

XXXII NOTES ON ACULEATE HYMENOPTERA IN THE INDIAN MUSEUM

PART I.

By COLONEL C. T. BINGHAM.

From time to time during the last two years Dr. Nelson Annandale, Superintendent of the Indian Museum, Calcutta, has been good enough to send me for determination small collections of Aculeate Hymenoptera contained in the Indian Museum. A list of these, with descriptions of the new forms, is given in the following paper.

TUBULIFERA.

Family CHRYSIDIDÆ.

Holopyga indica, Mocsáry.

Holopyga indica, Mocs., Mon. Chrys., 1889, p. 118, ♀ ; Bingham, Faun. Brit. Ind. Hym., ii, 1903, p. 422.

Hab.—Burma : Rangoon.

Apparently widely spread. I took it at Delhi, Nurse in Rajputana.

Ellampus timidus, Nurse.

Ellampus timidus, Nurse, Entom., xxxv, 1902, p. 305, ♀ ♂ ; Bingham, Faun. Brit. Ind. Hym., ii, 1903, p. 42, pl. I, fig. 11, ♀

Hab.—Assam : Margherita.

As widespread as the last. The single ♀ in the collection agrees entirely with a specimen sent me by Col. Nurse, taken in Baluchistan.

Hedychridium wroughtoni, du Buysson.

Hedychridium wroughtoni, du Buyss., Jour. Bomb. N. H. Soc., x, 1896, p. 466, pl. 2, fig. 6, and pl. 5, fig. 4 ; Bingham, Faun. Brit. Ind. Hym., ii, 1903, p. 425.

Hab.—Nepal : Soondrijal ; Oudh : Lucknow.

Originally described from Central India.

Chrysis mendicalis, Cameron.

Chrysis mendicalis, Cam., Mem. Manch. Lit. and Phil. Soc., xli, 1897, p. 4 ; Bingham, Faun. Brit. Ind. Hym., ii, 1903, p. 451.

Hab.—Purneah.

Originally described from Barrackpore.

Chrysis triacantha, Mocsáry.

Chrysis triacantha, Mocs., Mon. Chrys., 1889, p. 325; Bingham, Faun. Brit. Ind. Hym., ii, 1903, p. 453.

Hab.—Bengal: Purneah, Calcutta.

Extends to Ceylon and the Malayan subregion.

Chrysis nitidula, Fabricius.

Chrysis nitidula, Fabr., Syst. Ent., 1775, p. 359; Mocs., Mon. Chrys., 1889, p. 347.

Hab.—Assam: Margherita.

Of very wide distribution in both hemispheres. Not, however, recorded from India before.

Chrysis fuscipennis, Brullé.

Chrysis fuscipennis, Brullé, Hist. Nat. Ins. Hym., iv, 1846, p. 38; Mocs., Mon. Chrys., 1889, p. 370; Bingham, Faun. Brit. Ind. Hym., ii, 1903, p. 467.

Hab.—Purneah, Siliguri, Calcutta, Perso-Baluch Frontier.

A common form throughout India.

Chrysis angustata, Mocsáry.

Chrysis angustata, Mocs., Termész. Füzetek, xv, 1892, p. 225; Bingham, Faun. Brit. Ind. Hym., ii, p. 469.

Hab.—Purneah.

Occurs also in Upper Burma: Mandalay and Maymyo.

Chrysis obliterata, Mocsáry.

Chrysis obliterata, Mocs., Termész. Füzetek, xi, 1887, p. 15; *id.*, Mon. Chrys., 1889, p. 377; Bingham, Faun. Brit. Ind. Hym., ii, 1903, p. 460.

Hab.—Baluchistan.

Taken also in various parts of northern, central, and western India.

Chrysis cupreiventris, Bingham.

Chrysis cupreiventris, Bingham, Jour. Bomb. N. H. Soc., xii, 1898, p. 117, ♀; *id.*, Faun. Brit. Ind. Hym., ii, 1903, p. 465.

Hab.—Himalayas: Phagu near Simla.

Chrysis sarakhsensis, Radoszkowski.

Chrysis sarakhsensis, Radoszk., Rev. d'Ent., x, 1891, p. 195; Bingham, Faun. Brit. Ind. Hym., ii, 1903, p. 475.

Hab.—Bengal: Saraghat.

Has a wide range from Central Asia to Western India and Burma.

Chrysis bengalensis, Mocsáry.

Chrysis bengalensis, Mocs., Mon. Chrys., 1889, p. 527, ♀ ;
Bingh., Faun. Brit. Ind. Hym., ii, 1903, p. 482.

Hab.—Bengal : Purneah.

Recorded before from Bombay and Madras.

Chrysis lusca, Fabricius.

Chrysis lusca, Fabr., Syst. Piez., 1804, p. 171 ; Mocs., Mon.
Chrys., 1889, p. 527, ♂ ♀ ; Bingh., Faun. Brit. Ind. Hym., ii, 1903,
p. 484, pl. i, fig. 2.

Hab.—United Provinces ; Bengal : Murshidabad.

Occurs throughout India, Ceylon and Burma.

Chrysis orientalis, Guérin.

Pyria orientalis, Guér., Rev. Zool., 1842, p. 146, ♂

Chrysis orientalis, Mocs., Mon. Chrys., 1889, p. 592 ; Bingh.,
Faun. Brit. Ind. Hym., ii, 1903, p. 485.

Hab.—Bengal : Calcutta.

Spread generally throughout India, but not as yet recorded
from Assam or Burma.

Chrysis indica, Mocsáry.

Chrysis indica, Mocs., Mon. Chrys., 1889, p. 591 ; Bingh.,
Faun. Brit. Ind. Hym., ii, 1903, p. 486.

Hab.—Bengal : Purneah.

Fea obtained it in Upper Burma.

Chrysis oculata, Fabricius.

Chrysis oculata, Fabr., Syst. Ent., 1775, p. 357 ; Mocs., Mon.
Chrys., 1889, p. 543 ; Bingh., Faun. Brit. Ind. Hym., ii, 1903,
p. 488, pl. i, fig. 15.

Hab.—Bengal : Purneah.

Extended throughout India, Ceylon, Assam and Burma.

Stilbum cyanurum, Förster.

Chrysis cyanurum, Först., Nov. Spec. Ins., 1771, p. 89 ; Mocs.,
Mon. Chrys., 1889, p. 190, pl. 2, figs. 3, 4 and 16 ; Bingh., Faun.
Brit. Ind. Hym., ii, 1903, p. 433, pl. i, fig. 6.

Hab.—Bengal : Purneah.

Of world-wide distribution.

FOSSORES.

Family MUTILLIDÆ.

Mutilla sex-maculata, Sevederer.

Mutilla sex-maculata, Seved. (*nec* Smith), Nouv. Act. Holm.,
viii, 1787, 286 ; Rad. and Sich., Hor. Soc. Ent. Ross., vi, 1869,
p. 246.

Hab.—Rampur, Bijnor, Meerut, Burdwan, Purneah.
A very variable form generally distributed throughout India.

Mutilla indefrusa, Cameron.

Mutilla indefrusa, Cam., Mem. Manch. Lit. and Phil. Soc., xli, 1897, p. 62.

Hab.—Lucknow.

Mutilla interrupta, Olivier.

Mutilla interrupta, Oliv., Encycl. Méth., viii, 1823, p. 62 ;
Bingh., Faun. Brit. Ind. Hym., i, 1897, p. 14.

Hab.—Purneah.

Spread throughout India, Assam and Burma, extending to China.

Mutilla pilosella, Magretti.

Mutilla pilosella, Magr., Ann. Mus. Civ. Genova, xxii, 1892, p. 220, ♂ ;
Bingh., Faun. Brit. Ind. Hym., i, 1897, p. 45.

Hab.—Burma : Rangoon.

Described originally from Upper Burma. ♀ unknown.

Mutilla ruficrus, Magretti.

Mutilla ruficrus, Magr. (Radoszkowski MS.), Ann. Mus. Civ. Genova, xxii, 1892, p. 205 ;
Bingh., Faun. Brit. Ind. Hym., i, 1897, p. 14.

Hab.—Bengal : Port Canning.

Not recorded before from Continental India.

Mutilla lathonia, Cameron.

Mutilla lathonia, Cam., Mem. Manch. Lit. and Phil. Soc., xliv, 1900, p. 18.

Hab.—Calcutta, Bareilly.

Mutilla vicinissima, Gribodo.

Mutilla vicinissima, Grib., Ann. Mus. Civ. Genova, xiv, 1884, p. 13 ;
Bingh., Faun. Brit. Ind. Hym., i, 1897, p. 13.

Hab.—Calcutta.

Described originally from Upper Burma.

Mutilla spectra, form nov.

♀ . Apical half of the mandibles, the clypeus, antennæ, legs and abdomen, black ; the base of the mandibles, the head and thorax, dark red. The head in front and above, the thorax above, and the abdomen, clothed with stiff, erect, black hairs ; the mouth parts below the base of the antennæ, the occiput, the thorax on the sides, the legs, and the spots and bands on the abdomen, covered with golden yellow pubescence, inclining to ferruginous on the legs, the spines on which are distinctly dark ferruginous. The pubescent

markings on the abdomen are as follows: Above: a spot in the middle of the basal segment, three round spots in a transverse row close to but not actually on the base of the second, a medially interrupted broad band on the third, and a lateral spot on the fourth segment; beneath: the second, third and fourth segments fringed with stiff yellow hairs, anal segment similarly fringed on the sides and below. Head rounded, narrower than the thorax, coarsely and deeply punctured; clypeus very short, anteriorly crenulate; antennæ robust, the second joint of the flagellum slightly longer than the third or fourth; eyes oval, prominent; occiput slightly arched. Thorax subrectangular, convex, strongly tuberculate at the sides, above very coarsely and deeply punctured, the intervals between the punctures running into longitudinal coarse striæ; seen from above slightly narrower posteriorly than anteriorly, its posterior face vertical, distinctly concave. Abdomen massive, oval, longer than the head and thorax united; pygidial area convex, very delicately transversely striate; ventral carina on the basal segment short, deep, wedge-shaped, entire.

Length.—♀, 13 mm.

Hab.—Oncha near Naini Tal, United Provinces.

A very distinct form not closely resembling any Indian form known to me. In size and general shape not unlike *M. pulchrina*, Smith, but abundantly different in sculpture and markings. Like Smith's species, the pygidial area is convex and finely transversely striate, and the ventral carina wedge-shaped, short and deep.

Mutilla indiga, form nov.

♂ Head, postscutellum, median segment, legs and abdomen black; pro- and mesonotum and scutellum red; sides of the thorax and pectus black; antennæ dull golden brown, tips of the mandibles and the antennal tubercles red; pubescence silvery white, dense, and long on the face and front of the head and on the legs, shorter on the thorax and at base of and beneath the abdomen; on the last it forms distinct fringes along the apical margins of segments 1 to 3. Head orbicular, very slightly narrower than the thorax; pronotum long, posterior margin deeply arched; mesonotum convex, parapsidal furrows deep and well marked; scutellum and postscutellum short and laterally compressed; median segment long, strongly convex and gradually sloped posteriorly; abdomen subpetiolate, broad at base of second segment, gradually but quickly narrowed to the apex. Head, thorax and abdomen shining; head and thorax anteriorly finely and somewhat sparsely punctured; median segment more closely punctured with wide shallow reticulations; abdomen finely, somewhat closely and regularly, punctured. Wings fusco-hyaline; tegulæ large, black and shining; veins brown.

Length.—♂, 8; *exp.* 16 mm.

Hab.—Jhansi, N.-W. India.

Superficially resembles *Mutilla (Odontomutilla) herpa*, Cameron, from Sarawak, but structure, shape of median segment, and sculpture, all differ widely.

Family SCOLIIDÆ.

Iswara luteus, Westwood.

Iswara luteus, Westwood, Trans. Ent. Soc. Lond., 1850, p. 233, pl. 7, figs. 5, 5a—5f; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 55.

Tiphia himalayensis, Cameron.

Tiphia himalayensis, Cam.

Hab.—Nepal: Chandragiri.

Scolia quadripustulata, Fabr., var. *binotata*, Fabricius.

Scolia binotata, Fabr., Syst. Piez., i, 1804, p. 244; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 84.

Hab.—Ceylon.

Throughout India, Assam, Burma and Ceylon.

Elis prismatica, Smith.

Scolia prismatica, Smith, Cat. Hym. Brit. Mus., iii, 1855, p. 102, ♀; *Elis prismatica*, Sauss. and Sich., Cat. Scol., 1864, p. 190; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 98.

Hab.—Himalayas: Simla, Phagu, Matiana, 8,000 ft.; Mussoorie 7,000 ft.; Darjiling 7,000 ft.

Found also in Burma, Tenasserim, China.

Elis ceylonica, Kirby.

Campsomeris ceylonica, Kirby, Trans. Ent. Soc. Lond., 1889, p. 452; *Elis ceylonica*, Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 94.

Hab.—Nepal.

Described originally from Ceylon.

Family POMPILIDÆ.

Pseudagenia alaris, Saussure.

Agenia alaris, Sauss., Novara Reise Hym., 1867, p. 52.

Pseudagenia alaris, Cam., Mem. Manch. Lit. and Phil. Soc. (4), iv, 1891, p. 436; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 117.

Hab.—Calcutta.

Found also in Sikhim, Ceylon, Burma and Tenasserim.

Pseudagenia lævicula, Bingham.

Pseudagenia lævicula, Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 118.

Hab.—Burma: Rangoon.

Described originally from Tenasserim.

Pseudagenia culiciformis, form. nov.

♂. Uniform black. Head and thorax anteriorly covered with short, erect, soft whitish hairs, those on the cheeks posteriorly form a fringe. Head, pronotum, mesonotum, the sides of the thorax and the abdomen above very minutely and closely punctured; scutellum and postscutellum obliquely finely striate; median segment more coarsely punctured than the thorax, with a granular appearance. Wings hyaline, nervures brown, stigma jet black. Head lenticular, from in front orbicular; clypeus convex, as broad as long; antennæ long, thick and densely pubescent; second, third and fourth joints of the flagellum subequal; face in front slightly convex, vertex strongly arched, ocelli much closer to each other than are the posterior ones to the eyes. Thorax and median segment slightly compressed, narrow, together half as long again as the abdomen; pronotum comparatively long, the sides anteriorly convergent, its posterior margin angularly arched; mesonotum convex; scutellum laterally compressed; median segment very long, gently sloped to apex, rounded and convex; legs long, slender, tibiæ entirely without spines. Abdomen short, fusiform, subpetiolate, with a trace of a transverse furrow on the second ventral segment.

Length.—♂, 6; *exp.* 13 mm.

Hab.—Kumaon: Naini Tal, 6,400 feet.

Pseudagenia invidiosa, form nov.

♀ Black, covered all over with fine, short, white down, head and thorax very minutely and delicately aciculate; median segment finely transversely striate; abdomen very minutely and somewhat sparsely punctured, shining, the apical margins of all the segments very narrowly brownish testaceous. Head somewhat wider than the thorax; mandibles almost hidden under the clypeus, their apices castaneous red; clypeus comparatively large, convex, anteriorly triangularly produced, carinate down the middle; antennæ comparatively stout, the second joint of the flagellum one-third longer than the third, the latter slightly longer than the fourth; front convex, sloping upwards to the vertex; vertex transverse, the ocelli in an equilateral triangle closer to each other than are either of the posterior ocelli to the eyes; pronotum almost transverse anteriorly, broadly arched posteriorly; mesonotum slightly convex; scutellum, postscutellum and median segment declivous, the last rounded posteriorly and furrowed down the middle; legs stout, smooth or with only a few minute spines on the intermediate tibiæ; wings hyaline at base, fuscous towards their apices; abdomen subpetiolate, fusiform; sting well exerted.

Length.—♀, 8; *exp.* 17 mm.

Hab.—Soondrijal, Nepal.

Closest to *P. clypeata*, Bingh., from which it differs in the shape of the clypeus; that in *clypeata* is transversely suboval and has a conspicuous white macula on each side; the legs also are different in colour, being entirely black in the present form.

Pseudagenia mimica, form nov.

♀ Black, smooth and shining, sparsely clothed with somewhat long, soft, white hairs, which are most dense on the sides of the head behind the eyes and on the sides of the thorax and median segment; pronotum anteriorly with a rich purple prismatic sheen. Head and pronotum very sparsely and minutely punctured; mesonotum, scutellum and postscutellum very delicately aciculate; median segment furrowed medially from base, very obsoletely, transversely striate; abdomen smooth. Head broad, about twice as broad as long and much broader than the thorax; mandibles broad and stout; clypeus transversely oval, strongly convex, anterior margin narrowly reflexed; antennæ short but slender, the second joint of the flagellum half as long again as the third or fourth; front convex, bearing a very narrow medial furrow from the anterior ocellus to between the base of the antennæ; the ocelli very close together, the space between them barely half that between the lateral ocelli and the eyes; vertex broad, transverse. Thorax comparatively short, the pronotum transverse anteriorly, angularly arched posteriorly; mesonotum, scutellum, and postscutellum convex; median segment rounded, with an oblique slope posteriorly; legs slender, smooth; wings hyaline; nervures dark brown. Abdomen fusiform, about as long as the thorax and median segment, the second to the fifth segments in certain lights obsoletely banded along their posterior margins with silvery pile.

♂ Similar, smaller and more slender, the purple tint on the pronotum and the obsolete transverse silvery bands on the abdomen absent.

Length.—♀, 9; ♂, 6: *exp.* ♀, 16; ♂, 13 mm.

Hab.—Himalayas: Mussoorie, 7,000 ft.

Its nearest ally is *P. stulta*, Bingham. It differs from that form in the much shorter prothorax and median segment, the finely aciculate mesonotum, the colour of the legs, etc.

Salix (Priocnemis) rothneyi, Cameron.

Salix rothneyi, Cam., Mem. Manch. Lit. and Phil. Soc. (4), iv, 1891, pp. 452 and 453; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 146.

Hab.—Sikhim: Darjiling.

Descends also to the plains, as it was originally taken at Barrackpore.

Pompilus hecate, Cameron.

Pompilus hecate, Cam., Mem. Manch. Lit. and Phil. Soc. (4), iv, 1891, pp. 458 and 462, pl. 3, fig. 8; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 171.

Hab.—Nepal.

This form also descends to the plains; described originally from Barrackpore.

Pompilus iliacus, Cameron.

Pompilus iliacus, Cam., Jour. Straits Asiatic Soc., xxxviii, p. 90.

Hab.—Nepal: Nagarkote.

The specimen is not typical, and it is possibly a closely allied new form.

Family SPHEGIDÆ.

Tachytes modesta, Smith.

Tachytes modesta, Smith, Cat. Hym. Brit. Mus., iv, 1856, p. 299; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 190.

Hab.—Calcutta.

Probably spread throughout India, Burma, Siam and China.

Lyroda formosa, Smith.

Morphota formosa, Smith, Jour. Linn. Soc. Lond., 1859, p. 17, ♀

Lyroda formosa, Kohl., Verh. Zool.-bot. Ges. Wien, 1884, p. 267; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 209.

Hab.—Lucknow; Calcutta.

Widely spread. Originally described from the Celebes.

Pison punctifrons, Shuckard.

Pison punctifrons, Shuck., Trans. Ent. Soc. Lond., 1837, p. 77, ♀; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 219.

Hab.—Purneah.

Spread sparingly throughout Continental India, Assam and Burma.

Trypoxylon intrudens, Smith.

Trypoxylon intrudens, Smith, Trans. Zool. Soc. Lond., vii, 1872, p. 188; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 224.

Hab.—Purneah.

Occurs apparently throughout Continental India, Assam, Ceylon, Burma and Tenasserim.

Ammophila (Psammophila) tydei, Le Guillon.

Ammophila tydei, Le Guillon, Ann. Soc. Ent. Fr., x, 1841, p. 319, ♀

Hab.—Himalayas: Simla hills, Theog, 8,000 ft.

A remarkably wide ranging form found in Southern Europe, Northern Africa, through Western Central Asia, Baluchistan, the Himalayas, parts of Southern India, and the Malayan region to Australia.

Sceliphron bilineatum, Smith.

Pelopæus bilineatus, Smith, Ann. Mag. Nat. Hist. (2), ix, 1852, p. 47; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 238.

Hab.—Meerut.

Originally described from Western India.

Gorytes icariiformis, form. nov.

♀ Black: the anterior and lateral margins of the clypeus, a line gradually broadened anteriorly along the lower half of the inner orbits, and the scape anteriorly, bright sulphur-yellow. A line on the posterior margin of the pronotum, the apex of the femora, the tibiæ and tarsi of the anterior and intermediate legs, the knees and basal portions of the tibiæ of the posterior legs, the swollen globular portion of the first abdominal segment above, a broad band along the apical margin of the second abdominal segment and narrower similar bands on the third and fourth segments orange-red; the bands on the second and third segments continued narrowly on the ventral side. Head and thorax anteriorly closely, very finely punctured; opaque; a deep transverse groove with a number of short, longitudinal carinations between mesonotum and scutellum; median segment with a large basal triangular area coarsely longitudinally ridged and with a conspicuous medial short longitudinal sulca, which is divided into little quadrate areas by short transverse carinæ; rest of median segment coarsely sculptured, somewhat irregularly reticulate. Abdomen smooth and shining, a deep crenulated constriction between the first and second segments. Head transverse, nearly as broad as the thorax; mandibles narrow, acute at apex; clypeus transverse, convex in the middle, about twice as broad as high, the sides oblique, the anterior margin transverse, reflexed; antennæ short and slender, opaque, second flagellar joint twice the length of third; face slightly concave, inner orbits of the eyes parallel; vertex transverse. Thorax short and massive, the mesonotum slightly convex, broader than long; legs stout, posterior tibiæ with a few blunt, short spines; claws simple; wings hyaline, ample, fore and hind wings anteriorly shaded with fuscous nervures, brown. Abdomen longer than the thorax, first segment petiolate at base, apex suddenly enlarged and globose above as in most of the forms of the social wasps belonging to the genus *Icaria*.

Length.—♀, 11; *exp.* 23 mm.

Hab.—India.

The single specimen of this beautiful and very distinct form sent to me unfortunately has no particular locality on its label.

Philanthus pulcherrimus, Smith.

Philanthus pulcherrimus, Smith, Cat. Hym. Brit. Mus., iv, 1856, p. 469; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 299.

Hab.—Jullundur, Ferozepore, Agra.

Widely distributed in Continental India.

Philanthus (Trachypus) nepalensis, form. nov.

♂ Black with yellow markings. Head: a triangular mark on the clypeus, a crescentic spot above it between the base of the antennæ, an oval spot above that, a spot on the front of the scape,

a broad stripe on the sides of the face along the lower half of the inner orbits, and a large spot behind the eyes, yellow. Thorax: a line on the pronotum, a spot on the tegulæ anteriorly, the tubercles, a spot on the mesopleuræ in front, a transverse oval mark on the scutellum, a similar smaller mark on the postscutellum, and a spot on either side of the median segment at apex, yellow. Legs: the apex of the femora and the tibiæ in front and the basal joints of the tarsi of the anterior and intermediate legs, and the knees and basal joints of the tarsi of the posterior legs yellow. Abdomen: a large oval spot edged anteriorly with dark red on either side of the second segment at apical margin, and a waved line on the apical margins of the third, fourth and fifth segments, with a transverse medial spot on the apical margin of the sixth segment, yellow; ventrally there are short, yellow, lateral lines on the apical margins of the second and third segments. Head, thorax, and base of first abdominal segment densely punctured, granular; rest of the abdomen with a few very fine scattered punctures. Head broader than the thorax; mandibles stout, longitudinally grooved; clypeus and face in front slightly convex; antennæ short, opaque; second joint of flagellum four times as long as the third. Thorax oval; mesonotum large, convex; median segment rounded posteriorly, medially furrowed from base, the furrow not reaching the apex; legs slender, the tibiæ with a few minute spines; wings clear hyaline; nervures brown. Abdomen: the basal segment petiolate, long, about half the length of the rest of the abdomen, convexly swollen at apex.

Length.—♂, 11; *exp.* 20 mm.

Hab.—Nepal: Katmandu.

This form is nearest to *P. punjabensis*, Nurse, but can be distinguished as follows:—

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|-----|---|------------------------|
| (a) | Head sparsely punctured; clypeus bisinuate; first and second abdominal segment with broad, oval, lateral, yellow spots | <i>P. punjabensis.</i> |
| (b) | Head closely punctured, granular; clypeus arched, not bisinuate anteriorly; only second segment with broad, oval, lateral, yellow spots | <i>P. nepalensis.</i> |

Cerceris pictiventris, Dahlbom.

Cerceris pictiventris, Dahlb., Hym. Eur., i, 1845, p. 498; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 305.

Var. *Cerceris ferorus*, Smith, Ann. Mag. Nat. Hist. (4), xii, 1873, p. 411.

Hab.—Central India: Mhow.

Found throughout India, Assam, Ceylon, Burma and Tenasserim, extending as far as Java in the Malayan region. The specimen is var. *ferorus*, Smith.

Cerceris tetradonta, Cameron.

Cerceris tetradonta, Cam., Mem. Manch. Lit. and Phil. Soc. (4), iii, 1890, pp. 250, 261, pl. 10, fig. 12; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 304.

Hab.—Purneah.

Originally described from Poona.

Cerceris hilaris, Smith.

Cerceris hilaris, Smith, Cat. Hym. Brit. Mus., iv, 1856, p. 452. ♀; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 311.

Hab.—Himalayas: Mussoorie.

Probably found throughout Continental India.

Cerceris vigilans, Smith.

Cerceris vigilans, Smith, Cat. Hym. Brit. Mus., iv, 1856, p. 454; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 308.

Hab.—Calcutta.

Common.

Crabro annandali, form nov.

♀ Black, a short streak anteriorly near apex of scape of antennæ, a transverse band on the pronotum, the tegulæ of the wings anteriorly, the apices of all the femora, broad transverse bands along the bases of abdominal segments 2 and 5, and small lateral spots at the bases of segments 3 and 4, red. The band on the second abdominal segment posteriorly emarginate in the middle, the lateral spots on the fourth segment very small. Pubescence, erect, black on the head and thorax anteriorly, soft and whitish on the median segment and base of the abdomen; clypeus covered with dense silvery short pile. Head large, quadrate, broader than the thorax, very densely and minutely punctured, opaque; clypeus convex, transverse, shining, with a few scattered punctures; eyes very broad anteriorly, suddenly and strongly narrowed towards the vertex; seen from the front the inner orbits are widely divergent towards the vertex; antennæ comparatively short and robust; a deep fovea between the eyes above the base of the antennæ, which is continued as a shallow impressed line almost to the anterior ocellus; ocelli in an equilateral triangle; vertex and the cheeks behind the eyes very broad, the former almost flat. Thorax: pronotum transversely impressed in the middle; deep transverse sulci between the mesonotum and scutellum, between the scutellum and postscutellum, and between the last and the median segment, which last sulcus is margined anteriorly by a slender shining carina, the ends of which are turned downwards; median segment convex, steeply sloped, marked by a deep and comparatively broad medial furrow from base to near apex, crossed about midway by a transverse narrower furrow. The thorax anteriorly densely punctured like the head,

the median dull and opaque but with only scattered fine punctures. Legs: stout, the posterior femora studded with two rows of short thick spines. Wings: light brownish hyaline; nervures brown. Abdomen minutely aciculate, dull and opaque except the basal segment which is smooth and shining above.

Length.—♀, 15; *exp.* 31 mm.

Hab.—Himalayas, 9,000 ft., north of Taunghi.

This very distinct form superficially resembles *C. melanotarsis*, Cam., from the Khasi Hills, but in the latter the legs are more or less red; there is only one transverse red stripe on the abdomen, and that is on the third, not the second abdominal segment; and the sculpture of the median segment is entirely different.

DIPLOPTERA.

Family EUMENIDÆ.

Odynerus ovalis, Saussure.

Odynerus ovalis, Sauss., Mon. Guêp. Sol., 1852, p. 215; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 369.

Hab.—Ferozepore.

Throughout the plains of India.

Family VESPIDÆ.

Polybia stigma, Smith.

Polybia stigma, Smith, Jour. Linn. Soc. Lond., 1858, p. 114; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 384.

Hab.—Burma: Rangoon.

A common form in Burma, extending to Borneo.

Polistes marginalis, Fabricius.

Vespa marginalis, Fabr., Syst. Ent., 1775, p. 367; Sauss., Mon. Guêp. Soc., 1853-1858, p. 62, pl. 6, fig. 2.

Hab.—Himalayas: Simla; Nepal: Katmandu.

A very widespread form. The Himalayan form or variety is very dark.

Vespa flaviceps, Smith.

Vespa flaviceps, Smith, Trans. Zool. Soc. Lond., vii, 3, 1870, p. 191, pl. 21, figs. 10 and 11; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 406.

Hab.—Himalayas: Simla hills.

At low elevations in Sikhim, also found in the hills of Tenasserim.

Vespa auraria, Smith.

Vespa auraria, Smith, Trans. Ent. Soc. Lond., 1852, p. 46, pl. 8, fig. 8, ♀; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 407.

Hab.—Himalayas: Simla.

Found also in the hills of Tenasserim.

Vespa structor, Smith.

Vespa structor, Smith, Trans. Zool. Soc. Lond., vii, 3, 1870, p. 191, pl. 21, fig. 12; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 404.

Hab.—Himalayas: Simla.

Extends also to the Sikhim Himalayas.

Family APIDÆ.

Halictus albescens, Smith.

Halictus albescens, Smith, Cat. Hym. Brit. Mus., i, 1853, p. 61; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 423.

Hab.—Calcutta; Rajmahal; Himalayas: Simla, Matiana; Agra; Katmandu.

Widely distributed and variable.

Halictus subopacus, Smith.

Halictus subopacus, Smith, Cat. Hym. Brit. Mus., i, 1853, p. 63, ♀; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 428.

Hab.—Darjiling, Kurseong.

I took it in Upper Burma.

Halictus polyctor, form nov.

♀ Black; the head, pronotum and median segment opaque; the mesonotum, scutellum, postscutellum and the bases of the abdominal segments highly polished and shining. Head, thorax and abdomen with long, soft, white pubescence shorter and recumbent on the face in front and forming transverse narrow bands that are more or less posteriorly emarginate at the bases of abdominal segments 2 to 5. Head flat in front, closely punctured; clypeus slightly produced, truncate anteriorly; eyes with the inner orbits concavely arched and slightly convergent anteriorly. Thorax short, sparsely punctured above; median segment slightly compressed, truncate posteriorly, the enclosed space at base somewhat coarsely punctured, rugose. Wings hyaline, iridescent. Legs, slender, pubescent, on the posterior four legs the pubescence long, the calcaria yellow. Abdomen as long as the head and thorax united; segments 2 to 5 distinctly, finely, but sparsely punctured, each strongly constricted at base. Anal rima ferruginous.

Length.—♀, 6; *exp.* 13 mm.

Hab.—Himalayas: Theog near Simla, 8,000 ft.

A more slender and smaller insect than *H. constrictus*, Smith, its nearest ally.

Halictus deiphobus, form nov.

♀ Black. Head, thorax, legs, and abdomen, laterally and beneath with abundant, soft, erect, greyish or fuscous white pubescence; abdomen with comparatively broad whitish pubescent bands at the bases of segments 2 to 4; anal rima black. Head, thorax, and abdomen very minutely and densely punctured but not opaque, slightly shining; on the apex of the clypeus the punctures are larger and more scattered. Head about as wide as the thorax; clypeus broader than long, abruptly truncate anteriorly; antennæ short, opaque, bare; third, fourth, and fifth joints of the flagellum subequal, second joint twice the length of either of them; face flat; vertex arched; eyes wide apart, their inner orbits parallel; ocelli large and prominent, placed in a curve. Thorax short; mesonotum strongly convex, with a short impressed line above each tegula; median segment very short, evenly rounded posteriorly and vertical, the enclosed space at base very large, reticulate, punctate; legs very stout, the femora and tibiæ more thickly pubescent than the thorax, the intermediate and posterior calcaria ferruginous; wings hyaline, the nervures and stigma light brown. Abdomen as long as or a little longer than the head and thorax united, segments 1 to 4 with a medial transverse impression more or less obsolete in the middle but well marked on the sides.

Length.—♀, 8-9; *exp.* 14-16 mm.

Hab.—Himalayas: Simla hills, Matiana, 8,000 ft.

Differs from *H. vishnu*, Cam., in the abdominal segments being closely punctured right up to the margin, which is glabrous in *vishnu*, and from *H. buddha*, Cam., in the margins of the abdominal segments not being constricted, and in the head and thorax, though closely punctured, not being opaque. It differs also in the colour of the legs. *H. vishnu* and *H. buddha* were described from males, and it is quite possible that one of them may be the ♂ of the present form.

Halictus lucidipennis, Smith.

Halictus lucidipennis, Smith, Cat. Hym. Brit. Mus., i, 1853, p. 62, ♀; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 435.

Hab.—Kumaon: Bhim Tal; Simla hills: Theog.

Halictus senescens, Smith.

Halictus senescens, Smith, New Sp. Hym. Brit. Mus., 1879, p. 30; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 438.

Hab.—Mussoorie hills: Landour.

Generally distributed in India and Burma.

Halictus paris, form nov.

♀ Black, more or less shining. Head, thorax, legs, and the abdomen laterally and beneath clothed with short, erect, pale yellow pubescence, the abdomen probably in fresh specimens

with transverse bands of similar but shorter and recumbent pubescence on the apical margins of segments 1 to 4 (in the type and only specimen available, these bands are more or less abraded); anal rima black, apex of abdomen with [ferruginous pubescence. Head, thorax and abdomen minutely punctured, the punctures dense on the front of the head and the vertex, and on the thorax, above and on the sides, more scattered on the clypeus anteriorly and on the abdomen above. Head broader than the thorax, lenticular, posteriorly widely emarginate; clypeus convex, broader than long, its anterior margin transverse; antennæ short, stout, opaque, second joint of flagellum shorter than the third; ocelli in a curve just below the vertex; vertex arched. Thorax short; mesonotum convex; scutellum broad, wedge-shaped, truncate posteriorly; postscutellum sunk, densely pubescent; median segment compressed, vertical posteriorly, the enclosed space at base finely and very densely punctured, separated from the postscutellum by a sharp, curved, shining carina; legs stout, black beneath, rufous above on the femora, tibiæ and tarsi; wings hyaline; nervures and stigma pale brown. Abdomen shining, the margins of the segments where the pubescence is abraded, rufo-testaceous.

Length.—♀, 8; *exp.* 17 mm.

Hab.—Himalayas: Simla hills, Theog, 8,000 ft.

A race or representative form of the European *H. calceatus*, Scopoli, from which it differs in being much narrower in shape and somewhat smaller. The enclosed space at the base of the median segment in the European form is much more coarsely punctured, and has the sides of that segment rugulose and not smooth and shining.

Anthrena floridula, Smith.

Andrena floridula, Smith, Second Yarkand Mission, Hym., p. 2, fig. 4 of plate; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 444.

Hab.—Himalayas: Simla hills, Phagu, Theog, 8,000 ft.

Anthrena moris, Brullé.

Andrena moris, Brullé, Exped. Sc. Morea, Zool., ii, 1832, p. 353, pl. 49, figs. 8, 9.

Var. *Andrena lugubris*, Erichs., M. Wagner, Reise in Algeria, iii, 1840, p. 191, ♀ ♂.

Hab.—Himalayas: Simla hills, Matiana, 8,000 ft.

A solitary specimen quite indistinguishable from specimens from Northern Africa.

Anthrena brunneipennis, form nov.

♀ Black, densely pubescent. The pubescence pale yellow on the head, the front and sides of the thorax, and on the abdomen, very long, tufted and hoary on the thorax posteriorly and on the

median segment, and short, very dense and rich ferruginous on the tibiæ and tarsi, and on the apical two abdominal segments. Wings hyaline, basally stained or clouded with brown, this colour reaching up to the apices of the radial cubital and discoidal cells; the last joint of the tarsi of the anterior and intermediate and the whole of the tarsi of the posterior legs rufo-ferruginous. Head about as broad as the thorax, the mandibles large, acute; clypeus large, convex, punctured, and with a medial, ill-defined, vertical carina, anteriorly transversely truncate. Thorax massive, finely punctured underneath the pubescence; median segment rounded posteriorly, with a not very steep slope to the apex. Abdomen somewhat depressed, long, not so densely pubescent as the thorax, the pubescence hoary and arranged more or less in transverse bands as fringes at the apical margins of the segments; the surface beneath the pubescence, where it is sparse, lightly and sparsely punctured and more or less shining.

Length.—♀, 15-16; *exp.* 28-31 mm.

Hab.—Himalayas: Simla hills, Matiana, 8,000 ft.

Nearest to probably a race of the European *A. nigroænea*, Kirby, but larger; the colour of the pubescence and of the wings different.

Anthrena burkelli, form nov.

♀ Black, the second and succeeding joints of the flagellum of the antennæ, and the apical four joints of all the tarsi, red. Head and thorax more or less densely, abdomen very sparsely, pubescent. The pubescence round the base of the antennæ and on the front rich dark brown, in striking contrast to that on the sides of the face and clypeus and on the back of the head, which is hoary, as is that on the thorax, the median segment and abdomen; pubescence on the legs shorter, denser, and ferruginous. Head, thorax, and median segment very finely and sparsely punctured, enclosed space at the base of the median segment more densely and coarsely punctured. Abdomen very minutely, densely punctured, opaque; apical margins of segments 1 to 4 smooth, pale yellowish, testaceous, that colour preceded by an obscure, transverse, narrow red band. Head as wide as the thorax; mandibles stout, polished, smooth, and shining; clypeus nearly circular, very convex, medially vertically carinate, and strongly, though not very closely, punctured; antennæ stout, rugulose, second joint of the flagellum as long as the succeeding three joints united. Thorax rather long; mesonotum convex; median segment rounded, somewhat oblique at the sides, its posterior face steeply sloped, truncate, and slightly concave; legs robust; wings hyaline; nervures and tegulæ testaceous. Abdomen oval, about as long as the thorax and head united.

Length.—♀, 12; *exp.* 23 mm.

Hab.—Himalayas: Simla hills, Matiana, 8,000 ft.

A very distinct form not closely allied to or resembling any form known to me.

Anthrena mollis, Smith.

Anthrena mollis, Smith, Desc. New Spec. Hym. Brit. Mus., 1879, p. 50; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 446.

Hab.—Jhansi.

A very variable and generally distributed form.

Anthrena sodalis, Cameron.

Anthrena sodalis, Cam., Mem. Manch. Lit. and Phil. Soc., xli, 1897, p. 121.

Hab.—Calcutta (?), Darjiling.

Described originally from Mussoorie.

Anthrena gracillima, Cameron.

Anthrena gracillima, Cam., Mem. Manch. Lit. and Phil. Soc., xli, 1897, p. 118, pl. 4, fig. 19; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 444.

Hab.—Darjiling, Calcutta (?).

Described originally from Mussoorie.

Anthrena mephistophelica, Cameron.

Anthrena mephistophelica, Cam., Mem. Manch. Lit. and Phil. Soc., xli, p. 117; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 443.

Hab.—Mussoorie.

Probably spread throughout the Himalayas above 6,000 feet.

Nomia elliotii, Smith.

Nomia elliotii, Smith, Trans. Ent. Soc. Lond., 1875, p. 44; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 449.

Hab.—Calcutta.

The plains of India generally; Burma; Tenasserim.

Nomia westwoodi, Gribodo.

Nomia westwoodi, Grib., Bull. Soc. Ent. Ital., 1894, p. 128; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 449.

Hab.—Calcutta.

Nomia punctulata, Dalla Torre.

Nomia punctulata, Westwood (*nec* Smith), Trans. Ent. Soc. Lond., 1875, p. 213, ♀ ♂

Nomia punctulata, Dal. Torre, Cat. Hym. (Apidæ), x, 1896, p. 169.

Hab.—Calcutta.

Not recorded before from India. Originally described from China.

Nomia clypeata, Smith.

Nomia clypeata, Smith, Trans. Ent. Soc. Lond., 1875, p. 54, pl. 2, fig. 18; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 456.

Hab.—Lucknow.

Nomia floralis, Smith.

Nomia floralis, Smith, Trans. Ent. Soc. Lond., 1875, p. 58; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 453.

Hab.—Calcutta.

Found also in Burma. A very variable form as to the amount of red on the abdomen.

Osmia adæ, Bingham.

Osmia adæ, Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 468.

Hab.—Himalayas: Simla, Phagu.

Megachile lanata, Fabricius.

Apis lanata, Fabr., Syst. Ent., 1775, p. 385.

Megachile lanata, Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 483.

Hab.—Cawnpore.

Spread throughout India.

Megachile umbripennis, Smith.

Megachile umbripennis, Smith, Cat. Hym. Brit. Mus., i, 1853, p. 175; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 483.

Hab.—Calcutta.

Found also in Tenasserim.

Megachile albifrons, Smith.

Megachile albifrons, Smith, Cat. Hym. Brit. Mus., i, 1853, p. 180; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 487.

Hab.—Agra.

Probably spread throughout the plains of India.

Megachile nana, Bingham.

Megachile nana, Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 487.

Hab.—Agra, Ferozepore.

I procured it in Tenasserim in the dry Dipterocarpus scrub on more or less bare rocky hills.

Ceratina hieroglyphica, Smith.

Ceratina hieroglyphica, Smith, Cat. Hym. Brit. Mus., ii, 1854, p. 226; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 503, pl. 4, fig. 3.

Hab.—Mussoorie.

Very widely spread.

Ceratina bhawani, form nov.

♀. Black and shining, the bases of the mandibles, a large quadrate spot on the labrum, an irregular, very broad, **┘** shaped mark on the clypeus, an oblong mark on either side of the face along the middle of the inner orbits, a transverse line on the pronotum, the tubercles, and the calcaria of all the tibiae of the legs yellowish white; very narrow transverse bands along the junctions of the first and second, second and third, and third and fourth abdominal segments dull castaneous. Head, smooth and polished; thorax, with the exception of the postscutellum, very sparsely and finely punctured; postscutellum and abdomen quite as finely but much more closely punctate; the enclosed space at base of the median segment very minutely but very densely punctured and rugulose. Head broader than the thorax, with the hollows round the bases of the antennae and on the face above characteristic of *Ceratina*; antennae short, stout; second, third, and fourth joints of the flagellum subequal. Thorax short, with medial and sublateral, short, longitudinally impressed lines; median segment compressed, rounded, and vertical posteriorly. Legs stout. Wings ample, hyaline; nervures and stigma very dark brown; tegulae testaceous. Abdomen long, massive, longer than head and thorax united.

Length.—♀, 8; *exp.* 17 mm.

Hab.—Himalayas: Simla hills, Theog 8,000 feet.

Allodape parvula, Smith.

Allodape parvula, Smith, New Spec. Hym. Brit. Mus., 1879, p. 98; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 507.

Hab.—Jubbulpore.

Heriades parvula, Bingham.

Heriades parvula, Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 508.

Hab.—Mhow.

I procured it in Burma.

Habropoda magretti, Bingham.

Habropoda magretti, Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 523.

Hab.—Ferozepore.

Habropoda krishna, form nov.

♂. Black. Head, thorax, and abdomen densely covered with long, pale brownish yellow pubescence turning to ferruginous golden on the posterior segments of the abdomen, and mixed throughout with a sprinkling of black hairs, the surface beneath more or less closely and finely punctured. Head: mandibles white; apical

third rich castaneous; base black; clypeus white; apical margin narrowly castaneous; sutures at the sides and above narrowly black. Thorax: the wings hyaline; nervures and tegulæ testaceous. Legs: apical joints of the tarsi rufo-testaceous; claws black. Head as wide as the thorax; the vertex broad, depressed; antennæ comparatively long, second joint of the flagellum attenuate at base, clavate at apex, as long as the succeeding three joints; ocelli in equilateral triangle, the distance between the anterior and either of the posterior ocelli greater than either of the posterior ocelli and the eye next to it; eyes large, prominent, their inner orbits parallel. Thorax globose; mesonotum convex, scutellum and postscutellum slightly raised, median segment short, vertical at the sides and to the apex. Abdomen subcordate, short, very convex above.

In some specimens not so densely pubescent as others, the pubescence forms distinct transverse bands on the apical margins of the segments beneath which the surface is rufo-testaceous. Female unknown.

Length.—♂, 12-13; *exp.* 24-27 mm.

Hab.—Sikhim: Darjiling, 7,000 ft.

Nearest to *H. radoszkowskii*, but differs in sculpture and in colour of pubescence.

Podalirius quadrifasciatus, Villers.

Apis quadrifasciata, Villers, Linn. Ent., iii, 1789, p. 319.

Anthophora quadrifasciata, Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 529.

Hab.—No locality on label.

Podalirius pulcherrimus, Bingham.

Anthophora pulcherrima, Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 532.

Hab.—Simla, Matiana, above 7,000 ft.

Bombus hæmorrhoidalis, Smith.

Bombus hæmorrhoidalis, Smith, Trans. Ent. Soc. Lond., 1852, p. 43; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 554.

Hab.—Himalayas: Simla; Subathu; Dhurrampur, 5,000 ft. Originally described from China.

Bombus tunicatus, Smith.

Bombus tunicatus, Smith, Trans. Ent. Soc. Lond., 1852, p. 43, pl. 8, fig. 7; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 549.

Hab.—Himalayas: Simla hills, Theog, Matiana, Phagu, 8,000 ft.

Originally described from China.

Bombus flavescens, Smith:

Bombus flavescens, Smith, Trans. Ent. Soc. Lond., 1852,
p. 45; Bingham, Faun. Brit. Ind. Hym., i, 1897, p. 550.

Hab.—Himalayas: Taunghi, 9,000 ft.

