

# A REVISION OF THE DISTANTIAN AND PAIVAIAI TYPES OF NOTONECTIDAE AND CORIXIDAE IN THE INDIAN MUSEUM.

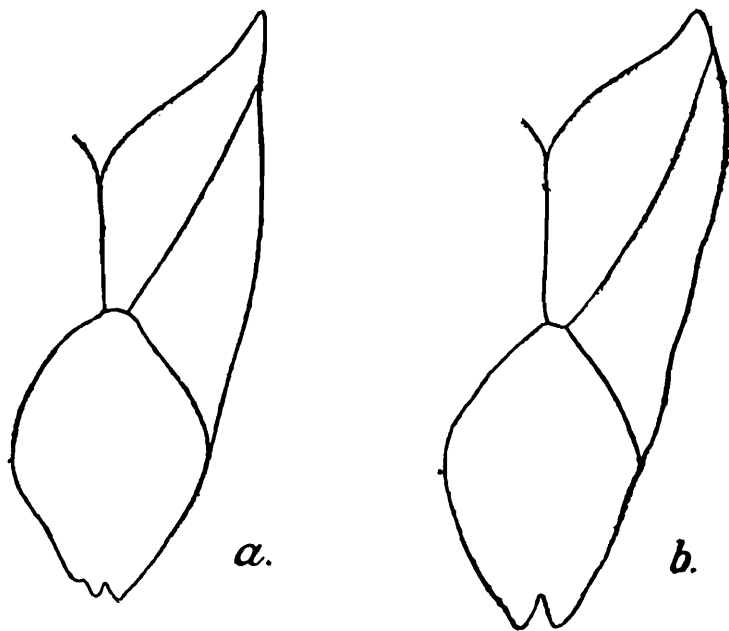
By G. EVELYN HUTCHINSON, M.A., F.L.S., F.E.S., Osborn Zoological Laboratory, Yale University and Yale North India Expedition.

The following notes are based on an examination of the specimens of *Notonectidae* and *Corixidae* described by Distant and by Paiva and preserved in the collection of the Zoological Survey of India (Indian Museum), Calcutta. Limited time and in some cases poor state of preservation of the material did not permit me to make as full descriptions of some forms as would have been desirable, but it is believed that all the species described below can be recognized, at least in more or less topotypical collections. All Paiva's types are preserved in the collection of the Museum, but the specimens of Distant's species are, unless otherwise stated, in all probability paratypes, Distant having retained the types in his own collection which was subsequently incorporated in that of the British Museum (Natural History), London. All the Distantian specimens discussed below are at least topotypical and apparently form part of the original series. The treatment of the Indian species of *Anisops* and *Nychia* is reserved till the material collected by the Yale North India Expedition has been determined, by which time it is hoped that Dr. O. Lundblad's work on the aquatic Hemiptera of the Sunda Islands will be available. My very best thanks are due to Lt. Col. R. B. Seymour Sewell, Director of the Zoological Survey of India and his staff for their kindness in giving me every facility during my stay in Calcutta; I am also indebted to my friend Dr. Hem Singh Pruthi for much assistance in examining the material in his charge.

## Family NOTONECTIDAE.

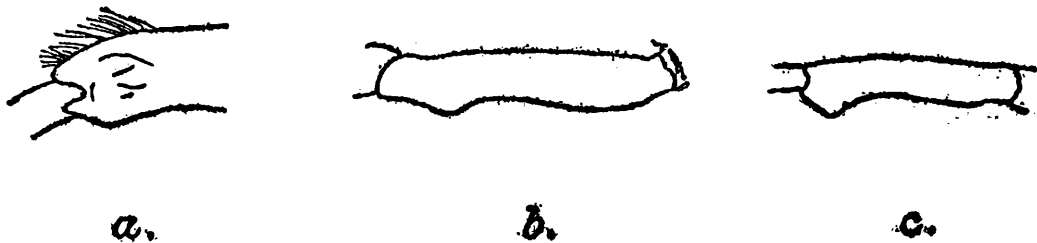
### *Enithares* Spinola.

The larger Oriental species of the genus have been fairly adequately described by Kirkaldy (*Wien. Ent. Zeit.* XXIII, p. 100, 1904); consi-

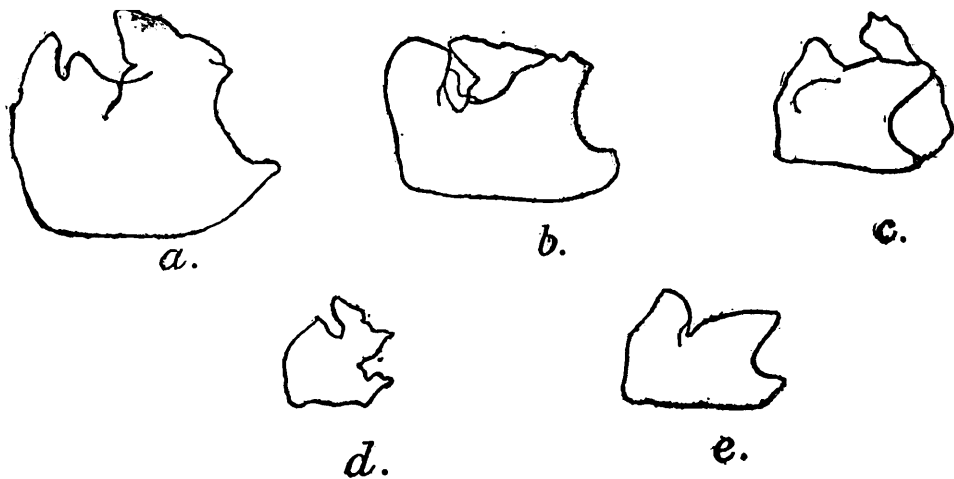


TEXT-FIG. 1.—Closed elytron of a. *Enithares lineatipes* Horvath; b. *E. templetonii* (Kirby)

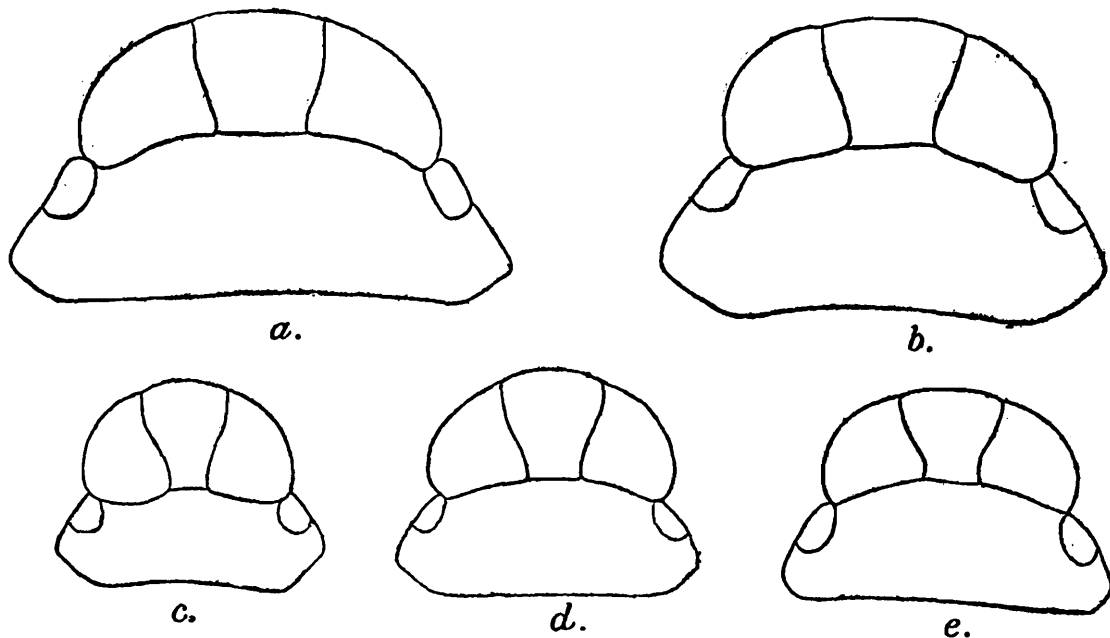
derable confusion has, however, resulted from his key having been based on rather unsatisfactory characters. Moreover, the smaller species described by Distant and by Paiva are practically unknown structurally. It seems desirable therefore to publish a provisional key by which species from the mainland of India can be determined. *E. marginata* (Fieber) is unknown to me and has been omitted as insufficiently described. It



TEXT-FIG. 2.—a. Apex of intermediate tibia of ♂ of *Enithares templetonii* (Kirby) ; b. Anterior tibia of ♂ of *E. abbreviata* (Kirby) ; c. of *E. intha* Paiva.



TEXT-FIG. 3.—♂ Genital capsule of a. *E. templetonii* (Kirby) ; b. *E. lineatipes* Horvath ; c. *E. abbreviata* (Kirby) ; d. *E. mandalayensis* Distant ; e. *E. intha* Paiva.



TEXT-FIG. 4.—Head and Pronotum of a. *Enithares templetonii* (Kirby) ; b. *E. lineatipes* Horvath ; c. *E. mandalayensis* Distant ; d. *E. intha* Paiva ; e. *E. abbreviata* (Kirby).

would perhaps run down to *E. mandalayensis*, though *E. marginata* is apparently a larger species and the two are probably not identical. *E.*

*rogersi* Distant, from the Nicobar Islands, might on the other hand be identical either with *E. marginata*, *E. lineatipes* or *E. templetonii*. All of these though closely allied, are easily distinguished by the form of the body as defined by the closed elytra (fig. 1); the last species has a tuft of bristles on the apex of the intermediate tibia of the male (fig. 2). The form of the male genital capsule of all the Indian species that I have studied is given in fig. 3, while the structure of the head and pronotum is indicated in fig. 4. In addition to redescriptions of *E. intha* and *E. mandalayensis*, it has seemed desirable to add an amended description of *E. abbreviata*.

- |   |   |  |
|---|---|--|
| 1. Not very stoutly built, under 13.5 mm. long . . . . .  | 2 |  |
| Very stoutly built, over 13.5 mm. long . . . . .  |   | <i>triangularis</i> (Guerin). S. India, Ceylon.  |
| 2. Under 11.0 mm. long . . . . .  | 4 |  |
| Over 11.0 mm. long . . . . .  | 3 |  |
| 3. Outline of body with elytra closed, converging posteriorly from before the middle; lateral margins of pronotum straight or slightly concave . . . . .          |   | <i>templetonii</i> (Kirby). Central and S. India, Ceylon <sup>1</sup> .                          |
| Outline of body with elytra closed, converging only in the posterior third; lateral margins of pronotum convex . . . . .  |   | <i>lineatipes</i> Horvath. Punjab, Himalayan Foothills (also Yarkand and Sumatra vide Kirkaldy). |
| 4. Anterior tibia of male with an apical eminence; length over 8.0 mm. . . . .  | 5 |  |
| Anterior tibia of male without apical eminence; length 7.0 mm. . . . .  |   | <i>mandalayensis</i> Distant. Burma.   |
| 5. Intermediate distal tarsal joint in male one and a half times the length of the proxima; in female one and one eighth times the length; length 9.8 mm. . . . . |   | <i>abbreviata</i> (Kirby). Throughout India and Ceylon.  |
| Intermediate distal tarsal joint but little longer than the proximal in male; length 8.5 mm. . . . .  |   | <i>intha</i> Paiva. Shan States, Burma.  |

### *Enithares abbreviata* (Kirby).

*Notonecta indica* Fabricius 1803. *Syst. Rhyng.*, p. 103, nec Linnaeus.  
*Notonecta abbreviata* Kirby 1891. *Journ. Linn. Soc. Zool.* XXIV, p. 126.  
*Enithares abbreviata* Kirkaldy 1904. *Wien. Ent. Zeit.* XXIII, p. 109.  
*Enithares indica* Distant 1906. *Faun. Brit. Ind. Rhynchota*, III, p. 42.  
*E. paivana* Distant 1910. *Faun. Brit. Ind. Rhynchota*, V, p. 329, fig. 190.  
*E. lactea* Paiva 1919 in Annandale. *Rec. Ind. Mus.* XVI, p. 155.

Head and pronotum stramineous, the latter tending to be grey anteriorly; scutellum black with two yellow lines adjacent to the central part of its posterior margins. Elytra stramineous grey, the apex of the clavus and the inner margin of the corium widely black; legs concolorous, stramineous; pronotal fossae pale (except in one specimen from Trivandrum and in the paratype of *paivana*).

Build moderately stout, the outer margins of the elytra hardly convergent before the middle of the body.

<sup>1</sup> Paiva (*Rec. Ind. Mus.* XVI, p. 156, 1919) records this species from the W. Himalayas but the specimens from Kumaon, on which this record is based, though placed originally in the series of *templetonii* in the Museum, are normal examples of *lineatipes*.

Head just over  $2\frac{1}{2}$  times as wide as the anterior margin of the vertex, which is just over twice as wide as the synthlipsis; inner margins of eyes divergent throughout and very slightly sinuate; anterior margin of vertex projecting little beyond eyes.

Pronotum about  $1\frac{1}{3}$  times as wide as head and  $1\frac{1}{3}$  times as wide as long.

Lateral margins straight save anteriorly where they converge on the anterior angles; posterior margin very slightly concave (fig. 4e).

Scutellum rather under twice the length of the pronotum.

♂. Anterior tibia with inner margin excavated centrally, the excavation ending distally against a low eminence (fig. 2b). Tibia just over three times as long as the proximal (1 2) joint, which is about  $1\frac{1}{2}$  times as long as the distal, claws subequal in length to the latter (42 : 13 : 9 : 9).

Intermediate tibia about  $4\frac{1}{2}$  times as long as the proximal (1 2) tarsal joint which is short, broad and somewhat flattened, distal joint about  $1\frac{1}{2}$  times as long as proximal and nearly twice as long as the longer outer claw (49 : 11 : 17 : 9).

Genital capsule as in fig. 3c.

♀. Anterior tibia simple, not excavate, proportions of leg as in the male (42 : 14 : 9 : 10).

Intermediate tibia  $3\frac{1}{2}$  times as long as the proximal tarsal joint which is about  $\frac{7}{8}$  as long as the second, the latter rather less than twice as long as the outer claw (49 : 14 : 16 : 9); length ♂. 9.8 mm.; ♀. 9.8 mm.

The specimen of Distant's *paivana* in the collection is a male from Madhupur (coll. Paiva), either the type or a paratype, in which the paler regions are pallid grey instead of yellowish, the inner margin of the eyes is perhaps a little more sinuate than in the other specimens but the structural peculiarities of the head mentioned in the original description are inappreciable. The form of the body, the structure of the anterior and intermediate legs and the posterior end of the partially extruded genital capsule show the specimen to be undoubtedly referable to *abbreviata*. The type of *lactea* Paiva is structurally a typical female, which is so teneral that it has not yet acquired any pigmentation; the head is slightly displaced so that Paiva's structural characters are illusionary. Two specimens, respectively from Verkulay and Korumaadi in Travancore are rather uniformly greyish yellow and are also presumably teneral.

The structure of the anterior and intermediate legs in the male and of the latter in the female is most characteristic. *E. abbreviata* is evidently widely distributed in South and Central India; the material in the Museum is from Ceylon, Travancore, the Western Ghats, Bombay Presidency, Behar (Madhupur) and Lucknow. Specimens referred to *abbreviata* from the Andaman Islands are specifically distinct and may represent a new species; these will be discussed in a later paper.

### **Enithares intha Paiva.**

*Enithares intha* Paiva 1918. *Rec. Ind. Mus.* XIV, p. 27.

Pale greyish yellow, pronotal fossae black.

Small, build moderate, converging posteriorly from about the middle of the body.

Vertex evenly and rather prominently rounded anteriorly; head  $2\frac{3}{8}$  times as wide as the anterior margin of the vertex which is twice as wide as the synthlipsis. Inner margin of eyes divergent in anterior part of head (fig. 4d).

Pronotum  $1\frac{1}{8}$  times as long as head and about  $1\frac{1}{3}$  times as long as wide; lateral margins very slightly and evenly curved, posterior margin almost straight.

Scutellum  $1\frac{5}{7}$  times as long as the pronotum.

Anterior leg with a conspicuous flat triangular apical eminence on the lower part of the inner surface of the tibia (fig. 2c); tibia just under three times as long as the proximal tarsal joint which is  $1\frac{3}{4}$  times as long as the distal, claws equal to the latter (51 : 18 : 11 : 11).

Intermediate leg with tibia produced apically to form a short spur overlapping the proximal tarsal joint which is short, wide and flat.

Tibia just over four times as long as the proximal tarsal joint which is very slightly shorter than the distal, claw  $\frac{3}{5}$  of the length of the latter (78 : 18 : 19 : 11).

Genital capsule as in fig. 3e.

Length 8.5 mm.

BURMA: Inlé Lake, Shan States (*type* ♂ and *paratype*).

The small size, shape of the head and in the male the structure of the anterior and intermediate tibiae as well as the genital capsule are characteristic.

### **Enithares mandalayensis** Distant.

*Enithares mandalayensis* Distant 1910. *Faun. Brit. Ind. Rhynchota*, V, p. 331, fig. 192.

Greyish yellow with dark pronotal fossae.

Very small, build moderate, subparallel in middle third of body. Head  $2\frac{1}{2}$  times as wide as the anterior margin of the vertex which is  $2\frac{3}{8}$  times as wide as the synthlipsis; inner margin of eyes diverging anteriorly in the front part of the head; anterior margin of vertex produced well in front of the eyes and evenly rounded.

Pronotum subequal in length to the head and about  $1\frac{1}{18}$  times as wide as the latter; lateral margins slightly and evenly rounded (fig. 4c).

Scutellum  $1\frac{3}{4}$  times as long as pronotum.

♂. Anterior tibia  $2\frac{3}{4}$  times as long as proximal tarsal joint, which is just over twice as long as the distal, the latter subequal to the claws (30 : 11 : 5 : 6).

Intermediate tibia slightly produced apically, just under three times as long as the proximal tarsal joint which is  $1\frac{5}{7}$  times the distal, the latter  $1\frac{3}{4}$  times the longer claw (35 : 12 : 7 : 4).

Genital capsule very small, as in fig. 3d.

Length 7.0 mm.

## Family CORIXIDAE.

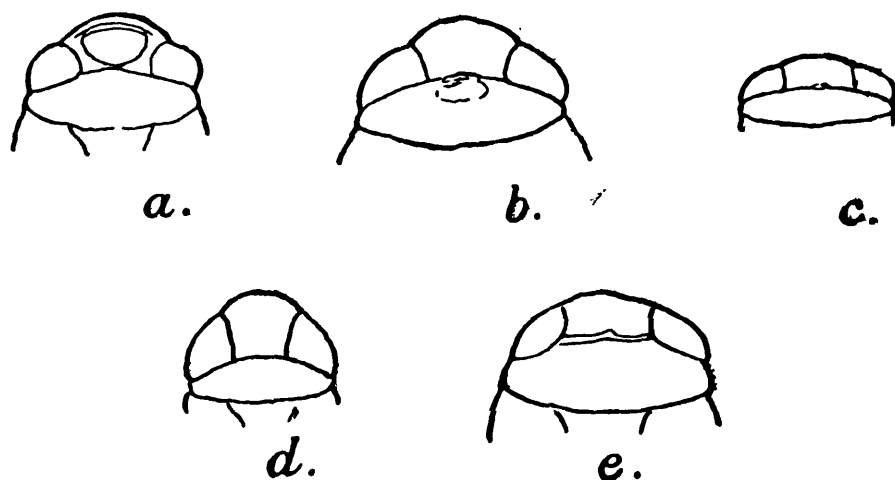
### Sub-family MICRONECTINAE.

#### **Micronecta** Kirk.

The material determined by Distant is in a state of great confusion, several forms of quite different *facies* having been frequently included

by him under one name. Considerable further study of the types of the Indian species of *Micronecta* in the British Museum is necessary before the status of many of them can be disentangled. In the present paper only two of Distant's species, based on short homogeneous series, are discussed.

In addition to these two, *Micronecta issa* Distant, a species of which I have not seen a male specimen; may be readily identified by the peculiar curved transverse carinae on the vertex. The anterior carina lies just within the anterior margin of the vertex; the posterior, which is not so well marked, lies with its concave edge forward, just in front of the posterior margin. Laterally the carinae run respectively backwards and forwards along the inner margin of the eye to form a continuous ridge, so that an ovoid space is more or less completely enclosed between them (fig. 5a.).



TEXT-FIG. 5.—Head and Pronotum of a. *Micronecta issa* Distant; b. *M. desertana* Distant; c. *M. fulva* Paiva; d. *M. daedala* Distant; e. *M. substriata* Paiva.

Three species of the genus were described by Paiva, all from the Inlé Lake, Shan States, Burma. The unique type of one of these, *M. soror*, is now represented only by a corroded pin; the other two are discussed below.

### *Micronecta desertana* Distant.

*Micronecta desertana* Distant 1920. *Rec. Ind. Mus.* XVIII, p. 206.

Head yellowish white, with an anterior orange spot on the vertex; pronotum and elytra pale greyish brown, lateral margins of the latter yellowish, clavus with a small indefinite brown spot near the apex, corium with faint traces of darker marking; legs greyish yellow throughout.

Head very slightly narrower than the pronotum, and  $2\frac{1}{2}$  times as wide as the least interocular distance.

Pronotum  $1\frac{2}{7}$  times as long as the head and almost three times as wide as long, lateral margins distinct, one quarter of the length of the pronotum and just under one-third of that of the posterior margin of the eye; pronotal disc with a slight transverse depression behind a very slight elevation on the anterior margin (fig. 5b).

Scutellum just over half as long as pronotum.

Intermediate leg with tarsus just under  $1\frac{1}{2}$  times the length of the tibia and  $1\frac{1}{2}$  times that of the claws (12 : 17 : 10). Subcostal fossa of elytra extending to the apex of the metapleuron.

♂. right paramere (only part of genitalia that could be examined) long, rather straight and not dilated in any part of the shaft (fig. 6a).

Length 2.6 mm.

PERSIA: Hurmuk, Persian side of Perso-Afghan-Baluch boundary, 3,000 ft. (desert spring).

The structure of the pronotum, particularly the transverse depression, appears to be rather characteristic. *M. desertana* does not appear to be synonymous with any of the species diagnosed by Horvath in his key to the Palaearctic members of the genus (*Rev. d'Ent.* XVIII, p. 101, 1899).

### *Micronecta daedala* Distant.

*Micronecta daedala* Distant 1910. *Faun. Brit. Ind. Rhynchota* V, p. 352, fig. 214.

Dull brown, head, margins of pronotum, a stripe along the clavo-corial suture and one along the anterior part of the subcostal margin of the corium paler.

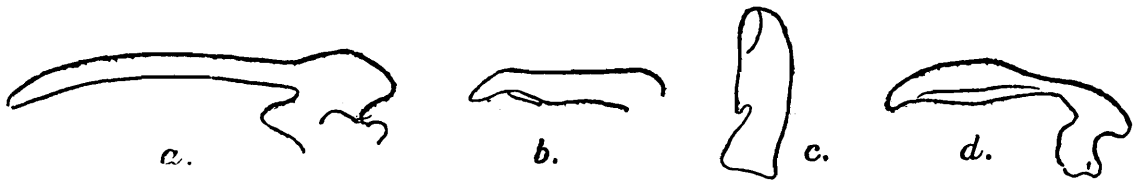
Head  $1\frac{1}{4}$  times as long as pronotum and  $2\frac{1}{8}$  times as wide as the least interocular distance.

Pronotum finely granulose;  $1\frac{1}{3}$  times as wide as the head and  $3\frac{1}{2}$  times as wide as long, lateral margins just over a third as long as pronotum and half the length of the posterior margin of the eye (fig. 5d).

Scutellum  $\frac{5}{8}$  the length of pronotum.

Subcostal furrow short.

Right paramere straight, flat and wide (fig. 6b).



TEXT-FIG. 6.—a. *Micronecta desertana* Distant, right paramere; b. *M. daedala* Distant, right paramere; c. *M. daedala* Distant, left paramere; d. *M. fulva* Paiva, right paramere.

Left paramere short, very wide and flat, more or less membranous apically (fig. 6c).

Length 2 mm. (*vide* Distant; the specimen examined is in too poor a condition for exact measurement.)

N. E. Himalayas: Kurseong, 5,000 ft. (Annandale).

The variegated colour and the very flat wide parameres should enable this species to be easily recognised.

### *Micronecta fulva* Paiva.

*Micronecta fulva* Paiva 1918. *Rec. Ind. Mus.* XIV, p. 32.

Yellowish brown throughout.

Head slightly longer and subequal in width to the pronotum, rather over  $2\frac{1}{2}$  times as wide as least interocular distance. Pronotum three times as wide as long, lateral margins rudimentary, posterior margin evenly rounded (fig. 5c). Scutellum just over half the length of the pronotum. Intermediate leg with tarsus hardly longer than tibia and

rather more than  $1\frac{1}{2}$  times as long as claws (14 : 14.5 : 9). Subcostal fossa long and rather narrow, ending indefinitely beyond the apex of the metapleuron.

Right paramere as in fig. 6*d*.

BURMA : Inlé Lake, Shan States (type ♀ and paratype ♂). This species is somewhat similar to *M. piccanin* Hutch., particularly in the form of the right paramere. I was not able to obtain a satisfactory preparation of the abdomen owing to the softness of the chitin, so its true affinities must be left in doubt. The above notes should enable it to be recognised in collections from Burma.

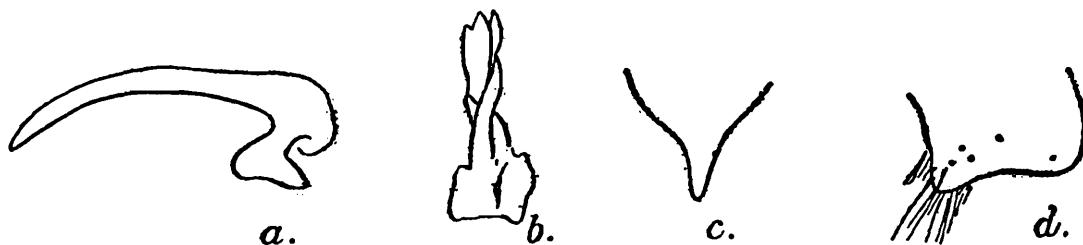
### *Micronecta substriata* Paiva.

*Micronecta substriata* Paiva 1919. *Rec. Ind. Mus.* XIV, p. 31.

Head dull brownish yellow ; pronotum dull brown, darker posteriorly ; clavus light brown, with a broad irregular darker stripe along the anterior margin ; corium light brown with four indefinite darker longitudinal stripes ; two dark elongate spots on embolium ; outer edge of membrane with a faint dark spot ; intermediate legs dull yellowish brown, apex of tarsus darker.

Head just over half the length of the pronotum, the latter rather more than  $2\frac{1}{2}$  times as wide as long and just over  $2\frac{1}{2}$  times as long as its lateral margins which are a little more than half as long as the posterior border of the eye (fig. 5*e*). Scutellum just over half as long as pronotum.

Intermediate leg with tarsus  $1\frac{1}{3}$  times as long as tibia, the latter a little longer than the claws (10.5 : 14 : 9). Dull wide part of subcostal fossa extending to rather more than half way from its base to the apex of the metapleuron, narrower apical part of furrow indefinite.



TEXT-FIG. 7.—*Micronecta substriata* Paiva. *a*. Right paramere ; *b*. Left paramere (free-hand sketch) ; *c*. Submedian process of 8th abdominal sternite ; *d*. Free portion of 8th abdominal tergite.

Submedian process of seventh abdominal sternite as in fig. 7*c*. Free portion of eighth abdominal tergite as in fig. 7*d*. Right paramere slender and curved (fig. 7*a*) ; left paramere irregularly styliform and twisted (fig. 7*b*).

Length 2.3 mm.

BURMA : Inlé Lake, Shan States (type and four paratypes including dissected ♂).

This species is perhaps synonymous with *M. quadristrigata* Breddin, of which species the Indian Museum possesses female specimens from the Philippines which are probably correctly determined.



## Sub-family CORIXINAE.

***Agraptocorixa hyalinipennis* (Fabr.).**

*Agraptocorixa hyalinipennis* Jaczewski 1926. *Ann. Zool. Mus. Polon.* V, p. 18 ;  
Lundblad 1929. *Arch. f. Hydrobiol.* XX, p. 297.

*Corixa unicolor* Paiva 1918. *Rec. Ind. Mus.* XIV, p. 30.

*Corixa paivana* Dover 1922. *Rec. Ind. Mus.* XXIV, p. 333.

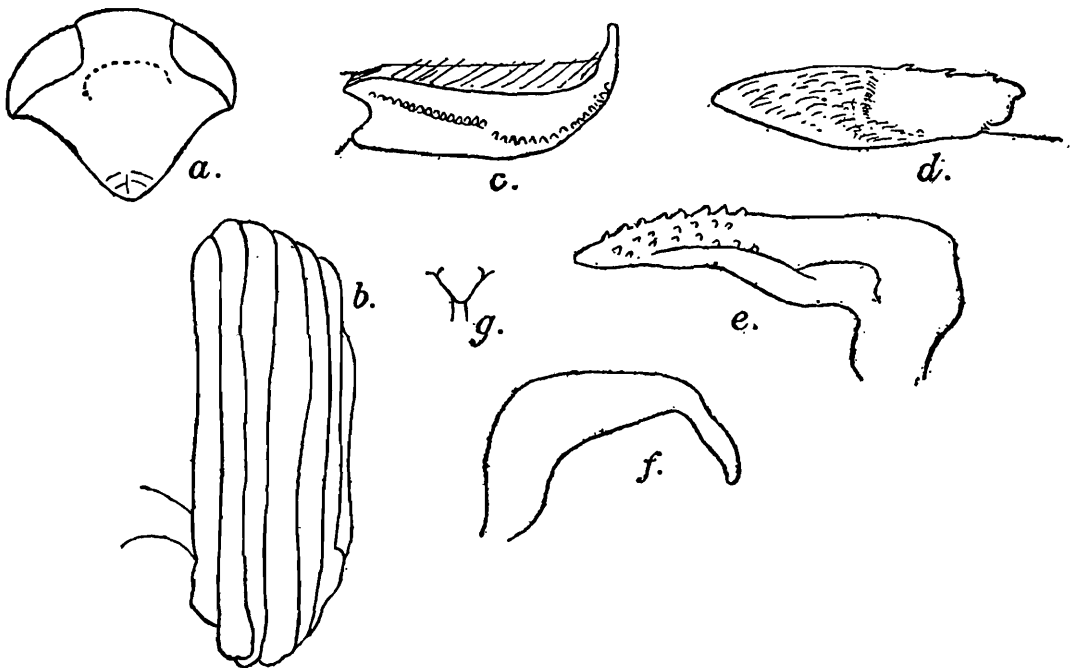
*Agraptocorixa unicolor* Lundblad 1928. *Ark. f. Zool.* XX A. No. 6, p. 2.<sup>1</sup>

An examination of the numerous specimens of *paivana* in the collection, including the type, leaves no doubt that they are referable to *hyalinipennis*. The type of *unicolor* is a female but there is no reason to separate it from this well known Asiatic species; the peculiar form of the head in Paiva's figure is an artist's error, the specimen does not differ from *hyalinipennis* in this or any other respect.

***Sigara seistanensis* (Distant).**

*Corixa seistanensis* Distant 1920. *Rec. Ind. Mus.* XVIII, p. 206.

Head yellow, pronotum pale greyish yellow with six very thin black transverse stripes which are much narrower than the intervening spaces, the fourth and sixth somewhat broken, the fifth wider than the others, posterior margin somewhat suffused with black; elytra predominantly yellow, base of clavus with broad yellow and narrow black transverse bands, rest of elytra with narrow black vermiculations that tend to run together longitudinally in the internal angle of the corium, membrane similarly vermiculated, separated from the corial markings by a yellow



TEXT-FIG. 8.—*Sigara seistanensis* (Distant). a. Anterior view of head; b. Strigil; c. Palp; d. Ventral surface of posterior femur; e. Left paramere; f. Right paramere; g. Xyphus.

line; embolium with a little black at the apex; legs yellow, apex of intermediate tarsus dark brown.

<sup>1</sup> See also Jaczewski, *Ann. Mus. Zool. Polon.*, p. 19, 1926.

Head not produced anteriorly. Fourth joint of antenna about  $\frac{5}{9}$  as long as third. Pronotum rastrate,  $1\frac{3}{4}$  as long as head and nearly twice as wide as long; lateral angles slightly obtuse, posterior angle very obtuse; median carina definitely developed on the anterior part of the pronotum, reaching to about the first black stripe.

Xyphus (fig. 8g) forming an equilateral triangle with a slightly rounded apex. Intermediate tibia  $1\frac{1}{2}$  times as long as the tarsus, claws about  $1\frac{1}{4}$  times as long as the latter (45 : 30 : 37).

Posterior femur with the ventral pubescent area not reaching half way down the middle line (fig. 8d.).

Clavus slightly rastrate, corium almost smooth.

♂. Facial impression slight, not extending between the eyes (fig. 8a). Pala cultrate, with a row of 30 pegs, the proximal 15 arranged in a straight row, the distal in an arc slightly separated from the straight proximal row (fig. 8c).

Strigil long as in fig. 8b. Parameres as in figs. 8e & f.

Length 6.2 mm.

SEISTAN: Water channels near Nasratabad (♂ type). *S. seistanensis* has of course no affinity to *Cymatia rogenhofen* (Fieber) to which it was allied by Distant.

### ***Sigara seistanensis* f. *randana* (Distant).**

*Corixa randana* Distant 1920. *Rec. Ind. Mus.* XVIII, p. 206.

The two specimens of *Corixa randana* Distant in the collection are apparently structurally inseparable from the above species, the general form, posterior femur, xyphus, and secondary sexual characters of the male being identical. The only possible structural differences are that the pronotal carina and the rastration appear to be a little more pronounced. These differences, however, may well be illusionary, as the dark colour of *randana* makes it difficult to compare such characters with those of the very pale *seistanensis*. The former form is very deeply coloured.

Head brownish yellow, pronotum brown-black with seven regular yellow stripes subequal in width to the intervening spaces, third, fourth and fifth confluent marginally; elytra as in typical form but black markings much wider so that the yellow colour does not predominate; legs dark yellowish brown, apex of intermediate tarsus hardly darker.

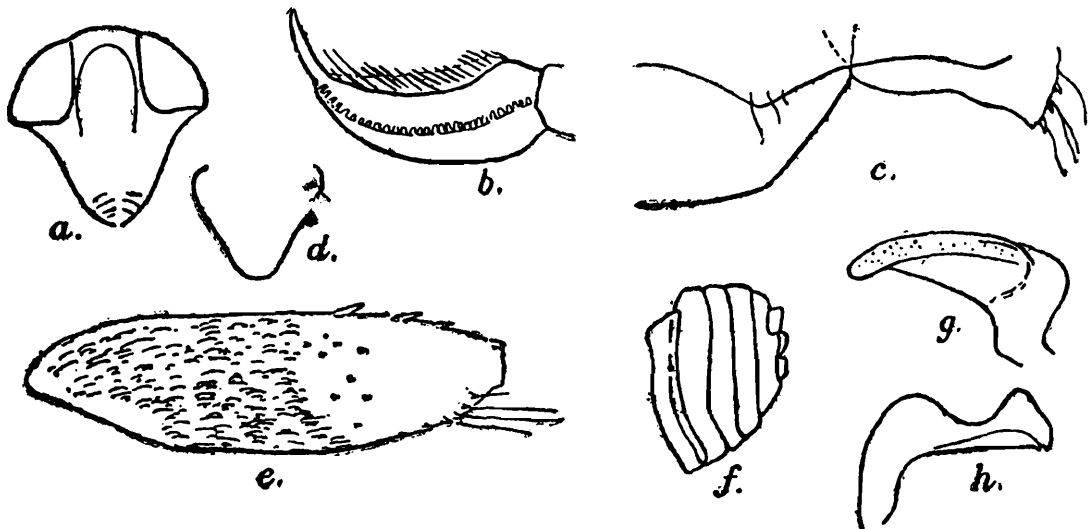
The more intense colouration is clearly real and not due to a discoloration of the chitin as the black bands themselves are distinctly wider than in the typical form. The structural identity of *randana* and *seistanensis* precludes the former from specific rank, but the great difference in colour allows it to be retained as a separate form. Such colour variation is of course well known in the genus. Since both forms are known only from Seistan, it is unlikely that they represent geographically separate subspecies.

***Sigara distorta* (Distant).**

*Corixa affinis* Distant 1910. *Faun. Brit. Ind. Rhynchota*, V, p. 341, fig. 283. *nec* Leach.

*Corixa distorta* Distant 1910. *Faun. Brit. Ind. Rhynchota* V, p. 343, fig. 205.

The five specimens of *C. affinis* Distant from Nepal in the collection are all females but are shown by the form of the xyphus, the armature of the posterior femur and the coloration to be conspecific with the unique male type of *distorta*. No new name is therefore required to replace the preoccupied *affinis*.



TEXT-FIG. 9.—*Sigara distorta* (Distant), ♂. *a.* Anterior view of head; *b.* Pala; *c.* Right hand posterior part of 7th abdominal segment; *d.* Xyphus; *e.* Ventral surface of posterior femur; *f.* Strigil; *g.* Left paramere; *h.* Right paramere.

Head dull greyish yellow; pronotum dark, with seven yellow lines a little narrower than the intervening spaces and tending to break and anastomose; elytra black, with yellow fragmented and vermiculated lines which tend to be more regular in the inner angle of the clavus though not thick and straight even in this region, intervening black markings tending to run into indefinite longitudinal series; apico-internal region of left membrane milky; legs dull yellow.

Head rather long centrally, just over  $\frac{2}{3}$  the length of the pronotum; fourth joint of antenna  $\frac{5}{7}$  the length of third. Pronotum just under twice as wide as long, rastrate, lateral and posterior angles obtuse.

Xyphus subequilateral and well rounded apically (fig. 9*e*). Intermediate leg with tibia and claw subequal, tarsus about  $\frac{3}{4}$  the length of the former (32 : 23 : 34). Posterior femur with the non-pubescent area entirely distal to the middle, proximal part of this area with numerous small scattered spines (fig. 9*e*).

♂. Facial impression well marked, extending upward between the eyes as far as the anterior margin of the ventral surface of the head, so forming a rather high arch with a sharply defined edge (fig. 9*a*).

Pala cultrate, with 33 pegs in a regularly curved row (fig. 9*b*).

Strigil, subquadrangular as in fig. 9*f*.

Genitalia as in figs. 9 *g*, *h*.

*Material examined*: type of *distorta* NEPAL, 1♂, Pharping, paratypes of *affinis* NEPAL, 4♀, Khatmandu, 1♀ Chonebal.

Two females from Seistan in the collection, referred to *affinis* by Distant (*Rec. Ind. Mus. XVIII*, p. 205, 1920) are clearly not conspecific with the above. Without males I do not feel justified at the moment in discussing their identity further. There are no specimens in the collection from Distant's other localities, Bengal and the Simla Hills, and the occurrence of the species outside Nepal is at present unconfirmed.

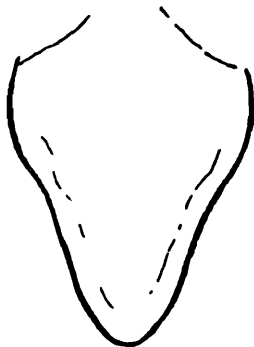
### **Sigara promontoria** (Distant).

*Corixa promontoria* Distant 1910. *Faun. Brit. Ind. Rhynchota*, V, p. 341, fig. 201.

*Corixa ribeiroi* Paiva, in Paiva and Dover 1922. *Rec. Ind. Mus. XXIV*, p. 333.

*Sigara promontoria* is evidently a common and widely distributed species in Northern India. In the near future I hope to examine the material referred by Distant to this species, which lack of time did not permit me to study in Calcutta. At present I merely indicate the salient diagnostic characters based on the type of *C. ribeiroi* Paiva which appears to be an absolute synonym of *promontoria*.

Xyphus elongate (fig. 10); elytra practically smooth; intermediate tibia just under  $1\frac{1}{2}$  times as long as tarsus, claw  $1\frac{1}{2}$  as long as the latter (38 : 26 : 31); ventral surface of posterior femur with the smooth area entirely in the distal half, a few spines near posterior margin.



TEXT-FIG. 10.—Xyphus of *Sigara promontoria* (Distant).

♂. Head well produced between the eyes, frontal depression rather deep, running up between the eyes to the anterior margin of the prominent head; pala regularly cultrate, with a simple row of 30 pegs; strigil sub-rectangular,  $1\frac{3}{5}$  times as wide as long with 7 irregular comb-rows.

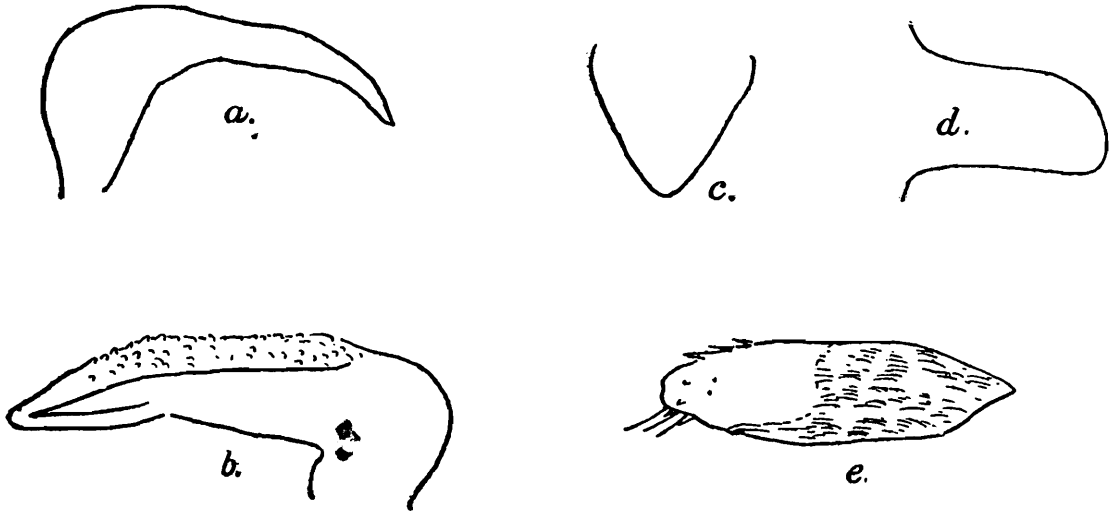
### **Sigara septem-lineata** (Paiva).

*Corixa septem-lineata* Paiva 1918. *Rec. Ind. Mus. XVIII*, p. 30.

Head yellow; pronotum with seven pale lines which are entire; regular and wider than the intervening spaces; clavus brown with yellow transverse lines which are entire, wide and tending to anastomose in the basal angle but otherwise fragmented; corium with yellow lines broken, brown, intervening spaces confluent and forming a longitudinal line in the inner angle; apical part of left membrane clear; legs pale yellowish. Head fairly short and not produced anteriorly (rather crushed in type).

Pronotum nearly twice as wide as long, posterior margin very widely rounded, the posterior angle being obtuse and rather ill-defined, median carina forming a tubercle extending to the second pale line.

Xyphus equilateral (fig. 11c).



TEXT-FIG. 11.—*Sigara septem-lineata* (Paiva). a. Right paramere; b. Left paramere; c. Xyphus; d. Lateral lobe of prothorax; e. Ventral surface of posterior femur.

Intermediate leg with tibia and claws subequal in length, tarsus about  $\frac{2}{3}$  as long as former (28 : 19 : 27).

Posterior femur with the pubescent area of the ventral surface reaching beyond the center of the midline, non-pubescent area with a few minute scattered spines sub-apically (fig. 11e). Facial impression well-marked, extending up between the eyes (exact limits uncertain owing to damage to head).

Genitalia as in figs. 11 a & b.

BURMA : Inlé Lake, Shan States (type ♂).

### ***Sigara rambhaensis* (Paiva).**

*Corixa rambhaensis* Paiva, in Paiva and Dover 1922. *Rec. Ind. Mus.* XXIV, p. 331.

Head yellow brown; pronotum dull yellow with six unbroken lines and the anterior and posterior margins dark; elytra predominantly yellow with very vermiculate and anastomosing markings that tend to run together longitudinally, but which do not form definite longitudinal lines, yellow areas thick at base of clavus; membrane dark with yellow vermiculate markings; anterior angles dark, inner part of left membrane colourless and transparent; legs yellow (intermediate legs missing).

Head obtusely rounded anteriorly; antenna with fourth joint just over half the length of the third (45 : 80).

Pronotum about  $1\frac{2}{3}$  times as wide as long, posterior angle obtuse, central carina very slightly indicated anteriorly. Lateral lobes of prothorax as in fig. 12c.

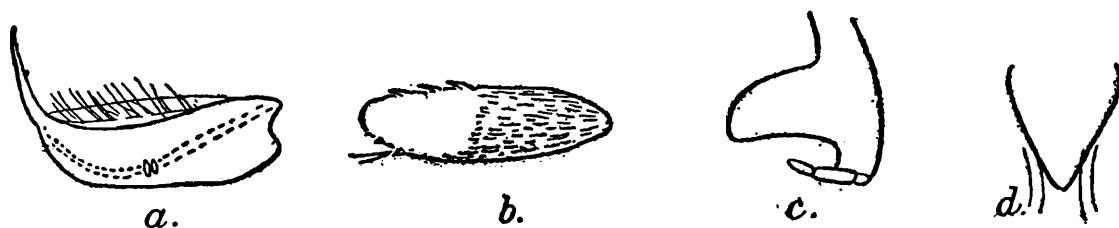
Xyphus sub-acute (fig. 12d).

Posterior femur below with the pubescent area reaching beyond the center of the midline, three anterior and two posterior spines alone developed on the margins of the non-pubescent part (fig. 12b).

Elytra not rastrate.

♂. Facial impression moderately marked, highly arched between the eyes, margin ill-defined.

Pala sub-parallel, with a row of pegs, which is straight proximally and gradually curved in the distal half (fig. 12a).



TEXT-FIG. 12.—*Sigara rambhaensis* Paiva, ♂. a. Pala; b. Ventral surface of posterior femur; c. Lateral lobe of prothorax; d. Xyphus.

Length 6.15 mm. (*vide* Paiva).

MADRAS: Rambha, Ganjam District (type ♂).

The above somewhat inadequate notes are based on the type which is in poor condition, lacking the abdomen entirely. Topotypical material could undoubtedly be recognised.

### *Sigara annandalei* (Paiva).

*Corixa annandalei* Paiva, in Paiva and Dover, 1922. *Rec. Ind. Mus.* XXIV, p. 332.

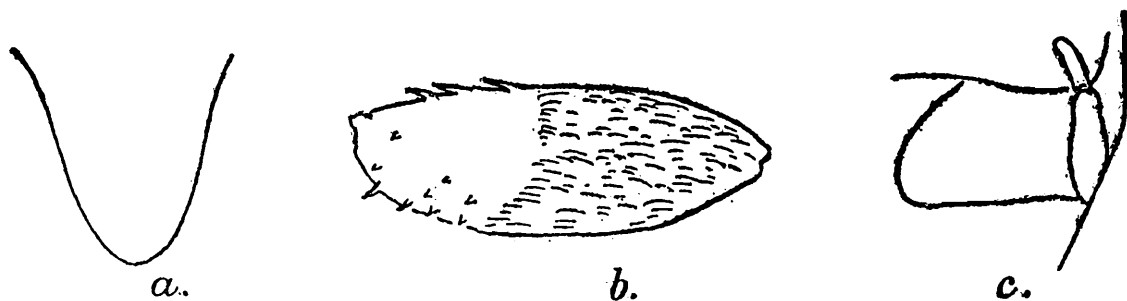
Head dull yellow; pronotum black with six yellow stripes, the first five confluent marginally, subequal to or slightly narrower than the intervening spaces; elytra black brown with clavus and corium evenly vermiculated with yellow markings which are hardly more entire at the base of the clavus than in other parts of the elytra, black areas not forming longitudinal stripes.

Head not elongated anteriorly, evenly rounded, about  $\frac{3}{4}$  the length of the pronotum.

Pronotum  $1\frac{1}{2}$  times as wide as long, somewhat rastrate, with a slight but definite longitudinal carina throughout; posterior margin gradually rounded to the obtuse rounded posterior angle, lateral angles obtuse.

Lateral lobes of prothorax as in fig. 13c.

Xyphus subelongate (fig. 13a).



TEXT-FIG. 13.—*Sigara annandalei* (Paiva). a. Xyphus; b. Ventral surface of posterior femur; c. Lateral lobe of prothorax.

Elytra shiny, clavus very slightly rastrate, corium smooth.

Intermediate leg with tibia  $1\frac{2}{3}$  times as long as tarsus, claw  $1\frac{1}{4}$  times the latter (41 : 25 : 30).

Posterior femur below with the pubescent proximal area reaching beyond the center of the middle line, several scattered spines posterolaterally (fig. 13b). Length, 7.0 mm.

ORISSA: Satpara (type ♀).

Though the type of *annandalei* is unfortunately a female, the above notes should enable it to be recognised in collections, at least from the north-eastern parts of Peninsular India. The form of the xyphus, the spination of the posterior femur and the shiny elytra are the most conspicuous characters of the species; *annandalei* is also, as Paiva pointed out, slightly larger than its Indian congeners.

### *Sigara paivai* Lundblad.

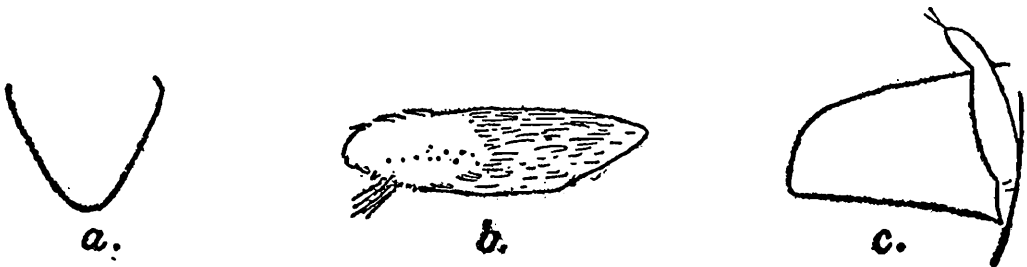
*Sigara paivai* Lundblad 1928. *Entom. Tidskr.* p. 241.

*Corixa dubia* Paiva, in Paiva and Dover 1922. *Rec. Ind. Mus.* XXIV, p. 332. *nec* Douglas and Scott 1869. *Entom. Mon. Mag.* V, p. 266; *nec* *Arctocorixa dubia* Abbott 1916. *Entom. News* XXVII, p. 342.

The name *paivai* was introduced by Lundblad on account of *dubia* being preoccupied; he was however unable to add anything to Paiva's brief description. Since *dubia* Douglas and Scott is a synonym of *S. nigrolineata* Fieber and since *dubia* Abbott is a member of the same genus a new name for the latter is perhaps also required.

The type of *paivai* is a female specimen. During my stay in Calcutta I obtained on 30 October 1932, a second female, clearly to be referred to this species, from a fountain in Dalhousie Square; prolonged search, however, failed to produce any more material of either sex. The following notes should enable the species to be recognized in collections from Peninsular India, the double spine row of the posterior femur is characteristic.

Head yellow; pronotum black, with six yellow transverse stripes slightly narrower than the intervening spaces, the second and third with an irregular cross anastomosis (not in Calcutta specimen). Clavus black, with very irregular and much broken vermiculations except in the proximal angle where they are more or less entire, corium black with very broken yellow vermiculations, the black areas not forming longitudinal lines, inner half of left membrane milky. Legs yellow.



TEXT-FIG. 14.—*Sigara paivai* Lundblad. a. Xyphus; b. Ventral surface of posterior femur; c. Lateral lobe of prothorax.

Head about  $\frac{6}{7}$  as long as pronotum; fourth joint of antenna just under half as long as third.

Pronotum rastrate,  $1\frac{6}{7}$  times as wide as long.

Lateral lobes of prothorax as in fig. 14c.

Xyphus subequilateral (fig. 14a.).

Intermediate tibia  $1\frac{2}{3}$  times as long as tarsus, claws missing in type (slightly shorter than tibia in Calcutta specimen).

Posterior femur below with the pubescent area reaching to more than half the middle length, non-pubescent area with a longitudinal irregularly double spine row (fig. 14*b*).

Length 5.8 mm.

ASSAM : Mazbat, Darrang District (type ♀).