense*, *Sauss. Mon. Grupp. Sol. Suppl.* p. 176, pl. 12, fig. 8, ♂; *Smith, Cat.* v, p. 44.

♀. Head and thorax finely and closely punctured, abdomen smooth and satiny; clypeus strongly convex, broadly pyriform, with two short parallel carinae on the anterior third, ending in two teeth at the apex; scutellum and postscutellum oblique, the former with a longitudinally impressed medial smooth line, the latter gibbous; median segment concavo-truncate posteriorly, a medial broad space, closely transversely striate, and divided by a narrow vertical furrow. Jet-black; the apical margins laterally of the 2nd-5th abdominal segments orange, on the 2nd segment the orange colour is continued along the sides of the dorsal plate forward; wings dark fuscous with a violet effulgence.

♂ similar, but the clypeus not carinate anteriorly, the apex emarginate; the clypeus and front of the antennae yellowish white; the apical joint of the flagellum ferruginous.

*Var.* The orange markings on the 4th and 5th abdominal segments more or less obsolete.

*Hab.* Barrackpore, Bengal; Allahabad, N.W.P., and probably through Central India. ♀. Length 15-17; cap. 34-36 mm. ♂. Length 12-14; cap. 32-33 mm.

#### 635. *Rhynchium flavovirginatum*, *Smith, Trans. Ent. Soc.* 1852, p. 55, ♂; *Sauss. Mon. Grupp. Sol. Suppl.* p. 177.

*Odynerus nigerrimus*, *Smith, Cat.* v, p. 42.

*Rhynchium basimaculæ*, *Com. Mem. Mus. L. Pl.* Soc. xii (1807).

♀. Head and thorax somewhat punctured, the punctures on abdomen more finely and sparsely scattered, the punctures on the 2nd-5th segments coarser posteriorly, forming a distinct subapical band above; clypeus broadly pyriform, the apex with a medial vertical short groove and ending in two prominent teeth; antennal carina short but distinct; postscutellum gibbous, projecting posteriorly, the margin roughened; median segment vertical, concavo-truncate posteriorly; abdomen with the basal segment not narrowed. Black; a spot between the antennae, a line on the front of the scape, an interrupted line (sometimes absent) on the pronotum, a spot on each side of the median segment posteriorly (absent in the type specimen), and a broadly interrupted narrow subapical line on the posterior margins of the 1st and 2nd abdominal segments above yellow or yellowish white; the apical joint of the anterior tarsi fulvous, the femora at apex more or less ferruginous; wings fusco-hyaline, beautifully iridescent in certain lights.



Fig. 105.

*Rhynchium flavovirginatum*, ♀.

♂ similar, the greater part of the clypeus and a line on the anterior tibiae above yellowish white.  
*Hab.* Sikkim; Mussooree, N.W. Himalayas; China. ♀. Length 13-17; cap. 34-40 mm. ♂. Length 13-14; cap. 33-36 mm.

**636. *Rhyachium flavolineatum*.**

*Odynerus flavolineatus*, Smith, Cat. v, p. 63, ♀.

♀. Head, thorax, and abdomen closely punctured, the punctures on the pro- and mesonotum fine and dense, giving them a granular appearance, on the posterior margins of the segments they are somewhat coarser; clypeus convex, broadly pyriform, nearly pentagonal, the apex slightly emarginate; postscutellum and median segment roundly truncate posteriorly, the latter depressed vertically beneath the former, the sides bulging laterally and minutely dentate, the truncation with a carina down the middle and faint transverse striae; abdomen with the basal segment cup-shaped, not narrowed. Black; the clypeus, a spot above it and one in the emargination of the eyes, a line behind them, the scape in front, the pronotum anteriorly, the tubercles, a spot on the mesopleura, the tegulae and a spot behind them, two abbreviated lines on the mesonotum posteriorly, the postscutellum, a large subovate spot on the sides of the median segment, a spot on the intermediate and posterior coxæ, a broad stripe on the anterior and intermediate femora in front, the tibiae on the outside, the claw-joint of the anterior tarsi, and the posterior margins of the 1st-5th abdominal segments, yellow; wings fusco-hyaline, the costal margin of the fore wing dark fuscous.

*Var.* The abbreviated lines on the mesonotum and the spots on the intermediate and posterior coxæ absent.

*Hol.* Rangit Valley, Sikhim; Tenasserim; Java. ♀. Length 13-15; *exp.* 30-34 mm. ♂ unknown.

**Genus ODYNERUS.**

- Vespa, pt., *Linn. Syst. Nat.* i, p. 948 (1767).  
 Epipona, *Latr. Hist. Nat. Ins.* xiii, p. 349 (1805).  
 Odynerus, *Latr. Hist. Nat. Ins.* xiii, p. 344 (1805).  
 Synmorphism, *Wesm. Mon. Odyner. Belg.* p. iii (1833).  
 Anisitrocerus, *Wesm. t. c. p.* iv (1833).  
 Otoplus, *Wesm. t. c. p.* iv (1833).



106.—*Odynerus diffinis*, ♀. 1, hind leg; 2, maxilla; 3, claw.

Type, *O. parietum*, Linn.

*Range.* All parts of the world.

Head very variable, generally more or less flat in front; the

parts also variable: the antennæ in the majority of species rather short, filiform, the apical joints in the male with a small hook, or spirally rolled; mandibles blunt with blunt teeth, never long as in *Eumenes*; labial palpi stout, 4-jointed, and covered with stiff hairs; maxillary palpi 6-jointed, diminishing in length to the apical joint, which, however, is sometimes longer than the 5th joint, the apical three joints united, distinctly longer than the 3rd. Thorax rounded or truncate both anteriorly and posteriorly, in a few species emarginate posteriorly; legs short, somewhat feeble and slender, intermediate tibiae with one apical spine; claws dentate.

Wings: in the fore wing the form and proportions of the radial and cubital cells are variable; in general, however, the radial cell is widely subtriangular, the apex acute, or slightly truncate and appendiculate; three cubital cells, the 2nd receiving both recurrent nervures. Abdomen of variable shape, the basal segment often narrowed, but never fashioned into a long petiole as in *Eumenes*, always more or less covering over the base of the 2nd segment.

The genera *Rhyachium* and *Odynerus* are only clearly separable by an examination of the mouth-parts, as noted in the key to the genera. Externally the two genera resemble each other and grade one into the other astonishingly. Roughly, however, the species of *Rhyachium* are larger, heavier built insects than the species of *Odynerus*. Both genera can at once be distinguished from *Eumenes* by the form of the basal abdominal segment, which is never narrowed into an elongate petiole, but, though often constricted and narrower than the 2nd segment, always receives and more or less covers over the base of the latter.

The species of *Odynerus* make sometimes little thin clay shells for nests, but more often make use of crannies and holes for their nurseries, storing as food for their larvae the caterpillars of various species of small moths. I have never found them attacking or storing spiders or other prey.

**Key to the Species.**

- A. First abdominal segment with one, sometimes two transverse sutures near the base.  
 a. Colours black and red ..... *O. sikhimensis*, p. 363.  
 b. Colours black and yellowish white ..... *O. richelli*, p. 363.  
 c. Colours yellow and ferruginous brown ..... *O. australensis*, p. 364.  
 B. First abdominal segment without a suture.  
 a. Colours reddish or ferruginous and yellow.  
 a'. Margins of all the abdominal segments more or less yellowish ..... *O. ornatus*, p. 364.  
 B'. Second to fourth abdominal segments yellow ..... *O. punctatipennis*, p. 365.  
 c'. Second abdominal segment only yellow, rest reddish brown ..... *O. punctum*, p. 365.  
 A. Colours black and yellow, or black and yellow and red.

Duplicate of #87

97a

Bingham, C.T.

(part of book)

Fauna of British India

Genus **ASTATA.**

Astatus, Latr. *Précis Caract. Gen. Ins.* p. 114 (1796).  
Astata, Latr. *Hist. Nat. Crust. et Ins.* t. iii, p. 336 (1802).  
Dimorpha, Panz. *Krit. Revis. Faun. Deutschl.* ii, p. 126 (1806).  
Dryudella, pt., Spin. *Ann. Soc. Ent. Fr.* 1843, t. i, p. 135.

Type, *A. boops*, Schrank.

Range. Both hemispheres.

Head wider than the thorax; mandibles not emarginate or incised on their outer margins, bluntly toothed on the inner side close to the apex; eyes very large, strongly convergent at top, in the ♂ meeting on the central line of the vertex; ocelli complete, round, placed in a triangle below the vertex; antennæ fili-



Fig. 40.—*Astata agilis*, ♂. ?

form, inserted low down on the front, just above the clypeus; pronotum depressed below the level of the mesonotum; legs thick, the tibiæ and tarsi (♀) thickly, (♂) less densely spinose, intermediate tibiæ with two apical spurs; abdomen short, somewhat cordate or conical in shape, in the ♂ flattened above. Wings with one radial and three cubital cells, the former long, narrow, roundly truncate at apex and appendiculate; the 1st cubital cell obliquely oval, divided transversely by an obsolete or nearly obsolete nervure; 2nd cubital cell subtriangular, receiving both recurrent nervures; 3rd obliquely quadrate, the opposite sides nearly parallel.

The large eyes and short conical abdomen of these insects make them closely resemble, in form, certain kinds of Diptera. *Astata* is eminently a sand-wasp, burrowing in hard sandy banks and storing its nests with larvæ of various species of Hemiptera; and the late Mr. F. Smith records having seen the English species of *A. boops* conveying to its nest specimens of an allied hymenopterous insect, *Oxybelus*.

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Key to the Species.

- A. Abdomen wholly black ..... *A. nigricans*, p. 183.
- B. Abdomen red and black.
  - a. Of comparatively large size (L. 10-13 mm.); mesonotum anteriorly carinated and furrowed ..... *A. orientalis*, p. 183.
  - b. Smaller (L. 7-10 mm.); mesonotum simple.
    - a'. Median segment above enclosed by lateral convergent furrows ..... *A. maculifrons*, p. 183.
    - b'. Median segment not furrowed laterally.
      - a<sup>2</sup>. Median segment long, finely longitudinally reticulate ..... *A. agilis*, p. 184.
      - b<sup>2</sup>. Median segment comparatively short, coarsely reticulate ..... *A. tarda*, p. 184.

Hymenoptera Vol. I

Taylor & Francis,  
London - 579 p.

1897

355. *Astata nigricans*, *Cam. Mem. Manch. L. Ph. Soc.* (4) ii, 1889, p. 151, ♂.

♂. Head, thorax, and abdomen thinly pubescent, the pubescence denser on the sides of the face and sides and apex of the median segment; eyes strongly convergent and meeting on the vertex; the front convex, punctured, the anterior ocellus large, twice the size of the posterior ones, on the front beneath it an obscure T-shaped furrow; pro- and mesonotum, scutellum, and post-scutellum rather closely punctured, the disc of the scutellum smooth and shining; median segment long, slightly narrowed and sloping posteriorly; the apex truncate, above coarsely reticulate, with a medial longitudinal carina; abdomen shining, minutely punctured, the margins of the segments slightly depressed. Black, the pubescence hoary white, silvery on the sides of the face; the tarsi and the posterior margins of the basal five segments bronzy testaceous; wings hyaline and iridescent, nervures pale testaceous, tegulæ black.

*Hab.* Poona, Bombay Presidency. ♂. *Length* 8-9; *exp.* 16 mm. Type in coll. Rothney.

356. *Astata orientalis*, *Smith, Cat.* iv, p. 310; *Cam. Mem. Manch. L. Ph. Soc.* (4) ii, 1889, p. 150.

♂. Head above the base of the antennæ coarsely rugose and covered with thin long pubescence; the cheeks and occiput smooth, with soft thin pubescence; mesonotum, scutellum, and post-scutellum very minutely and closely punctured; the mesonotum anteriorly with two parallel, abbreviated, longitudinal carinæ, terminating posteriorly in minute tubercles, and two parallel, abbreviated, longitudinally impressed lines in the space between the carinæ; scutellum impunctate, smooth, and shining in the middle; median segment long, rounded at the sides, concavo-truncate posteriorly, the truncation punctured, above coarsely reticulate; abdomen smooth, opaque, the basal segment at apex strongly constricted. Black, the posterior margin of the 1st and 2nd abdominal segments entirely ferruginous red, the remaining segments more or less dark fusco-ferruginous; wings flavo-hyaline, sometimes entirely hyaline.

*Var.* With the basal two and basal half of the 3rd segment red.

*Hab.* Nishchindeepore, Bengal; Tenasserim. ♂. *Length* 10-13; *exp.* 18-23 mm.

357. *Astata maculifrons*, *Cam. Mem. Manch. L. Ph. Soc.* (4) ii, 1889, p. 149, ♂.

♂. Head—the clypeus produced in the middle at apex, deeply depressed at the sides, front convex, punctured, the punctures close above the ocelli; eyes strongly obliquely convergent, meeting above on the vertex; cheeks smooth, shining; mesonotum, scutellum, and postscutellum shining, sparingly punctured; median segment as long as the rest of the thorax, truncate posteriorly, rounded towards the sides; above divided off by two deep furrows.

one on each side, meeting below the edge of the truncation in a small depression, the enclosed space coriaceous, with a medial longitudinal faintly-marked carina, the sides and truncated portion of the segment rugose-punctate; abdomen smooth, shining, with a few scattered delicate punctures. Black, the front below the ocelli with a transverse yellow mark rounded at the sides, emarginate in the middle anteriorly; abdomen with the basal three segments and sides of the 4th red above; the head, thorax, and abdomen covered with a very sparse, soft, erect fuscous pubescence; wings hyaline, the fore wing anteriorly light fuscous; nervures testaceous, tegulæ yellow.

*Hab.* Mussooree. ♂. *Length* 9; *exp.* 17 mm. Type in coll. Rothney. This is the Eastern representative of the British *A. stigma*.

358. *Astata agilis*, *Smith, Trans. Ent. Soc.* 1875, p. 39, ♀; *Kohl, Verh. zool.-bot. Ges. Wien*, 1884, p. 447; *Cam. Mem. Manch. L. Ph. Soc.* (4) ii, 1889, p. 150.

♀. Head—the clypeus, the cheek and occiput, the pronotum, the sides and apex of the median segment, the coxæ and femora of the legs, and the base of the abdomen covered with a long thin soft pubescence; the head in front closely punctured and bearing a medial short vertical furrow in front of the anterior ocellus; pro- and mesonotum less closely punctured; the scutellum large, prominent, smooth and shining; the median segment long, truncate at apex; above and at base longitudinally reticulate, and bearing a fine medial longitudinal carina; abdomen broad, short (very short and subcordate in shape in the ♂), acutely pointed at apex, very minutely and closely punctured at the bases of the segments. Black, the apical margin of the 1st, the whole of the 2nd, and the base narrowly of the 3rd abdominal segment red; wings hyaline, with a faint fuscous cloud beyond the stigma, the apex pale; nervures and tegulæ testaceous.

♂ similar but smaller, more pubescent.

*Var.* The fore wing flavo-hyaline from base to apex of radial cell, hyaline beyond.

*Hab.* Nishchindeepore; Tirhoot; Poona; Sikhim; Tenasserim. ♀. *Length* 7½–9; *exp.* 14 mm. ♂. *Length* 7–8; *exp.* 14 mm.

359. *Astata tarda*, *Cam. Mem. Manch. L. Ph. Soc.* xli (1897).

♂. Closely resembles *A. agilis*, *Smith*, from which it can be distinguished by being much more finely and closely punctured and larger. Head in front, pro- and mesonotum, scutellum and post-scutellum finely and closely punctured; median segment coarsely reticulate, above the apex truncate; the head in front, the pronotum, apex of the median segment, and base of abdomen covered with a soft long thin silvery pubescence. Black, the apical margin of the 1st, the whole of the 2nd, and the basal half of the 3rd abdominal segment red; wings hyaline, very faintly fuscous on the apical margin; nervures and tegulæ dark brown.

*Hab.* Ceylon. ♂. *Length* 10; *exp.* 18 mm. Type in coll. Rothney.

shaped projection which is narrowed at base and obliquely concave at apex. Jet-black and shining, the apical three joints of the flagellum of the antennæ light testaceous; the whole head, thorax, and abdomen covered with a thin soft hoary pubescence; wings hyaline, lightly fuscous.

*Hab.* Burma; Tenasserim. ♂. Length 10-12; *exp.* 21-23 mm. ♀ unknown.

Genus **THAUMATOSOMA.**

*Thaumatosoma*, Smith, *Trans. Ent. Soc.* ser. 3, vol. ii, 1865, p. 394.

Type, *T. duboulaii*, Smith.

*Range.* Australia; Burma.

♂. Head orbicular, about as wide as the thorax; ocelli in a broad triangle, nearly in a curve, on the vertex; labial palpi 4-jointed, basal two joints subequal, elongate, the apical two minute, placed at an angle near the apex of the 2nd joint; maxillary palpi 2-jointed, minute, basal joint stout, apical thinner, pointed at apex; the apical lobe of the maxilla twice the length of the basal lobe; antennæ with the scape short, thick, the flagellum with the apical joint dilated, flat and thin, the rest of the joints either all slender, filiform and elongate, or the basal seven normal and the subapical four suddenly attenuated and filiform. Thorax ovate; legs moderately stout: the

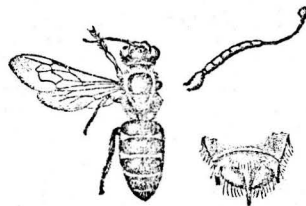


Fig. 153.—*Thaumatosoma burmanicum*, ♂. ♀.

fore wing with the radial cell narrow, rounded at base and apex; two cubital cells, the 2nd receiving both recurrent nervures, the 1st near the base, the 2nd near the apex. Abdomen cylindrical, the apical segments curved downwards, the 7th segment medially strongly carinate, the carina ending in a blunt spine, the sides of the segment also produced and forming incurving blunt teeth on each side; basal segment beneath produced and having a strong blunt tooth on each side.

In the paper in the *Trans. Ent. Soc.* containing a diagnosis of the genus *Thaumatosoma*, Smith also described an insect from South America under the name *Eucera mirabilis*, the antennæ of which still more closely resemble those of the insect described below. No specimen of this so-called *Eucera* is in the British Museum, but I have little doubt that it also agrees best, as does the Burman insect, with the characters, especially of the mouth-parts, of the genus *Thaumatosoma*.

823. *Thaumatosoma burmanicum*, n. sp.

♂. Head, thorax, and abdomen finely and closely punctured and more or less pubescent, the head in front densely so; median segment short, truncate posteriorly, the sides rounded. Black; the

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of abdominal  
Fr.  
Bengal;  
♂. Length 6;  
Tenasserim.  
the eyes small,  
on the anterior  
of the female  
the apical three  
curved and  
lateral triangle;  
maxillary palpi  
orbicular, short;  
rounded posteriorly;  
anterior tibiae in males  
broad, ample; fore  
cell broad at base,  
which is approxi-  
mally three  
1st cell the largest,  
strongly narrowed  
comparatively broad,  
almost tuberculate;  
edge-shaped tubercle  
only Indian species  
owers of what looked  
ams in Tenasserim.  
B. M. p. 60, ♂; Dall.  
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oft hairs; the front  
clypeus raised into a  
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e middle of each of  
2nd prominently pro-  
early forming lateral  
a remarkable wedge-

pubescence on the head in front and the thorax white, slightly fulvous; the scape, the basal two and subapical four filiform joints of the flagellum of the antennæ, and the femora above and tibiæ of the anterior and intermediate legs testaceous red; the rest of the antennæ and legs nigro-piceous; the pubescence on the legs and transverse bands, widening laterally on the apical margins of abdominal segments 1-5, greyish white; wings fusco-hyaline, nervures and tegulæ dark piceous brown.

*Hab.* Rangoon, Lower Burma; Tenasserim. ♂. *Length* 9; *exp.* 17 mm.

#### Genus OSMIA.

*Osmia*, Panz. *Krit. Revis. Faun. Deutschl.* ii, p. 230 (1806).

Amblys et Hoplitis, Klug, *Illig. Mag. Ins.* vi, pp. 225 & 226 (1807).

Type, *O. rufa*, Linn.

*Range.* Both hemispheres.

Head not quite so wide as the thorax, subglobose; ocelli placed in a curve on the vertex; antennæ filiform, the scape slightly incrassate; the mandibles stout, with teeth at apex; labrum oblong; tongue elongate; labial palpi 4-jointed, the 1st joint shorter than the 2nd, the apical two minute; maxillary palpi 4-jointed, basal joint stout, 2nd longer than the 1st, 2nd and 3rd subclavate, apical joint minute. Thorax short; fore wing with the radial cell acute at apex and slightly appendiculate; two cubital cells, the 2nd receiving the 1st recurrent nervure between base and middle, the 2nd near the apex; legs moderately stout and long. Abdomen oblong, convex above, densely pubescent beneath in the female; in the male the apical segment dentate.

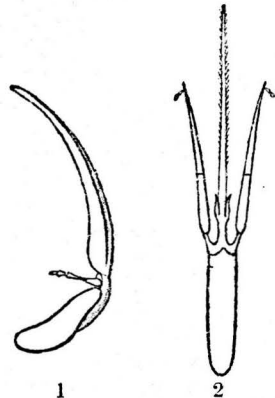


Fig. 154.—*Osmia*. 1, maxilla; 2, labium. (Much enlarged.)

Nothing is known of the habits of the sole species of *Osmia* as yet known from India. The European species construct their nests variously in the earth of banks, in dry bramble branches, in old posts and railings, in snail-shells, &c.

#### 824. *Osmia adæ*, n. sp. (Pl. III, fig. 10.)

♂. Head, thorax, and abdomen very finely and closely punctured, granular; the abdomen shining, the margins of segments 1-5 slightly constricted; clypeus slightly convex, rounded anteriorly; median segment concavo-truncate posteriorly, the apical segment of the abdomen bidentate. Dark shining metallic blue; the mandibles, antennæ, and tarsi piceous black; the clypeus and front, the cheeks and occiput, and the sides of the thorax and of

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*Hab.* K  
10; *exp.* 1

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Type, *L.*

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*Hab.* A  
Burma; T

the median segment covered with long soft white pubescence: the legs and sides and apex of the abdomen with shorter, more sparse glistening silvery pubescence; wings hyaline, nervures piceous.

*Hab.* Kumaun, N.W. Himalayas (*Miss Ada Book*). ♂. *Length* 10; *exp.* 18 mm.

#### Genus LITHURGUS.

*Lithurgus*, *Latr. Fam. Nat. du Règne Anim.* p. 463 (1825).

Type, *L. cornutus*, Fabr.

*Range.* Both hemispheres.

Head as broad as the thorax; the inner orbits of the eyes parallel or very slightly convergent below; mandibles narrow, thick, not flattened as in *Megachile*, tridentate at apex; labial palpi 4-jointed; maxillary palpi 4-jointed; face between the antennæ tuberculate; vertex rounded, the ocelli placed in a triangle on the front below it; thorax as in *Megachile*; legs stouter, generally with longer pubescence in the female; wings exactly as in *Megachile*; abdomen broad, flattened and depressed above, more convex beneath than in *Megachile*.

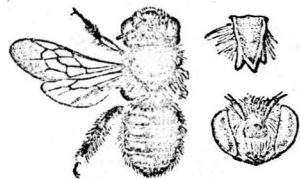


Fig. 155.

*Lithurgus atratus*, ♀. †.

The habits of one of the Indian species, *L. dentipes*, Smith, are said by Horne (*Trans. Zool. Soc.* vii, p. 175) to be similar to those of *Megachile*.

The habits of one of the Indian species, *L. dentipes*, Smith, are said by Horne (*Trans. Zool. Soc.* vii, p. 175) to be similar to those of *Megachile*.

#### Key to the Species.

- a. Posterior tibiæ coarsely rugose on outer side. . . *L. atratus*, p. 469.  
 b. Posterior tibiæ finely punctured on outer side. . . *L. dentipes*, p. 470.

825. *Lithurgus atratus*, *Smith, Cat.* i, p. 145, ♀; *Dall. Torr. Cat.* x, p. 415.

♀. Head and thorax transversely rugose; abdomen shining, sparsely punctured, the punctures shallow; clypeus strongly punctured, produced into a triangular prominent tubercle at base, arched anteriorly, and fringed with a thick tuft of pubescence; the posterior tibiæ coarsely rugose above; the 2nd abdominal segment constricted at base, the apical margins of segments 2-5 narrowly subdepressed. Jet-black; the apex of the clypeus, the face on both sides the pronotum, the sides and apex of the median segment, and base of the abdomen with a thin soft white pubescence; the legs black with black pubescence; the apical margins of segments 1-5 fringed with white pubescence, on the basal segment this is broadly interrupted in the middle; the apical segment with black pubescence above; the pollen-brush thin, from a brownish red to black in different specimens; wings fusco-hyaline, with a slight purple effulgence.

*Hab.* Allahabad; Dehra Dun; Karáchi; Bangalore; Ceylon; Burma; Tenasserim. ♀. *Length* 11-13; *exp.* 20-24 mm.



896. *Allodape marginata*, *Smith, Cat. ii, p. 230, ♀.*

♀. Head with a few scattered punctures, mesonotum smooth, shining, scutellum and median segment delicately punctured; the basal three segments of the abdomen smooth, apical three punctured, the punctures getting more dense towards the apex; clypeus flat, transverse anteriorly. Black; a broad nail-shaped spot on the front and clypeus, a line on the pronotum, the tubercles, and the tegulae of the wings pale cream-colour; the labrum, base of the mandibles, and the apical joints of the tarsi testaceous; the posterior legs covered with a pale glittering pubescence; the apical margins narrowly of segments 1-5 of the abdomen very pale testaceous; wings hyaline and iridescent, nervures pale testaceous.

*Hab.* India? (*Smith*). The type in the British Museum collection is the only specimen I have seen. ♀. *Length* 6; *exp.* 11 mm.

897. *Allodape parvula*, *Smith, New Sp. Hym. B. M. p. 98, ♀.*

♀. Head, thorax, and abdomen smooth, shining and impunctate; face slightly produced below; clypeus flat, transverse anteriorly; median segment somewhat narrowed and rounded posteriorly, the space at base slightly concave and smooth but opaque, not shining. Black; the face below the base of the antennae and the clypeus in the middle pale yellow; the labrum, the mandibles, tubercles, apical joints of the tarsi, and the apical margins rather broadly of segments 1-5 rufo-testaceous; the posterior tibiae and tarsi with pale glittering pubescence; wings hyaline and iridescent.

*Hab.* Bombay district; probably through a great part of India; Burma; Tenasserim. ♀. *Length* 5-6; *exp.* 8-11 mm.

## Genus HERIADES.

*Heriades*, *Spinola, Ins. Lig. ii, p. 7 (1808).*

*Chelostoma, Latr. Gen. Crust. et Ins. iv, p. 161 (1809).*

*Trypetes, Schenck, Nassau. Verein. f. Naturk., Jahr. xiv, p. 32 (1859).*

*Eriades, Dall. Torr. & Friese, Entom. Nachr. xxi, p. 69 (1895).*

Type, *H. truncorum*, Linn.

*Range.* Both hemispheres.

Head orbicular, about as wide as the thorax; ocelli in a triangle placed well forward on the vertex; antennae subclavate; labial palpi 4-jointed, the 1st joint about half the length of the 2nd, the latter acute at apex, the apical two joints minute, at right angles to the 2nd joint; the maxillary palpi 3-jointed, the basal joint short, stout, the 2nd twice as long as the 1st, the 3rd slender, with two setae at apex; clypeus with the anterior margin generally transverse and bidentate, the labrum beneath anteriorly rounded. Thorax short, broadly oval; fore wing with the radial cell long, subacute at apex; two cubital cells, the 2nd receiving both recurrent nervures, the 1st near its base, the 2nd near its apex. Abdomen elongate, cylindrical, furnished with a dense pollen-brush beneath.

ocelli three, in a tri-  
ex; antenna filiform,  
lum thickening to-  
tongue long; labial  
basal two joints  
apical two minute;  
6-jointed, basal joint  
long as the following  
e minute, subequal;  
otably longer than  
les narrow, acute.  
legs slender, short;  
y broad, fore wing  
cell constricted to-  
and appendiculate;  
the 1st longer than  
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ate size.

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cies belonging to this  
eral appearance they  
e species of *Prosopis*,  
inguished at once by  
tongues. *A. cupuli-*  
company with *P. fca*,  
reams in Tenasserim.

*A. cupulifera*, p. 503.

*A. marginata*, p. 507.

*A. parvula*, p. 507.

*Div. Gen. (2a) xiv, 1894,*

egment smooth and  
ured, each puncture  
um slightly exerted;  
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wly vertically raised.  
on the scape of the  
the flagellum of the  
o-testaceous; wings

♀. *Length* 4-5; *exp.*

Nothing is known of the habits of the Oriental forms. I procured both species on the wet sand by the banks of streams. The European species nest in the wood of old posts and rails.

*Key to the Species.*

- a. ♀ length 8-9 mm. . . . . *H. aureocincta*, p. 508.  
 b. ♀ length 4.5-5 mm. . . . . *H. parvula*, p. 508.

898. *Heriades aureocincta*, n. sp. (Pl. IV, fig. 2.)

♀. Head, thorax, and abdomen closely and finely punctured, shining; clypeus subtriangular, convex, submarginate anteriorly, with two not very approximate shining blunt teeth; median segment vertical, rounded posteriorly, not truncate, obscurely medially carinate, the base narrowly impunctate, shining; abdomen with a deep transverse narrow groove close to the base of the 2nd segment. Jet-black; the face and legs with a thin covering of pale glittering soft hairs; the scutellum and postscutellum covered with dense fulvo-ferruginous pubescence, and abdominal segments 2-5 with narrow fringes of the same, having a golden lustre; the apical margin of the 1st segment broadly golden testaceous; pollen-brush white; wings hyaline and iridescent; nervures and tegulæ dark brown.

*Hab.* Sikkim, 6000 ft.; Ta-u plateau, Tenasserim, 4000 ft.  
 ♀. *Length* 8-9; *exp.* 16 mm.

This species perhaps belongs to the subgenus *Chelostoma*, Latr.

899. *Heriades parvula*, n. sp.

♀. Head and thorax coarsely and closely, abdomen more finely punctured; clypeus broad, convex, subtriangular, its anterior margin transverse; median segment longer proportionately than in *H. aureocincta*, broadly transverse posteriorly; base of the abdomen slightly concave, 2nd segment with a very fine transversely impressed line. Jet-black and shining; the face in front, the thorax on the sides and at the apex of the median segment, and the apical margins of abdominal segments 1-5 covered with white pubescence, forming very fine fringes to the last-named; pollen-brush soft and white; wings hyaline and iridescent, nervures and tegulæ very dark brown.

*Hab.* Rangoon, Burma. ♀. *Length* 4.5-5; *exp.* 8 mm.

Genus **CÆLIOXYS.**

*Cælioxys*, Latr. *Gen. Crust. et Ins.* iv, p. 166 (1806).

Type, *C. conicus*, Linn.

Range. Both hemispheres.

Head transverse



Fig. 171.—*Cælioxys*

parallel, base broad, short, more or less tooth at base; at apex; two of the two rings the 1st transverse bent inwards; conical, the base The male has also

The species of I have often with *chile lanata*, which until the *Megac* in, turn round, nest, which it before the *Mea* the nest with time kept the

- A. Ventral plate more or less  
 a. Scutellum posterior  
 b. Scutellum posterior  
 a'. Second with  
 b'. Second not  
 B. Ventral plate conical, as  
 a. Head with  
 b. Head with  
 a'. Under  
 a''. Front  
 b''. Front