Chlorocypha pavonis spec. nov., a new chlorocyphid dragonfly from West Africa (Odonata)

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With 6 text-figures

Abstract. — Descriptions and illustrations are given of two allied species of *Chlorocypha* Fraser, viz. *C. glauca* (Selys) and *C. pavonis* spec. nov., based on males in the Berlin museum, from Cameroon and Togo, respectively, supported by a colour photograph of a live specimen of the new species, recently taken in Ghana.

In February, 1972, I received a letter from my colleague, Dr. H. K. PFAU, of the Zoologisches Institut der Universität des Saarlandes at Saarbrücken, in which I was asked to identify a little zygopteron from West Africa. Enclosed in this letter was a beautiful colour-slide of a male *Chlorocypha*, with striking red-and-blue abdomen and very conspicuous blue head and thorax markings. The picture, here reproduced in black and white (Fig. 2) had been taken over a forest brook near Kumasi in Ghana, by Dr. PFAU's companion, ERWIN KOHLER, while journeying in this country during April, 1971. Unfortunately, the insect on that particular occasion was only observed twice, and any attempt to capture it remained fruitless.

While going over the extensive literature on African Chlorocyphidae, I remembered having seen some neat little drawings of the body pattern of a similarly-looking *Chlorocypha* illustrating one of F. KARSCH's papers on Odonata from West Africa (1893). Two of these sketches show the thorax and abdomen design of a male *Chlorocypha* collected in 1889-90 at Bismarckburg, in the Adeli province of adjacent Togo. This species, along with the males of four others (all from the same locality) which are of no concern in the present context, was arranged in a key. As is evident from some of the insect's characters, it was wrongly named *Libellago rubida* Selys. The true *Chlorocypha rubida* is an entirely red-bodied species, originally described in *Libellago* by HAGEN in SELYS (1853), KARSCH's insect conforming to an additional description of the supposed *rubida*, based on a male from Cape Coast Castle (Guinea), published by SELYS in the 4e Additions (1879: 381). The last-mentioned species has a bicoloured abdomen and is a member of the rather heterogeneous "*Glauca*-group", defined by PINHEY (1967: 189). It should be mentioned, that KARSCH, on an earlier occasion (1891), had already recorded another specimen of "*Libellago rubida*", from the Barombi Station in Cameroon, on which he observed that it agreed with SELYS's subsequent description mentioned above, not with HAGEN's. This was confirmed by FRASER (1949) and PINHEY (1967), who recognised that *rubida* Hagen belongs to a different species-group, characterized by PINHEY as the "*Rubida*-group". Now it was rather surprising to see KARSCH's sketches in his 1893 paper of "*rubida*" correspond so nearly with the pattern exhibited by the brightly coloured *Chlorocypha* from Ghana, shown in Dr. PFAU's photograph, that I was led to investigate the proper identity of the two examples named *Libellago rubida* by KARSCH, i.e., the one male from "Kamerun" and the other from Togo, both I assumed would still be kept in the Berlin museum. This proved indeed to be so, and I am grateful to Dr. K. K.

GÜNTHER, of the Museum für Naturkunde in Berlin, for the privilege of studying these two specimens and to describe and figure them. The result is as follows.

The 1891 specimen from Barombi Station (Cameroon), placed by PINHEY (1962: 150) in the synonymy of *C. rubida* (Hagen in Selys), is a full-coloured male of *C. glauca* (Selys). Details of its colour design are here shown in Fig. 1.

The male from Togo, figured and briefly characterized by KARSCH in 1893, requires a new name, for it is distinct from *glauca*; these sketches and notes have apparently been overlooked by subsequent writers as no citations of KARSCH's account are to be found in the existing literature. Both of them run out in PINHEY's key (1967: 178, 189) to the "*Glauca*-group" of *Chlorocypha*, to which they evidently belong. The following notes, with comments on previous observations on the group, may serve to prove this.

Chlorocypha glauca (Selys)

Libellago glauca, SELYS, 1879: 380—381 (♂ Mongo-Ma, Guinea; not "vieux Calabar").
Chlorocypha glauca, FRASER, 1949: 23—25, figs. (♂ partim ?); LONGFIELD, 1959: 28, fig. 4A; PINHEY, 1962: 149 (cat.; references); PINHEY, 1967: 178 (key), 189—190 (♂ ♀ partim, with *glauca* var. and *g. radix* Longfield).

Material. — Cameroon: ♂ (adult, right wings partly missing), labelled: 5315 (print), Kamerun, Barombi-Stat. Preuss S. (print on blue), 62 (written), Libellago rubida Selys (in KARSCH's writing), in the Berlin museum.

The present specimen is fully mature and in good colour condition. Light dorsal markings on head and prothorax blue, those on dorsum of synthorax not very sharply outlined, though narrow, and of a dark ochreous tint, while the broad lateral bands are obscurely orange-brown. Black areas on ventral surface of thorax slightly pruinescent, the inner faces of the femora (partly) and tibiae (entirely) covered with light blue-white pruinescence. Wing membrane hyaline, faintly yellowish only at extreme base. Quadrilateral with two cross-veins in the fore wings, three in the hinder pair. Dorsum of abdominal segments 1—5 sky-blue, this colour very slightly intermingled with red towards the end of segment 5; 6—10 unicoloured scarlet. Markings of head, synthorax and abdomen as shown in Fig. 1; anal appendages (partial dorsal view), Fig. 6.

Measurements: abd. + app. 23.2 mm, hind wing 24.5 mm.

This is the first male of "*rubida*" recorded by KARSCH. Its new status is beyond doubt as it agrees in all essential characters with *C. glauca*. Subsequent to FRASER's (1949) account of this species, LONGFIELD (1959) gave a colour description of the type and two paratype males of *glauca*, which she says came from the 13.000 ft. peak, known as Mongo-Ma Lobah, of the Cameroon Mountains. She proposed to name this dark-thoraxed mountain form *C. glauca glauca*, referring all the others, known from the low coastal regions, or below 5000 ft. in altitude, to her new subspecies, *C. glauca radix*, which she had from Ghana, Sierra Leone and Nigeria. LONGFIELD also commented upon the variation of this form, stating that SELYS's *rubida*, described in 1879 from Cape Coast Castle in Ghana, also belongs here. It would be interesting to check this last statement by re-examining the „deux mâles adultes" in de SELYS' collection, because the abdomen of these Ghana specimens is described as "jaune-verdâtre ou bleuâtre dans sa première moitié,

passant au rose ensuite, enfin les 9—10e segments rouge vif". These colour notes lend weight to a recent observation made by PINHEY (1967), who says that there are two varieties of the male of this striking species (i.e., *glauca* and *glauca* var.), one with blue extending to abdominal segment 4, followed by six scarlet segments, the other with segment 5 also in the blue region. According to him, the two forms may occur together and may be either incidental varieties or, perhaps less likely, developmental stages. They are said to be evidently polyandrous (loc. cit.: 189). This may well be so, for the Cameroon specimen described above and the Guinea males discussed by SELYS are not quite alike with regard to the distribution of blue and red colour on the abdomen; at the same time they differ somewhat in this respect from the varieties mentioned by PINHEY. For further details, see under the next species.

Chlorocypha pavonis spec. nov.

Libellago rubida, KARSCH, 1893: 32 (key ♂), 35, fig. 4, 4a (body markings, ♂ Adeli, Togo). ? SELYS, 1879: 381 (♂ Cape Coast, Guinée).

Chlorocypha glauca, FRASER, 1949: 23—25, figs. (♂, partim); LONGFIELD, 1959: 28 (partim ?); PINHEY, 1962: 149, cat. (partim ?); PINHEY, 1967: 189—190 (partim ?).

Material: Togo: ♂ (adult, discoloured, head glued on to prothorax), labelled: Togo, Bismarckburg, 1.11—15.12.90, R. Büttner S. (print), Libellago rubida Selys (in KARSCH's writing), and two additional labels in unknown handwriting: "nicht ganz der Rubida Karsch 1891", and "ist dies glauca Selys?". In the Berlin museum. The specimen is the holotype.

Male. — Stature of *C. glauca* (Selys). Labium deep black, but submentum and squamae bright yellow. Mandible-bases and genae dark brown; labrum black, the latter rather smooth and shining. Clypeus shaped as in *glauca*; colour black, anteclypeus somewhat lustrous, the transverse striae fewer in number and less deeply impressed than in *glauca*. Rest of head dull black; frontal, epicranial and occipital markings sharply defined, shaped as in Fig. 3, all coloured light greenish-blue. Light markings, including the broad lateral thoracic bands of pro- and synthorax, of the same light greenish-blue tint, as are also most of the ante-alar triangles and conspicuous spots on the alar processes, meso- and metascuta, postnotum and axillary plates. Ventral surface of thorax deep black, centred with obscurely brownish-green spots on the lower parts of metepimera and poststernum. Legs slender, deep black, inner faces of femora on their distal portions and on whole length of tibiae, coarsely pruinescent white. Wings hyaline except a faint tinge of yellow at extreme bases, the apices and posterior borders smoky grey. Neuration much as in *glauca* (only one male available); *Arc* at Ax_3 on all wings; quadrilateral with only a single cross-vein in fore wings, two in hinder pair; 10—11 antenodals in all wings.

Abdomen shaped similarly to *glauca*; light dorsal markings as in Fig. 4, contrastingly coloured: 1—4 light greenish-blue, 5—10 dark red (evidently discoloured); ventral surface of all segments deep black. Anal appendages black, shaped as in Fig. 5; apices of superior pair slightly more abruptly incurved and distinctly more expanded than in *glauca*; lower portions of inferior appendages

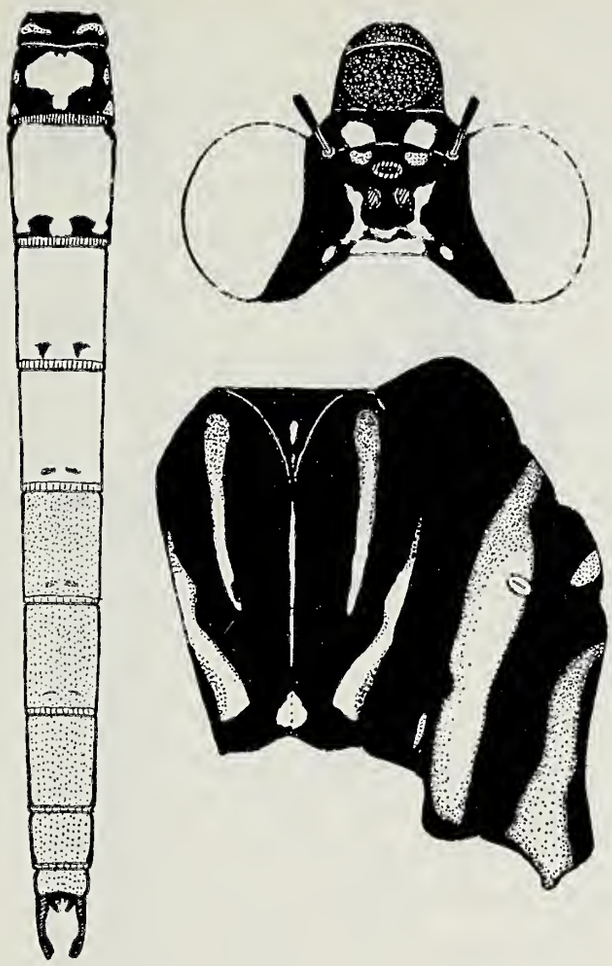

Fig. 1. *Chlorocypha glauca* (Selys). Colour pattern of head from above, synthorax (diagrammatic), and abdomen, of adult ♂ from Barombi Station (Cameroon), in the Berlin museum. White basal segments of abdomen blue, stippled segments (6—10) scarlet. See description.

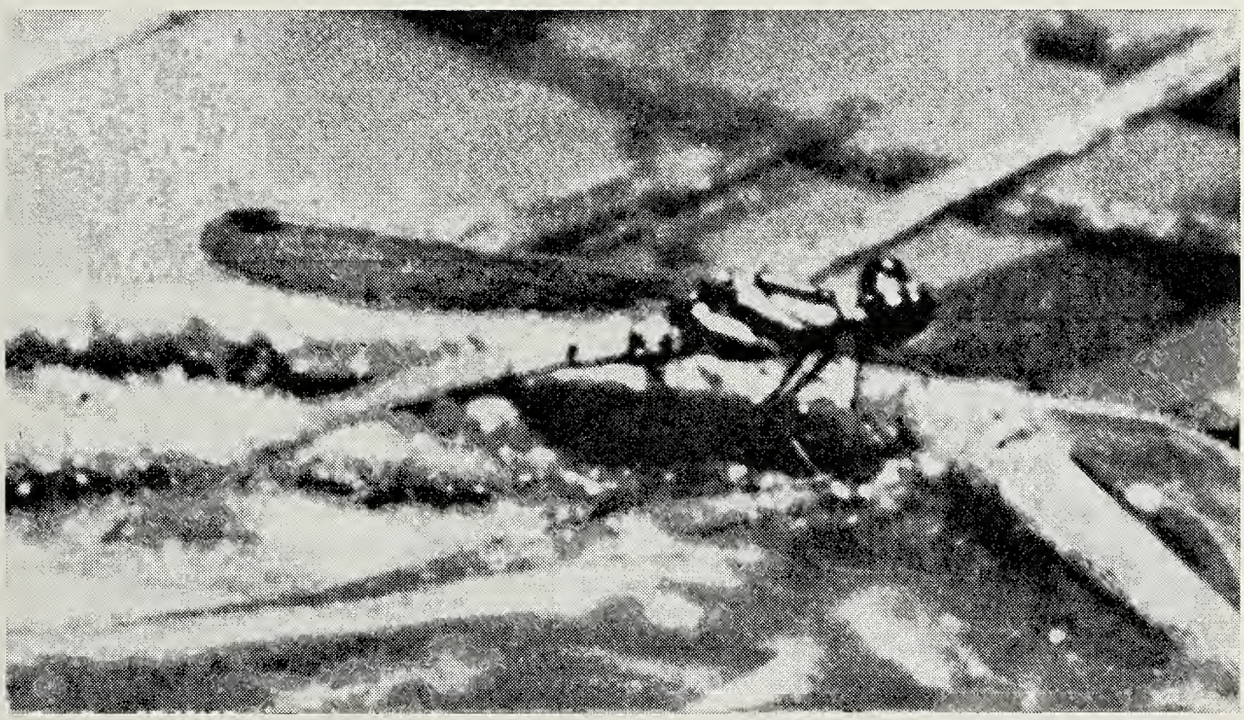

Fig. 2. *Chlorocypha pavonis* spec. nov., adult ♂ over forest stream near Kumasi (Ghana), April 1971. Enlarged photograph from colour-slide taken by Erwin KOHLER. Body length 33 mm approx.

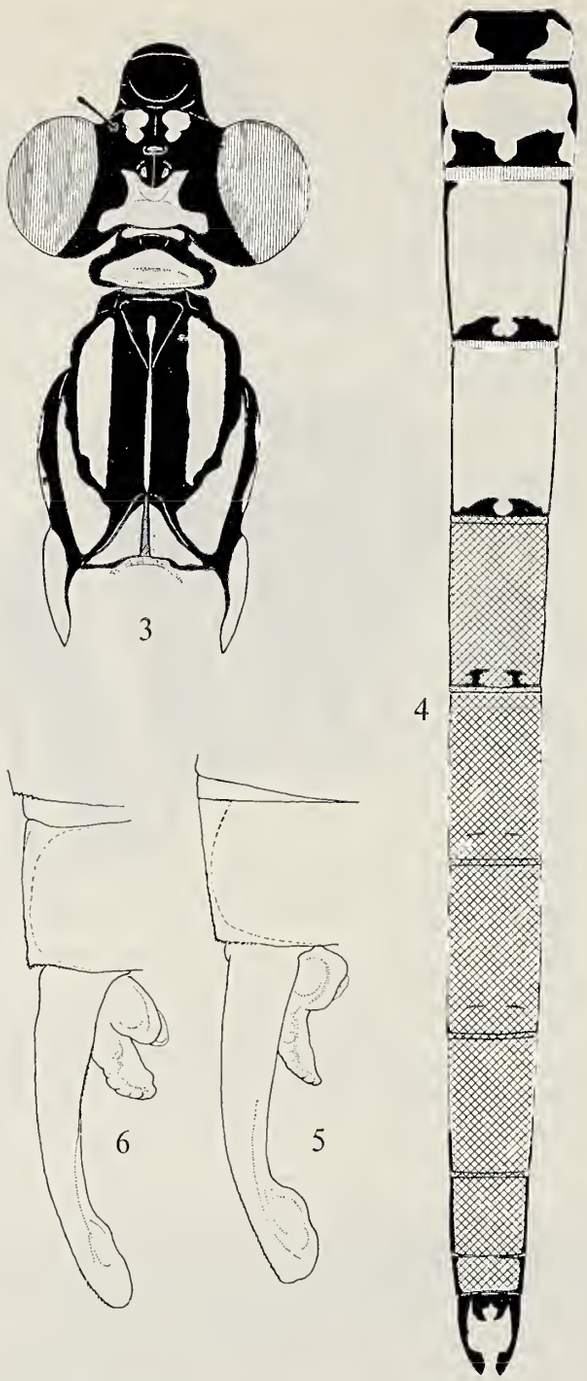

Fig. 3—5. *Chlorocypha pavonis* spec. nov., adult holotype ♂ from Bismarckburg (Togo); Colour pattern of head and thorax segments from above (3), the same of abdomen (4), and left half of 10th segment and anal appendages (5).

Fig. 6. *Chlorocypha glauca* (Selys). Left half of 10th abd.-segment and anal appendages of ♂ from Barombi Station (Cameroon), in the Berlin museum. White basal segments of abdomen blue, stippled segments (5—10) scarlet. See description.

relatively longer and upper portions more evenly narrowed towards the end, than in *glauca* (cf. Figs. 5 and 6).

Measurements: abd. + app. 22.5 mm, hind wing 23.4 mm.

In the introduction I have already observed on the male colour-scheme of this conspicuous species, that it conforms almost precisely to that of the specimen photographed by Mr. KOHLER (Fig. 2). In the type from Togo the blue marks are somewhat faded, the red on the abdomen being of a dark crimson. The colour-slide of the Ghana male shows the blue of a brighter and lighter tint, while the apical segments are scarlet. Otherwise the two males agree in having broad, completely isolated, dorsal thoracic bands, black legs, and a contrastingly parti-

coloured abdomen; the head and thorax of the photographed male are, perhaps, even slightly more profusely adorned with blue than in the type. I have, therefore, no doubt that the two are conspecific, which is of great interest considering their different habitat. The bicoloured abdomen is a feature characteristic of *C. glauca* and its alleged subspecies *radix* Longfield; they differ from one other member of the "*Glauca*-group" with parti-coloured body, *C. curta* (Hagen), in that the basal segments are blue and the terminal ones red, whereas *curta* has these colours reversed.

Thus we see that *C. pavonis* can be distinguished from its nearest relative, *C. glauca*, by the much greater extent of blue colour, especially on the thoracic dorsum. Both specimens of *pavonis* also differ from the heterogeneous series of males united by LONGFIELD under *C. glauca radix*, by lacking the strong yellow tint of the wing membrane, which in all *radix* (including the type) is pronounced as far out as the nodus. Moreover, typical *radix* has the dorsal thoracic stripes completely joined on the "shoulder", near the prothorax. Some of LONGFIELD's "paratypes" are said to have broad wedge-shaped dorsal thoracic stripes, only quite narrowly separated one from another, along their entire length, a character which they share alike with *pavonis*. Hence I am not convinced that all specimens from Ghana, Nigeria and Sierra Leone should be attributed to a single "subspecies", *radix* Longfield. *C. glauca glauca* is restricted by LONGFIELD to high mountain individuals from Cameroon. Since we have seen that KARSCH's male from Barombi Station in Cameroon — which fits the description of *glauca* in every detail ("... thorax noir, ayant en avant l'arête dorsale, deux raies étroites *isolées* jaunâtre ...") —, was evidently collected at a much lower elevation, the vertical distribution of that species would extend from the lower mountain zone to very high altitudes. We know little about the altitudinal range and geographical distribution of these forms; re-examination of the entire series may also reveal structural differences to exist between them, — *pavonis* having, perhaps, been included? However this may be, I prefer for the present to keep these taxa apart as full species and await further studies before attempting a subspecific arrangement.

The name of this handsome *Chlorocypha* is an allusion to that of the well known odonatologist, Dr. H. K. PFAU of Saarbrücken, who initiated its discovery.

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