NOTES ON THE GENUS *DREPANOSTICTA* LAID.,

with descriptions of the larva and of new Malaysian species (Odon., Zygoptera).

By

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(Zoölogisch Museum, Buitenzorg).

I. The ultimate larval instar of the genera *Protosticta* and *Drepanosticta*

In chapter XV of his 'Biology of Dragonflies' (Cambridge, 1917), TILLYARD united all genera with a regular quadrilateral and with reduced wing-veins Cu_1 and Cu_2 in his sub-family *Protoneurinae*, thus following DE SELYS who placed them in his group or "legion" *Protoneura*. The progress of researches on the order Odonata in the course of the preceding period enforced LAIDLAW, in the same year, to alter this system of classification and to remove *Drepanosticta* and other old-world genera (including the neotropical *Palaemnema*) from the legion *Protoneura* and to place them at the foot of the *Agrionidae*, between the legions *Platycnemis* and *Protoneura*, into the new "legion *Platysticta*" (Rec. Ind. Mus. 13, p. 339). Later, the same author went further and erected the new sub-family name *Platystictinae* for the reception of the same group of genera, pending the discovery of an interesting type of larva that would throw more light upon the relationships of this group (Spolia Zeylan. 12, 1924, p. 360).

In the meantime, ANNANDALE had been fortunate enough to discover the larva of *Protosticta gravelyi* LAIDLAW, an Indian species of the sub-family, which was described and figured by FRASER (Rec. Ind. Mus. 16, 1919, p. 465-466, pl. 35 fig. 4 and pl. 37 fig. 7). This larva, chiefly on account of the curious shape of its mouth-parts and tracheal gills, proved to be so entirely different from any other known type of Agrionid larvae, that LAIDLAW's opinion of the *Platysticta*-series of genera forming a group of their own, appears more than justified.

The larva of *Protosticta gravelyi* was described from two exuviae, picked up "from rocks in small rocky stream, Bhavani River, base of Nilgiris, 1500 ft., 24. viii. 1918, N. ANNANDALE." FRASER's description, though incomplete, allows a comparison with the larval skin of *Drepanosticta sundana*, described later. It runs as follows: —

"Mask very flat, ovate, resembling in some measure that of a Gomphine, the inner surface finely striated with rows of minute, transverse grooves; mid lobe with a well-marked cleft, the mouth of which is contracted so that the edges approximate and enclose a small fenestrum. The free biting edge of this lobe armed with a row of slightly irregular, fine teeth. Lateral lobes massive and short, ending in a blunt, molar-like tooth and furnished with a robust, moveable hook. No setae on the mask.

Head moderately large, eyes globular, synthorax small. Abdomen not spined laterally. Caudal appendages in a very poor, shrivelled condition. They appear to be lanceolate and triquetral in shape and without node or spines. Legs long and slim." (p. 466, *loc. cit.*)

The figures accompanying this description are not very distinctive but sufficiently clear to recognize a highly aberrant type of larva which is well worthy of further discussion.

Let us first consider a similar type of larva that, after prolonged search in various places, finally came into my hands and which gives a better idea of morphological features, allowing a more complete study of structural details.

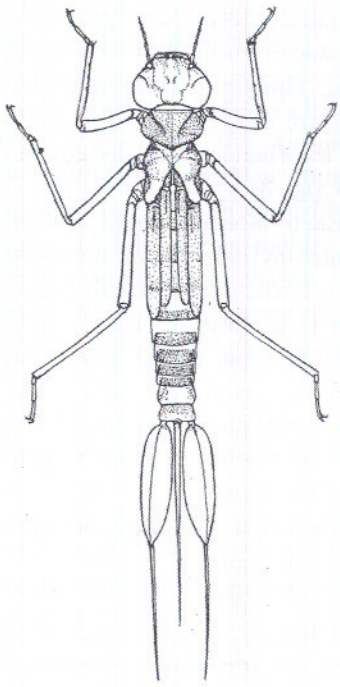
This is the larva of *Drepanosticta*, a genus very closely allied to *Protosticta*, differing from this only in venational characters of but slight importance.

As hinted at further in the text, the Javan *D. sundana* (KRÜGER) is universally, though sparingly, distributed in the plains and lower mountain districts of Java, but occurs only in damp and shady surroundings where a forest-brook or torrential stream is found in close vicinity. More than once I had come across suitable breeding-places for this species, the adults being found on various occasions and in many localities. However, it was not until April, 1930, that I finally got a single cast skin of *sundana* in a torrential stream at the foot of Mt. Salak, near Buitenzorg. In the morning of April 6 I had, for a long distance, slowly been following the rocky bed of the Tjihideung river, in search of ovipositing females of *Trithemis festiva*, when I suddenly noticed the glittering wings of a long-bodied Agrionid arising from some point under the dark overhanging bank of the stream, and flying straight on to the sheltering trees. The specimen was captured and proved to be a freshly emerged ♀ of *D. sundana*. The spot whence it came being located, I got to work in order to find the nymphal skin and, at the end of ten minutes' close examination, quite fortunately found the soft and flabby cast-skin attached to the flat underside of a partly submersed rock of huge size, only half an inch above the surface of the water. The empty skin soon showed that it was of a type new to me, the most striking peculiarity being the presence of three strongly pointed caudal gills of the saccoid type. Being at last on the track of the breeding-place of *Drepanosticta*, I continued searching for the larva itself with a view to take them back alive to the laboratory for a study of the internal organs, but no single specimen was found, so I had to be content with this unique nymphal skin, of which the following description and figures were made.

left mandible there are only three teeth, the first counting from the dorsal margin is narrow and longer than the remaining two, which are broad and obtuse (second) or rectangular and plate-shaped (third). Internal branch of right mandible short and obtuse, on left mandible equal in length to the third tooth of external branch, its base with a strong internal spine; apex truncated with three distinct teeth on outer half.

Maxillae with the outer lobe slender and setigerous apically and with the inner lobe attenuate at tip, which bears three long ventral internal teeth followed on by a number of strong setae gradually decreasing in size, and three stout and strongly curved dorsal internal teeth (pl. 9 fig. 1).

Labium when folded at rest reaching back to the bases of the prothoracic legs. Median (mental) lobe broad, plate-shaped, very slightly produced distad, with a deep and narrow median cleft bearing a number of radiant striae; distal margin entire, clothed with a great number of minute, flattened, scale-like setae which are widened and branched apically as shown in pl. 9 fig. 5. Mental setae absent; just around the median cleft are a few setae and on the middle of the mentum are two finely striated areas. Lateral lobes with a long moveable hook and with a simply rounded distal tooth (pl. 9 fig. 4).



Textfig. 1. *Drepanosticta sundana* (KRÜG.). Nymphal skin, W. Java. Median caudal gill collapsed.

Prothorax large and broad, smoothly rounded with two low dorsal tubercles. Meso-metathorax a little narrower. Front wing pads reach to the mid-length of abdominal segment 4, those of hind wing to the end of segm. 5. Legs long and slender, sparsely pilose; tibiae of anterior pair armed with a row of 3-4 strong setae along inner margin and with three short spine-like bristles at apex. Tarsi three-jointed, claws simple.

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   a. The squarish form of the mentum is not found in *Agrionidae* (*Platycneminae* + *Protoneurinae* + *Agri* eral outline it bears some likeness to that of *Euphaea* and, to a less extent, *Argiolestes*.
   b. The absence of setae on mentum and lateral lobes is which will serve to distinguish our larval type from Here again we find much resemblance with the con

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1. The mandibles. — These are somewhat alike the type found in the Euphaeid genus *Euphaea* and the Polythorid *Cora*. They are asymmetrical and biramous, both having quite distinct so-called "molar" and "incisor" areas, the molar area of the right mandible being reduced to a blunt knob-like outgrowth, which is separated from the incisor group of teeth by a concavity; it is not clear whether the well developed molar area of the left mandible works into the hollow of the right one. — Biramous mandibles have so far been described only for *Euphaea, Cora* and *Hemiphlebia;* they are considered archaic but may occur in other Zygopterous Odonata.

   The shape of the maxillae does not afford any peculiarity.

2. The labial mask. — The shape of the labial mask is of considerable interest inasmuch as it is of a highly aberrant type: —
   a. The squarish form of the mentum is not found in any of the true *Agrionidae* (*Platycneminae* + *Protoneurinae* + *Agrioninae*). In general outline it bears some likeness to that of *Euphaea, Diphlebia, Cora* and, to a less extent, *Argiolestes.*
   b. The absence of setae on mentum and lateral lobes is also a character which will serve to distinguish our larval type from the *Agrionidae.* Here again we find much resemblance with the condition found in the *Euphaeidae, Polythoridae, Amphipterygidae* and *Megapodagrionidae.* In all known Agrionid larvae there is at least one mental seta.
   c. The cleft median lobe of the labium is apparently absent in all *Agrionidae,* except in the *Isosticta*-series of the *Protoneurinae,* but here the mask has a prominent median lobe, as in all Agrionid larvae, the cleft being possibly secondarily developed.
   d. The absence of any process on the side-lobe of the labium. This is a character not found, I think, in any other Zygopterous larva. In fact, the entire structure of the lateral lobe is strongly reminiscent of a Gomphine nymph.

3. The caudal gills. — The shape and internal structure of the caudal gills is unique among Odonate larvae. Having only a single exuviae at my disposal, I am unable to give a detailed account of the internal structure, and no sections could be made through the gills with a view to determine their natural shape. — The breaking-joint of the gill in *Drepanosticta* lies very near to its base, the gill being flexible but not easily detachable from the abdomen. In outward appearance the gills are entirely unlike those of the *Agrionidae,* being very obviously similar to the 'simple saccus' found in *Euphaea* and, more especially, *Diphlebia.* Like these, the larvae of *Drepanosticta* are rock-dwellers in fast mountain-streams, and like the Australian *Diphlebia,* are only found in the shallow rapids and never in the deep still pools. According to TILLYARD, *D.* clings

also to the under-surface of flat rocks lying in the main current, in company with Perlid larvae, which they sometimes resemble, except for their gills. They are however, unlike the Perlid larvae, very sluggish, and are only capable of rapid movements in the water. When a rock is lifted up with a *Diphlebia*-larva beneath it the dragging of the huge gills upon the wet rock-surface effectually prevents any speedy movement (Proc. Linn. Soc. N. S. Wales, 42, 1917, p. 75). In *Drepanosticta* (and *Protosticta* as well) we meet with a type of gills exactly corresponding to that of *Diphlebia lestoides;* they are pointed in the same way, and bear the same soft hairs. The distribution of tracheae appears also rather similar, only the main trunks are fewer in number and better developed, pursuing a course through the middle of the gill.

As might have been expected, a comparison of our nymphal skin of *Drepanosticta* with the described exuviae of *Protosticta* reveals no important generic distinction. The labia are very much alike and the caudal gills also do not appear different. A study of the rectal breathing apparatus, the larval wing-tracheation, and a closer examination of the tracheal gills, seems much to be desired.

The general conclusions which we may make from the above facts are that the larva of Platystictid dragonflies is a very primitive type, decidedly more archaic — at any rate much less specialized — than the most primitive members of the *Agrionidae*, viz. the *Isosticta-Selysioneura* series of the *Protoneurinae*. It shows no relationship with the larval forms of the *Synlestidae, Megapodagrionidae* and *Lestidae*, and the characters which it has in common with the families previously united in the *Calopterygidae* of DE SELYS, are certainly only due to convergence. The *Platysticta* series of genera is perhaps best placed between the *Hemiphlebiidae* and the *Agrionidae* (= *Coenagriidae* auct.), though relationship with the former is a very distant one.

The erection of the family ***Platystictidae*** appears to be absolutely necessary on the larval characters alone, and this family may be regarded as a specialized off-shoot of an early type of *Zygoptera* whose larva has preserved some strikingly primitive features.

II. The imagines of the *D. sundana*-group.

Drepanosticta kruegeri LAIDLAW (Pl. 10 fig. 1-4).

1926. LAIDLAW, J. Mal. Br. Roy. As. Soc. 4 (2), p. 228-229, fig. 2a-c (apps., pter., proth.) ♂♀ Siberoet, Sipora & Pagai Is. (*krugeri*).

Material examined: — One ♂ (ad., paratype), N. Pagai Is., X. 1924, C.B.K. and N.S., in coll. LAIDLAW.

Described in detail by LAIDLAW. A distinct species, characterized by the dull red-brown pterostigma which, according to LAIDLAW, in almost all specimens

examined is pentagonal instead of quadrangular, the distal side being broken by a veinlet dividing the cell distal to it into two. In the paratype ♂ from Sipora such a veinlet is present in two wings, but the ordinary four-sided shape of the pterostigma is not affected by it, so that I cannot regard the pentagonal shape as a specific character of *kruegeri*. A further means of distinction is found in the armature of the ♂ prothorax, the clubbed processes being exactly identical in shape and length with the same structure of *sundana*. The anal appendages are also similar in principle, although the superior pair is longer and of slenderer build, and not so strongly downbent as in *sundana*. The inf. apps., however, are entirely different (*cf.* fig. 1 on pl. 10).

The colouring of the body is generally paler than it is in the other two species, but no differences occur in the arrangement of the dark markings.

Length variable. ♂ abd. + app. 36, hw. 23 mm (LAIDLAW gives 39.7, 24 mm).

In the shape of appendages, this species comes very near to the Sumatran *arcuata*, from which it is at once distinguished by the pterostigma and the structure of the prothorax.

Drepanosticta arcuata sp. n. (Pl. 10 fig. 1, 2, 4).

? 1898. KRÜGER, Stett. ent. Zeitg. 59, p. 107-111. — ♀ Soekaranda, Sum. (*nec* ♂) (*Platysticta sundana*).

1927. RIS, Zoöl. Meded. 10, p. 19-20, 45, fig. 10 (apps. ♂). — ♂ S. W. Sumatra (*kruegeri*).

1934. SCHMIDT, Archiv f. Hydrobiol. Suppl.-Bd. 13, p. 334. — ♂ juv., S. Sumatra (*kruegeri*).

Material examined: — One ♂ (semiad.), S.W. Sumatra, Benkoelen, Soebanajam, VI. 1916, EDW. JACOBSON, in Mus. Leiden. Twe ♂♂, one ♀ (ad.), S. W. Sumatra, Lampong distr., Waiteboe near Talangpadang, 500 m alt., 24. VI. 1934; one ♀, same loc., Wailalaän, 250 m alt., 22. VI. 1934; all L. J. TOXOPEUS leg., in Mus. Buitenzorg.

The most obvious differences from *kruegeri* and *sundana* are given in the key to the species. RIS' s description was based upon two rather teneral individuals, one of which has been examined by the writer.

Male (ad.) — Generally a little darker and more slenderly built than *sundana*. Pale colour in front of head and of synthorax light blue. Abdominal segments still narrower, very thin. Ground-colour dirty ochreous, with markings similar to *sundana*, dark brown on the back, black behind.

Legs pale; femora distinctly ringed with black, knees jet-black.

Structure of prothorax entirely different from *sundana* and *kruegeri*. Posterior lobe with two flattened, diverging, ribbon-like lateral processes, which are directed almost straight upwards and then curled a little forewards. These processes are evenly narrowed towards the end, the apices being flat and very narrow, though not pointed, less hairy at extreme tips than in *kruegeri* and *sundana*.

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The colouring of the body is generally paler than it is in the other two species, but no differences occur in the arrangement of the dark markings.

Length variable. ♂ abd. + app. 36, hw. 23 mm (LAIDLAW gives 39.7, 24 mm).

In the shape of appendages, this species comes very near to the Sumatran *arcuata*, from which it is at once distinguished by the pterostigma and the structure of the prothorax.

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1927. RIS, Zoöl. Meded. 10, p. 19-20, 45, fig. 10 (apps. ♂). — ♂ S. W. Sumatra (*kruegeri*).

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Male (ad.) — Generally a little darker and more slenderly built than *sundana*. Pale colour in front of head and of synthorax light blue. Abdominal segments still narrower, very thin. Ground-colour dirty ochreous, with markings similar to *sundana*, dark brown on the back, black behind.

Legs pale; femora distinctly ringed with black, knees jet-black.

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Wings narrower and slightly more pointed than in *sundana;* neuration not appreciably different. Pterostigma deep black, surrounded by a fine yellowish line, smaller and higher than in *sundana*. In *arcuata* the proximal side is almost straight and the inner edge is rectangulate, whereas in *sundana* the proximal side is distinctly oblique, so that the inner edge appears acute-angulate (pl. 10 fig. 2).

The structure of the penis is quite similar to *kruegeri* and *sundana,* the slight difference noted being probably due to shrinkage or decomposition (pl. 10 fig. 3).

Superior anal apps. evenly curved towards apices, lacking the abrupt and prominent dorsal bend as seen in *sundana* (rather intermediate in shape between *kruegeri* and *sundana*). Inferior apps. similar in shape to *kruegeri:* distal portion extremely slender, strongly downbent with apices incurled and finely pointed (pl. 10 fig. 1).

Female (ad.) — Identical to the ♀ of *sundana,* except in the shape of wings and in its slightly darker colours. Structure of prothorax and genital organs not differing from that species; in both the side-portions of the posterior lobe are little prominent, rectangulate.

Size variable: ♂ abd. + app. 37-39, hw. 24-25 (RIS: 44, 27); ♀ 36-37, 25-26 mm.

Drepanosticta sundana (KRÜGER) (Pl. 10 fig. 1-2).

1898. KRÜGER, Stett. ent. Zeitg. 59, p. 107-111. — ♂ Java (*nec* ♀) (*Platysticta*).
1912. RIS, Tijdschr. Ent. 55, p. 160, pl. 7 fig. 2 (apps. ♂) — ♂ S. Java (*Platysticta*).
1929. LIEFTINCK, Tijdschr. Ent. 72, p. 113-114 (key), fig. 8 (apps. ♂) — ♂ S. Java.

Material examined: — A large series of both sexes from many different localities in West, Mid and East Java.

This is a well-known species, described by KRÜGER and by myself. RIS was the first to give sketches of the ♂ appendages, in which the very characteristic shape of the inferiors is well shown. Specimens from the western part of the island differ in no way from those captured on the slope of Mt. Raoeng, in the extreme eastern corner of Java, and this leads me to consider Sumatran *arcuata* specifically distinct from *sundana*. The outline figures of structural details of *sundana* were made from a ♂ captured by myself on Mt. Karang, the most westerly situated volcano on Java (N. Bantam residency). The points of difference between this and

the distal border is margined with black and occasionally the entire upper lip is coloured so.

As in the Javan *D. gazella* LIEFT., there is considerable variation in the development of the side-edges of the ♀ prothorax. In most specimens these edges are produced into short triangular processes, but in many others the hind margin on both sides is simply rectangulate; lastly, in one female from Djampang Tengah (W. Java) the apical protuberances of the prothorax are long, distinctly clubbed and fringed with brownish hair at apex, being in fact quite similar to the clubs of the male. Curiously enough, in none of the numerous males which I have been able to examine such a variability in the structure of the hind lobe was noticed, all specimens having longish clubs.

No differences could be found in the shape of the p e n i s in the three species under discussion.

The m a l e s are readily distinguished thus: —

1. Prothoracic hind lobe furnished with two parallel, straight club-shaped processes, which are directed straight backwards, lying down on the back of synthorax; clubbed apices fringed with longish hair.
   2. App. sup. gradually bent downwards and inwards, apical portion not so widened and apex rather more rounded; app. inf. broad at base, distal half without subapical dorsal tooth-like projection, very narrowly pointed apicad, with hook-like tips. Pterostigma red-brown ..... ***kruegeri.***
   2′ App. sup. rather suddenly bent downwards and a little inwards, with apical portion more widened and apex truncated; app. inf. broad at base, but distal portion only slightly narrowed apicad, and with a distinct subapical dorsal tooth-like projection. Pterostigma blackish brown, or almost black ..... ***sundana.***

1′ Prothoracic hind lobe furnished with two diverging, narrow and flattened, ribbon-like processes which are curled upwards and forewards; apices not clubbed, fringed with few, short hairs. App. sup. evenly and but little downbent, apical portion shaped much as in *sundana.* App. inf. very similar in shape to *kruegeri,* apical portion without tooth-like projection, very thin and slender. Pterostigma jet-black. ***arcuata.***

III. Descriptions of two new species of *Drepanosticta* from West Borneo.

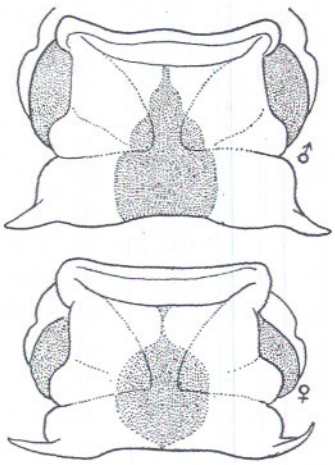
In "Konowia", 11, 1932 (1933), I published descriptions of three Bornean species of *Drepanosticta,* two of which were new. During the past three years I received from Mr. L. COOMANS DE RUITER, of Singkawang, two other species of this genus, both extremely rare, captured in the same district and apparently quite distinct from any other known species. These are now characterized below.

Drepanosticta attala sp. n. (Textfig. 2-3).

Material examined: — One ♂, two ♀♀, W. Borneo, Singkawang-Bengkajang Rd., forest-brook near Seroekan, hill-country, 16. IV. 1934, 30. VIII. 1932 and 28. I. 1932, respectively. Type ♂ and allotype ♀ in Buitenzorg Museum.

Male (adult). — Labium pale yellow. Anterior surface of head coloured as in related species: labrum, anteclypeus and a small spot filling up the upper edge at base of mandibles, vividly cream-coloured with faint green intermingling. Labrum with sharply pronounced black stripe along anterior margin. Postclypeus shining black. Remainder of head dull bronzy black. Occiput black, very shining. Antennae missing.

Prothorax palest bluish white; a deep black spot, widest behind and almost pointed to in front, over the middle, ceasing at base of anterior lobe and covering the median third of posterior lobe. Sides also deep bronzy-black. The two broad light bands thus enclosed are very conspicuous and in dorsal view have the shape of an inverted V. Posterior lobe short and broad, not elevated, hind margin almost straight in dorsal view, side-portions produced laterad and ending in a short nipple-shaped process (textfig. 2).



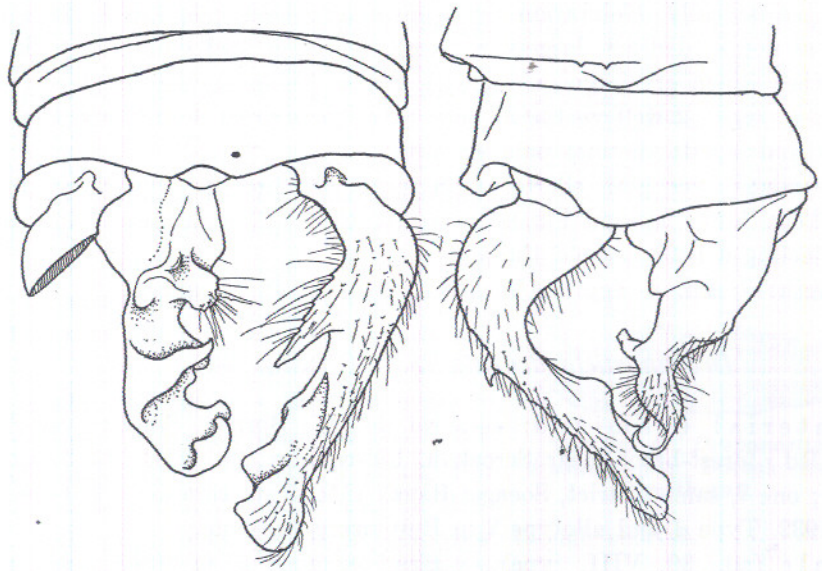
Textfig. 2. *Drepanosticta attala*, sp. n. Dorsal view of prothorax.

Synthorax, as far down as the first lateral suture, including the mesinfraepisternite, shining greenish bronzy-black with coppery reflections on mesepimerum. Sides palest bluish white with a strongly contrasting thick black stripe, slightly narrowed below, joining the second suture; this stripe is a little narrower than each of the white bands on both sides of it and does not include the spiracle, its lower (posterior) border being a little irregular. There is, besides, a very small blackish stripe placed upon the postero-dorsal edge of each metepimerite. Ante-alar triangles whitish. Venter pale.

Legs pale; coxae and femora yellowish white, exterior ridges of the latter with a sharp black stripe along full length of posterior two pairs, rather diffuse on anterior pair; knees blackish. Tibiae and tarsi pale ochreous, tibiae darkened interiorly and at base. Tarsi reddish; all spines dark brown.

Wings clear. Accessory basal postcostal nervure situated a trace beyond halfway base and Ax_1. *Ac* very oblique, placed midway between Ax_1 and Ax_2; it meets the wing margin in the production of the proximal side of *q*, joining *Ab* at margin under an obtuse and somewhat rounded angle in all wings. Cu_1 reaching the hind margin at 2-3 cells distal to the subnodus. Postnodals 12 in front, 11 in hind wing. M_3 arises slightly distal to subnodus in front, at the

subnodus in hind wing, *Rs* between nodus and Px_1. M_2 originates at the 6th postnodal in front, at the 5th or 6th in hind wing. M_{1a} 2 cells distal to M_2 in front wing, 2-3 in hind wing. Pterostigma jet-black, surrounded by a fine pale line, about 1½ times longer than high (almost twice longer than high in hind wing), a little widened distally; costal side distinctly shorter than anal side in front wing, less so in hind wing; proximal angle rather acute, distal side slightly convex.



Textfig. 3. *Drepanosticta attala*, sp. n. ♂ Anal appendages, dorsal view and right side (left sup. app. omitted).

Abdomen very long and slender, shaped as usual. Segm. 1-2 creamy yellow aside, light brown on the back; on segm. 2 the dorsal band is complete but narrowed to in front, and its anterior ⅔ part is divided into two halves by a clear yellow longitudinal stripe, which is widest towards the base of the segment. Segm. 3-7 dark brown with the exception of very narrow whitish basal rings. Dorsum of 8-10 blackish brown; on 8 there are traces of an ochreous side-spot along base, and on either side of the middle of 9 are placed two quite distinct, squarish blue basal spots. Segm. 10 black.

Anal appendages, sup. black, rather paler interiorly; inferiors ochreous brown (textfig. 3).

Female (ad.) — Very similar to the ♂, differs as follows. Labrum light blue, the black along distal margin more extensive, covering at least the distal half and projecting in the middle so as to form two oval pale spots at base. Anteclypeus wholly light blue. Mandibles entirely black.

Prothorax creamy white, the black spot almost circular; posterior lobe of the same characteristic form, the side lobes furnished with a long whitish

spine which is directed sidewards and a little forewards. Synthoracic colour-pattern as in the ♂, sharply contrasting. Upper surfaces brilliant metallic green. Ante-alar triangles bluish green.

Black stripes over exterior sides of femora effaced, barely visible; knees distinctly blackened.

Neuration similar to the ♂. *Ac* placed well beyond half the distance between Ax_1 and Ax_2. Postnodals 10-11 in front wing, 10 in hind wing. Pterostigma black.

Abdomen much shorter than in the opposite sex, evenly widened and rather club-shaped apically. Coloration not appreciably different; basal rings narrower and not so distinct, largely replaced by fairly well delimited yellowish side-patches which are large on segm. 5 and 6. Yellow longitudinal line over the back of segm. 2 well visible at base only. Dorsum of 8-10 black, 8 yellow laterally and 9 with distinct pale side-spot.

Appendages vestigial, shorter than segm. 10, broadly triangular, black. Valves long, lower margin almost straight, pale yellowish brown in colour, tips projecting a little beyond the apps.

Length: ♂ abd. + app. 39, hw. 20.5; ♀ 29-30, 19-20 mm.

Drepanosticta drusilla sp. n. (Textfig. 4-5).

Material examined: — Two ♂♂, W. Borneo, Singkawang-Bengkajang Rd., forest-brook near Seroekan, hill-country, 30. VIII. 1932 and 13. X. 1933; one ♀, same district, Soengei Bagak (Mt. Raja complex), hill-country, 7. IX. 1932. Type ♂ and allotype ♀ in Buitenzorg Museum.

Male (ad., 30. VIII, type). — Head coloured as in *attala*, pale areas vividly greenish yellow. Antennae light brown.

Prothorax, with the exception of the posterior lobe, pale bluish white; hind lobe black in colour, fading to yellow laterally; depressed, very broad, hind margin almost straight, the downbent side-portions obtuse angulate, projecting very slightly laterad and abruptly leaving off half-way down the prothorax (textfig. 4).

Synthoracic pattern almost exactly similar to the preceding species. Lower half of black stripe covering the second lateral suture a little narrower and middle portion more distinctly widened to behind. No blackish stripe on mesepimerites. Ante-alar triangles bluish. Venter pale.

Legs pale yellowish white. Exterior ridges of femora indistinctly blackish, but knees and bases of tibiae dark in colour. Tarsi reddish brown; all spines dark brown.

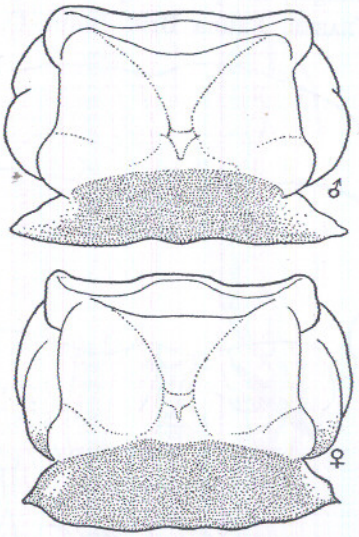
Wings clear. Anal cross-veins placed as in *attala*; two accessory basal postcostal nervures in right hind wing. Cu_1 reaching the hind margin 3½ - 4½ cells distal to subnodus. Postnodals 13-14 in front wing, 13 in hind wing. Position of the veins M_3 and *Rs* not different from *attala*. M_2 at the 7th or 8th postnodal in front, at the 6th or 7th in hind wing. M_{1a} 1-2 cells distal to M_2 in both pairs of wings. Pterostigma jet-black, not surrounded by

a pale line, fully twice longer than high in all wings and very slightly widened distally; costal side markedly shorter than anal side, distal side slightly convex.

Abdomen extraordinarily long and slender, much more drawn-out than in the preceding species. Segm. 1-2 and base of 3 pale green aside, light brown on the back; on segm. 2 the dorsal band is scarcely narrowed to in front, lacking a yellow median line. Segm. 3-7 as in *attala*, the whitish basal rings barely traceable. Segm. 8-10 distinctly clubbed, dorsum chiefly dark brown in colour, pale markings similar to those of *attala*.

Anal appendages brown, base of inferiors dirty ochreous (textfig. 5).

Male (juv.) — Differs from the adult in that the face is blue instead of greenish yellow, the upper parts of the head acquiring a fine bluish lustre. Body-markings otherwise less sharply delimited and paler. Postnodals 12 in front, 11-12 in hind wing. Pterostigma pale brownish.



Textfig. 4. *Drepanosticta drusilla*, sp. n. Dorsal view of prothorax.

Female (semiad.) — Similar to the ♂, differs as follows. Anteclypeus and basal third of labrum bluish green, remainder black. Prothoracic hind lobe a little longer than in the ♂ and with side-angles rectangulate in side view, though shorter.

Postnodals 13 in front wing, 12 in hind wing.

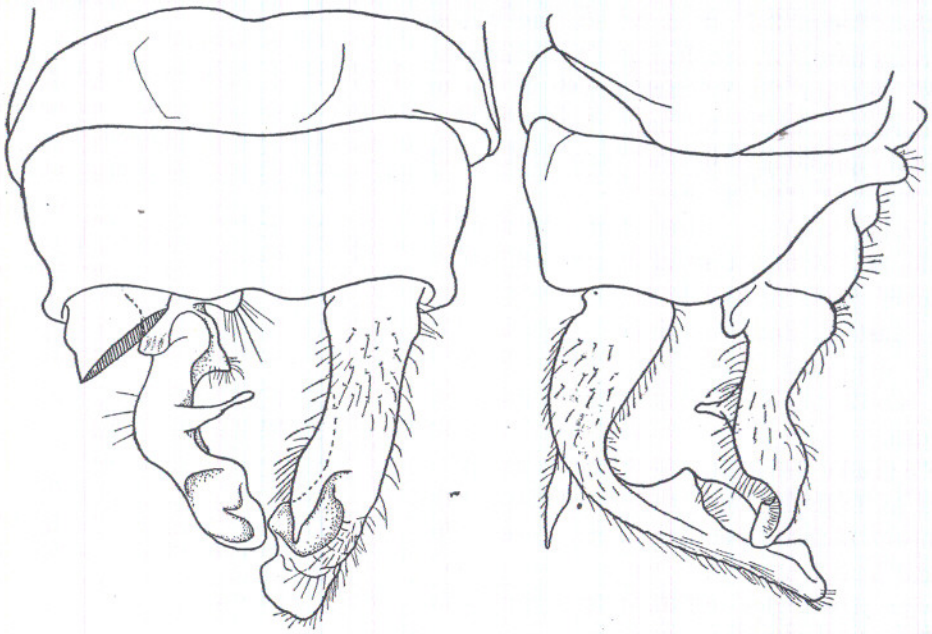
Abdomen very much shorter than in the opposite sex (deformed by pressure). Coloration similar to ♂ but basal rings decidedly expanded laterally and almost one-sixth of the length of each segment 4-6. Black apical rings of 3-7 distinct.

Appendages and valves much as in *attala*, the valves dark brown and a little shorter than in that species.

Length: ♂ abd. + app. 48.5, hw. 24 (type), 41, 20 (paratype); ♀ 38, 24.5 mm.

The two species, just described, should be placed within the *rufostigma*-group of the genus, which is represented in Borneo by *rufostigma* (SELYS) and *dupophila* LIEFT. The ♂♂ of our new species are very easily distinguished from the others by the strongly downbent superior appendages. The thick black stripe over the thoracic sides and the lightly coloured ante-alar triangles are two further characters which they have in common and by means of which they are immediately recognized from other species *D. drusilla* differs from *attala* chiefly by the great length of the ♂ abdomen, by the shape and colouring of the prothorax, and by the enormous spine on the sup. anal apps. The alternated black-and-white pattern of the prothorax of *attala* is a very striking feature of that species and produces strongly an impression as if it were scaled.

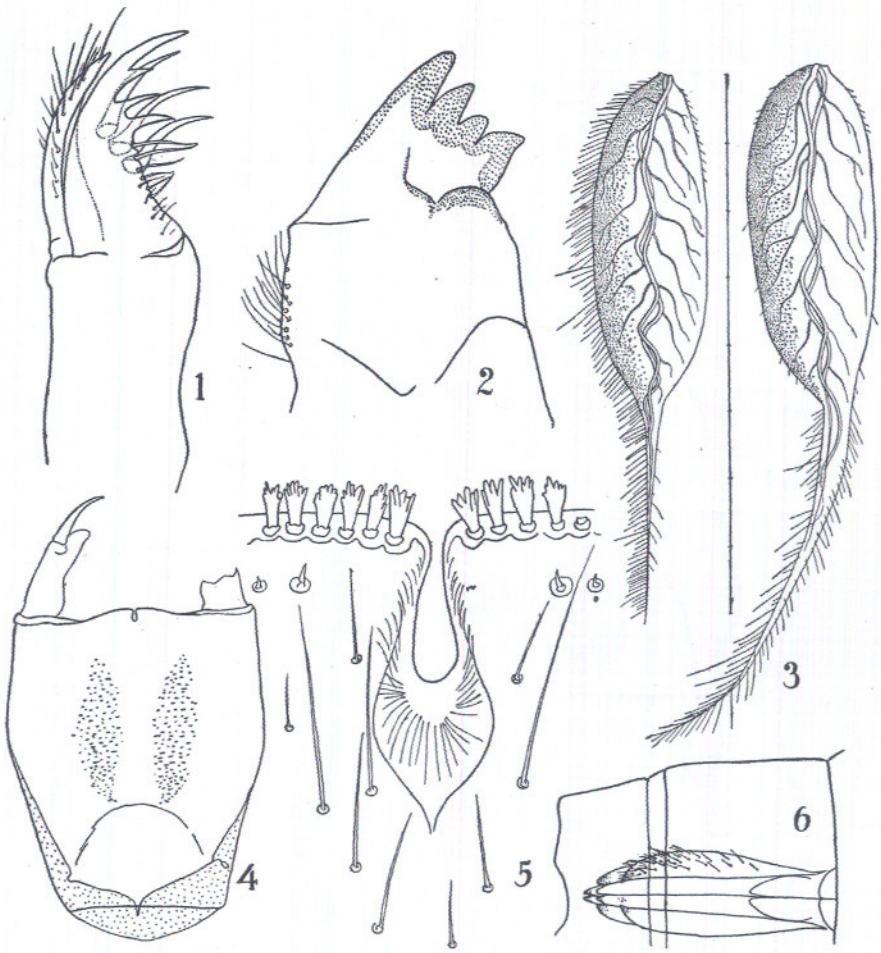
D. drusilla seems to find a near ally in *D. viridis* FRASER, from Mergui, Lower Burma. In both species the abdomen of the male is exceptionally long and attenuated, and both possess a strong spine at the point of angulation of the superior anal appendages. They differ mainly in the shape of the inferior appendages, the pterostigma being also much longer in *drusilla* than in *viridis* (cf. FRASER, Fauna Brit. India, Odonata I, 1933, p. 145-147, fig. 69).



Textfig. 5. *Drepanosticta drusilla*, sp. n. ♂ Anal appendages, dorsal view and right side (left sup. app. omitted).

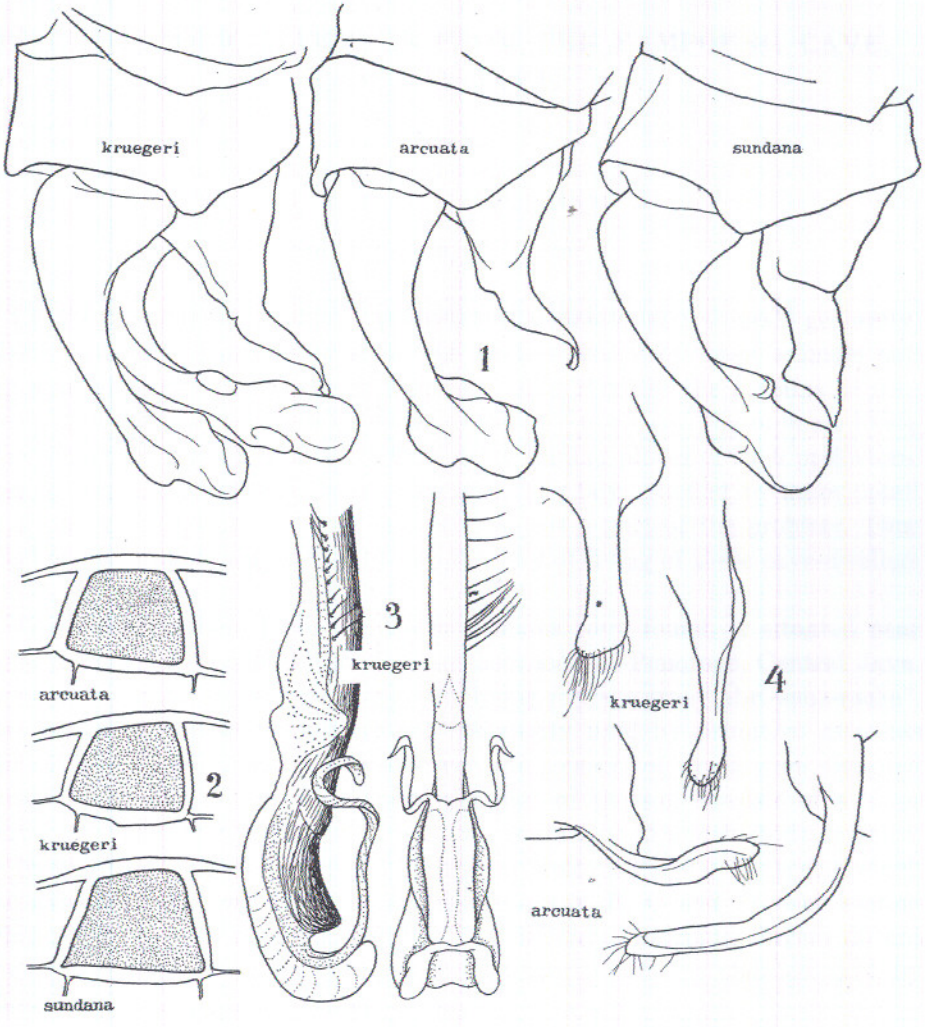
The following species are now known to occur in Borneo: —

D. actaeon LAIDLAW
D. attala LIEFT.
D. crenitis LIEFT.
D. drusilla LIEFT.
D. dupophila LIEFT.
D. rufostigma (SELYS).



M. A. LIEFTINCK, Notes on Malaysian *Drepanosticta*.
Larval structures of *D. sundana* (KRÜGER).

Fig. 1. Right maxilla, ventral aspect.
Fig. 2. Right mandible, ventral aspect.
Fig. 3. Median and left lateral caudal gills, interior view.
Fig. 4. Interior view of labium.
Fig. 5. Medio-apical portion of mentum, showing median cleft, marginal scales and setae.
Fig. 6. Ventral view of female gonapophyses.



M. A. LIEFTINCK, Notes on Malaysian *Drepanosticta*.

Fig. 1. Right side-view of male anal appendages.
Fig. 2. Pterostigmata of right front wing.
Fig. 3. Penis, left side and ventral view.
Fig. 4. Right half of male posterior lobe of prothorax, dorsal (left) and right side-view (right).