

DESCRIPTIONS OF TWENTY NEW INDIAN DRAGONFLIES.

By Lt.-Col. F. C. FRASER, I.M.S.

During the past three years several large collections of dragonflies have been sent to me for identification, among which nearly forty new species have been found.

A number of these have been described in various Journals and Memoirs by myself, but owing to pressure of work in other directions I have been unable so far to deal with the rest. It had been my intention to include these in a paper dealing with the Odonata of Northern India and Upper Burma, which was to form a companion to that dealing with the dragonfly fauna of Western India, published in these *Records* (Vol. XXVI, 1924), but owing to the time needed to digest the enormous volume of notes collected during the past ten years, and in order not to delay further the publishing of these new species, I have thought it better to include the latter in a separate paper.

The most important collections, which have furnished material for this paper, were made by Mr. T. Bainbrigg Fletcher in Assam, by Mr. Chas. Inglis in Sikkim and Bengal, by Mr. H. V. O'Donel in the Duars, Bengal, and lastly by Col. F. Wall, I.M.S., in Upper Burma and Ceylon.

Several interesting facts are illustrated in these collections, among which are the discovery of a new *Dysphuea*, the first of its genus to be reported from Burma, and the second from the Indian Empire; a new *Philoganga*, the first to be reported from Burma, and the third species to be reported belonging to this most interesting and archaic genus. A new *Macromia* is reported from Ceylon, and is noteworthy as being the first member of the subfamily Corduliinae to be found in that island. There is a new *Onychogomphus* from Upper Burma, whose colouring is totally at variance with all other known members of the genus, whilst a new *Gynacantha* is as brightly coloured as any *Aeschna*, a circumstance which is explained by its being a diurnal flyer, a hitherto unknown habit of any species of the genus. A subspecies of *Agrionoptera insignis* has been taken in the Duars, Bengal, this being the most westerly point of distribution so far reported; another species of *Hylaeothemis* has been discovered in North India, a rather unexpected find; a *Macromidia* from Upper Burma, which I had mistaken for *rapida* Mart., from Tonkin, after comparison with the type in the Paris Museum, turns out to be a distinct new species, the second of its genus to be found in India, and the first from Burma. Happily it combines the characters of *donaldi* from Western India, with those of *rapida* and *fulvia* from Tonkin and Borneo respectively. The four known species, although separated by enormous gaps, are thus seen to be closely linked. Another new subfamily has been added to the genus *Aeschna* by the discovery of *Petaliaeschna* from Assam, characterized by the extreme petiolation of the hind wings. The male of *Allogaster latifrons* has at last been discovered

after nearly half a century from the discovery of the female, and, by a curious coincidence, another species belonging to the same genus has been taken in the same locality. Both are described here.

I take this opportunity of thanking the various collectors mentioned above, who have so generously supplied me with the material upon which this paper is based. Types of all new species will be lodged in the British Museum.

The following new species are described below :—

Sub-order ANISOPTERA.

Subfamily Libellulinae.

Agrionoptera insignis dorothea.
Hylaeothemis gardeneri.

Subfamily Corduliinae.

Macromidia shanensis.
Macromia aculeata.
Macromia zeylanica.

Family Aeschnidae.

Aeschna quadrilateralis.
Periaeschna nocturnalis.
Petaliaeschna fletcheri.
Gynacantha biharica.
Gynacantha albistyla.

Subfamily Cordulegasterinae.

Allogaster hermionce.
(*Allogaster latifrons* Selys.)

Family Gomphidae.

Onychogomphus pulcherrima.

Sub-order ZYGOPTERA.

Family Agrionidae.

Philoganga loringae.
Anisopleura subplatystyla.
Dysphaea walli.

Family Epallagidae.

Rhinocypha hilaryae.
Rhinocypha perforata beatifica.

Family Coenagrionidae.

Ischnura mildredae.
Copera superplatypes.
Caconeura dorsalis auricolor.

The text-figures are all original and, with the exception of the two wing-figures, have been drawn from camera lucida studies.

***Agrionoptera insignis dorothea*, subsp. nov.**

Male.—Abdomen 24-25 mm. Hindwing 25 mm.

Head.—Labium bright chrome yellow, the midlobe and contiguous borders of lateral lobes black; labrum bright citron yellow, its anterior border narrowly black; ante- and post-clypeus and lower border of frons, as well as a broader area at the sides, pale creamy yellow; frons above this area and on upper surface brilliant metallic blue, vesicle similarly coloured; eyes brown; occiput glossy black.

Prothorax black, unmarked.

Thorax black variegated with greenish yellow as follows:—a narrow stripe on each side of the middorsal carina, a small upper humeral spot and a large quadrate lower one, a small spot on the centre of humeral suture, a large spoon-shaped spot lying between the two lateral sutures, with two small spots above just under the base of forewing, a large elongate spot bordering the front of the second lateral suture, and lastly, the greater part of the metepimeron.

Legs black, anterior pair of femora with a streak of yellow on inner aspect.

Wings hyaline, uniformly enfumed in old specimens: nodal index:— $\frac{10-14}{10-11} \mid \frac{13-10}{12-9}, \frac{10-11}{10-11} \mid \frac{12-11}{12-9}$. Pterostigma blackish brown, over 2-3 cells; trigones and hypertrigones entire, subtrigone of forewing traversed once, loop of only 6 to 7 cells, very short and obtuse; only 1 cubital nervure in all wings; *Rspl* and *Mspl* absent; 2 rows of discoidal cells in forewing to level of node or beyond.

Abdomen blood-red, or in teneral, bright ochreous. Marked with black narrowly along the borders of each segment, and more broadly at the apical ends, where the black forms complete rings on each.

Segment 1 dull ochreous green clouded with brown laterally. Segments 8 to 10 entirely black.

Anal appendages black, superiors subcylindrical, arched as seen in profile, with the apex tapering to a fine point and curled evenly upward; inferior triangular, its apex curling gently up.

Genitalia not differing markedly from *insignis insignis*, the hamular hooks rather more curled, the lobe constricted at its base, longer and bulbous at its apex.

Female.—Abdomen 27 mm. Hindwing 28 mm.

Differs in a few respects from the male. The wings are rather more deeply enfumed; the yellow of the labrum brighter and split into two spots by a broad median black fascia; the lateral markings of the thorax broader, the spoon-shaped mark on the sides being confluent with the upper anterior spot, and the elongate spot bordering the last suture broken into two spots; the ground colour of the abdomen ochreous; the 8th segment dilated laterally to form prominent wing-like borders; the anal appendages short and conical; the markings on segments 2 and 3 brighter and broken up by a broad subdorsal lateral black stripe.

Distribution.—Hasimara, Duars, Bengal and Gopaldhara, Darjeeling dist., 4 males and 1 female from the former place, and 1 female from the latter, the former lot from the Duars collected by Mr. H. V. O'Donol, the latter by Mr. H. Stevens.

Mr. Stevens' specimen was badly broken-up and its colours faded, but a comparison with the Duars female proves them to be conspecific. This constitutes the most westerly record of the genus as well as the most northerly. The species may be distinguished from *insignis insignis* by its smaller size, lower nodal index, the thoracic markings, and lastly by slight differences in the genitalia. It has been named after Mrs. H. V. O'Donel.

Hylaeothemis gardeneri, sp. nov.

Male.—Abdomen 25 mm. Hindwing 29 mm.

Head.—Labium bright citron yellow, mid-lobe with a median black stripe; labrum yellow with a broad median and a narrow blackish brown border; rest of face bright citron yellow; frons and vesicle metallic blue; occiput black, very minute.

P¹thorax black marked with yellow, the posterior lobe moderately large, bordered with yellow.

Thorax black marked with greenish-yellow as follows:—a fine yellow line on either side of the middorsal carina, no antehumeral stripe, a humeral stripe narrow above, broadening irregularly below.

The greater part of the sides greenish-yellow, the second lateral suture heavily mapped out in black, this stripe splitting below to enclose the root of the hind leg. Coxae yellow behind, black anteriorly; legs black, posterior femora with a row of closely-set, short robust spines, gradually increasing in length as traced towards the end of femur; mid femora with a row of closely-set, short spines on the proximal half only, and four much longer and gradually lengthening spines, very widely spaced on the distal half.

Wings hyaline, pterostigma black, squared inwardly, oblique outwardly, unbraced, over $2\frac{1}{2}$ cells; (neuration irregular in the right hindwing of type, where the trigone is entirely deformed and a nervure is present in the median space; the antenodals also in this wing do not coincide), nodal index $\frac{9-16}{9-14} \mid \frac{14-9}{15-9}$; 2 rows of postanal cells in hindwing, only 1 in the fore; 1 cubital nervure in forewing, 3 in the hind; trigone in the normal hindwing traversed once; loop with 3 cells in both hindwings; 1 row of discoidal cells in forewing nearly as far as termen.

Abdomen black marked with bright yellow as follows:—segment 1 with a large spot on either side, extending to ventral border and from end to end, also a dorsal apical triangular spot, segment 2 with a median dorsal subapical spot and a broad L-shaped spot on each side, segments 3 to 7 with lateral stripe split into a basal part, by the black jugal suture, and a median longer. On segment 3 the basal part confluent with a ventral stripe, on 4 the basal spot oval, on 5 and 6 the basal part represented by a small round spot, which is quite absent on segment 7; 8 to 10 unmarked.

Anal appendages black, inferior appendage equal in length to superiors, the latter pointed and with a blunt spine beneath the apex, on which are developed several smaller minute spines.

Genitalia.—Lamina projecting cowl-like; hamules very conspicuous in profile, robust, outer ones foliate, inner small, strongly recurved hooks, lobe narrow pointed, very prolonged.

Distribution.—Kampison, Himalayas, 9th April 1924. A single male coll. by S. Chatterjee. *Type* in Museum of Forest Research Institute, Dehra Dun, N. India. Differs in markings and in genitalia from *fruhstorferi* and *clementia*. Venational details also differ in several respects.

More closely related to *clementia* but differs by the yellow labrum, shape of genitalia, etc.

Macromidia shanensis, sp. nov.

Male.—Abdomen 38 mm. Hindwing 32 mm.

Head.—Labium whitish yellow; labrum dark brown; anteclypeus pale yellow; postclypeus, face, frons and vesicle brilliant metallic dark green; occiput dark brown; eyes emerald green.

Prothorax palest brown on dorsum, yellow at the sides.

Thorax brilliant metallic green marked with citron yellow:—an antehumeral stripe extending about halfway up the dorsum of thorax, a narrow medial lateral stripe, a small isolated spot above and a narrow hinder stripe on the metepimeron.

Legs black, coxae of anterior pair yellow. All tibiae keeled.

Wings hyaline; discoidal field in forewing of a single row of cells for a distance of 8 cells, or to level of inner end of bridge; 2 cubital nervures in forewings, 4 in the hind; hypertrigones traversed twice in forewings, once in the hind; nodal index $\frac{9-17}{13-9} \left| \frac{16-9}{10-12} \right|$; pterostigma black, rather short, over $2\frac{1}{2}$ cells. Membrane brown.

Abdomen black, segment 1 metallic green with a narrow lateral apical yellow border, segment 2 with the small oreillet, a spot behind it, and a sharply defined linear spot on the middorsal carina extending basad as far as the jugum, bright citron yellow, segment 3 with a linear middorsal stripe tapering away apicad, all other segments unmarked, except 6 which has an oblong middorsal spot of yellow.

Anal appendages black, shaped similarly to those of *rapida*.

Female.—Abdomen 36 mm. Hindwing 34 mm.

Exactly similar to the male. The yellow lateral spots on segment 2 forming a continuous broad stripe, which is continued on to segment 3 as far as the jugal suture. The spot on segment 6 rather larger, shaped like a long necked flask, with the tapered end pointed basad.

Anal appendages small, black. Vulvar scale projecting, deeply bifid into two spine-like processes, half the length of segment 9.

Wings tinted with saffron at the bases, especially in the cubital and subcostal spaces, as far out as the arc; 12-13 cells in the loop; discoidal field in forewings irregularly of one or two rows of cells, or of two rows with an occasional single cell intercalated; nodal index:— $\frac{9-15}{11-10} \left| \frac{16-10}{10-11} \right|$, pterostigma similar to male.

Distribution.—Maymyo, Upper Burma, 2 females and a single male collected by Col. F. Wall, I.M.S., 31st May 1925, 7th June 1925.

The species is important as it links up *rapida* with *donaldi* in its venation. It is distinguished from the former by the colour of its appendages and by the very restricted markings of abdomen, etc.; from the latter by its much larger size and differently shaped anal appendages.

The large identification mark on segment 6 is strikingly similar to that found in *donaldi*. Type in the Fraser collection.

Macromia aculeata, sp. nov.

Male.—Abdomen 48 mm. Hindwing 36 mm.

Head.—Labium brownish yellow; labrum and face brown with some ill-defined yellow markings,—a small oval spot at the base of each side of the labrum, a small spot at the middle of anteclypeus and a larger well-defined spot shaped like a broad-brimmed hat at the centre of postclypeus; frons brown in front, obscurely yellow above, where it is deeply notched; vesicle and frontal eminences slightly blue metallic; occiput black. Eyes blue.

Prothorax brown. Thorax brown in front marked by a yellow ante-humeral stripe, which is well defined below, but gradually fades away above; laterally blue metallic with a bright citron yellow stripe at its centre and another on hinder border of metepimeron.

Wings hyaline, pterostigma black, over 1 to 2 cells; nodal index:— $\frac{6-13}{8-10} \mid \frac{13-6}{10-9}$; 4 cubital nervures in forewing, 3 in the hind; hypertrigones traversed twice in forewings, once in the hind. Membrane white.

Abdomen black marked with bright citron yellow as follows:—the basal half of segment 2 and the tip of lobe, broad median rings on segments 3 to 6, the basal half of 7 and rather more than the basal third of segment 8, remainder unmarked. Segment 10 with a prominent acute dorsal spine.

Anal appendages black, superiors slightly shorter than the inferior, stout, curved slightly in at apex which is blunt and very slightly upturned. On the outer side, well beyond the middle of appendage, a short very robust spine. Inferior triangular, curled very slightly up, its apex more so, and split into two minute points. (The spine on segment 10, in type, bears three small spines at its apex, but this may be abnormal.)

Genitalia.—Lamina very depressed, notched, coated with short stiff golden hairs, hamules very long, slightly tapered, ending in a well curved hook which overhangs the lobe, (very similar in shape to that of *bellicosa*), lobe prolonged, narrow, projecting perpendicularly to long axis of abdomen, its hinder border bevelled, coated with short stiff golden hairs.

Distribution.—Maymyo, Upper Burma, a single male collected by Col. F. Wall, I.M.S., 25th May 1925, in my own collection. It belongs to group *cingulata*, but is distinguished from all other species by its genitalia.

In my group characters, given for the genus in *Records of the Indian Museum*, Vol. XXV, p. 452, instead of “well-defined stripe,” I should have said, “well isolated stripe,” for in *cingulata* itself, there is a well-defined stripe, but it is confluent with the other yellow markings of the face. In all other members of the group the stripe is absent or poorly defined.

In addition to this male taken by Col. Wall, there are two females taken in the same locality on 3rd-25th May 1925, but their markings show them to belong to group *calliope*. Here follows their description.

Macromia sp. Female (male unknown).

Abdomen 43 mm. Hindwing 39 mm.

Head.—Labium with midlobe citron yellow, its centre narrowly brown, lateral lobes brown, citron yellow basad; labium black with an elongate oval citron yellow spot at base; rest of face and frons glossy black with a broad transverse citron yellow stripe across postclypeus. Occiput and vesicle black. Eyes blue.

Prothorax brown.—Thorax metallic greenish-blue marked with an antehumeral stripe extending nearly up to alar sinus, a broad medial lateral stripe, and a third, on hinder border of metepimeron, all vivid citron yellow.

Legs black, trochanters marked with yellow.

Wings hyaline.—In an adult specimen the apices of forewings enfumed, the extreme bases of both pairs golden yellow. In a teneral specimen the whole of the wings palely enfumed, the bases golden yellow as far out as level of 2nd antenodal nervure; nodal index:— $\frac{7-16}{9-11}$ | $\frac{17-6}{10-10}$; 13 to 15 cells in loop (only 6 in *aculeata*); hypertrigones traversed 3 to 4 times in forewings, twice in the hind.

Abdomen black marked with citron yellow as follows:—segment 1 with a small spot on either side, 2 entirely yellow except for a narrow dorsal apical black border, segment 3 with a baso-lateral spot, narrowly confluent with a pair of middorsal confluent spots, segments 4 to 6 with a pair of medial middorsal spots which decrease gradually in size as traced from segment to segment, 7 with a broad basal ring covering nearly half the segment, 8 with a minute quadrate ventral spot, remainder unmarked.

Anal appendages small, black. Vulvar scale minute, triangular, bifid, glossy black.

***Macromia zeylanica*, sp. nov.**

Male.—Abdomen 38 mm. Hindwing 33 mm.

Head.—Labium citron yellow, the middle lobes broadly bordered with black; labrum black with a citron yellow spot at its base; anteclypeus black, postclypeus bright citron yellow, forming a curved transverse stripe on lower part of face. A small yellow spot against each eye nearly confluent with the yellow stripe, and lastly, a small oval spot on the upper surface of each side of frons.

Prothorax black.—Thorax brilliant metallic bluish green marked with citron yellow as follows:—an antehumeral stripe extending nearly up to alar sinus, which is itself yellow, a narrow mediolateral stripe and the hinder border of metepimeron. A large spot on anterior trochanter and a smaller on the middle one.

Legs black.

Wings hyaline, very faintly enfumed; pterostigma black, small, over $1\frac{1}{2}$ cells; 6 cells in loop; hypertrigones traversed 4 times in forewings, once in the hind; 4 cubital nervures in forewings, 3 in the hind; nodal index $\frac{6-14}{9-9}$ | $\frac{15-5}{10-10}$; membrane white.

Abdomen black marked with citron yellow as follows:—segment 2 with a dorsal duplicate spot limited apicad by the jugal suture and prolonged basad as two points, a large baso-lateral spot limited to the

basal half of segment, segment 3 with a triangular baso-lateral spot and a paired medial dorsal spot, segments 4 to 6 with similar dorsal spots, but almost obsolete on 6, segment 7 with a narrow subbasal ring, 8 with a narrow dorsal basal spot almost confluent with a large quadrate ventral spot. Segments 9 and 10 unmarked, the latter with a robust dorsal spine.

Anal appendages very similar to those of *cingulata*, but the superiors more tapered, the lateral robust spine situated further from the apex.

Genitalia very similar to that of *cingulata*, the hamules are stouter, the terminal hook not so long. Lobe similar, its apex level with the apex of hamules.

Distribution.—Kandy, Ceylon. A single male collected by Col. F. Wall, I.M.S., 13th September 1924, at present in my own collection. Closely related to *cingulata*, but distinguished easily by the markings of face and by slight differences in the anal appendages and genitalia. This is the first species of the subfamily Corduliinae to be discovered in Ceylon.

***Aeschna quadrilateralis*, sp. nov.**

Male.—Abdomen (first 5 segments) 30 mm. Hindwing 53 mm.

Labium light warm brown; labrum, face and frons pale yellowish brown, the upper surface of frons dark blackish brown; occiput olivaceous, small. Eyes palest brown, probably blue during life.

Prothorax brown, its posterior border laterally greenish yellow.

Thorax warm reddish brown marked with bright greenish yellow as follows:—narrow antehumeral sinuous stripes sloping obliquely upward and inward so as to converge, but not nearly meeting the antearlar sinus; two lateral stripes, the first lying between the humeral and first lateral suture, the second occupying the central area and greater part of the metepimeron, both bordered diffusely with blackish.

Legs.—Femora dark reddish brown changing to black distad, tibiae and tarsi black. Hind femora with a row of very small, very closely-set, sharply sloped short spines.

Wings hyaline with a diffuse clouding of dark blackish brown at the bases of all wings, occupying the costal, subcostal and median spaces in the forewing, and a much smaller area in the hindwings, extending out for about the 8th antenodal nervure in forewings.

Pterostigma very short, over $3\frac{1}{2}$ cells in forewing, over 2 in the hind. In the latter wings, in the space immediately next to the pterostigma, are two opaque blackish brown cells, their colour being confluent with the pterostigma so that the latter has a peculiar stunted, quadrated appearance. Relatively to the size of the insect, the size of the pterostigma is the smallest known within the genus.

Details of the wings are as follows:—median space entire; nodal index $\frac{22-29}{22-19}$ | $\frac{27-21}{19-23}$; 6 cubical nervures in forewings, 6-7 in the hind; trigones of forewings with 7-8 cells, the inner one cleft in two, in the hind shorter, only 5 cells; 12-14 cells in the loop; outer side of trigones sinuous and sending off a supplementary nervure which runs parallel with *M_{spl}* for a long distance; *M_{ii}* sharply angulated towards the costa

about 2-4 cells proximad of pterostigma ; *Rs* forked about 5-7 postnodal cells proximad of pterostigma, 4 rows of cells between the branches of fork ; 3-4 rows of cells between *Rs* and *Rspl* ; 3 cells in anal triangle ; base of hindwing oblique, shallowly excavate ; reticulation very close. Membrane yellowish white.

Abdomen dark brown, the base of each segment very narrowly yellow, as also small paired apical lunules. The oreillets small, bright greenish-yellow above, acutely pointed outwardly and furnished with a border of about 12-14 minute teeth. (The last 5 segments lost, apparently knocked off with the rim of the net.)

Genitalia.—Lamina tumid, deeply cleft into two tumid lateral masses ; hamules of curious structure, at first curled out of the genital sac, then curling back again as they converge towards each other, then abruptly angulated towards the base of abdomen, tapering to a fine point, forming two closely approximated pointed scales which pass high up in the arch formed by the lamina ; lobe scrotal shaped and with a median narrow longitudinal sulcus.

Distribution.—A single incomplete male from Hasimara, 19th April 1924, Duars, Bengal, collected by Mr. H. V. O'Donel.

Periaeschna nocturnalis, sp. nov.

Male.—Abdomen 48 mm. Hindwing 40 mm.

Head.—Lips and face dark ochreous ; frons brownish yellow ; occiput blackish brown, very minute ; penultimate joint of antennae bright yellow ; eyes lustrous greeny grey.

Prothorax and thorax dark brown, the middorsal carina bright yellow, and on the sides two vestigial yellow stripes or oval spots, the larger on the metepimeron.

Legs reddish brown, the distal ends of femora darker brown ; hind femora armed with two rows of robust short moderately closely spaced evenly sized spines.

Wings hyaline, nodal index $\frac{19-25}{21-18}$ | $\frac{24-19}{19-20}$; cubital nervures $\frac{6-8}{7-7}$; hypertrigones traversed $\frac{6-7}{4-4}$; loops 10-celled ; a basal antenodal nervure in all wings ; one row of cells between *Rs* and *Rspl* ; trigones of forewings traversed 6 to 7 times, those of the hind 5 times ; 4 to 5 median nervures in all wings ; the 6th and 7th the primary antenodal nervures in forewings, the 5th in the hind. Two rows of cells between forking of *Rs* ; a poorly developed supplement to trigones. Pterostigma bright yellow, very small, well braced, over $2\frac{1}{2}$ to $3\frac{1}{2}$ cells ; membrane greyish white, very short and limited in hindwing to the petiole ; reticulation very close.

Abdomen dark brown marked with citron yellow as follows :—a diffuse basal bordering to segment 1, segment 2 with the jugal suture finely yellow and a fine line on the middorsal carina apicad to the jugal suture. Laterally, on this segment, a stripe moderately broad at base, tapering as far as jugum where it curves up above oreillet and continues as far as apical border of segment, 3 with a small baso-lateral spot near the ventral border, a fine well-defined line on the jugum expanding dorsalwards, lastly a pair of apico-dorsal triangular spots. Segments 4

to 7 with similar dorsal and apical spots, segment 8 with only vestiges of these, and 9 with a vestige of the jugal marking only. Segment 10 diffusely yellow at the base for about half the segments length.

Anal appendages dark brown, superiors shaped like an assegai as seen from above, equal in length to segments 9 and 10, pointed at apex, fringed with long hairs within. Inferior triangular, curled strongly up as seen in profile, the apex minutely recurved.

Genitalia compressed and difficult to make out, lobe short, spined along its lower border.

(Female unknown.)

Distribution.—Shillong, Assam. Described from a teneral male coll. by Mr. T. Bainbrigge Fletcher, 14th June 1924. Beaten up from jungle during the day and evidently a crepuscular insect. *Type* in the Pusa Museum, Bihar. (I believe since transferred to the British Museum.)

Possibly the colouring of the adult insect is more defined, especially the lateral markings of thorax, which may well be green or bright citron yellow.

Petaliaeschna, gen. nov.

Head globular, face deep and narrow as in *Gynacantha*; eyes broadly contiguous, occiput very minute.

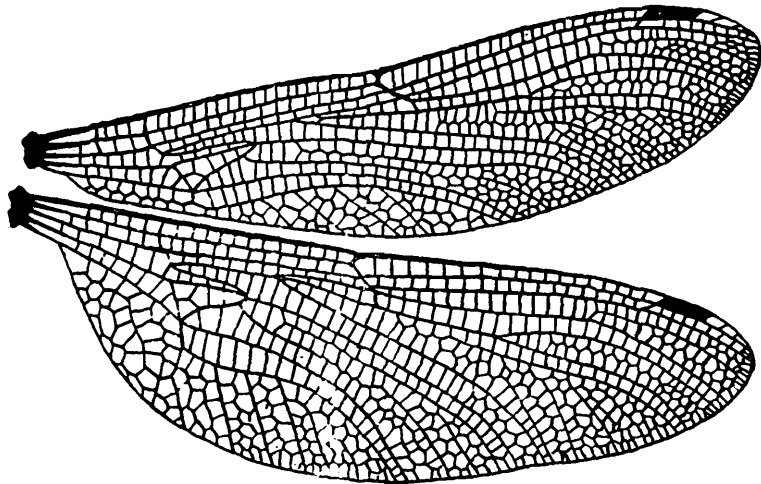


FIG. 1.—Wings of *Petaliaeschna fletcheri*, sp. nov. Male.

Thorax short, robust, its middorsal carina strongly keeled. Legs moderately long, hind and mid femora with two rows of short, robust, closely-set spines, and two or three longer distal ones.

Wings long and broad, reticulation very close, hindwings distinctly petiolated, the forewings less so; base of hindwings very oblique, very shallowly excavate, tornus right angled; basal space reticulated; cubital nervures numerous; loop very narrow, made up of 2 rows of cells only; 5 cells in anal triangle; trigones rather long and narrow, that of forewing the longer, 5-celled in the male, 6 to 7-celled in the female; *Rs* forked from about midway between the node and pterostigma, only 2 rows of cells between its branches; *Rspl* not well defined, a single row of cells between it and *Rs*; pterostigma short, over 3 to 5 cells, that of hindwing slightly the longer; a supplementary nervure springing from

the distal side of all trigones; a basal subcostal nervure to all wings (rarely absent).

Anal appendages nearly as long as the two last abdominal segments, typically Aeschnine in shape (see under species). Vulvar scale forked, minutely spined, very similar to that of *Cephalaeschna*.

Genotype *Petaliaeschna fletcheri*, sp. nov.

Distribution.—Assam and Sikkim.

***Petaliaeschna fletcheri*, sp. nov.**

Male.—Abdomen 52 mm. Hindwing 40 mm.

Head.—Lips, face and frons uniform olivaceous yellow, no basal marking to frons or its creat; occiput reddish brown; vesicle brown.

Prothorax brownish yellow. Thorax with middorsal carina bright yellow, area between it and humeral suture warm brown bordered with blackish brown; laterally two bright citron yellow stripes separated by a median narrow band of dark brown.

Legs yellow, middle and hind femora with two rows of dark brown spines as for genus.

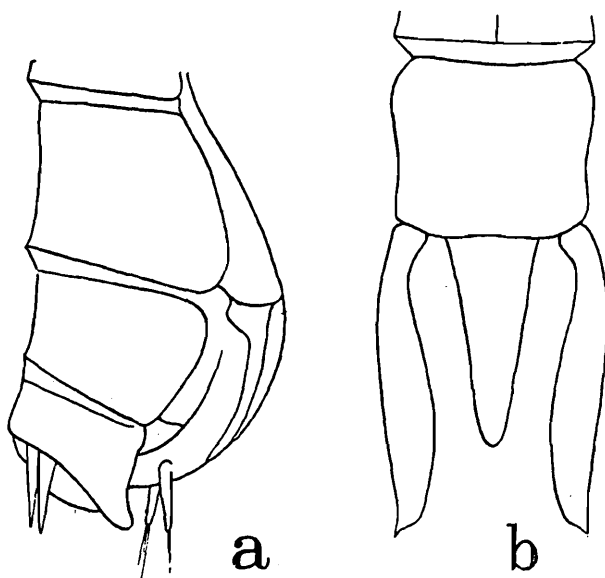


FIG. 2.—*a*. End segments and genitalia of *Petaliaeschna fletcheri*, female, right side, viewed in profile. *b*. Anal appendages of male of same species.

Abdomen dark olivaceous brown marked with bright yellow as follows:—segment 1 with the sides yellow, segment 2 with a dorsal stripe tapering towards the apical border, a baso-lateral spot and the oreillets, the latter bordered with black and a row of fine black spines; segment 3 to 7 with basal middorsal spots becoming more obscure as traced towards the anal segments; segment 3 with baso-lateral and apico-lateral spots, segment 4 with the latter spot only; 8 to 10 with obscure basal rings, rather broader and more distinct on segment 10.

Wings hyaline; pterostigma yellow, short, over $3\frac{1}{2}$ cells or more, unbraced; 6 median nervures in forewing, 5 in the hind; 8 cubital nervures in forewing, 6-7 in hind; nodal index $\frac{21}{21-16} \frac{21}{18-21} \mid \frac{23-20}{18-21}$; anal triangle 5-celled.

Genitalia.—Too distorted to make out in the only male studied.

Anal appendages.—Superiors nearly twice the length of segment 10, dark brown, narrow and sinuous as seen from above, with a strong dorsal longitudinal keel and a fine point directed outwards at apex. Each appendage at first inclined outwards and then curving in, converging ever so slightly. Slightly dilated at the middle, inner border fringed with hairs. Inferior appendage pale yellow tipped with brown, triangular, curling upward at apex.

(Of an adult in the living state, Mr. Bainbrigge Fletcher makes the following note :—Eyes greenish brown ; the whole face bright yellow, duller above. The midthoracic ridge, lateral stripes and legs bright yellow. Inferior appendage yellowish white.)

Female.—Abdomen 47 mm. Hindwing 44 mm.

Very similar to the male but a more robust insect. Abdomen brown, with a bright yellow, almost unbroken ventro-lateral stripe running from base of segment 2 to base of 9. Other markings as for the male. Loop rather larger than in the male, with 8 to 9 cells ; nodal index :—

$$\begin{array}{c|c} \frac{23-24}{23-18} & \frac{26-23}{18-22} \end{array}$$

Distribution.—Assam and Sikkim. *Type* in the Pusa collection, but probably since transferred to the British Museum. Closely related to *Cephalaeschna*, from which it is separated by the long, narrow face, etc. To this genus belongs, I think, *Cephalaeschna acutifrons* Mart. Its face is far too narrow for *Cephalaeschna*, and the venation except for some minor details agrees with the above.

Shillong, Khasia Hills, Assam, 19th-23rd May 1924, collected by Mr. T. Bainbrigge Fletcher, who has sent me the following notes about its habits and colouring :—Lies up in scrub during the day, beaten up in bushes behind upper stream in fruit garden, Shillong ; flew a few yards and then settled again, flight rather weak. Eyes greenish brown, whole face bright yellow, duller above. Midthoracic ridge, lateral stripes and legs bright yellow. Inferior appendage yellowish white.

Gynacantha biharica, sp. nov.

Male.—Abdomen 45 mm. Anal appendages 5.9 mm. Hindwing 42 mm.

Head.—Labium yellowish brown ; labrum olivaceous ; face and frons pale green, the latter with a broad black T-like mark on its upper surface ; occiput bluish green ; eyes glaucous green.

Prothorax brown.—Thorax apple-green with bright blue spots at bases of wings on tergum. (Dark brown in the dry state.)

Legs reddish yellow, distal ends of femora blackish brown.

Wings evenly enfumed, the centres of areolets paler ; pterostigma 3 mm. long in forewing, 3.75 in the hind, brownish yellow, its costal border yellow, hinder border black, over $3\frac{1}{2}$ cells, sinuously braced. Membrane absent. 1 row of cells between *Cui* and *Cuii* at origin ; 12 cells in loop ; 5 rows of cells between *Rs* and *Rspl* ; nodal index :—

$$\begin{array}{c|c} \frac{18-25}{20-18} & \frac{24-16}{17-18} \end{array}, \text{trigones } \frac{7-6}{6-7}, \text{cubital nervures } \frac{9-8}{7-7}.$$

Abdomen blackish brown marked with turquoise blue and grass-green as follows :—segment 1 with its sides broadly, and its apical border

narrowly turquoise blue ; 2 with the sides irregularly blue, a large, basal spot on upper and lower surfaces of oreillets, the basal side of the jugal suture and the surface behind it, except the middorsal crest, turquoise blue ; oreillets with a broad black border bearing 7 robust spines ; segment 3 with a large basal spot at sides and two large spots on apical border, narrowly interrupted by the dorsal crest, turquoise blue, these spots narrowly confluent laterally by an isthmus of blue ; segments 4 to 6 with subtriangular baso-lateral spots extending along the ventral border grass-green, in addition a pair of dorsal apical spots of the same colour, segments 7 and 8 with the basal spots only, 9 and 10 unmarked, the latter with a pair of small dorsal tubercles.

Anal appendages dark blackish brown, paler reddish brown at the middle. Superiors very long, outer sides straight, inner sinuous, apical thirds broadening markedly, then narrowing to a fine point which is in line with the outer border. In profile, almost dead straight but with a slight bayonet-like bend at the junction of basal and middle thirds. Inner borders lined with coarse black hairs. Inferior appendage less than half the length of superiors, sloping down, almost straight in profile, triangular and narrow as seen from above, tapering rapidly to a blunt point.

Distribution.—Pusa, Bihar. Two males collected by Mr. T. Bainbrigg Fletcher, 7th August 1924. *Type* in the Pusa collection, paratype in Fraser collection. Easily distinguished from all other species by its display of colours, and quite the most handsome species of the genus. I am indebted to Mr. T. Bainbrigg Fletcher for his notes on the colours during life. He states that it is a day-flyer and flew into the bungalow about 1 P.M. This may explain the vivid colouring so unique in a dowdy genus.

***Gynacantha albistyla*, sp. nov.**

Male.—Abdomen 41 mm. Hindwing 34 mm.

Head.—Eyes brown or olivaceous during life ; labium yellow ; labrum olivaceous, yellow at free border ; face, frons and bases of mandibles golden brown changing to bluish at the sides ; vesicle blackish brown ; occiput pale greenish white. No marking on upper surface of frons save for an obscure brownish bordering along the crest. Prothorax brown.

Thorax pale brown dorsally, pale bluish green laterally. Legs pale ochreous with black spines.

Wings hyaline ; pterostigma yellowish brown, over 3-4 cells ; nodal index :— $\frac{15-16}{16-12}$ | $\frac{18-14}{12-16}$; loop 8-celled ; 5 cells in trigone of forewing, 4 in the hind, the basal cell in each bisected by a transverse nervure to form two cells ; 3-4 rows of cells between *Rs* and *Rspl* ; 5 cubital nervures in forewings, 6 in the hind.

Abdomen variegated with pale blue and black as follows :—segment 1 with a large triangular dorsal black spot broadening apically, segment 2 with the dorsum broadly black, the sides blue, a fine middorsal line of blue and a similar bordering the jugal suture basad, finally small subapical, subdorsal blue lunules, segments 3 to 8 similar, the subdorsal

lunules confluent narrowly with blue on the sides, from which prolongations are sent up at the base of segment and along the apical border of jugum, segment 9 broadly black, the sides reddish brown, with a pale blue subdorsal stripe expanding apicad, narrowing basad but not quite reaching the base of segment, 10 black with an irregular subdorsal spot confluent with a triangular spot on the dorsal carina, which tapers as far as the base.

Anal appendages long, straight, of the same width from base to apices, apex very slightly broadened, blunt, subrotundate, with an abbreviated outer point, reddish brown, darker at apices, keeled above for rather less than the apical half, fringed with long hairs on the inner side. Inferior appendage narrowly triangular, only half the length of superiors, its apex turned up very slightly as a minute upper spine, white, tipped with dark brown at apex.

Oreillets large, but smaller than in *biharica*, pale bluish, finely bordered with brown and bordered with 4-5 spines.

Female.—Abdomen 43 mm. Hindwing 38 mm. Appendages 4 mm.

Colour and markings almost identical to those of male. The blue not extending up along the jugal sutures, markings on segments 8-10 slightly modified to suit the length and formation of segments.

Anal appendages brown, shorter than in the male, broadening from the middle to apices which are subrotundate and without a spine. Wings similar to male; cubital nervures 6-8; loop 11-8, nodal index as for male. Pterostigma pale brown.

Distribution.—Pusa, Bihar, a single pair in the Pusa collection, collected by Mr. T. Bainbrigg Fletcher, 5th September 1924. There are many points of resemblance between this and *biharica*, but the latter insect is much larger, and the occiput bears a black T marking. It also, like *biharica*, appears to be a diurnal species.

***Allogaster hermionae*, sp. nov.**

Male.—Abdomen 44 mm. Hindwing 35 mm.

Head.—Labium dark ochreous; labrum, face and frons uniform dark reddish brown; upper surface of frons and occiput rather darker brown; eyes brown. Face very broad, frons projecting as in *latifrons*, higher than occiput, a fringe of hairs along its crest projecting straight forward, a short distance behind which is another fringe projected back. Occiput with a fringe of coarse hairs projecting back.

Prothorax dark reddish brown, unmarked.

Thorax mahogany brown marked with citron yellow with a faint greenish tinge as follows:—two dorsal pyriform spots, short and almost triangular on the upper half of dorsum, a narrow humeral stripe and a shorter and broader one on the middle of metepimeron, both framed rather broadly in black.

Legs dark reddish brown, tibiae and tarsi black. Armature as for *Cordulegaster*.

Wings hyaline, base very oblique, scarcely notched; pterostigma differing in size in the wings, 2.45 mm. in forewings, 3.25 in the hind, over 3 cells, reddish brown between black nervures, very narrow and non-braced; 3 to 4 cubital nervures in forewings, 2 in the hind; nodal

index $\frac{12-18}{13-13}$ | $\frac{18-13}{14-14}$; all trigones traversed once by a nervure running from costal to outer side; 4 cells in anal triangle; 6 cells in loop; membrane pale brownish white. (The specimen is remarkable for the clarity with which it shows the plastic formation of node, arc, etc.)

Abdomen reddish brown marked with bright citron yellow as follows:—segment 1 unmarked, segment 2 with a dorsal saddle-shaped marking which is bifid apicad and limited basad by the jugal suture, except for a small triangular prolongation which does not extend quite to base of segment. Laterally the small blunt oreillet is coloured yellow. Segment 3 with two large dorsal triangular spots finely separated by the ground colour. Segments 2 and 3 with narrow apical dorsal lunules, 4 to 8 with similar dorsal spots but gradually decreasing in size from 4 to 8, rest of abdomen unmarked.

The abdomen is shaped exactly as for *Anotogaster nipalensis*.

Anal appendages reddish brown, the superiors directed straight back, as long as segment 10, narrow at base, pointed at apex, with a fine pointed ventral spine situated a little basad of middle of appendage and directed somewhat inward. A second broader and more robust spine situated beneath the extreme base of appendages.

Inferior appendage shorter than superiors, blunt at apex and slightly bifid, curled up evenly and slightly hollowed out above.

Genitalia.—Lamina depressed, its border emarginate; inner hamules foliate, thin squarish plates which curl inward. Outer hamules broad blunt spines; lobe tongue-shaped, shallowly bifid at apex and hollowed out above.

Distribution.—A single male from the Darjeeling district, on the wing in July. It differs from the rest of the Asiatic species of the family except *Allogaster latifrons*, from which it may be distinguished by its much smaller size and abdominal markings. It is strongly reminiscent of some members of the allied genus *Cordulegaster* from North America, especially *sayi* and *maculatus*. *Type* will be deposited in the British Museum.

Allogaster latifrons, Selys.

The male of this species has not been described. Mr. Chas. Inglis has taken a male at Nathui La, near the Thibetan-Sikkim border, which will be deposited in the British Museum. Its description follows:—

Male.—Abdomen 52 mm. Hindwing 40 mm.

Head, thorax and legs coloured and marked exactly as for type.

Wings hyaline with a slight saffronation at extreme base of both and without any trace of the dark brown clouding so characteristic of the female. Reticulation very close; pterostigma narrow, 3 mm. long in forewings, 3.5 mm. in the hind, reddish brown between black nervures, over 4 to 5 cells; 3 cubital nervures in forewings, 2 in the hind including the base of subtrigone; all trigones traversed once; nodal index $\frac{14-18}{15-15}$ | $\frac{18-15}{14-13}$; membrane greyish white; loop 5 cells; anal triangle 4-celled.

Abdomen black on dorsum, reddish brown on sides and beneath, marked with citron yellow as follows:—segment 1 reddish brown,

unmarked, segment 2 with two small dorsal lunules on the apical side of the jugal suture, and two longer narrower apical lunules, segments 3 to 8 with small triangular paired dorsal spots replacing the dorsal lunules, and segments 3 to 6 with similar apical lunules, which on segment 7 are represented by a tiny point only. Segment 9 unmarked, segment 10 with two small apical subdorsal spots.

Anal appendages black. Superiors compressed, the apex pointed, slightly curled so as to lie in a different plane to rest of appendage. A median ventral robust tooth and a similar one beneath the extreme base of appendage. Inferior subquadrate, the apex a little turned up and very shallowly notched, hollowed out above, nearly one third shorter than superiors.

Genitalia.—Lamina depressed, coated with very long hairs; anterior hamules broad and foliate, the apices curling in towards the mid line; posterior hamules long stilette-shaped organs, ending in a blunt apex, directed obliquely towards each other and meeting over dorsum of penis; lobe short and broad, scrotal-shaped, the apex very slightly bifid and cupped.

This male is distinguished by its abdominal markings and by its much larger size from *hermionae*, which it resembles in general facies and in its ground colour. Two other females collected from the same district do not differ from the cotype described by myself in the *Journal of the Bombay Natural History Society*, but in one the wings are un-fumed as in the male described above.

The posterior lobe of the prothorax of male is citron yellow, as also is the trochanter and coxa of the first pair of legs. The dorsal thoracic stripe is much abbreviated and shorter than in *hermionae*.

***Onychogomphus pulcherrima*, sp. nov.**

Male.—Abdomen 40 mm. Hindwing 30 mm.

Head.—Labium yellowish; labrum pale green, the anterior border of former narrowly reddish brown; face and especially frons vivid pea-green above as well as in front; vesicle and vertex dark blackish brown; occiput grass green, brownish at the sides.

Prothorax dark reddish brown marked with yellow, the posterior lobe, a large geminate spot in the middle line confluent with it, and a narrow anterior collar.

Thorax dark mahogany brown marked with green as follows:—Nearly the whole of the dorsum, where are two very broad green antehumeral stripes confluent with a narrow mesothoracic collar, which latter is continuous with a narrow yellow midthoracic suture. This suture merely separated from the antehumeral stripes by a clouding of warm reddish brown. Laterally the whole of the sides greenish except for a moderately broad reddish brown stripe on the second lateral suture broadening anteriorly below.

Legs blackish brown, the extensor surfaces of anterior pair of femora yellow, of the two hinder pairs, reddish brown.

Wings hyaline, palely saffronated and distinctly tinted with yellow at extreme base. Pterostigma dark reddish brown, framed in blackish brown, but with a fine yellow streak between the ground colour and black

frame, strongly braced, over $3\frac{1}{2}$ to $4\frac{1}{2}$ cells ; 4 cells in anal triangle ; 1st postanal cell entire, not extending basad beyond the centre of subtrigone ; other details typical of venation of genus *Onychogomphus* ; nodal index $\frac{10-14}{12-10}$ | $\frac{14-9}{10-10}$.

Abdomen dark ochreous and blackish brown ; the first two segments marked with yellow, segment 1 with the lower parts of the sides broadly light greenish yellow, segment 2 with the same area, including the oreillets, yellow tinged with ochreous, the dorsum brown, this colour passing down on each side as a narrow stripe behind the oreillets. Segment 3 with the base and dorsum broadly dark ochreous, segments 4-7 dark reddish brown deepening to black at apices, segments 8-10 gradually paleing in colour from dark to bright reddish brown. The apical borders of all segments narrowly black.

Anal appendages yellow, reddish at apices. Superiors subcylindrical, tapering very slightly, the apical ends turned in and down rather abruptly and compressed, the outer angle of this part bearing four minute brown spines. At the centre and inner aspect of each appendage a small elongate tumid eminence, below which the appendages become laminated to form a very obtuse spine with broad base. Inferior appendage deeply cleft into two widely divaricate branches, which, seen in profile, are bent at a right angle at about one th rd of their length from the base. Curving at first down, they then sweep upward towards the superiors, each branch minutely spined on the outer border, slightly sinuous as seen from below, and ending in a point. Superiors as long as segments 9 and 10, inferior as long as segment 10.

Genitalia.—Lamina projecting markedly, its border slightly emarginate and concave ; anterior hamules long fine stilette-like hooks ending in a fine recurved spine, directed back and converging ; posterior hamules much stouter structures, broad, abruptly narrowed near apex, where they form a very robust slightly recurved spine ; lobe deeply cleft into quadrate, slightly bifid branches with a shallow groove on the outer surface, its base tumid.

Distribution.—Three males taken by Col. F. Wall, I.M.S., at Maymyo, Upper Burma, 31st May 1925. Female unknown. The bright apple-green markings on a mahoghany red background are so unique in the genus as to easily distinguish it from all other species. *Type* will be deposited in the British Museum.

***Philoganga loringae*, sp. nov.**

Male.—Abdomen 41 mm. Hindwing 39 mm.

Head.—Labium dirty yellow ; labrum greenish yellow with a small median comma at base : bases of maxillae and cheeks as far up as level of antennae citron yellow ; rest of head matt-black with some scattered pruinescence. Eyes brown.

Prothorax black with a median dorsal citron yellow stripe which broadens anteriorly and on the posterior lobe.

Thorax black marked with pale citron yellow as follows :—The midthoracic suture narrowly black, bordered on either side by a narrow yellow stripe, a narrow slightly sinuous antehumeral stripe, the sides

entirely pale yellow except for the second lateral suture which is strongly mapped out in black.

Wings very long and very narrow, petiolated from a point slightly proximal to *ac*; palely and evenly enfumed; pterostigma blackish brown, rather short, over $3\frac{1}{2}$ cells, unbraced; nodal index: $\frac{22-13}{20-13} \mid \frac{13-21}{11-19}$; 2 basal subcostal nervures in all wings, occasionally 3 in one or another; the so-called crossing of *Rs* greatly delayed, and no evidence whatever of an oblique vein in any wings examined.

Legs long and slim, the hind femora extending as far back as the middle of the second segment, anterior femora black, the middle and hinder pairs darkest ochreous; tarsi and tibiae black.

Abdomen dark reddish brown, segment 1 greenish yellow, segment 2 with a broad latero-ventral bright yellow stripe bordered above by black, the dorsum reddish brown, segment 3 with a continuation of the black stripe, which is here very diffuse and largely blocking the dorsal reddish brown; the ventral border dark ochreous, segments 4 to 10 similar but the black stripe gradually extending so as to black out most of the ground colour. On segment 9 a middorsal bright ochreous spot bisected by the broadly black middorsal carina. On segment 10 two bright ochreous rounded spots at the middorsum.

Anal appendages black. Inferiors aborted, merely two small eminences, invisible from the side. Superiors nearly twice the length of segment 10, pincer-like, curling gradually in to enclose a space shaped like a bishop's mitre. Only slightly dilated at the apices as seen from above and ending in an abrupt blunt point. A few very minute spines on the outer border of apices, much smaller than those found in *montana*. Seen from the side, these appendages lie in a horizontal plane, directed straight back, but curling up at apices. Below, slightly hollowed out, especially at apices.

Genitalia.—Lamina and hamules in one piece, the former very deeply cleft, the sides of the fissure so formed parallel. Laterally the lamina is continued as the hamules as a broad cowl-like plate which projects at a sharp angle from the genital sac, and the roof of which is accommodated in the cleft of the lamina. Lobe scrotal-shaped, very depressed, glossy black, resembles the flattened tumid body of a tick.

Female.—Abdomen 42 mm. Hindwing 37 mm.

A much bulkier insect in all respects than the male, the abdomen being especially robust. Colours identical to those of the male. Wings differing in a few details only, thus there are 2 basal postcostal nervures in some wings and only 1 in others. In one wing, two such nervures are in the closest apposition. Petiolation distinctly proximal of *ac*. Pterostigma slightly longer, over $4\frac{1}{2}$ cells; as in the male, there is no vestige of an oblique nervure in any of the wings.

Nodal index $\frac{22-13}{18-10} \mid \frac{13-20}{12-19}$.

Abdomen very similar, the sides of segments 9 and 10 broadly ochreous, the dorsal spots replaced by a diffuse dark ochreous.

Vulvar scale similar to that of *montana*.

Anal appendages brownish yellow tipped with black, short, narrow conical and pointed.

Distribution.—Maymyo, Upper Burma. One pair taken *in cop*, and one other male, 1st July 1925, coll. by Col. F. Wall, I.M.S.

Differs from *montana* by its much smaller size, abdomen 41 mm., hindwing 39 mm. to 52 mm. and 48 mm. respectively. Nodal index correspondingly lower.

***Anisopleura subplatystyla*, sp. nov.**

Male.—Abdomen 34 mm. (with appendages). Hindwing 28 mm.

Labium black, midlobe pruinosed; labrum bright apple-green very finely encircled with black; cheeks, epistome and frons pale ochre, rest of head black with a largish reniform spot, ochreous in colour on the outer side of the ocelli, the hilum of the spot directed inward. Eyes brown.

Prothorax black with a large oval spot on each side and a narrow triangular one on each side of the posterior lobe yellow.

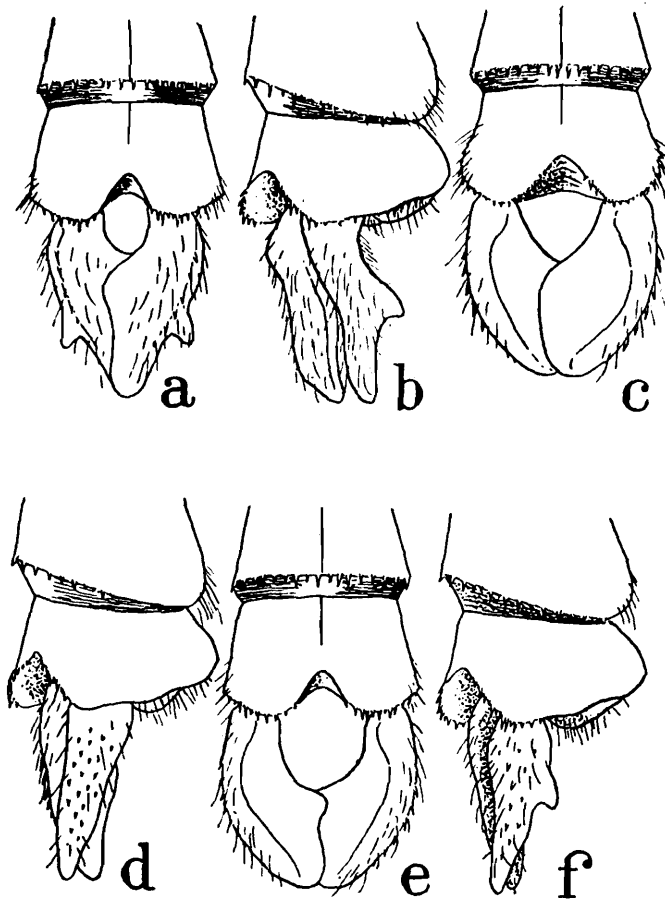


FIG. 3.—*a.* Anal appendages of *Anisopleura lestoides* Selys, dorsal view. *b.* The same seen from the right. *c.* The same of *Anisopleura comes* Selys, dorsal view. *d.* The same seen from the right. *e.* The same of *Anisopleura subplatystyla*, sp. nov., dorsal view. *f.* The same seen from the right.

Thorax velvety black, pruinosed beneath, marked with bright yellow as follows:—narrow antehumeral stripes running close to and parallel with the middorsal carina, the upper end of the stripes curved and strongly hooked outward; a narrow humeral stripe running parallel

to the former and broadly confluent with it below, but not quite meeting the outwardly curled part above. A small upper spot lying close to the outer side of the humeral stripe. The sides broadly yellow with a broad black stripe on the second lateral suture.

Legs black, inner and proximal part of the two anterior pairs of femora pale greenish yellow.

Wings hyaline, bases of both pale greenish yellow. A pale cloud of black at the extreme apices of the forewings. Pterostigma dark blackish brown, over 4 cells; 17 antenodal nervures and 22 postnodals to forewings, 14 and 20 respectively in the hind. Quadrilaterals entire; 4 cubital nervures.

Abdomen black, segments 9 and 10 pruinosed white on the dorsum, segment 1 broadly greenish yellow on the sides, this colour extending apicad on to dorsum as an almost complete ring. Segment 2 with a broad lateral stripe, 3 to 6 each with a baso-lateral spot followed by a long narrow stripe.

Anal appendages.—Superiors broad, roughly triangular and broadly hollowed out as seen from above, the outer border thickened. Conical as seen from the side and with a stout ventral spine which is continued back from near middle of appendage to the base. Inferiors practically obsolete, barely discernible from above or in profile.

This species differs from *lestoides* which has the epistome glossy black, the spots on the vertex greenish and nearly circular, only a single dorsal thoracic stripe and lastly by the anal appendages subcylindrical and with an acute spine on the outer sides.

It more nearly resembles *comes* but may be distinguished from it by the presence of the humeral spot which is absent in *comes*, and also by the tooth on the appendages which is also absent in *comes*.

From *furcata* it is distinguished by the shape of the superior anal appendages which are broadly bifid in *furcata* and shaped like a crab's claw. The humeral stripe is also absent in the latter species.

Distribution.—Shillong, Khasia Hills, 5,000 ft., collected by Mr. T. Bainbrigge Fletcher, 28th May 1924, 4th June 1924. Several specimens of both sexes. *Type* in Pusa collection. Paratypes in Fraser collection.

Dysphaea walli, sp. nov.

Male.—Abdomen 35 mm. (with appendages). Hindwing 31 mm.

Head glossy black with a small obscure spot of yellow on the upper part of each cheek.

Prothorax black with a large oval spot of yellow on each side the middle lobe.

Thorax black marked with yellow as follows:—narrow complete humeral and antehumeral stripes connected above by a short horizontal bar near the alar sinus, converging and confluent below; four bright yellow stripes on the sides, one at the first lateral suture, a second broader along the anterior border of the second lateral suture, a third very fine on the anterior part of the metepimeron and lastly the whole of the basal half of this structure.

Legs black, the hinder femora broadly yellow on the outer flexor surface.

Wings palely and evenly enfumed, the bases of all four dark blackish brown for nearly two-thirds of the distance from base to node in the forewings, and fully three-fourths of that distance in the hind ; the outer margin of this fascia slightly convex. Nodal index :— $\frac{21-28}{21-23}$ | $\frac{27-20}{19-18}$; trigones traversed once in the forewings, once or twice in the hind ; pterostigma black, long, narrow, over 6 to 8 cells.

Abdomen black, narrow and cylindrical, segment 10 without dorsal spine, segment 1 with a large triangular lateral yellow spot, segments 2 to 5 with a lateral stripe of blue, broad at base, tapering to a fine point to end of each segment, remaining segments unmarked.

Anal appendages black, the inferiors in closest apposition, very short and barely visible in profile, superiors as long as segment 9. Seen laterally, rather broad at base, tapering to a rounded apex. Seen from above narrow at base, broadening apicad and then finally narrowing, hollowed out on the inner surface. Apices curled strongly in to overlap each other.

Genitalia.—Hamules broad and confluent medially ; lobe of penis small, pouch-like, black.

Distribution.—Maymyo, North Shan States, Upper Burma, collected by Col. F. Wall, I.M.S., 30th May 1924, four males (female unknown). *Type* in British Museum.

One specimen has decidedly broader thoracic markings, the antehumeral stripe is complete, the humeral and other stripes broader, and the whole of metepimeron greenish yellow except its anterior border. By analogy, we may safely assume that the female is very similar to that of *D. ethelae*, that its wings are unmarked, or at the most enfumed, with perhaps cloudy apices, its body marked with bright greenish-yellow markings more broadly than in the male, and extending to all segments of the abdomen.

The discovery of two species of *Dysphaea*, in widely different areas, within Indian limits, and within the space of one year, when the genus had hitherto been unreported, is worthy of comment. This new species is not very closely related to *limbata*, which has the basal black of wings much more extensive, and more so in the hindwings than in fore, its entire costal margin black, and the apices of all wings broadly so. It is easily distinguished from *ethelae* which has the wings unmarked and much narrower. From *dimidiata* (Java) the same points separate it as seen in *limbata*. There is some resemblance to *Pseudophaea masoni*, but the spined segment 10 of the latter will at once separate the two species.

Rhinocypha hilaryae, sp. nov.

Male.—Abdomen 23-24 mm. Hindwing 28-29 mm.

Head velvety black marked with azure blue as follows :—labium unmarked ; labrum with two triangular spots inclined obliquely towards one another and confluent at a point below, a narrow stripe bordering the eyes and a small isolated spot on the cheeks nearly confluent with the stripe ; the mandibles entirely blue, a spot on either side the rhinarium, two large subquadrate spots angulated outwards on the

epistome, and two pentagonal spots on the frons, the former well separated, the latter pair nearly confluent; a small linear spot on the outer side of each posterior ocellus, lastly a tiny round postocular spot on each side.

Prothorax velvety black, with a narrow median longitudinal azure blue stripe which expands slightly on the posterior lobe.

Thorax velvety black, the mesothoracic triangle azure blue, extending from the antealar sinus but not quite reaching the anterior border of triangle, although it invades the black here as a median point. The median suture of the alar sinus yellow. A fine linear humeral spot parallel with and bordering the alar sinus, and below a fine humeral stripe represented in some specimens by a vestigial spot. Laterally a fine bluish stripe, stilette-shaped, bordering the hinder border of humeral suture in its upper two-thirds. Lastly a broad oblique, very ragged, very broken stripe or fascia extending the whole length of side, filling the centre of metepimeron, broadly interrupted by the second lateral suture and bluish yellow in colour. Above a small linear spot behind the first lateral suture and another linear spot below base of hindwing.

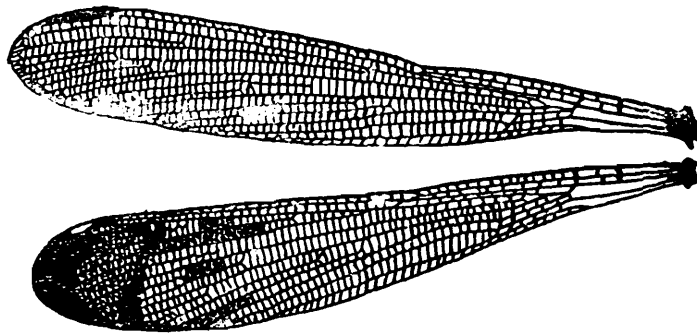


FIG. 4.—Wings of *Rhinocypha hilaryae*, sp. nov., male.

Legs black, the four hinder tibiae markedly pulverulent white on the flexor surfaces, the femora less so.

Wings palely saffronated, especially at the bases. The extreme apices of forewings bordered with dark brown for a depth of one cell, this colour continuous with pterostigma which is black and covers 7-8 cells. Apices of hindwings black from about the level of middle of pterostigma, the black fascia tapering away on the hinder border of wing and extending inward for rather more than one fourth the length of wing. The inner border of fascia very irregular, zigzagged, and sending a short prolongation inward just below pterostigma and to about its middle. Below this point, the fascia rapidly narrows until it is only one cells depth along the hinder border of wing. At about 7 cells proximad of inner end of pterostigma, a small black spot made up of 3 to 5 cells, subquadrate, or in others bifid posteriorly. This spot may or may not be confluent with a prolongation from the hinder border of wing, usually it is widely separated. The greatest variability is seen in these markings, differing in almost every specimen. In some lights the black apex is dark metallic green. The area enclosed by it and by the inner spots, as well as three spots just proximad of the level of the subcostal

black spot, vitreous and a beautiful lilac or peacock blue according to the angle of view. Of the row of three vitreous spots, the anterior is more or less continuous with the black spot and is about 20 cells in length, the median spot is only 6 cells long by 2 wide, whilst the hinder is about 10 cells long and rather irregular.

The broad intercalated vitreous area has its inner border distinctly concave. Pterostigma black with an elongate azure blue spot rather variable in size, on its upper surface, covers 8 cells. Forewings with 15-18 antenodal nervures, and 36-38 postnodals. Hindwings with 16-18 antenodals, and 29-33 postnodals; quadrilaterals with 3-5 cross nervures; petiolation begins slightly proximad of the 2nd antenodal. Fore- and hind-wings moderately broad, the hind not broader than the fore.

Abdomen black marked with bluish spots as follows:—segment 1 with a large triangular subdorsal spot, its base on the apical border; segment 2 with a linear stripe on the hinder two-thirds of each side, and a small triangular subdorsal apical spot; segments 3 to 6 or 7 with lateral linear stripes, decreasing in length from segment 3 to 7, on the latter of which it is either obsolete or vestigial. Segment 3 has also a small subdorsal apical spot.

Anal appendages black, the superiors about twice the length of segment 10, long, linear, stilette-shaped, their apices curving evenly in until they meet. The inferiors only half the length of superiors, sub-conical, pointed, sloped in, so that their apices meet in the middle line.

Female.—Abdomen 22 mm. Hindwing 31 mm.

Labium black, a small trace of yellow at the base of the lateral lobes; labrum greenish yellow, its anterior border broadly black, its base very narrowly so and a small median tongue of black which partially divides the ground colour; the epistome black in front finely encircled with yellow, black above with a prominent spot on either side, other spots on upper surface of head very similar to those found in the male. An additional small central spot on the hinder border of occiput.

Prothorax black with a fine median dorsal stripe bright yellow, on the sides a rounded spot at the middle and another larger triangular just above trochanter.

Thorax black.—The mesothoracic triangle ascending nearly to alar sinus, narrowly mapped out in palest yellow; a narrow complete antehumeral stripe curled strongly out above, a narrow humeral stripe incomplete below, lying just posterior to the humeral suture. Laterally a thick, very ragged bright yellow fascia running almost parallel with the ventral border of thorax, lastly a fine curved stripe above between the roots of the fore- and hind-wings. Beneath bright citron yellow with a black mark shaped like a thistle-head on a long stalk.

Legs black, not pruinosed.

Wings hyaline, no black or metallic markings. Pterostigma black, its outer half yellow; nodal index: $\frac{33-18}{33-18}$ | $\frac{16-31}{18-30}$; trigones traversed 3 times; petiolation begins slightly distad of the basal antenodal nervure. Wings saffronated in the basal and costal areas about as far as node or less.

Abdomen as for male. Anal appendages small and conical. Vulvar scale as for genus.

Distribution.—Maymyo, Upper Burma, several of both sexes collected by Col. F. Wall, I.M.S., during the month of July 1924. Belongs to group *bifasciata-trifasciata*.

***Rhinoctypha perforata beatifica*, subsp. nov.**

Male.—Abdomen 19 mm. Hindwing 23 mm.

Head.—Labium cinereous; labium and epistome glossy black; rest of head velvety black marked sparsely with small blue spots:—a small reniform spot with its hilum facing inwards, on the outer side of each posterior ocellus, a linear spot on the hinder border of the occiput, and a rounded spot to the outer side and front of latter.

Prothorax black with a large pale blue spot on each side of the middle lobe, and the posterior lobe pinkish.

Thorax black with the mesothoracic triangle pale salmon pink and extending only halfway up the dorsum of thorax; a large triangular spot on each side of the mesothoracic triangle lilaceous in colour; an upper antehumeral spot of pale blue, a fine curved posthumeral lilaceous stripe which expands at its lower part. Lastly the sides broadly pale blue except for the hinder suture which is narrowly black.

Legs black, the middle and hind pair of tibiae heavily pruinose white on the flexor surface.

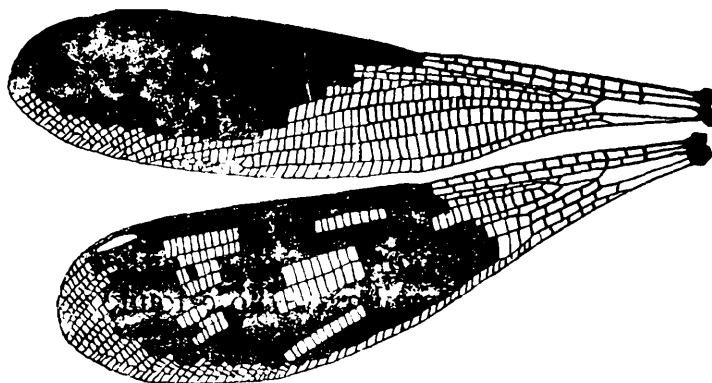


FIG. 5.—Wings of *Rhinoctypha perforata beatifica*, subsp. nov., male.

Wings hyaline for slightly less than their proximal halves, this basal portion tinted palely yellow, whilst the outer apical half is opaque black. The opaque portion beginning at the node in all wings, bevelled zigzag fashion in the forewing downwards and outwards towards the termen which however it just fails to reach, leaving a narrow hyaline vitreous bordering about one-fourth the breadth of the wing in depth, which extends as far as the apex of wing, and which has a brilliant violet metallic reflex. In the hindwing the opaque area runs back almost straight to the termen, but has a very ragged and indented margin. The basal hyaline area is continued along the hinder margin of the wing as a vitreous area one cell wide, as far as the apex, where it turns upward to the pterostigma, occupying the whole of apex of wing as far inwards as to slightly overlap the outer end of pterostigma. This area, as well as two rows of vitreous spots in the opaque area, brilliant metallic emerald green. The apical row of spots lies about 4 cells proximal to the inner

end of pterostigma and consists of two spots, the anterior of which is 5 cells wide by 9 long, the posterior 3 cells wide by 5 long and separated from the first spot by a single row of cells. This row of spots lies two cell rows from the costa, as does also the second or proximal row, which consists of 3 spots. The anterior spot is situated about 9 to 10 cells from the outer row, and it and the posterior spot are one cell wide, whilst the middle spot of the series is from 2 to 3 cells wide. All spots are about 7 to 9 cells long. The posterior spot is confluent by its outer cell with the bordering vitreous area on margin of wing. Finally another long vitreous spot is seen at the inner end of the opaque area, projecting well into the hyaline area.

Both wings narrow, the hind only slightly broader than the fore, and its apex rounded. Pterostigma black, its hinder half azure blue. Antenodal nervures:— $\frac{11}{13}$ | $\frac{12}{12}$; trigones traversed 3 times in all wings; petiolation beginning at level of the 2nd antenodal nervure.

Abdomen black with a dark bluish green metallic reflex, marked with azure blue as follows:—a large triangular spot on each side of segment 1, a broad lateral stripe on segment 2 which broadens markedly at the apical border of segment, a similar stripe on 3 which tapers to a fine point near the base; triangular latero-apical spots on segments 4 to 8; short linear ventral spots on 3 to 5, merely vestigial in the last.

Anal appendages black, very similar to those of *quadrifaculata*, the superiors twice the length of inferior, equal in length to segment 9, linear, pincer-like, their apices curving in gently until they meet.

Distribution.—Two males only of this beautiful insect are known, one in my own collection was taken at Nungba, in the Naga Hills, Assam, 8th April 1924, the other is in the Pusa collection.

***Ischnura mildredae*, sp. nov.**

Male.—Abdomen 24 mm. Hindwing 16 mm.

Head.—Labium white; labrum blue, its base narrowly black; epistome, frons and vertex black with a small round blue postocular spot on each side of occiput; eyes dark olivaceous green.

Prothorax black on dorsum, yellowish laterally.

Thorax black on dorsum with narrow bluish green antehumeral stripes. Laterally bluish green with short linear spots at upper ends of sutures. Legs yellowish, the extensor surfaces of femora, especially anterior two pairs, black.

Wings hyaline, faintly enfumed; pterostigma lozenge-shaped, acutely pointed at both ends, bright tawny with the two inner borders finely black. Forewing with 8 postnodal nervures, hind with 7.

Abdomen.—Segment 1 pale greenish with a quadrate spot of black on dorsum, 2 greenish at base changing to bright reddish orange at apex, marked with a large quadrate black spot on dorsum of basal half, and a rounded spot on apical half, the two narrowly confluent, the latter spot confluent with a narrow apical ring, segments 3 to 6 bright reddish orange with narrow black apical rings, 7 to 10 black, segment 8 bearing a small blue spot on centre of dorsum,

Anal appendages carneous, the inferior tipped with black. Superiors very short, curled on themselves, about half the length of segment 10, tumid; inferiors broad at base, rapidly tapering to a blunt point, the apices curled strongly in and nearly meeting.

Female.—Abdomen 24 mm. Hindwing 16 mm.

Almost identical in colouring to the male. Abdomen stouter, segment 2 with a goblet-shaped spot on dorsum quite different to that of male, the stem of goblet very narrow, its base situated subapically but confluent with a narrow apical ring by a medial prolongation of the stem, which passes through the foot of goblet and apical ring on to base of segment 3. The blue spot on segment 8 very large, covering nearly the whole dorsum save for a narrow basal and a narrower apical ring of black. The basal ring has two minute points invading the blue, whilst laterally the blue is bordered narrowly with black. Segments 7 to 10 with the ventral borders tawny.

Anal appendages small, pointed, tawny. Pterostigma yellow, narrowly framed in black.

Distribution.—Maymyo, Upper Burma, collected by Col. F. Wall, I.M.S., 7th June 1925. *Types* will be deposited in British Museum, paratypes in Fraser collection. This species, which has been named after Mrs. Wall, a keen collector, closely resembles *annandalei*, and is the first of that group discovered bearing blue colouration on the end segments, thus bringing the group into relationship with the *inarmata* group.

***Copera superplatypes*, sp. nov.**

Male.—Abdomen 26 mm. Hindwing 15 mm.

Head.—Labium white; labrum, anteclypeus and cheeks palest blue, almost white; rest of head black save for a narrow pale blue transverse stripe running from eye to eye at level of ocelli.

Prothorax black with a pale whitish blue stripe laterally and a small white spot below it.

Thorax black as far as the first lateral suture, with a pale blue humeral stripe bordering the front of that suture. A tiny white spot just behind upper end of humeral suture. Laterally after the first lateral suture pale bluish, with the second lateral suture mapped out in black, a large central isolated black spot on the metepimeron and another between the sutures, confluent partly with the black on fore part of sides.

Wings hyaline; pterostigma black, diamond-shaped, slightly longer than broad, covers one cell; 12 to 13 postnodal nervures in forewings, 1 in the hind. Petiolation begins proximal to *ac* which lies nearly midway between the two antenodal nervures; 2 cells between the quadrilateral and subnode.

Legs very short, pure creamy white with fine black spines. The distal halves of all femora jet black. Tibiae enormously dilated, much more so than in *annulata*. (See text-figure 6.)

Abdomen black, the sides of segment 1 bluish white, segment 2 with a pair of eye-like bluish dorsal spots (similar to those seen in *Agriocnemis clauseni* group), the sides of same segment rather broadly bluish at apical end, narrowly so at basal, segments 3 to 5 with the ventral border bluish and confluent with interrupted narrow basal rings; seg-

ments 6 to 8 similar but the rings more widely interrupted and with a subapical extension of the bluish area. Segment 9 unmarked, 10 with the dorsum creamy white.

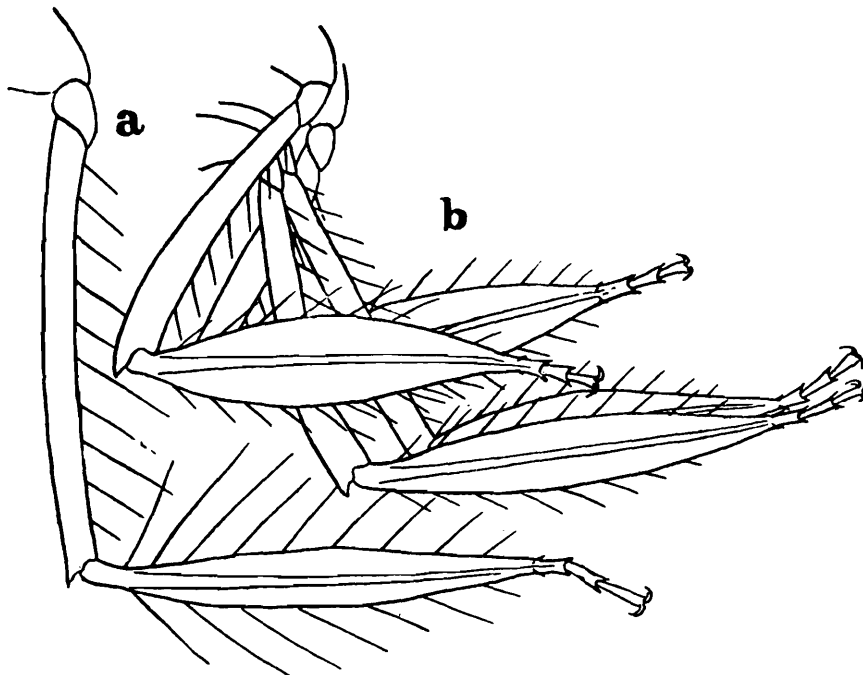


FIG. 6.—Legs of:—*a.* *Copera annulata* Selys, male. *b.* *Copera superplatypes*, sp. nov., drawn to the same scale.

Anal appendages as long as segment 10, creamy white to the tips, the inferiors blackish at the base, both pairs similar in shape, simple, broad at base tapering to a fine point, the inferiors more robust and slightly longer.

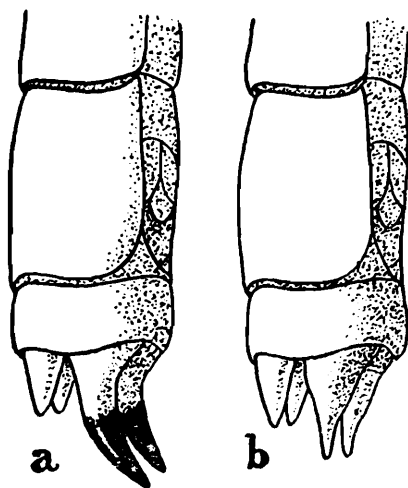


FIG. 7.—End abdominal segments, showing anal appendages of:—*a.* *Copera annulata* Selys, and *b.* *Copera superplatypes*, sp. nov.

Distribution.—A single male from Hasimara, Duars, collected by Mr. H. V. O'Donel, at present in the Fraser collection. This striking insect is the smallest of the *annulata* group and is marked quite differently from the rest. The head markings are more like those of *membranipes* group, as also are the anal appendages. The very short legs and enormous dilatation of tibiae serve readily to distinguish it.

***Caconeura dorsalis auricolor*, subsp. nov.**

Male.—Abdomen 29 mm. Hindwing 18 mm.

Head.—Labium black; labrum yellow, cheeks and epistome palest blue; rest of head velvety black traversed from eye to eye at level of anterior ocellus by a broad belt of bright chrome yellow; eyes olive green with an equatorial belt of black.

Prothorax black marked with a moderately broad subdorsal stripe of pale creamy yellow extending from base to apical border.

Thorax black marked with bright chrome yellow and palest green. The whole of dorsum between the humeral sutures, except for a narrow line mapping out the middorsal carina, bright chrome yellow. Laterally a broad pale greenish stripe lying between the lateral sutures, and a second occupying the hinder half of metepimeron.

Wings hyaline, pterostigma dark blackish brown framed in black, with a second inner frame of pale yellow, covers 1 to $1\frac{1}{2}$ cells, diamond-shaped. Postnodal nervures 14 in forewing, 13 in the hind.

Legs.—Femora whitish on flexor surface, black on extensor, tibiae yellow on extensor surface, black on flexor.

Abdomen black marked with pale green and blue as follows:—segment 1 with a large pale greenish spot on each side, segment 2 with a narrow ventro-lateral stripe of the same colour and a fine middorsal carinal stripe of pale blue, segments 3 to 7 with paired basal dorsal spots, and subapical ventro-lateral blue spots, segments 8 and 9 unmarked, 10 broadly azure blue on dorsum.

Anal appendages blue, as long as segment 10, of the usual *Caconeura-Disparoneura* shape, superiors shaped like the butt and of a pistol, inferiors thick at base, tapering strongly to apices.

Female.—Abdomen 30 mm. Hindwing 20 mm.

Head marked similarly to male but the transverse stripe more narrow and pale straw coloured. The subdorsal stripe on prothorax bluish grey in colour.

Thorax black marked with narrow creamy white antehumeral stripes and laterally a broad medial stripe and the hinder three-fourths of metepimeron the same colour, clouded with darker yellow.

Legs dirty white with longitudinal beaded black stripes on the extensor surface.

Wings as for male, 13 postnodal nervures in forewings, 12 in hind.

Abdomen blackish brown marked with creamy yellow as follows:—the ventral and apical borders of segment 1, the apical portion interrupted by the black carinal ridge, segment 2 with fine ventral and subdorsal stripes confluent at the base of segment, 3 to 7 with fine medio-lateral stripes which are confluent with moderately broad, subapical incomplete white rings; each segment has in addition a pair of basal bluish white lunules. Segment 8 with its ventral border narrowly creamy white, 9 and 10 with the dorsal carina and ventral border similarly coloured.

Anal appendages very small, creamy white, conical, pointed.

Distribution.—Maymyo, Upper Burma, a large number of specimens collected by Col. F. Wall, I.M.S., 5th August 1925. *Type* in British Museum.