

REVIEW

'A REVISION OF NORTH AMERICAN *CAPITOPHORUS* VAN DER GOOT AND *PLEOTRICHOPHORUS* BÖRNER (HOMOPTERA: APHIDIDAE)'

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This work contains descriptions of the known morphs of the North American species of *Capitophorus* and *Pleotrichophorus*, synonymy, data for host plants and geographical distribution, keys for the identification of the apterae viviparae of *Pleotrichophorus* and both the apterae and the alatae viviparae of *Capitophorus* and an alphabetically arranged and systematically indexed host plant catalogue. The bibliography contains nearly 200 references. The admirable features of the work include clear line drawings of most of the species, statements of the number of specimens of each morph examined and discussions of the difficulties which remain to be solved. Thirty-eight of the most commonly used terms are abbreviated, presumably to save space, and although the glossary on pages 7 and 8 is clearly set out, the keys and descriptions make slow reading for those not immersed in the group. The keys could be improved by supplementary characters in cases where obscure characters visible only in good preparations are used. For instance the apterae viviparae of *Capitophorus jopepperi* Corpuz-Raros & Cook are separated from those of *C. hippophaes* (Walker) by the arrangement and shape of the dorsal abdominal setae. The key does not mention that in apterae of *jopepperi* the processus terminalis is 3.9–5.2 times as long as the base of the sixth antennal segment while in *hippophaes* it varies from 7.2 to 9.2 times as long, and this ratio can usually be obtained from even the worst preparations. The keys give the impression of being constructed either from notes rather than specimens or of a greater interest in systematics than the taxonomic problems of identification of specimens (systematics being a profession, taxonomy a trade and nomenclature, of course, a calling). Despite these criticisms this, the most comprehensive account yet of the North American fauna of the group, will be essential to all identifying North American aphids and very useful to aphidologists dealing with the group from any part of the world. — V.F. EASTOP.

A new method of clearing insect specimens for dissection. — As an alternative to aqueous potassium hydroxide for dissolving muscle and other proteins from dried insect specimens, NCS tissue solubilizer mixed with water (in the ratio 5:1) acts more rapidly in the cold and also dissolves any lipids. Small specimens can be cleared on a glass slide with a well, covered with a cover slip. The specimen should then be transferred to lactic acid (preferably) or acetic acid to neutralize the alkali before mounting, dissection or permanent storage.

NCS solubilizer is a quaternary ammonium base in toluene manufactured by Amersham/Searle, U.S.A. and marketed in the U.K. by Messrs. Hopkin and Williams, P.O.Box 1, Romford RM1 1HA. It was originally developed for solubilizing tissues containing radioactive isotopes for liquid scintillation measurement. As with all strong alkalies, extreme care should be taken not to get it into the eyes (which could cause serious damage) and any spilt on the skin should be rapidly washed off. — W.J. LE QUESNE, Anne Cottage, 70 Lye Green Road, Chesham, Bucks. HP5 3NB: April 3rd, 1974.

Two uncommon species of Hoptilis (Hym., Sphecidae) in Southern England. — On 22.vii.73 I took a male *Hoptilis laticinctus* (Lep.) on flowers of *Pastinaca sativa* L. at the edge of Vernditch Chase, South Wilts., a few miles south-west of Salisbury. On 7.ix.73 I caught a female *Hoptilis bicinctus* (Rossi) at Dunster, Somerset. Mr. G.R. Else informs me that there are only a few published British records of *H. laticinctus*, from East Anglia, Dorset and the New Forest. *H. bicinctus* is not so uncommon, being recorded from several southern counties, though not from Somerset. — C.H. ANDREWES, Overchalke, Coombe Bissett, Salisbury: February 18th, 1974.

A NEW SPECIES OF *CHLOROCYPHA* FRASER, 1928 (ODONATA: CHLOROCYPHIDAE) FROM NIGERIA, AND SOME NEW OR LITTLE-KNOWN NIGERIAN SUBSPECIES OF FORMS BETTER KNOWN FROM THE CAMEROONS

BY R. MOYLAN GAMBLES

SYNOPSIS

A new species of *Chlorocypha* is described from the Nigeria-Cameroons border, the difference between the faunas of Nigeria and the Cameroons is referred to, and separate Nigerian subspecies are described or redescribed of three well-known Cameroons species.

INTRODUCTION

In December, 1961, in the course of a three-day visit to the Obudu Plateau (approx. 5000 ft), close to the eastern border of Nigeria, four male specimens of a large *Chlorocypha* were taken beside a small stream running through a narrow strip of forest. They differed in pattern from all known species of the genus, chiefly in that the pair of "bollard" markings on the abdominal segments seen in many species (Pinhey, 1967) were here more centrally placed and fused with each other, and on the second segment the centre was black and the lateral part red, instead of vice versa. The species is therefore described as new, under the name of *Chlorocypha centripunctata*.

The Cameroons has a characteristic insect fauna of its own, which is distinct from that of most of Nigeria and the countries lying to the West. The boundary between the two faunas does not follow the national frontiers, and the easternmost strip of Nigeria contains a fauna which, — at least as far as the dragonflies are concerned, — is of the Cameroons type. The zoogeographical boundary appears to run roughly north and south through the town of Ikom at a longitude of 8° 40' E., and then in a north-easterly direction, following the mountain range. Similarly in some areas in the northern part of West Cameroon, draining into the Benue, the dragonfly fauna appears to be of the Nigerian type.

Although the Obudu Plateau is in Nigeria, the insect fauna, — to judge by the species of dragonflies present, — appears to be that of the Cameroons. Very few other species were found in this particular piece of forest at the time, *Nesolestes nigriensis* Gambles, 1970, not known elsewhere; *Nubiolestes diotima* (Schmidt, 1943), then only known from a single specimen from the Cameroons, but of which I found eight more in the Cameroons the following year; *Chlorocnemis pauli* Longfield, 1936, described from Uganda and not previously known from West Africa at all; and two widespread tropical African species, *Unma longistigma* (Selys, 1869) and *Enallagma subtile* Ris, 1921. Over a more open stream half a mile away *Orthetrum camerunense* Gambles, 1959, probably an upland species and previously described from the Bamenda Highlands, was again found in some numbers. Also over a stream crossing the road a few miles lower down, the common Cameroonian *Sapho orichalcea* McLachlan, 1869, was found, instead of the usual Nigerian *S. ciliata* (Fabricius, 1781).

A number of species whose typical forms were originally described from the Cameroons are replaced in Nigeria by readily recognisable subspecies, two of them being *Chlorocypha* spp. *C. glauca radix* Longfield, 1959, is here redescribed, and new subspecies are described of *C. selysi* (Karsch, 1899) and *Pseudagrion sjoestedti* Förster, 1906. The females of the nomino-typical forms of these three species, and of *C. glauca radix*, have never been described, or only very briefly, so these have also been included, and figured.

Dr. G. Demoulin has kindly loaned Selys's original specimens of *C. glauca* and *C. selysi* from the Brussels Museum for comparison with the Nigerian subspecies.

Chlorocypha centripunctata sp.n.

A large species of distinctive appearance, with no obvious affinities with any known species.

Male (holotype). Head: labrum pinkish orange, finely bordered with black, and with a black wedge-shaped spot basally leaving the pinkish area B-shaped; sides of mandibles and genae pinkish; front of epistome (anteclypeus) pale blue in life, but faded to pinkish after death, with a small black spot where it meets the labrum; dorsum of epistome (postclypeus) black with a small transverse reddish streak at base; frons vertex and occiput black except for the following reddish marks, — a pair of semicircular spots on the frons, rounded and clearcut posteriorly, straight anteriorly and merging into the black, comma-shaped marks (inverted) enclosing the vertex, and post-ocular spots with a transverse rectangular stripe between; antennae black except for pale pink apical half of basal joint.

Prothorax black, with the following red markings, — anterior lobe with pair of oblique stripes converging anteriorly, central lobe with longitudinal stripes laterally, and whole posterior lobe red except for a very narrow black border.

Pterothorax black with the following red markings, — median carina salmon-pink, except at either extremity; antehumeral stripes broad and continuous, wider antero-ventrally than posterodorsally but not in the form of fish-hooks; centre of antealar sinuses red, edged with black; sides red with broad black complete stripes along humeral and second lateral sutures, and a narrow black half-stripe on upper portion of the semi-obiterated first lateral suture; terga and wing-base sclerites red; legs black.

Abdomen: dorsal surface red, marked with black as in figure 1; appendages black, inferiors extending for fully half the length of the superiors, instead of slightly less than half as in most *Chlorocypha* spp., or the whole length as in *Africocypha*; the ridge of teeth running longitudinally along the dorsal surface of the inferior are more prominent than in most species (figs. 2, 3); ventral surface with pale lateral spots on anterior half of segments 3-8, where in *Chlorocypha consueta* (Karsch, 1899) and *C. cancellata* (Selys, 1879) they run the whole length of the segment, and where in most other species the whole surface is darkish.

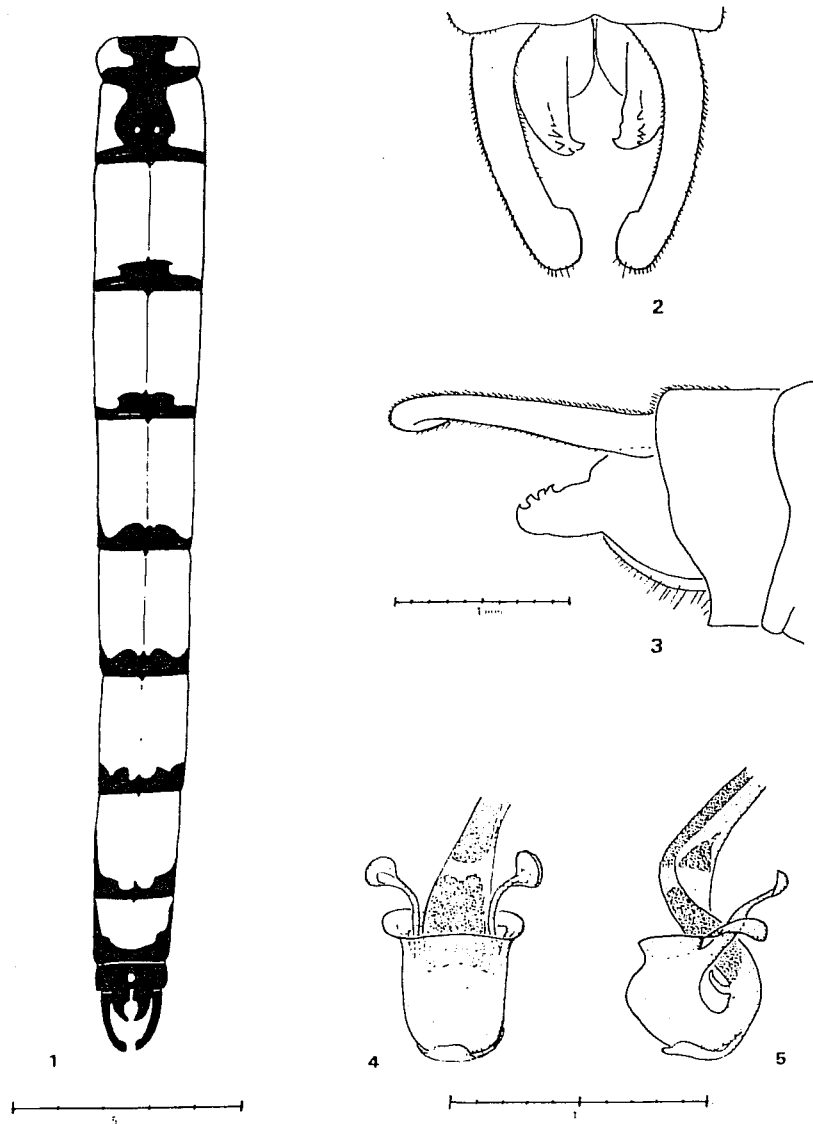
Wings: hyaline, with dark veins; nodal formula

22	16	15	23
	17	16	
20	15	14	
	18	17	19

origin of R₃ at 1st Px in left fore and right hindwing, between 1st and 2nd in the others; IR₂ at 5th Px; IR₃ at 8th Ax in left fore, at 6th in both right, and between 5th and 6th in left hind; quadrilateral with 2 crossveins (3 in right hind); pterostigma black, dark brown in centre, 2.8 x 0.5 mm in forewings, 2.9 x 0.6 in hind.

Accessory genitalia: prophallus (figs. 4, 5) with end lobe appearing bell-like in ventral view, with external apical branch short and tucked in at the sides, internal apical branch elongated and spatulate at extremity, not unlike the figure given by Pinhey (1967:166, fig. 2) for *C. consueta*.

Abdomen (excluding appendages) 21.5 mm, hindwing 28 mm.



Figs. 1-5. — *Chlorocypha centripunctata* sp. n., male: 1, abdomen, holotype; 2, appendages in dorsal view, teneral paratype; 3, ditto, right lateral; 4, prophallus in ventral view, holotype; 5, ditto, left lateral.

Three mature male paratypes from the same stream are marked almost identically with the holotype.

- | | | | | |
|-------|----|--|----|---|
| (i) | 20 | $\begin{matrix} 13 & 13 \\ 14 & 15 \end{matrix}$ | 21 | Pt. forewings 2.45 x 0.5 mm; hind 2.55 x 0.5; |
| | 17 | $\begin{matrix} 13 & 14 \\ 15 & 15 \end{matrix}$ | 15 | abd. (excl. app.) 20.5 mm; hw 27.5 mm. |
| (ii) | 23 | $\begin{matrix} 14 & 14 \\ 16 & 14 \end{matrix}$ | 23 | Pt. forewings 2.2 x 0.5 mm; hind 2.3 x 0.6; |
| | 19 | $\begin{matrix} 15 & 15 \\ 15 & 17 \end{matrix}$ | 19 | abd. (excl. app.) 20 mm; hw 27.5 mm. |
| (iii) | 23 | $\begin{matrix} 16 & 16 \\ 17 & 18 \end{matrix}$ | 23 | Pt. forewings 2.5 x 0.5 mm; hind 2.7 x 0.6 |
| | 21 | $\begin{matrix} 14 & 16 \\ 17 & 18 \end{matrix}$ | 20 | abd. (excl. app.) 20.5 mm; hw 27.5 mm. |

A teneral male has recently been received from Prof. J.T. Medler of Ife University, and is also included as a paratype.

The markings are exactly as in the holotype, but the mature red colours have not yet developed. On the head and thorax these are mostly yellowish grey, except for the genae and sides of mandibles, which are bright yellow. The anteclypeus is pale bluish grey. The pale spots on the frons are circular instead of semicircular, the anterior half having not yet become obscured and merged into the dark part. The red areas of the mature-coloured abdomen are here represented by a bluish grey, and segments 2-8 have the anterior margins marked with a narrow band of bright yellow. The pale marks on the ventral surface are also yellow. Nodal formula

16 $\begin{matrix} 13 & 13 \\ 15 & 14 \end{matrix}$ 16
14 $\begin{matrix} 13 & 15 \\ 13 & 16 \end{matrix}$ 15

pterostigma yellow, darkened at either extremity with close black stippling, 3.0 x 0.5 mm in all wings; abdomen (excl. app.) 19 mm; hind wings 27 mm.

Female unknown.

Holotype ♂, NIGERIA: Obudu Plateau, 6° 30' N., 9° 20' E., 20.xii.1961, author's collection.

Paratypes: (same locality,) 3♂, mature, 20-21.xii.1961; 1♂, teneral, (J.T. Medler), 25.iii.1971, author's collection.

Chlorocypha glauca (Selys)

Libellago glauca Selys, 1879.

Chlorocypha glauca (Selys); Fraser, 1941, 1949: 21, fig. 3.

Chlorocypha glauca (Selys); Pinhey, 1967: 166, fig. 10, 174, fig. 48.

Subsp. *Chlorocypha glauca radix* Longfield, 1959: 29, fig. 4.

Libellago rubida Selys, 1879 (nec *rubida* Hagen in Selys, 1853).

This species was originally described from three males from Mongo-ma Lobah, the old name for Mount Cameroon. I have been unable to trace any actual designation of any one of these three as holotype, but as the two in the British Museum (Nat. Hist.) (Mongo-ma Lobah Nos. 65 and 416) bear paratype labels, and that in the Brussels Museum (Mongo-ma Lobah No. 361) has a red label "Type", this is accepted and the Brussels specimen is here designated as **Lectotype**, and the other two as paratypes.

Miss Longfield (1959) described a lowland subspecies as *C.glauca radix*. With more material to hand than was available at the time of her description, the characters she used for its separation need slight revision. Our ideas of the distribution of the two forms also need modification. The nominotypical form, which she thought was confined to Mount Cameroon, is found throughout the Cameroons, low-lying as well as mountainous, and extends to the Congo. *C.glauca radix* is the subspecies found in Nigeria and the territories to the West.

Pinhey (1961) called attention to the fact that there were two colour forms of *C.glauca*, one with the first four abdominal segments pale blue or greenish and the last six red, and the other with five segments blue and five red. He has also kindly given particulars (personal communication) of the colours, markings, and localities of all his specimens. This shows that while the separation by colour does not coincide exactly with the division into the two subspecies, the great majority of the nominotypical form have five blue segments, whereas all known specimens of *C.glauca radix* have only four blue. Selys's original material is rather discoloured and it is not very obvious where the blue gives way to red, so authors have overlooked the five blue segments. However, careful reexamination of the British Museum paratypes in the light of Pinhey's observations shows that both of these had the fifth segment blue.

C.glauca radix was originally described from a male that I took at Ado-Ekiti, Ondo Province, West Nigeria, with paratypes from various West African countries in the British Museum Collection, where they had been lying mixed with two of Selys's original Cameroons specimens without the difference between the two forms being appreciated. The character most emphasised by Miss Longfield was that the two halves of the antehumeral stripe, completely and widely separated in *C.glauca glauca*, were here either joined ventrally to form the familiar "fish-hook" or else separated only narrowly. The black bollard markings on the 2nd abdominal segment, usually attached to the lateral and anterior as well as the posterior margin in *C.g.glauca*, are usually free laterally in *C.g.radix*. She also mentions without any special emphasis that the bollards, on segments 2 and 3 in *glauca*, extend to 4 and 5 in *radix*. Actually, this is the most constant feature separating the two forms.

She had not seen the female, so this was not described, but one was taken at the same time and place as the type and three other males. This is therefore described here as the **allotype**¹ of *radix*.

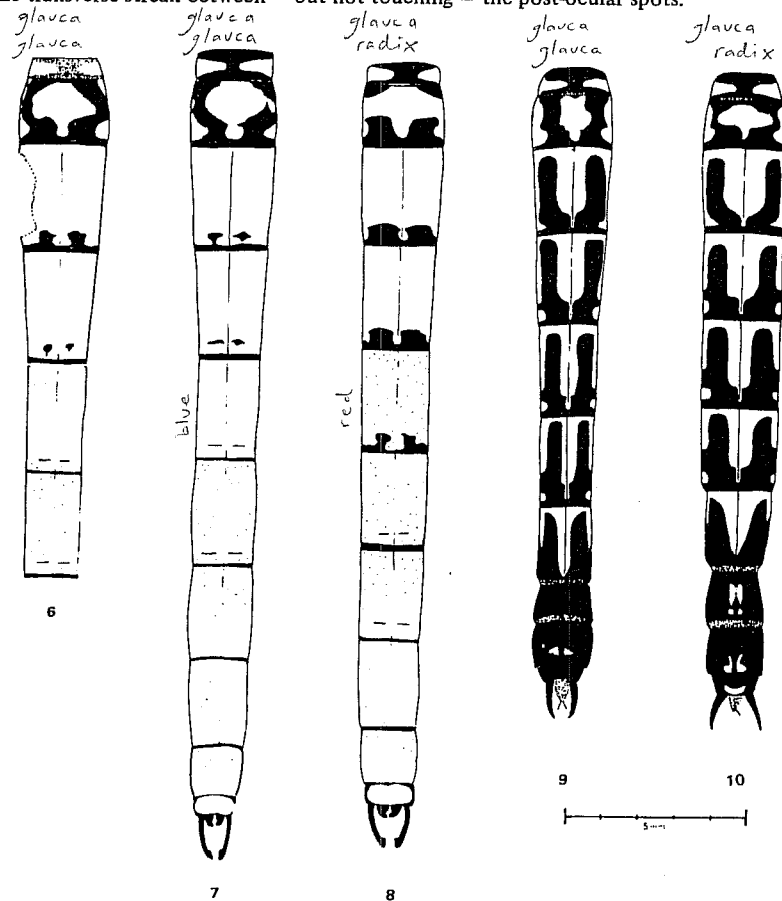
The female of *C.glauca* was not known to Selys. Pinhey (1967) briefly describes a female without mentioning the origin of his material or to which subspecies it belongs. A female taken flying with a typically marked *C.glauca glauca* male in the Cameroons is therefore described here as the **allotype**.

Chlorocypha glauca glauca (Selys, 1879)

Male (*lectotype*), — a brief redescription of the specimen in the Brussels Museum, salient features only.

¹The allotype category is not now recognised in the International Code of Zoological Nomenclature. — Eds.

Head black, except for four pale bluish spots on frons, the anteriors fused with the posteriors, pale cream-coloured marks beside and behind the vertex, fused behind with a pale transverse streak between — but not touching — the post-ocular spots.



Figs. 6-10. — *Chlorocypha glauca* (Selys): (in the male abdomen, the distinction between the blue and the red segments is indicated by light stippling of the latter); 6, subsp. *glauca*, male abdomen (lectotype); 7, subsp. *glauca*, abdomen of a more typically patterned male (Mamfe); 8, subsp. *radix*, abdomen of male (Ado-Ekiti); 9, subsp. *glauca*, abdomen of female (allotype); 10, subsp. *radix*, abdomen of female (allotype).

Thorax: two halves of antehumeral stripe completely separated, the black stripe between them dilated anteroventrally, thus accentuating the separation.

Abdomen: segments 1-4 pale blue with black markings as in fig. 6, (left-hand margin of 3 damaged by dermestids); 5 and 6 separated and reattached by glue, but presumably from the same specimen. They are red (unlike more typical specimens where 5 is blue); 7-10 are missing.

Hindwing 24.75 mm; abdomen 1-6 15 mm.

Female (allotype). — Head black, marked with brownish yellow as follows; — apical border of labrum and a pair of pale spots; dorsal border of anteclypeus, whole dorsal surface of postclypeus; genae, sides of mandibles; remaining pale head markings as in lectotype.

Thorax: the two halves of antehumeral stripe joined anteroventrally to form fish-hook, widely separated posterodorsally; lateral and metepimeral stripes. Hindwing 25.5 mm.

Abdomen yellowish brown, patterned with black as in fig. 9; length (excluding appendages) 17.5 mm.

Chlorocypha glauca radix Longfield, 1959

Miss Longfield (*loc. cit.*) gives a very full description of the holotype, and the salient features of the subspecies have been mentioned above, so nothing further is required here.

Female (allotype). Head and thoracic markings as in the female *C.g. glauca*, but a little more yellow laterally on anteclypeus, and none at dorsal border; two halves of antehumeral stripe joined anteroventrally, also posterodorsally, leaving the dark streak between them completely isolated. Hindwing 24.5 mm.

Abdomen yellowish brown, patterned with black as in fig. 9; length (excluding appendages) 17.5 mm.

In noninotypical *glauca* specimens tend to be slightly larger and more melanic than in the subspecies, although in the latter the males have black bollards as far back as segments 4 and 5, instead of 2 and 3. The length of the hindwing of *g. glauca* males is from 23-25 mm, (mean of nine specimens measured 24.4), and that of *g. radix* 23-24 mm (mean of 22 specimens 23.5). The amount of black marking in addition to the bollards on segment 2 is greater in *g. glauca*. On this segment the bollards are usually attached not only to the posterior margin but also the lateral and anterior black, thus enclosing (fig. 6) or nearly enclosing (fig. 7) a pale blue mushroom-shaped mark in the centre of the segment. In eleven specimens in which this was studied, eight had the mark completely enclosed and two had it almost so. In only one (from the Congo) was there no contact between the bollard and the anterior black. In *g. radix* (fig. 8), 22 specimens examined all had the pale blue unenclosed and stretching in a band right across the segment. None had any contact of the bollards with the anterior margin, and only six with the lateral, three of these on one side only and sometimes very tenuously. In males of *g. glauca* the melanism is sufficient to cause wide separation of the two halves of the antehumeral stripe (in all of eleven specimens especially examined for this point, and probably in the others also), while in 22 *g. radix* they were separated in twelve (sometimes widely, sometimes narrowly), separated merely by brownish discoloration in five, and completely joined in four. One had an inverted fish-hook, joined posterodorsally but not anteroventrally. In the two allotypes (the only females I have examined), the same difference in melanism is to be noted, *g. glauca* having these stripes joined anteroventrally, and *g. radix* joined at both ends, and the black of the abdominal segments is more extensive in *g. glauca*. Out of 26 male *g. glauca* (including eleven of Pinhey's from the Congo), 19 have the first five abdominal segments blue, and in a twentieth the fifth segment appears blue anteriorly and red

glauca: 55: 19: blue
radix: 11: blue

posteriorly. The remainder have only four segments blue. In 24 *g. radix* (including Pinhey's two), all have only four segments blue. One *g. glauca* lacks bollards even on segment 2. Of the remaining 25, all but four have bollards on 2 and 3 only, the others having them also on 4, but sometimes narrowly attached or on one side only. Of 24 *g. radix*, 21 have bollards as far as segment 5, the remaining three only as far as 4.

Material examined.

C. glauca glauca (Selys). *Holotype* ♂ (*lectotype*). CAMEROONS: Mongo-ma Lobah, 4° 12' N., 9° 10' E., no 361. Brussels Museum (Institut royal des Sciences naturelles de Belgique).

Paratypes: 2♂, same data as lectotype, nos 65 and 416. British Museum (Nat. Hist.). 1♀ (*allotype*). CAMEROONS: Mamfe, 5° 46' N.; 9° 17' E., 17.x.1962, author's collection.

Other material: 3♂, Mamfe, 5.i.1958, 17 & 19.x.1962, author's collection; 1♂ CAMEROONS: Tiko, 1.i.1913 (v.Rothkirch), Royal Scottish Museum; 1♂, CAMEROONS: Barombi Mbo, 20.iii.1970, Dr. S.A. Corbet's collection; 3♂ CONGO (ZAIRE): Bondo, Buta ii.1958 (E.C.G. Pinhey) British Museum, Nat. Hist. (Fraser Bequest); Information provided by Pinhey concerning 15♂, CAMEROONS, CONGO: in National Museum of Rhodesia, Bulawayo.

C. glauca radix Longfield. *Holotype* ♂, NIGERIA: Ado-Ekiti, 7° 37' N., 5° 14' E., 19.iii.54 (R.M.G.), British Museum (Nat. Hist.).

Paratypes: 9♂ from Ghana, Sierra Leone, and Nigeria, as detailed by Longfield (1959), British Museum (Nat. Hist.); 1♀ (*allotype*), same data as holotype, author's collection.

Other material. 3♂, same data as holotype and allotype, and 8♂, NIGERIA: Jemaa, 9° 30' N., 8° 23' E., various dates, author's collection; NIGERIA: Oshogbo, 7° 46' N., 4° 33' E., 1.iii.1913 (H. Strachan), British Museum (Nat. Hist.); Information provided by Pinhey concerning 1♂, GHANA; and 1♂, IVORY COAST: Issia, in National Museum of Rhodesia, Bulawayo.

Chlorocypha selysi (Karsch)

Libellago curta Selys, 1879, (nec *L. curta* Hagen in Selys, 1853).

Libellago curta Selys, 1879; Karsch, 1893.

Libellago selysi Karsch, 1899.

Libellago camerunensis Sjöstedt, 1899.

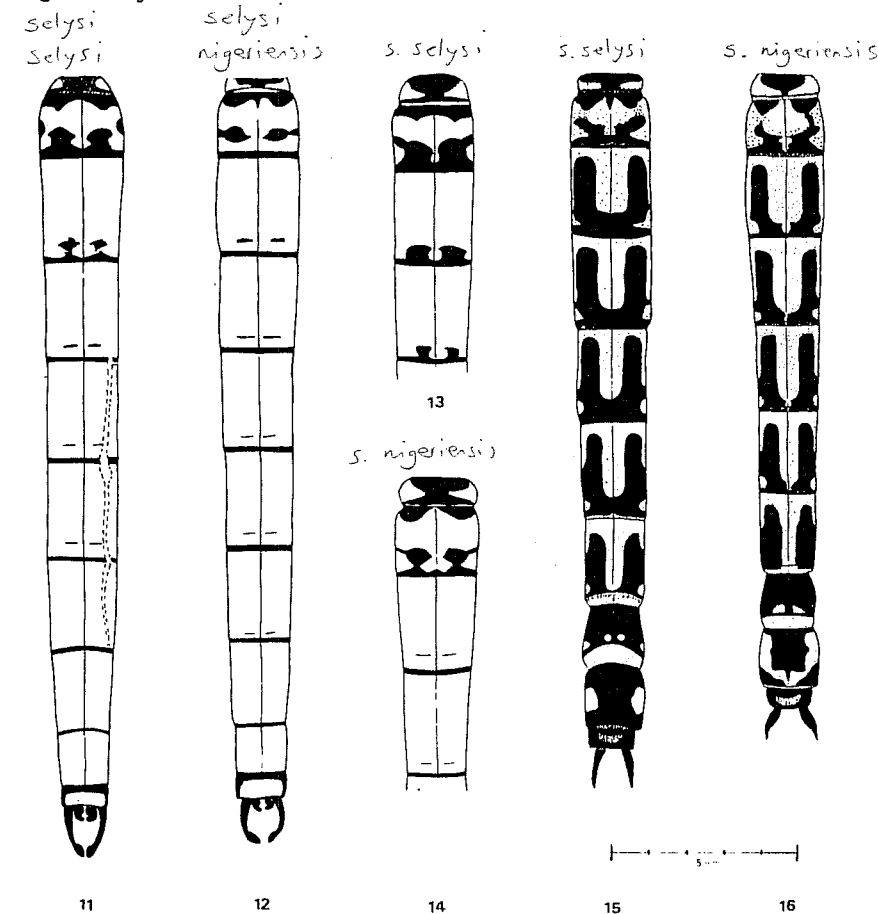
Chlorocypha selysi (Karsch); Longfield, 1936.

Chlorocypha selysi (Karsch); Fraser, 1941: 27, fig. 4.

Chlorocypha selysi (Karsch); Pinhey, 1967: 174, fig. 38.

Karsch (1899) proposed the name *selysi* for the species described by Selys (1879) as *Libellago curta*, which clearly differed from the true *L. curta* Hagen in Selys 1853 (see also Longfield, 1936). Pinhey (1967) has noted that *L. camerunensis* Sjöstedt, 1899, described from a single teneral female, now in the Stockholm Museum, is the same species as *selysi*. Karsch's paper appeared in June, 1899. Dr. W. Odelberg, Head Librarian of the Royal Swedish Academy of Science, (pers. comm.), tells me that although Sjöstedt's paper was communicated in March 1899 the publication date was between

July and December, thus confirming the priority of Karsch's name not only for this species, but also for *L. gracilis* which Pinhey has made a synonym of *L. grandis* Sjöstedt.



Figs. 11-16. — *Chlorocypha selysi* (Karsch): 11, subsp. *selysi*, abdomen of male (lectotype); 12, subsp. *nigeriensis*, male abdomen (holotype); 13, subsp. *selysi*, abd. 1-4 of a more heavily marked male (Mamfe); 14, subsp. *nigeriensis*, abd. 1-4 of an exceptionally heavily marked male (Jemaa); 15, subsp. *selysi*, abdomen of female (allolectotype); 16, subsp. *nigeriensis*, abdomen of female (allotype).

The specimens described as *Libellago curta* by Selys in 1879 consisted of three males from Mongo-ma Lobah (Mt. Cameroon). Two of these, labelled "♂ très adulte, Mongo-ma Lobah no 929" and "♂ adulte, Mongo-ma Lobah no 417" are in the British Museum (McLachlan Collection), and the third,

labelled "♂ adute" (sic) "Mongo-ma Lobah no 933" is in the Brussels Museum. Selys also included a number of other specimens rather more tentatively attributed to this species; "un exemplaire un peu plus grand et semi-adulte de Camaroons parait y appartenir" (B.M., labelled "Camaroons" in McLachlan's handwriting); "enfin j'y rapporte comme jeunes trois males de Camaroons" (one in B.M., "Camaroons" in McLachlan's hand, so presumably the other two are in Brussels); "je rapporte a cette espèce trois femelles de Camaroons, et une de Mongo-ma" (the latter is in the B.M., Mongo-ma Lobah no 930, and two of the former, so presumably the third is in Brussels).

The male, Mongo-ma Lobah no 929, from the British Museum is here chosen as the *lectotype*, being the most mature and most typically marked of the original specimens, although even this is not as fully developed as Selys implies. The other two M.-m.L. Nos. 417 and 933 become paratypes. As far as can be seen, Selys's females appear to be correctly attributed to this species, so the M.-m.L. female No. 930, — in good condition, and the only one from the type-locality, — becomes the *allotype*.

In typical *C.selysi* from the Cameroons, of which I have examined 40 males, and two others from Fernando Po, the bollards are always attached to the posterior margin in segment 2 (except in one very immature specimen), usually so on segment 3, and often also on segment 4 (figs. 11, 13). In Nigerian material, nine males in my own collection, two in the British Museum, and at least eleven others examined, only one has these markings attached in segment 2, and these only very lightly (figs. 12, 14). There is no attachment in any of the other segments. These are here described as a new subspecies. Specimens have been found in all months of the year except June to September, so the material should show no bias towards especially young age-groups to account for the lightness of the markings.

Nominotypical females tend in general to be more melanic than those of the subspecies. The Mongo-ma Lobah female, although very immature, shows more darkening than the almost fully mature *allotype* of *C.s.nigeriensis*. However, colour and pattern are variable, and it would be difficult to separate the two females on markings alone, so the males with which they are associated would be a surer guide.

Chlorocypha selysi selysi (Karsch, 1899)

Male (lectotype), — a brief redescription of the male in the British Museum (Nat. Hist.), Mongo-ma Lobah No. 929.

Head: black except for the following:— labrum, anteclypeus, sides of mandibles, genae, pale bluish green or grey; four pale blue spots on frons, the anterior pair half-fused with the posterior; yellowish streaks lateral to vertex; post-ocular spots and a separate transverse streak between them also yellowish.

Thorax black, antehumeral stripes almost obliterated, but had apparently been in the form of fish-hooks, lateral and metepimeral stripes a little clearer and pinkish or reddish brown; legs black.

Abdomen red, with black markings as in fig. 11; (segments 5, 6, and 7 are slightly split dorsally); appendages black.

Hindwing 22.5 mm. (pterostigma 2.5 mm in forewing, 2.6 in hind); abdomen (excluding appendages) 19 mm.

Female (allolectotype). Mongo-ma Lobah No. 930 in British Museum (Nat. Hist.). Immature, with pterostigma still all white except at extreme base.

Head: labrum pale greyish; anteclypeus pale brownish in centre, pale greyish at edges; other pale marks as in *lectotype*, but all yellowish.

Thorax black with pale yellowish brown stripes; antehumerals in the form of fish-hooks, the dark stripe separating the two halves slender and broken halfway along its length; lateral and metepimeral stripes shown clearly; legs all black.

Abdomen yellowish brown marked with black as in fig. 15.

Hindwing 24 mm (pt 2.6 in all wings); abdomen (excl. app.) 17.5 mm.

Chlorocypha selysi nigeriensis subsp.n.

Male (holotype). Head: labrum and anteclypeus pale whitish blue, (the latter with an irregular brown transverse streak close to its border with the labrum); postclypeus black; genae and sides of mandibles bluish white; frons and vertex varying from black to dark brown, pale marks as in *C.s.selysi*, but spots on frons dull greyish blue, and the yellowish brown streaks beside the vertex joined to the transverse streak between the post-ocular spots.

Thorax black with yellowish brown antehumeral stripes forming fish-hooks, lateral and metepimeral stripes; legs black.

Abdomen red, marked with black as in fig. 12.

Hindwing 24 mm (pt 2.5 mm in all wings); abdomen (excl. app.) 20 mm.

Taken over a stream in forest near Jemaa (2000 ft), 20.i.1957.

Female (allotype). Head: labrum and anteclypeus pale yellowish brown; postclypeus and frons dull ochreous brown; vertex and occiput black with yellowish streaks beside and behind vertex almost but not quite touching the pale post-ocular spots.

Thorax black with yellow antehumeral stripes (fish-hooks), the dark stripes separating the two halves slender, that on the right broken in two at its middle; black humeral stripe broken into three parts by encroachment from the fish-hooks, which cross the humeral suture in the middle; a complete black stripe separating the pale lateral and metepimeral stripes; legs with femora black above, yellowish brown beneath; tibiae and tarsi all black.

Abdomen dull greyish brown, marked with black as in fig. 16.

Hindwing 25.5 mm (pt 2.7 in all wings); abdomen (excl. app.) 18 mm.

Taken 26.ii.1961, over same stream as holotype.

Material examined.

C.selysi selysi (Karsch). *Holotype* ♂ (*lectotype*). CAMEROONS: Mongo-ma Lobah No. 929, British Museum (Nat. Hist.).

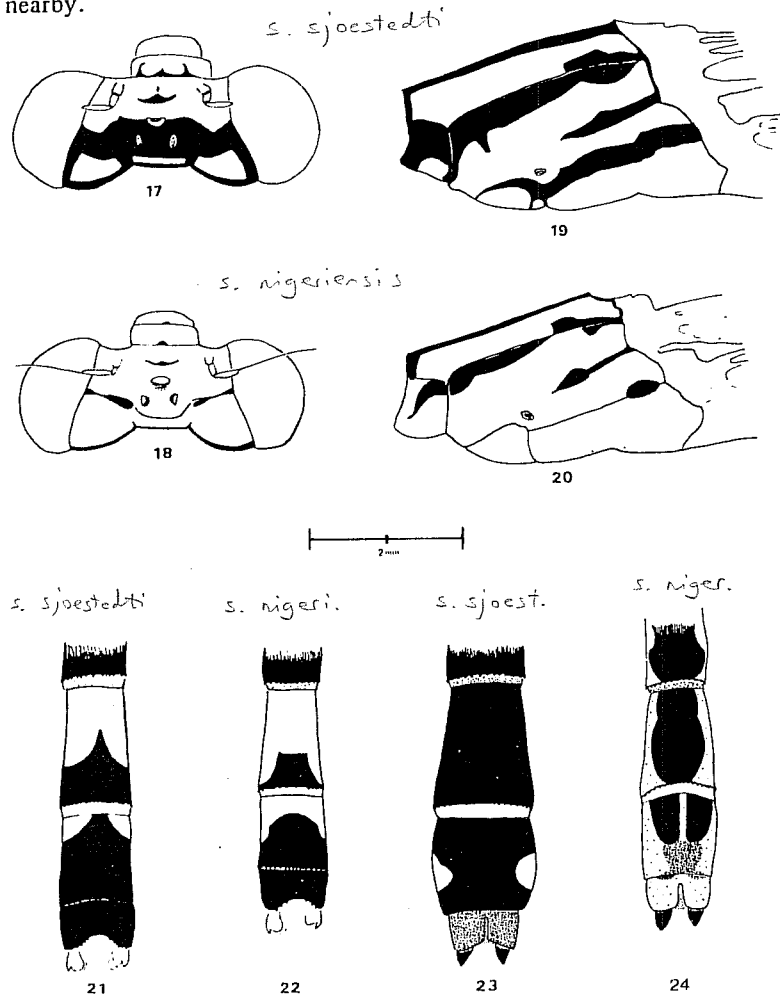
Paratypes: 1♂, same data as *lectotype*, No. 933, Brussels Museum; 1♂ No. 417, 1♀ (*allolectotype*) No. 930, same data, British Museum (Nat. Hist.); CAMEROONS (no precise locality), 2♂ 2♀, British Museum, Nat. Hist. (McLachlan Collection). Three further specimens from the Cameroons mentioned as part of Selys's original series, 2♂ 1♀, probably ex-McLachlan, have not been examined, but are presumed to be in Brussels.

Other material. 2♂ 1♀ (*in cop.*), CAMEROONS: between Mamfe and Widekum, i.1958 and x.1962, author's collection. 7♂, CAMEROONS: 6 from Barombi Mbo, 20.iii.1970, 1 from Kumba 24.iii.1970, Dr. S.A. Corbet's collection; 2♂, CAMEROONS: Ekona, 23.vi and 17.vii.1926 (M.E. Fontaine), Royal Scottish Museum; 2♂, FERNANDO PO: Fishtown, and Santa Isabel, British Museum (Nat. Hist.).

C.selysi nigeriensis subsp. n. *Holotype* ♂, NIGERIA: Jemaa, 9° 30' N., 8° 23' E., 20.i.1957, author's collection.

Paratypes: 2♂ NIGERIA: Ilesha, 7° 37' N., 4° 46' E., (L.E.H. Humfrey), British Museum (Nat. Hist.): 1♀ (*allotype*) same locality as holotype, 26.ii.1961, author's collection; 8♂, 2♀ NIGERIA: Jemaa, Wamba, and Jal, various dates, author's collection.

Other material. At least 11 other males examined from the above localities or nearby.



Figs. 17-24. — *Pseudagrion sjoestedti* Förster: 17, subsp. *sjoestedti*, head of male (Mamfe); 18, subsp. *nigeriensis*, head of male, (Jemaa); 19, subsp. *sjoestedti*, left lateral view of thorax, male (Mamfe); 20, subsp. *nigeriensis*, ditto, male (Jemaa); 21, abd. 8-10 *sjoestedti*, male (Mamfe); 22, ditto, *nigeriensis*, male (holotype); 23, ditto, *sjoestedti*, female (*allotype*); 24, ditto, *nigeriensis*, female (*allotype*).

Pseudagrion sjoestedti Förster

Pseudagrion sjoestedti Förster, 1906.

Pseudagrion sjoestedti Förster; Ris, 1920 (part); Ris, 1936 (part).

Pseudagrion massaicum Schmidt, 1951 (nec Sjöstedt), (part).

Pseudagrion sjoestedti Förster; Pinhey, 1967.

As with the two species of *Chlorocypha* discussed above, *Pseudagrion sjoestedti* also has its Nigerian subspecies, and many others in the eastern and southern parts of its range, from Uganda to Rhodesia (Pinhey, 1964). Pinhey mentions and briefly describes the Nigerian form from a single male that I sent him, but by a misunderstanding he thought that it was only known from the Assob Falls at the foot of the escarpment in Plateau Province, and preferred not to give it a name until a wider range of material was available for examination. Actually it is widespread through Nigeria. Both sexes of the subspecies are here described as *P.sjoestedti nigeriensis*, and as there has been no description yet published of the female of the nominotypical form, a female which I took in the Cameroons, occurring in the company of typical males is here described as the *allotype* of *P.sjoestedti sjoestedti*.

Pseudagrion sjoestedti sjoestedti Förster, 1906

Male (figs. 17, 19, 21). Pinhey (1964) has given a good description of the nominotypical male, based — unlike most previous accounts — on material taken reasonably near the type locality, so nothing further is required here.

Female (allotype). Head: labrum and anteclypeus pale orange-brown; postclypeus black; frons pale brownish orange with black anchor-shaped mark between antennal bases; remainder of head black from level of median ocellus backwards, apart from a transverse orange stripe between and just separated from the post-ocular spots, which are quadrate, curved, and orange-brown.

Prothorax: anterior lobe dull yellow; median lobe with black M-shaped mark dorsally; posterior lobe and stylets yellow, the latter slender, divergent, with blunt points tipped with black, lying on either side of the M; the base of the M continued lateral to the stylets, curved round anterolaterally to meet the anterior lobe close to the top of the M, the whole forming a spectacle-shaped mark.

Pterothorax dull yellow marked with black as follows: — moderately wide median stripe, same width as humeral stripes, bifurcating posteriorly along the anterior margins of the antealar sinuses (which are bordered with black but pale in the centre), and surmounted anteriorly by a pair of pale yellow spots separating the stripe from the deep black spiracular grooves behind the mesostigmal lamina; humeral stripes complete, with a dilatation at the posterior end overflowing on to the mesepisterna and extending about one quarter the way towards the median stripe; a short dark stripe along the upper part of the obsolete 1st lateral suture, extending two thirds the distance towards the metastigma; a longer stripe along the 2nd lateral suture, extending as far as the metinfraepisternum.

Legs: femora striped with black on extensor surface, pale on flexor; tibiae pale on extensor surface, streaked narrowly with black on flexor; tarsi pale.

Abdomen: 2nd segment with black thistle-shaped mark filling most of dorsal surface; remainder black dorsally, brown laterally and ventrally, dorsal surface with the following pale marks: — narrow annular markings at anterior margins of 3-7, divided mid-dorsally on 3, complete in the others but more faintly marked; 7-10 marked as in fig. 23, the lateral spots on 9 being orange-yellow; appendages black short and pointed, 0.2 mm wide at base, 0.23 mm long.

Wings: 15 and 14 postnodals in left and right forewings respectively, 11 and 12 in

hind; origin of R₃ slightly proximal to 7th Px in forewings, and to 6th in hind; of IR₂ at 10th in forewings, 9th and 10th in hind; Ac distal to origin of 1A in forewings (anal rudiment approximately same length as Ac), at origin in hind; pterostigma pale brown, 0.8 x 0.5 mm in forewings, 0.9 x 0.5 in hind.

Length of hindwing, 23.5 mm, abdomen 30.5 mm.

Pseudagrion sjoestedti nigeriensis subsp. n.

Male (holotype). Head: labrum, clypeus, frons, vertex, and eyes deep orange in the dried specimen (red in life), with scarcely any dark markings; post-ocular spots very large, occupying whole dorsum of occiput, yellowish green bordered with a thin black line anteriorly, posteriorly and laterally (fig. 18).

Prothorax: anterior lobe orange-yellow, posterior lobe greenish, median lobe grading from the one colour to the other, with a thin broken M-shaped mark mid-dorsally.

Pterothorax yellowish green in life, now with a slight orange tinge, marked with black as in fig. 20; antearalar sinus yellowish green, lightly outlined in black; legs with femora black on extensor surface, pale on flexor; tibiae and tarsi pale on both.

Abdomen green, marked with black dorsally; 2nd segment, dorsum almost wholly filled with a black mark enclosing a pale longitudinal streak, and with a pale complete annulus posteriorly, tinged with orange; 3-6 with greenish annulus anteriorly, and an interrupted one, tinged with orange, posteriorly; 7 with anterior annulus only; 8-9 dull greenish in the holotype, but blue in the other specimens, black marks in the posterior part of these segments less extensive than in *P.sjoestedti sjoestedti*, and shaped differently (fig. 22); appendages generally similar in shape to those of the nominotypical form.

Wings: 11 Px in left forewing, 12 in right, 10 and 9 in hind; origin of R₃ at 5th Px in forewings, just before 5th and at 4th in hind; of IR₂ at 8th and 9th Px in forewings, 7th in hind; and of 1A proximal to Ac in forewings (anal rudiment same length as Ac), at Ac in hind; pterostigma orange-brown, 0.6 x 0.4 mm in forewings, 0.7 x 0.4 in hind.

Hindwing 18.5 mm; abdomen (excluding appendages) 28 mm.

Taken in tandem with female allotype, lower Assob River, near Jemaa, (1900 ft.)

Female (allotype). Head: labrum, anteclypeus pale ochreous; postclypeus, frons, vertex, and occiput pale brown, eyes yellowish brown; post-ocular spots as in holotype.

Prothorax pale yellowish brown, with slender divergent stylets tipped with black, faint shadow of M-shaped mark between them.

Pterothorax pale yellowish brown, spiracular groove black; black stripes shaped as in holotype, but much narrower; legs as in holotype, but black lines finer.

Abdomen pale yellowish brown, becoming slightly darker towards the posterior segments, with dorsal black marks as follows: 2nd segment with narrow elongated thistle-shaped mark reaching anterior margin, occupying only the central third of the segment's width; 3-7 with similar marks but pointed anteriorly and not quite reaching anterior margin, becoming progressively wider on each segment until on the 7th it occupies practically the whole width of the dorsal surface; 8-10 patterned as in fig. 24; appendages pale brown, short, and pointed, 0.18 mm wide at base, and 0.23 mm long.

Wings: 11 Px in forewing, 9 in hind; origin of R₃ at 5th Px in forewing, 4th in hind; of IR₂ at 8th forewing, 7th in hind; of 1A proximal to Ac in forewing, at it in hind; pterostigma pale ochreous brown, 0.75 x 0.4 mm in forewing, 0.8 x 0.4 in hind.

Hindwing 18 mm; abdomen 25 mm.

Taken in tandem with holotype.

The new subspecies differs from the nominotypical form chiefly by its smaller size, reduced melanism, and generally paler colour. In the male the red colour is confined to the eyes and anterior part of the head. The occiput and pale parts of the thorax are green, sometimes tinged with yellow, but never red. In sub-species *sjoestedti* all these parts except the metepimeron,

are deep red. The males of the two forms can also be readily told apart by the more extensive pale blue areas on abdominal segments 8 and 9 in subspecies *nigeriensis* (figs. 21, 22), and by the very much abbreviated stripe (almost a spot) on the 2nd lateral suture of the thorax (figs. 19, 20). Eight males of *P.sjoestedti* examined had the hind-wing varying from 20.5-22.5 mm (mean 21.6) and the abdomen 31-34 mm (mean 32.7). Sixteen males of *P.s.nigeriensis* had the hindwing 17.5-20 mm (mean 18.65) and the abdomen 26-30.5 mm (mean 27.6).

The female *nigeriensis* differs from the nominotypical form by the dark marks on segment 9, a pair of dark longitudinal marks on the anterior part of the segment similar to those in the female of *P.glaucescens* Selys, 1876, and usually a darkish central patch in the posterior part meeting the two anterior marks, but this is sometimes absent. The general appearance is much more like a small specimen of *glaucescens* (from which it can be distinguished by the thoracic stylets being divergent instead of parallel, and by the posterior mark on the 9th segment, when present). It is unlikely to be confused with the nominotypical form, where in addition to the larger size, and the full length of the stripe on the 2nd lateral suture of the thorax, the anterior black marks on abdominal segment 9 have fused with the posterior mark and the whole complex expanded until no pale colour remains visible dorsally except the two lateral spots (figs. 23, 24).

Specimens of *nigeriensis* have been examined from various Nigerian localities as detailed below, also from Gashaka, formerly in the Cameroons, but now part of the North-East state of Nigeria. These localities drain into the Benue, where a fauna of the Nigerian type might be expected. There is also a male from Ghana in the British Museum Collection which appears to be *nigeriensis*.

Material examined.

P.sjoestedti sjoestedti Förster. *Allotype* ♀. CAMEROONS: 30 m. E. of Mamfe, 6.x.1962, author's collection.

Other material. 1♂, NIGERIA: Ajassor, 5° 50' N., 8° 50' E., 5.x.1962. author's collection; 7♂, CAMEROONS: Mamfe, and 30 m E. and W., heights 400-1200 ft, 6-19.x.1962, 6 in author's collection, 1 given to British Museum (Nat. Hist.).

P.sjoestedti nigeriensis subsp. n. *Holotype* ♂ in tandem with *allotype* ♀, NIGERIA: Jemaa, 26.ii.1961, author's collection.

Paratypes: 13♂, NIGERIA: Jemaa, 12.iii.1961, 8.iv.1962; Assob Falls, 9° 31' N., 8° 37' E., 30.xii.1956, 10.i.1960; Badeggi, 17.iv.1957; Wuya, 19.xi.1962; Lafia, 21.x.1962; 30 m. N. of Makurdi, 3.iii.1956; 2♀, Badeggi, 17.iv.1957; Dogon Kurmi, 26.ii.1961; author's collection; 2♂, Zungeru, 16-18.xi.1910, (J.W.S. Macfie), British Museum (Nat. Hist.); 1♂, 1♀, Kainji, 16.viii.1970, Zugurma, 11.viii.1970 (P.H. Ward), British Museum (Nat. Hist.); 1♂, Ogoja, 6° 40' N., 8° 42' E., (R.W. Meyer's Collection); 1♀, CAMEROONS: Gashaka, 7° 52' N., 11° 28' E., 26.iii.1970, (J.T. Medler), author's collection.

One of the Assob paratypes was sent to Dr. Pinhey, at Bulawayo; and one of those from Lafia was presented to the Ann Arbor Museum, Michigan,

where Förster's type of the nominotypical *sjoestedti* is housed.

The holotype of *Chlorocypha centripunctata*, both types of *C. selysi nigeriensis* and *P. sjoestedti nigeriensis*, and the allotypes of *C. glauca glauca*, *C. glauca radix*, and *P. sjoestedti sjoestedti* are at present in my own collection, and will be bequeathed to the British Museum (Nat. Hist.).

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Windings, Whitchurch Hill, Reading.
Formerly of Veterinary Research Department, Vom, Nigeria.
May 5th, 1973.

[Since this article was completed, but prior to its publication, Dr. M.A. Liefstinck (1973) has published a paper entitled "*Chlorocypha pavonis* spec. nov., a new chlorocyphid dragonfly from West Africa (Odonata)", *Ent. Ber.*,

Amst., 33(2):32-7. His new species, the type of which is a male from Togo in the Berlin Museum, described and figured by Karsch (1893) as *Libellago rubida* Selys, appears to be identical with *Chlorocypha glauca radix* Longfield, 1959. Liefstinck compares it with another Berlin specimen, this time from Barombi, Cameroon, also recorded by Karsch (1891, *Ent. Nachr.*, 17:65-81) as *rubida*, but which is in fact *C. glauca glauca*. The synonymy of Karsch's specimens had been overlooked by all authors prior to Dr. Liefstinck's paper, and I am grateful to him for pointing it out to me. R.M.G., 3.x.74.]

Wing loss in Aneurus laevis (F.) (Hem., Aneuridae). – While collecting in mixed oak/hornbeam woodland at Yorklets, near Whitstable, Kent (TR 093629) on 5th January, 1964, I discovered abundant *Aneurus* under the bark of a dead oak. The tree was about 30 cms in diameter and although the sub-cortical cavity was very dry there were extensive patches of white fungal mycelia on the wood in places. Examination of the barkbugs with a hand lens showed that they were mostly typical *A. laevis* (F.), but that some of the females appeared to be apterous. A group of individuals, including two wingless ones, was taken and examined under the binocular microscope, when the atypical specimens were seen to be not truly apterous, but to have lost their wings in the adult stage. The fore-wings are broken off at about the level of the apex of the scutellum, while the hind-wings are torn off diagonally about a scutellum length beyond this.

It is hard to see how these injuries could have occurred to several individuals. Predators are most unlikely to attack the wings first as they are closely adpressed to the abdominal tergites in *Aneurus*. Possibly the wings, which are very delicate, became stuck to a surface dorsal to the bugs while they were resting in a narrow crevice. Adhesion could have been due to condensation, sap or fungal secretions. The same liquid might have flowed by capillarity between all four wings, producing on drying a single unit. This condition is often encountered in preserved specimens which have been wetted. In these circumstances the legs could still gain purchase on the opposed surface so the insects might escape but at the expense of the wings. These organs were certainly not damaged during the last moult as the remaining stumps are perfectly formed and show clear torn edges. Although several more specimens showing similar mutilation were noted but not collected on this occasion, I have not since encountered the phenomenon at this or any other locality.

It is worth noting that *A. laevis*, which was often abundant at the Yorklets locality from 1962–1965, and *A. aventus* (Dufour), seen regularly during that period, were not encountered for several years afterwards despite regular collecting. Only in 1974 has one of them, *A. laevis*, been rediscovered. I do not think that this can be related to changes in availability of habitat and the change in abundance seems too marked to be a subjective impression. – HARRY K. KENWARD, Unit for Environmental Research in Archaeology, York Archaeological Trust, 47 Aldwark, York: *August 5th, 1974.*

Occurrence of Baetis atrebatinus (Etn.) (Ephemeroptera) in a river in South West Wales. – On April 3rd, 1974, nymphs of *Baetis atrebatinus* (Etn.) were collected with other baetid species from marginal vegetation of the River Teifi at Pont Gogoyan, four miles south-west of Tregaron, Cardiganshire (Grid Ref: SN(22)642544).

These nymphs, the mouth parts of which are particularly distinctive, were identified using Macan (1970, *Scient. Publ. Freshwat. biol. Ass.*, 20). The species is recorded by Kimmins (1954, *Scient. Publ. Freshwat. biol. Ass.*, 15:65) as scarce or local in alkaline rivers and streams, and although widely distributed in Ireland, has only been definitely recorded from Hampshire and neighbouring counties (Macan, *op.cit.*:39,58). – R.A. JENKINS, Welsh National Water Development Authority, South West Wales River Division, Penyfai House, 19 Penyfai Lane, Furnace, Llanelli, Carm. SA15 4EL: *May 9th, 1974.*