

NEW INDIAN CHALCIDOIDEA (PARASITIC HYMENOPTERA).

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INTRODUCTION.

Among the various major groups of Hymenoptera the super-family Chalcidoidea, popularly called the "fairy flies," is economically the most important. Very few groups of insects approach it in its complexity of morphological and ecological features. Except for one or two minor groups such as the Agaontidae and the Megastigminae they are parasites of the various classes of insects, which in their turn are pests of economic plants. Some of them are also hyper-parasites and attack eggs, larvae, etc., of other parasitic Hymenoptera, including Chalcids.

Very little work, either systematic or bionomic, has been done on these insects in India. Occasional descriptions of the Chalcids of India have appeared in periodicals, most of which are not readily accessible. The earliest description of an Indian species was by Fabricius, while Kirby, Motschulsky and Walker described a number of species from Ceylon and continental India. Mayr added a few species to these records, and in 1898, Dalla Torre listed thirty Indian species. Several new forms were later described by Cameron, Westwood, Howard, Ashmead, Crawford, Rohwer, Gahan, Girault and Weld. Ramakrishna Ayyar¹, besides describing a few species, recently published references to some three hundred species, which have so far been described from India and Ceylon.

I became interested in these wasps in the course of my studies on gall midges, which are very heavily parasitized by the Chalcids. I made collections in different parts of India and have also examined the named collections in the Agricultural Research Institute, Coimbatore, and the Zoological Survey of India, Indian Museum, Calcutta. Numerous undetermined specimens collected at different times by the officers of the Zoological Survey were kindly placed at my disposal by Dr. Bains Prasad, Director, Zoological Survey of India. Dr. T. V. Ramakrishna Ayyar, Government Entomologist, Coimbatore, very generously loaned me the material from the Coimbatore Institute and also donated the types of some new species to the collection of the Zoological Survey. Numerous specimens were also collected by one of my sisters Miss M. Meenakshi. In the course of my studies I came across several new forms, some of which are described in this paper.

I take this opportunity of recording my grateful thanks to Dr. Bains Prasad, Director, Zoological Survey of India for giving me facilities

¹ Ayyar, T. V. Ramakrishna, *Spol. Zeyl.*, XIII, pp. 235-254, (1925); also see Ayyar, T. V. Ramakrishna and Margabandhu, V., *Journ. Bombay Nat. Hist. Soc.*, XXXVII, pp. 193-196 (1934).

for work in the laboratories of the Zoological Survey and for helping me in my work. To Dr. T. V. Ramakrishna Ayyar, Government Entomologist, Agricultural Research Institute, Coimbatore, I am indebted for the loan of the valuable collection of Chalcids, for going through the manuscript and many helpful suggestions.

Family CHALCIDIDAE.

Subfamily LEUCOSPIDINAE.

Genus *Polistomorpha* Westwood.

1839. *Polistomorpha*, Westwood, *Zeitschr. Entomol.*, I, p. 265.
 1874. *Polistomorpha*, Walker, *Thesaur. Entomol. Oxon.*, p. 133.
 1890. *Polistomorpha*, Schletterer, *Berlin. Entomol. Zeit.*, XXXV, p. 292.
 1904. *Polistomorpha*, Ashmead, *Mem. Carnegie Mus.*, I (4), pp. 247, 402.
 1906. *Polistomorpha*, Ducke, *Bull. Soc. Entomol. France*, pp. 163-166.
 1909. *Polistomorpha*, Schmiedeknecht, *Gen. Ins.*, fas. 97, p. 14.
 1922. *Polistomorpha*, Wêld, *Proc. U. S. N. Mus.*, LXI, p. 4.

Polistomorpha was erected as a subgenus of *Leucospis* Fab. in 1839 by Westwood to accommodate a Chalcid which he described under the specific name *surinamensis*; it was given generic status by Walker in 1874. About six species have so far been described, a key for which was published by Ducke in 1906. No member of this genus has been previously recorded from India. One specimen in a series of Chalcids received from Dr. T. V. Ramakrishna Ayyar, Coimbatore, belongs to this genus and is described here as a new species under the name *Polistomorpha indica*, sp. nov. This species appears to differ from the typical forms mainly in the absence of the spur on the hind coxae. Its relationship to the known forms is shown in the key below which is modified from Ducke.

The genus is recognised by the following characters: Vertex not cornuted, posterior margin of head straight, third antennal segment as long as or longer than the second; pronotum equally broad both anteriorly and posteriorly; scutellum normal, never heart-shaped; central part of metathorax projecting; hind coxae with or without a strong erect spur on the upper side; abdomen spindle-shaped, never compressed, with or without median longitudinal furrow towards the posterior end, apex pointed; ovipositor limited to the underside of the abdomen.

Key to species.

I. Hind coxae unspurred above; small species—

- A. Hind femur with over 10 teeth, first tooth large, rest small; carina on the yellow band on pronotum faint *P. bulbiventris* (Cresson).
 B. Hind femur with only 5 teeth; first short; second, third and fourth long; fifth large and tridentate; carina on the yellow band on pronotum well developed *P. indica*, sp. nov.

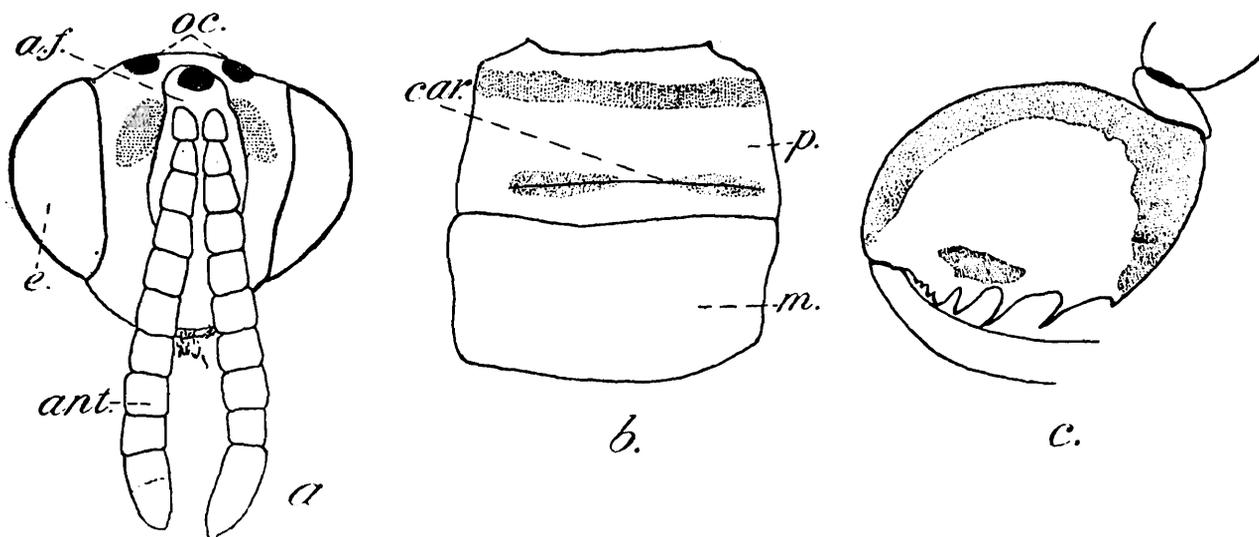
II. Hind coxae spurred above; large species—

A. Hind femur with 6 or 7 teeth, first larger than the rest—

- | | |
|---|----------------------------------|
| 1. Body black | <i>P. sphegoides</i> Walker. |
| 2. Body testaceous— | |
| a. Fourth dorsal segment shiny, punctation coarse, first tooth of hind femur triangular | <i>P. nitidiventris</i> Ducke. |
| b. Fourth dorsal segment somewhat opaque, punctation fine, first tooth of hind femur very long, sharp | <i>P. fasciata</i> Westwood. |
| c. Fourth dorsal segment opaque, finely and densely punctate, first tooth of hind femur large, triangular | <i>P. surinamensis</i> Westwood. |

***Polistomorpha indica*, sp. nov.**

Female.—7.5 mm. long. Body shiny and sparsely setose. Head partially hidden beneath the thorax, densely umbilicately punctate, villous; frons more hairy than the back and occiput; eyes dark brown and finely pubescent; posterior ocelli widely separated. Antennae about one and a half times the vertical length of the head, very finely pubescent; segments 11; funicle 7-articulate; club biarticulate. Thorax much sculptured; pronotum with one distinct transverse carina parallel to the hind margin, somewhat faint at the ends; apparently more coarsely punctate than the mesoscutum; scutellum sculptured, similar to the pronotum. Fore wings smoky from about the basal half onwards. Front coxae densely setose; hind coxae densely and finely punctate and setose, unspurred apically; hind femur finely punctate and setose, teeth 4 simple, 1 compound; first tooth short, small; second long and sharp; third longer and sharper; fourth short and obtusely pointed; fifth or the compound tooth tridenticulate; hind tibia as long as femur. Abdomen shiny, densely and finely punctate.



TEXT-FIG. 1. *Polistomorpha indica*, sp. nov. a. head in front view; a. f. antennal fovea; ant. antenna; b. pronotum and mesonotum from above; c. hind femur; car. carina; e. eye; m. mesonotum; oc. ocelli; p. pronotum (spots and markings shaded).

Body colour mostly black with yellow spots or markings; small, oblong yellow spots on frons on either side of the apex of antennae; pedicel of antennae black; funicle dark reddish brown; a moderately narrow, transverse, yellowish band anteriorly on pronotum reaching

almost down to the lateral margin of the latter; narrow transverse yellow bands on either ends of the carina on pronotum, growing fainter inwards and almost completely absent in the middorsum; tegulae dark testaceous; a transverse brownish yellow band posteriorly on scutellum, broader at the ends than in the middle; front coxae testaceous; femur dark brown except for a linear-triangular brownish yellow spot apically; tibia dark testaceous except in front, where it is brownish yellow for the whole length; mid leg almost similar to the fore leg except that the coxae are darker and the longitudinal yellow stripe on tibia is broader; hind coxae reddish brown except for a basal yellowish spot above; femur olive-brown except for a large irregular, basal yellowish spot on the outer side continuing anteriorly to apex and except for an oblong spot posteriorly just above the fourth tooth; a yellow line on hind tibia, from basal third, broadening apically; three transverse yellowish bands on abdomen, anterior band broad and short, middle broader and longer, posterior narrow and very long; also a small crescentic yellow spot sub-apically on the middorsum.

Type.—Female, on pin. Coll. T. V. Ramakrishna Ayyar, v. 1915. Yercaud, S. India. In the collections of Zoological Survey of India (Ind. Mus.), Calcutta, No. $\frac{891}{H_3}$.

Genus *Leucospis* Fabricius.

1775. *Leucospis*, Fabricius, *Syst. Entomol.*, I, p. 361.
 1874. *Leucospis*, Westwood, *Thesaur. Entomol. Oxon.*, p. 135.
 1890. *Leucospis*, Schletterer, *Berlin. Entomol. Zeitschr.*, XXXV, pp. 141-302.
 1894. *Exochlaenus*, Shipp, *Entomologist*, XXVII, p. 245.
 1904. *Leucospis*, Ashmead, *Mem. Carnegie Mus.*, I (4), p. 247.
 1909. *Leucospis*, Schmiedeknecht, *Gen. Ins.*, fas. 97, p. 14.
 1922. *Leucospis*, Weld, *Proc. U. S. N. Mus.*, LXI, pp. 4-35.

This genus was erected by Fabricius in 1775 and was comprehensively dealt with by Schletterer in 1890 in his monograph on the subfamily Leucospidinae. In 1894 Shipp transferred the species *Leucospis anthioides* Westwood to a new genus, which he named *Exochlaenus*; this was accepted by Ashmead in 1904 and by Schmiedeknecht in 1909. In his recent monograph on the subfamily Leucospidinae Weld has reunited under *Leucospis* Fab. all the species referred to *Exochlaenus* Shipp, which according to him is not distinct from the former. I originally held the view that *Exochlaenus* may be considered as a subgenus of *Leucospis* and Dr. Ramakrishna Ayyar also shared the same view, but after studying a large number of new and known forms I agree with Weld in considering *Exochlaenus* as a synonym of *Leucospis*.

The species of this genus are relatively more numerous in the tropics, where they are generally found as parasites in the nests of honey bees. Five species are already known from India and three new ones are described below.

Leucospis meenakshiae, sp. nov.

This species, with which I associate the name of one of my sisters who collected numerous Chalcids for me, very closely approaches the Philippinese species *Leucospis ornatifrons* Weld in Weld's key to the

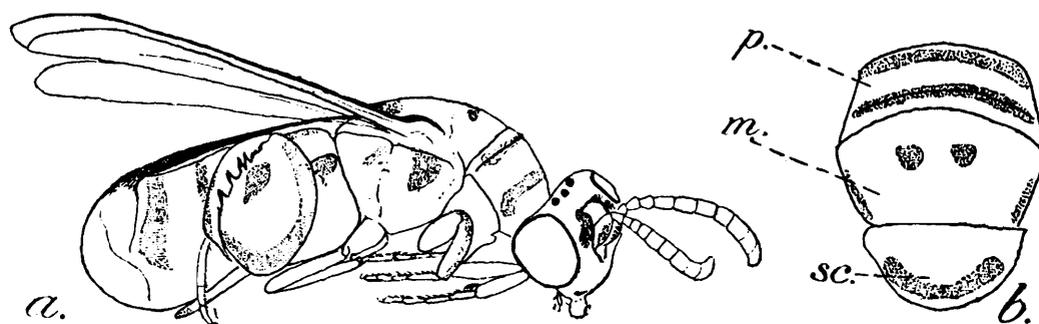
world species of the genus *Leucospis* Fab. It is, however, quite distinct from a specimen received from Dr. Ramakrishna Ayyar, which I identified as *Leucospis ornatifrons* Weld. It is distinguished from the same by its larger size, red spots and markings, ovipositor reaching the posterior margin of scutellum and clouded fore wings. It is further remarkable on account of its extremely long ovipositor, which extends forward more than in all the other known species.

Female.—9.25 mm. long. Body mostly black, spotted yellow and orange red, finely punctate and moderately setose. Antennae about two thirds the length of the body, moderately slender; segments 12, club biarticulate; scape longer than the following two segments, fusiform; pedicel about half shorter than the first segment of the funicle; second and third segments of funicle sub-equal; fourth segment about three-fourths the length of the third; the succeeding segments nearly equal in length, but shorter. Scapal furrow apically about one fourth the interorbital width. Pronotum one half shorter than the mesoscutum in the median line; with one transverse carina parallel to the hind margin, posterior in situation and ends reaching very nearly to the lateral margins; punctation umbilicate and coarse. Mesoscutum with a coarser punctation than pronotum. Lateral foveae on metanotum rugosely punctate. Hind coxae closely punctate. Hind femur less so than coxae, with a length about one seventh greater than its breadth, with five teeth; basal tooth small, sharp; second and third long, sharp (second also a little shorter and stouter than third); fourth tooth equal in length to second, somewhat stout, bluntly pointed; last tooth broad, compound, tridenticulate and blunt. Hind tibiae about three fourths the length of the femur; produced apically into a stout, straight, acutely pointed, spinous process on the outside and with a short slender spur sub-apically on the inner side. Fore wings uniformly clouded and brown.

Seen from above abdomen has a length about twice its greatest width; second tergite largest, with longitudinal, moderately broad furrows on either side of a median ridge; third tergite covered; fourth and fifth shorter than sixth, beyond which the abdomen is compressed. Seen from the side the abdomen is straight along the dorsal line, wide posteriorly and broadly rounded apically; finely umbilicately punctate, more hairy apically than basally. Ovipositor reaches the posterior margin of the scutellum.

Body spotted or marked as follows: hind femur rich gamboge-yellow, except for the teeth and for a large, central, reddish brown area on the outer side touching margin near the apex beneath and again between first and third teeth; also an oval yellow spot near apex and beneath on the outer side; a pale yellow longitudinal stripe behind on the outer side on hind tibiae extending from the basal third to about the apex. Rest of the body brick red or orange as follows: scape below; an oval spot between eyes and antennal foveae, touching the edges of the latter and extending from vertex to about half the length downwards of the foveae, differing in these respects from *L. ornatifrons* Weld; a broad anterior band dilated at ends and a posterior, narrow, short, reddish band, very narrow in the middorsum and superimposed

on the transverse carina on pronotum; two small, conspicuous, sub-orbicular spots in the center on either side of the middosum on mesoscutum, which is also margined laterally; submarginal band broader



TEXT-FIG. 2. *Leucospis meenakshiae*, sp. nov. a. profile view with the head slightly turned to one side to show details of markings on face; b. thorax from above; m. mesonotum; p. pronotum; sc. scutellum (spots and markings shaded).

at the ends than in the middle, posteriorly on the scutellum; an obtriangular large spot below the tegulae; front tibiae on the inner and front sides; a spot above at base on hind coxae; two long, oblique, sublongitudinal spots on second tergite on either side of the submedian foveae; transverse band on fifth tergite; a transverse band posteriorly on sixth tergite, becoming broader downwards at the sides; hypopygium brownish yellow apically.

Metanotum unspotted; front and mid coxae unspotted; hind coxae unspotted apically; abdomen without a crescent-shaped spot at apex.

Type.—Female. Coll. Miss M. Meenakshi, 29-xi-1932. Girls' Christian High School, Tanjore, Madras Presidency, S. India, in the collections of Zoological Survey (Ind. Mus.), Calcutta, No. $\frac{893}{H3}$.

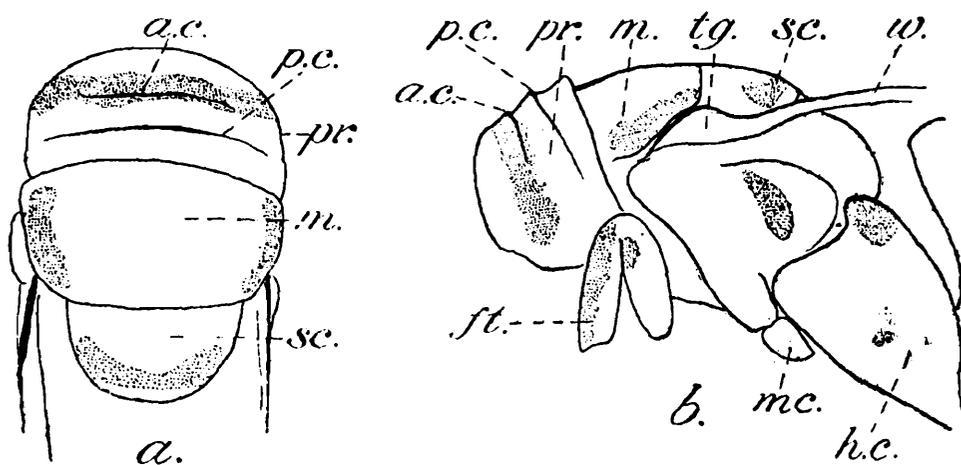
***Leucospis bombayensis*, sp. nov.**

This new species is based on a Chalcid from Bombay in the collections of the Zoological Survey. The presence of an anterior carina on pronotum and other characters place this species with *L. guzaretensis* Westwood in Weld's key to species. It is distinguished from the same by its smaller size, presence of markings on sixth abdominal tergite, absence of a basal band on hind femur, which is quite differently marked and wings without any purple iridescence. It has a superficial resemblance to *L. ornatifrons* Weld but is readily separated by the presence of two carinae on pronotum instead of one and by variations in the colour of the spots and markings.

Female.—5.5 mm. long. Body moderately setose and moderately sculptured. Antennae less than one third the length of the body; segments 12; pedicel subequal to the first segment of the funicle; second and third segments of funicle subequal; fourth a little longer; fifth subequal to third; club short, biarticulate; scapal furrow apically about one half the interorbital width. Pronotum about two thirds the mesoscutum in the median line; with two transverse carinae parallel to the hind margin; anterior carina short, nearly as high as the posterior

which latter is a little longer but does not reach the sides ; punctation coarse. Mesoscutum with a punctation coarser than on pronotum. Metanotum with a broad anterior carina. Hind coxa with a sharp angle above at base, sparse serrations above subapically, closely and minutely punctate, densely covered with long setae below. Hind femur somewhat coarsely punctate, with a length about twice its breadth ; teeth 7 below ; basal tooth large, broad, blunt ; second tooth minute, blunt ; third about as long as the basal, stout, pointed ; fourth and fifth subequal, a little longer than third, pointed ; sixth similar to third ; seventh large, short, compound, penta-denticulate. Hind tibia about three fourths the length of hind femur ; apically produced into a short, stout, slightly curved, moderately sharp, spinous process and with a weak spur subequal to the process. Fore wings hyaline basally, clouded from about the stigmal vein to apex.

Seen from above abdomen about half the length of the body and about thrice the greatest width which is in the region of the sixth tergite ; somewhat narrow in the region of the second tergite ; the second tergite somewhat longer than the sixth in the median line, with a single deep groove not reaching forward of the tip of ovipositor but without any ridges ; broadly rounded at apex. Seen from the side abdomen with a slight depression in the region of 3-5th tergites, *i.e.*, in the middle. Ovipositor almost reaching the anterior margin of the second tergite, at least never shorter than the middle of the same.



TEXT-FIG. 3. *Leucospis bombayensis*, sp. nov. a. dorsal view of thorax ; *abd.* abdomen a.c. anterior carina on pronotum ; b. profile view of thorax ; *f.t.* fore tibia ; *h.c.* hind coxa ; *m.* mesonotum ; *m.c.* mid coxa ; *p.c.* posterior carina on pronotum ; *pr.* pronotum ; *sc.* scutellum *tg.* tegula ; *w.* wing (markings shaded).

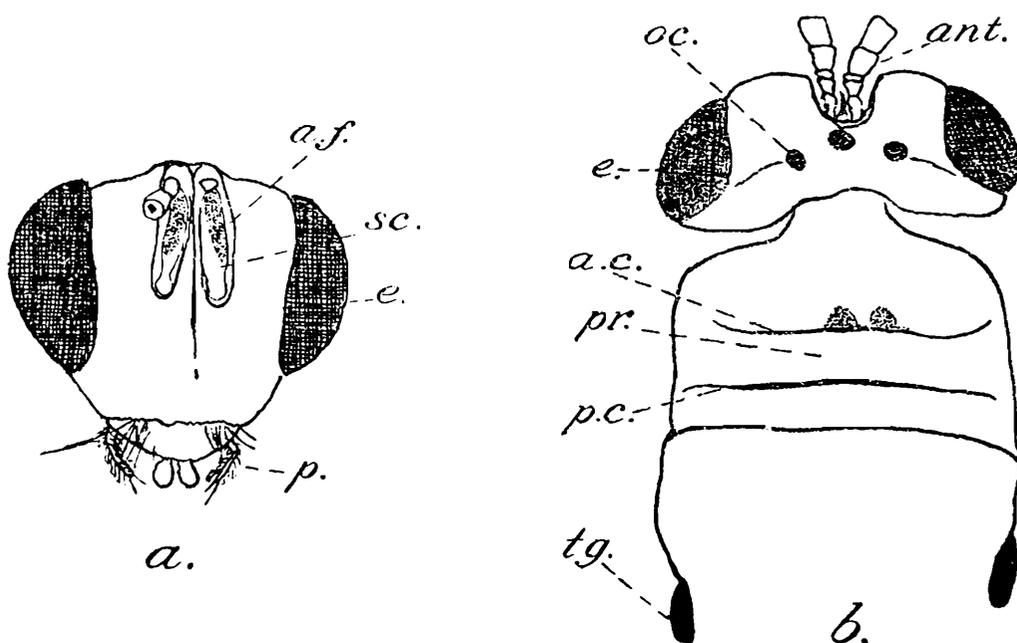
General colour of the body black except that the fore and mid legs inclusive of their coxae and the coxae and tarsi of hind legs are brownish red. Spotted or marked white as follows : Scape below, except for a short portion basally ; a broad transverse, anteriorly curved band on pronotum, reaching low down laterally, covering the anterior carina and dilated at ends ; broad marginal bands on mesoscutum laterally ; oblique band on mesopleura ; a posterior submarginal, broad band on scutellum, dilated at ends, straight posteriorly and curved anteriorly ; a short, longitudinal subapical band below on the outer side of front femur ; ore tibia in front ; hind coxa above at basal upper angle, another below

subapically; hind femur on the outer side except for a large, triangular, very dark reddish area subapically and posteriorly including teeth; hind tibia behind; two closely approximated, subtriangular spots anteriorly in the middorsum on the second abdominal tergite, with the bases of the triangles turned forwards; narrow band on fifth tergite; another large, fusiform, submarginal mark posteriorly on the sixth tergite on either side of the median fovea.

Type.—Female on pin. Coll. R. B. S. Sewell and H. S. Rao, 24-iii-1930. Satara, Bombay Presidency, W. India, in the collections of Zoological Survey (Ind. Mus.), Calcutta, No. $\frac{894}{H3}$.

Leucospis ramakrishnai, sp. nov.

The presence of two carinae on pronotum places this new species with *L. guzaretensis* Westwood, which it resembles more closely than the *L. bombayensis* described above. It is distinguished from the former mainly by its immaculate hind femur, while from the latter it is readily separated by its larger size and fewer spots and markings. I have named the species after its collector, Dr. Ramakrishna Ayyar.



TEXT-FIG. 4. *Leucospis ramakrishnai*, sp. nov. a. head viewed in front; a.c. anterior carina on pronotum; a.f. antennal fovea; ant. antenna; b. dorsal view of head and thorax; e. eye; oc. ocellus; p. palpus; p.c. posterior carina on pronotum; pr. pronotum; sc. scape; tg. tegula (spots shaded).

Female.—10 mm. long. Body black, sparsely pubescent. Head much sculptured, densely covered with long hairs; eyes densely pubescent; terminal part of the antennae broken, scape with a longitudinal yellowish white spot below. Pronotum finely umbilicately punctate, with two carinae parallel to its hind margin and with two closely approximated, subtriangular, yellowish white spots on the middorsum just in front of the anterior carina, the bases of the triangles being turned forwards; mesonotum coarsely punctate; less pubescent than pro-

notum; scutellum and metanotum umbilicately punctate and almost devoid of hairs. Fore and mid legs dark reddish brown; hind coxae entire on upper margin; hind femur black, deeply punctate, sparsely pubescent, teeth large and 7 in number, basal tooth short and broad followed by 4 teeth which gradually grow shorter, a large sixth tooth after some gap, last tooth compound and tetradenticulate; hind tibia black, finely punctate, without hairs, with two short, longitudinal, yellowish white lines apically; hind tarsus dark brown. Wings smoky black and with a purplish iridescence. Metanotum broadly rounded behind. Abdomen subcompressed, about as long as the rest of the body, straight along the mid dorsal line in the side view, black, finely punctate and pubescent; sixth tergite with two very minute, brownish red, round spots on either side of the median longitudinal sulca. Ovipositor reaching forward of the second tergite.

Type.—Female on pin. Coll. T. V. Ramakrishna Ayyar, Pusa, Bihar, N. E. India, 23-v-1906. In the collections of Zoological Survey (Ind. Mus.), Calcutta, No. $\frac{885}{H3}$.

Subfamily CHALCIDINAE.

Tribe CHALCIDINARIAE.

Genus *Pseudochalcis* Kirby.

1862. *Halticella* (*partim*), Walker, *Trans. Entomol. Soc. London*, I, p. 360.
 1883. *Pseudochalcis*, Kirby, *Journ. Linn. Soc. London*, XVII, p. 62.
 1904. *Pseudochalcis*, Ashmead, *Mem. Carnegie Mus.*, I (4), p. 249.
 1909. *Pseudochalcis*, Schmiedeknecht, *Gen. Ins.*, fas. 97, p. 23.

This genus is being recorded for the first time from India. It is distinguished from *Chalcis* Fab. by the characteristic shape of the abdomen, the femoral teeth not being very minute and by the other characters given below. I believe that the shape of the abdomen, as given by Ashmead in his tables, is not a constant feature.

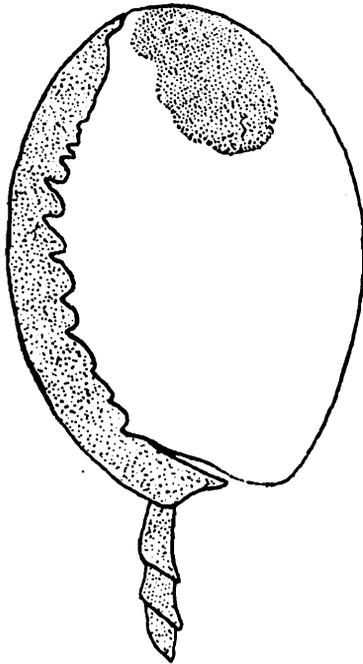
Metathorax with two teeth on each side, scutellum with a short, thick projection behind, hind femur with 7-8 teeth beneath.

Pseudochalcis indica, sp. nov.

This species appears to differ from others of the genus mainly in the shape of the abdomen.

Female.—5 mm. long. Body black. Head finely punctate; densely villous in front and at the back; eyes with a few scattered hairs; front ocellus on the vertex of the scapal furrows. Antennae black, pubescent; segments of the funicle, exclusive of the first, are subequal; club biarticulate. Thorax finely umbilicately punctate, pubescence normal. Scutellum umbilicately punctate; tegulae yellowish brown. Fore femur black to dark reddish brown basally, yellowish apically; rest of the fore legs yellowish; femur of mid legs reddish brown, knee yellowish, tibiae brick red; hind coxae basally black, brick red beyond, glabrous and shiny on the flattened upper side, pubescent and finely punctate beneath; femur purplish brown, very finely

punctate, finely pubescent, apex yellowish brown, teeth rather long and prominent, over 10 in number; tibiae and tarsi yellowish brown,



TEXT-FIG. 5. *Pseudochalcis indica*, sp. nov. Hind femur, tibia and basal tarsal segments (spots shaded).

finely pubescent. Abdomen short, broad above, narrow beneath, second apparent segment dark reddish at the sides and black above, other segments shiny black, finely punctate and villous. Ovipositor short.

Type.—Female on pin. Coll. F. H. Gravely, Barkuda Island, Chilka Lake, Madras Presidency, 3-16-viii-1919. In the collections of Zoological Survey (Ind. Mus.), Calcutta, No. $\frac{886}{H3}$.

Genus *Stypiura* Kirby.

1834. *Chalcis* (*partim*), Perty, *Del. Anim. Art.*, p. 134.

1883. *Stypiura*, Kirby, *Journ. Linn. Soc. London*, XVII, p. 59, pls. iii, figs. 28-30.

1904. *Stypiura*, Ashmead, *Mem. Carnegie Mus.*, I (4), pp. 249, 250.

1909. *Stypiura*, Schmiedeknecht, *Gen. Ins.*, fas. 97, p. 23.

This genus, apparently monotypic, has not been recorded previously from India. It is distinguished from *Pseudochalcis* Kirby mainly by the emarginate or bidentate raised scutellar process and unarmed metathorax.

Antennae with 11 segments, scutellum ending in a raised bidentate or emarginate plate, metathorax armed or unarmed, marginal vein long, stigmal vein moderately long, hind femora with one large tooth followed by 6 or 7 smaller ones.

Stypiura variabilis, sp. nov.

This variable species is described from a series of Chalcids in the collections of the Zoological Survey of India, labelled as 'Chalcid No. 4' by Luigi Masi. The specimens had not been referred to any genus

and had not been also described so far. The series includes specimens collected from such distant localities as Assam, Karachi and Travancore.

Female.—4 mm. long. Body black. Head viewed in front triangular, heavily punctate and densely covered with silvery white, shiny, long hairs both on the frons and on the back; eyes dark brown, glabrous; posterior ocelli placed below the occipital ridge on the vertex; scapal furrows rather deep. Antennae short, stout, black, inserted a little above an imaginary line drawn from the basal margins of the eyes; with numerous, white, minute, dotted hairs; segments 11; scape linear-fusiform, black, glabrous, shiny; pedicel very short, broader than long; funicle with 7 segments; first segment long, broader apically than basally, second segment a little shorter, also a little dilated at apex, each of the remaining segments of funicle nearly equal; club biarticulate, twice the length of the last segment of the funicle, somewhat reduced towards the truncate apex. Tegulae brownish red, sometimes yellowish white, with or without a dark upper margin. Fore legs reddish brown, except the basal moiety of the femur, which latter is black and the yellowish brown tarsus. Mid legs mostly reddish brown, sometimes yellowish brown. Hind coxa dark reddish brown, dark brick red or black, villous; femur brick red, finely punctate, pubescent, with or without a large or small, diffuse, subhemispherical or irregular, black spot touching the lower margin, extending up to the middle, sometimes as large as the outer surface of the femur; teeth moderately developed; knee tipped yellowish brown above a little from the base; tarsus brown. Fore wings hyaline, veins dark brown. Abdomen short, shiny black; second apparent segment large, glabrous, shiny; third finely punctate, finely pubescent in the middle; other segments finely pubescent and punctate posteriorly. Ovipositor short.

Cotypes.—Female on pin, Myawadi, Amherst District, Burmo-Siamese Frontier, Coll. F. H. Gravely, 24-26-xi-1911, in the collections of the Zoological Survey (Ind. Mus.), Calcutta, No. $\frac{887}{H3}$; Female on pin, Mangaldai, Assam, Coll. S. W. Kemp, 6-i-1911, in the collections of Zoological Survey (Ind. Mus.), Calcutta, No. $\frac{888}{H3}$.

Localities.—Sadiya, Assam, Mus. Coll., No. $\frac{1208}{H3}$; Margherita, Assam, Mus. Coll., Nos. $\frac{9547}{H3}$, $\frac{9584}{H3}$, $\frac{9591}{H3}$, $\frac{9595}{H3}$, $\frac{9609}{H3}$; Calcutta, Mus. Coll., Nos. $\frac{1659}{H3}$, $\frac{2131}{H3}$, $\frac{3144}{H3}$; Karachi, Coll. Cuming, No. $\frac{889}{H3}$; Maddathoray, Travancore, S. Madras at the base of the W. Ghats, Coll. Annandale 17-xi-1908, No. $\frac{890}{H3}$. In the collections of the Zoological Survey (Ind. Mus.), Calcutta.

Tribe SMICRINARIAE.

Genus *Spilochalcis* Thomson.

1875. *Spilochalcis*, Thomson, *Hymenop. Skand.*, IV, p. 15.

1904. *Spilochalcis*, Ashmead, *Mem. Carnegie Mus.*, I (4), pp. 251, 253, 413-447.

1909. *Spilochalcis*, Schmiedeknecht, *Gen. Ins.*, fasc. 97, p. 37.

This genus comprises numerous species, which are extremely variable in their colouration and spotting. Most of the species of this genus

described so far are from Brazil, South America but Cameron¹ has described one species from Simla. Ashmead has comprehensively dealt with the genus and has published a key of all the species described by him.

Antennae with 13 segments; scape normal, *i.e.*, not very long and not extending beyond the ocelli. Thorax generally never wholly black; pronotum anteriorly acute or nearly so; scutellum unarmed at apex or armed with an emarginate or bidentate plate; metathorax unarmed or armed with 2-4 teeth or projections; middle tibia with an apical spur in the male; hind femur armed with one or two large, long or moderately long teeth basally, followed by numerous smaller teeth (more than 20 or so in number) or armed with one large tooth near the base followed by many small or minute teeth from 10-20 or more. Abdomen fusiform, sometimes subglobose or conically pointed in the female; petiole short, stout, rarely longer than thick, not carinate; eighth segment in female normal or nearly so, *i.e.*, not produced into a stylus.

***Spilochalcis indica*, sp. nov.**

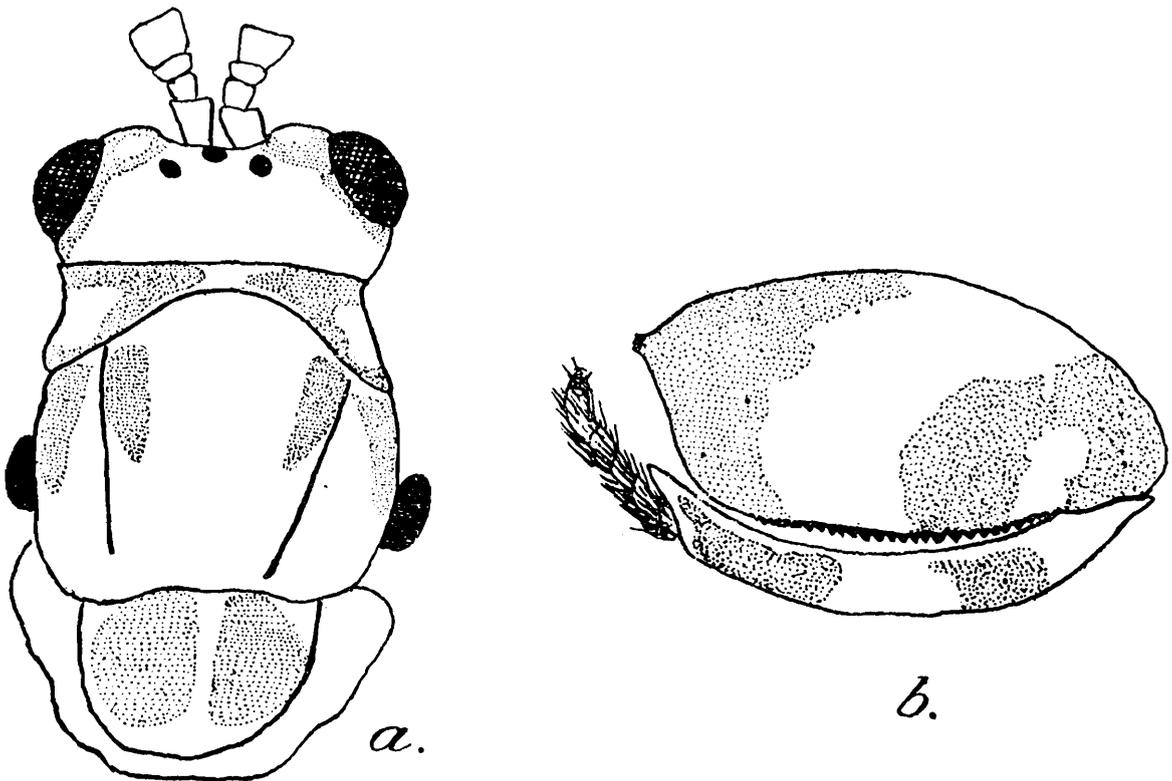
This new species is based on a unique specimen in the collection of the Zoological Survey. The species approaches most near to *S. janeiroensis* Ashmead, described from Rio de Janeiro, Brazil, but is easily distinguished by several important characters. It also differs from the other Indian species *S. simlaensis* Cam. in its smaller size and the spotting of the thorax.

4.5 mm. long, moderately densely clothed with long silvery white hairs. Antennae about one third the length of body, second segment of funicle about half the length of first. Head and thorax roughly half the length of the body; parapsidal furrows well formed; middle lobe of mesonotum umbilicately punctate; scutellum prominent, with an emarginate raised plate posteriorly, with a punctation similar to that on mesonotum; metanotum coarsely tubercular, armed with a pair of somewhat closely approximated, short, stout blunt processes a little above the attachment of the pedicel. Tibia of mid leg armed apically. Hind coxa one tenth shorter than the hind femur, which latter has a length about twice its breadth, basally with one very large tooth followed by numerous minute ones. Pedicel of abdomen a little less than one third the length of the rest of the abdomen and with a thickness nearly equal to the length, bicarinate above subapically. Abdomen subglobose.

The general colour and the spots or markings are as follows: Body mostly black, spotted or marked with yellow. Scape yellow beneath and brownish above, funicle yellowish brown except for the brown above basally. Frons yellow; orbit margined yellow posteriorly; a black spot, narrowly margined yellow posteriorly, on the occiput between the eye and the lateral ocellus and just in front of the latter; the back of the head, occiput, vertex black; cheek yellow. Thorax mostly black; pronotum yellow except in the middorsum and except for a subreniform large black spot on each side postero-laterally, *i.e.*, on the

¹ Cameron, P., *Journ. Bombay Nat. Hist. Soc.*, XIV, pp. 438-439 (1903).

shoulder; middle lobe of mesonotum black except for a pair of linear-triangular large yellow spots anteriorly, inside of and just touching the



TEXT-FIG. 6. *Spilochalcis indica*, sp. nov. a. dorsal view of head and thorax with the former slightly turned to one side; b. hind leg (spots and markings shaded).

parapsidal furrows, with the bases of the triangles turned forwards; lateral lobes black except for a large broadly triangular (with rounded angles) yellow spot antero-laterally, the apex of the triangle reaching farther behind than the middle of the lobe; tegulae brown; scutellum yellow but for a median longitudinal, anteriorly expanded black line; axillae black; metanotum black. Fore legs yellow except for longitudinal dark brown spots above on the femur and the middle of tibia. Mid legs similar to the fore legs except that the coxa is mostly testaceous black. Hind legs yellow except the coxa which has a large black spot above at the base; for an irregular broad band, broader above than below, on the outer side; and for spots on the inner and outer sides of femur and except for the bands on tibia. Pedicel black. Abdomen polished black, immaculate.

Type.—On pin. Coll. H. S. Rao, Shillong, Khasi Hills, Assam, 15-xi-1930, in the collections of Zoological Survey (Ind. Mus.), Calcutta, No. $\frac{892}{H3}$.

Family EUCHARIDAE.

Genus *Schizaspidia* Westwood.

1835. *Schizaspidia*, Westwood, *Proc. Zool. Soc. London*, III, p. 69.
 1904. *Schizaspidia*, Ashmead, *Mem. Carnegie Mus.*, I (4), pp. 268, 269.
 1909. *Schizaspidia*, Schmiedeknecht, *Gen. Ins.*, fas. 97, p. 76.

This is a small genus comprising about eight species¹. The genotype, *S. furcifera* Westwood, was described from India and Clausen² has recently described another species, *S. manipurensis*, from Assam.

Body short, stout; antennae short, stout, segments 13; scutellum large, scutellar process broad, produced behind a little over the abdomen but not very long; metathorax without teeth; metapleura without a hump-like process.

Schizaspidia indica, sp. nov.

This species differs from *S. furcifera* Westwood by its larger size, general colouration of the body and in having an umbilicately punctate thorax. It also appears to be distinct from *S. manipurensis* Clausen.

Male.—4 mm. long. Body black with a metallic dark green lusture. Head black. Coarsely and umbilicately punctate. Antennae long, slender, brownish yellow, densely hairy, terminal part broken; basal segments elongate, cylindrical; pedicel very broad and short. Coxa concolourous with the thorax, rest of the legs brownish. Wings hyaline, pubescence brown; submarginal vein dark brown, long; marginal vein shorter, stigmal vein absent, stigma being sessile; postmarginal vein long. The bidentate spiny scutellar process about as long as the petiole of the abdomen. Abdomen dark metallic green, last segment slightly brownish along the anterior and posterior margins.

Type.—Male, on pin. Mus. Coll. Assam. In the collections of Zoological Survey (Ind. Mus.), Calcutta, No. $\frac{879}{H3}$.

Family ENCYRTIDAE.

Subfamily EUPELMINAE.

Tribe EUPELMIARIAE.

Genus **Neanastatus** Girault.

1915. *Neanastatus*, Girault, *Mem. Queensland Mus.*, IV, p. 29.

The exact position of this genus in Ashmead's tables cannot accurately be determined; his tables of the subfamily are unsatisfactory in several respects.

Ramakrishna Ayyar (*loc. cit.*) lists two species of this genus, *viz.*, *pulchericorpus* (Girault) and *trochantericus* Girault, from India and Ceylon. The relationship of the new species described here to the known species is shown in the key on the following page.

¹ L. Masi, Genoa, has erected a species *S. scutellaris* Masi for a specimen in the collections of the Zoological Survey of India (Ind. Mus.) bearing the label: Calcutta, Mus. Coll., 25th June 1907, 157/H3. I have not been able to trace the description of this species in the literature available here. This species differs from the new species described above in the following respects: Frons with longitudinal striae on either side of the antennal foveae not reaching the insertion of the antennae; occiput transversely striate; bidentate scutellar process comparatively longer.

² Clausen, *Proc. Entomol. Soc. Washington*, XXX, pp. 83, 85 (1928).

The genus can be recognised by the following characters: Head viewed in front subtriangular, only as wide as the greatest width of the thorax; face convex; frons broad; eyes not large, not convergent; genal sulcus distinct; mandibles tridentate. Antennae inserted just below the eye, segments 10, ring joint 1, club biarticulate. Scutellum with a broad base and a median groove. Tibial spurs of mid legs as long as the tarsi, stout, spiny, at apex ending in several stout spines. Marginal and submarginal veins not differentiated, very long; stigmal vein well developed; postmarginal vein very long, thrice or more the length of the stigmal vein. A long oblique hairless, transparent line runs cephalo-distad towards the base of the stigmal vein, but does not quite reach it for some distance. Abdomen conic-ovate; ovipositor not exerted.

Key to species.

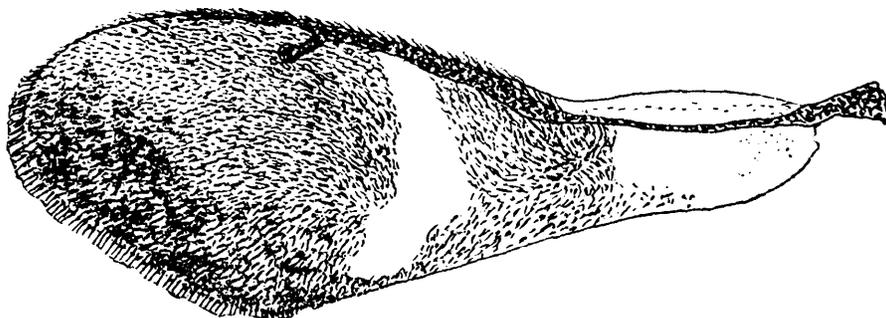
- | | |
|---|--|
| I. Body metallic green or dark metallic green, mixed with black; trochanters of mid legs unarmed— | |
| A. Head lemon yellow, except for the centre of vertex between the posterior ocelli; mesopleura with a large, triangular, yellow spot in front; except basal half of hind coxae and femora, the hind legs are yellow | N. <i>pulchericorpus</i>
(Girault). |
| B. Head brownish black, hind legs uniformly brownish black | N. <i>ramakrishnai</i> , sp. nov. |
| II. Body orange yellow, trochanters of mid legs with a spine dorsally | N. <i>trochantericus</i> Girault. |

***Neanastatus ramakrishnai*, sp. nov.**

This new species, named after Dr. Ramakrishna Ayyar is described from a Chalcid taken at Howrah, near Calcutta. It apparently differs from the typical *Neanastatus* Girault in the apical tibial spur of the mid leg not being as long as the tarsus and in the somewhat slightly exerted ovipositor, in which respects it approaches the genus *Solindinelleus* Girault. I, however, believe that in spite of these slight variations, it is referable to the genus *Neanastatus* Girault.

Female.—2 mm. long. Body metallic green and black. Head brownish black, finely and minutely punctate in front, metallic green behind; face convex with two slight grooves for the antennae. Antennae with 10 segments; scape brown, long; ring joint 1; funicle 7-articulate, segments short, subcylindrical, dark brown, the two terminal ones nearly equal to each other; club biarticulate, apparently excavated on the inner side (?), with a length about four times that of the terminal segments of the funicle. Thorax smooth, dark bluish black; concave depression on the mesonotum metallic green; scutellum finely punctate. Fore wings dark brown, hyaline in the region of the subcostal vein; with a long oblique, transparent, white, hairless, moderately broad band running cephalo-distad to the base of the stigmal vein but not quite reaching it for some distance; lighter near the apex; marginal vein about two fifths the length of the submarginal vein; postmarginal vein apparently thrice the length of the stigmal vein. Fore legs uniformly brownish black, tibiae pubescent, knee brownish; mid legs

uniformly dark brown, knee dark reddish brown, tibiae longer than the tarsi, tridentate, apical spur stout, a little longer than the first tarsal



TEXT-FIG. 7. *Neanastatus ramakrishnai*, sp. nov. Wing.

segment, subserrate; first tarsal segment swollen, compressed, 7-dentate below on either side; second segment tridentate; third segment bidentate; fourth or the terminal segment with two very minute, rudimentary teeth; hind legs brownish black, tibiae with one slender, subapical, lateral spur. Abdomen black.

Type.—Female, on pin. Coll. M. S. Mani, Howrah, near Calcutta, 17-iii-1934. In the collections of Zoological Survey (Ind. Mus.), Calcutta, No. $\frac{882}{H3}$.

Family EULOPHIDAE.

Subfamily ELACHERTINAE.

Tribe EUPLECTRIARIAE.

Genus *Euplectrus* Westwood.

1832. *Euplectrus*, Westwood, *Philos. Mag.* (3), I, p. 128.
 1857. *Diplectron*, Dahlbom, *Oef. Vet.-Akad. Förh.*, XIV, p. 292.
 1904. *Euplectrus*, Ashmead, *Mem. Carnegie Mus.*, I (4), p. 351.
 1909. *Euplectrus*, Schmiedeknecht, *Gen. Ins.*, fas. 97, p. 402.

Ramakrishna Ayyar (*loc. cit.*) has recorded five species of this genus from Ceylon and Continental India. I describe below one new species, the relationship of which to the known Indian species is shown in the key below.

The species of the genus *Euplectrus* are distinguished from those of the allied genera by the following characters: Scape not abnormally enlarged in either sex, but long and slender; postmarginal vein distinctly longer than the stigmal vein.

Key to species.

- I. All legs, including their coxae, coloured yellow or white uniformly—
- A. Pedicel armed with pairs of long, stout, bristles both basally and apically; legs yellow *E. ceylonensis* Westwood.
 - B. Pedicel unarmed, without bristles—
 - 1. Scutellum punctate, posterior ocelli placed near the margin of the eyes, pubescence whitish *E. leucostomus* Rohwer.
 - 2. Scutellum finely umbilicately punctate in the middle, posterior ocelli placed at a distance from the margin of the eyes, pubescence brownish *E. euplexiae* Rohwer.

II. Legs differently coloured; black, brown, reddish brown or a combination of these—

A. Pedicel shorter than the first segment of the funicle—

1. Scape white, segments of funicle unequal; hind coxa uniformly coloured black

E. bussyi Crawford.

2. Scape brown, segments of the funicle subequal; hind coxa black basally and reddish brown apically

E. himalayaensis, sp. nov.

B. Pedicel as long as the first segment of the funicle or nearly so

E. nyctemeræ Crawford.

***Euplectrus himalayaensis*, sp. nov.**

Female.—2.5 mm. long. Body black. Head smooth, with a breadth about two fifths the height, sparsely covered with long, slender, stiff hairs. Antennae dark brown, inserted low down below the level of an imaginary line drawn from the bases of the eyes, about three fifths the length of the body; segments 8; scape brown, slender, subcylindrical, with a length about one third of the funicle, pedicel subcylindrical apically, narrowed basally, with a length about one fourth that of the scape; funicle with 4 segments, first segment with a length about twice that of the pedicel; second, third and fourth segments nearly equal to each other and each about one half shorter than the first segment; club ovate-lanceolate, stouter and a little darker than the other segments, with a length about one half greater than that of the last segment of the funicle, reduced to a pointed apex, apparently biarticulate. Thorax



TEXT-FIG. 8. *Euplectrus himalayaensis*, sp. nov. Distal part of hind leg showing the apical tibial spur.

roughly half the rest of the body, finely and minutely striate, sparsely covered with long hairs; scutellum subacutely produced forwards; parapsidal furrows complete and well developed; metathorax with a longitudinal carina in the median line. Fore wings with a length about twice the breadth; submarginal vein about two thirds the length of the marginal vein; postmarginal vein about twice the length of the stigmal vein and about equal to the submarginal veins. Fore coxa reddish brown, other parts of the fore legs brown. Mid legs uniformly brown, their tibiae densely and shortly setose. Hind coxa black basally, reddish brown apically; other parts of the hind legs brown; their tibiae moderately and shortly setose, the outer spur with a length about half

that of the tarsus, which latter has rather long setae. Abdomen depressed, black basally, ventrally brown in the middle, seen from above with a length a little greater than the breadth.

Type.—Female, on pin. Coll. Jenkins, Darjiling, E. Himalayas, 8-viii-1909, in the collections of Zoological Survey (Ind. Mus.), Calcutta, No. $\frac{876}{H3}$.