

any other suitable pupation material. The mature larvae will leave the tube to pupate in the material supplied. If no such provision for pupation is made in time the larvae will invariably die of suffocation before pupation due to excessive moisture produced by the larvae in the prepupal stage.

Many generations of each species have so far been reared as described above and it would appear that the medium adequately fulfills the nutritional requirements of them. In general the larvae differ in colour from those collected in the field being a few shades lighter and seemingly more transparent. Different phases specially in *S. eximpta* and *S. exigua*, however, show up clearly. The adults, when compared with field material, are more often than not larger and more robust. Egg laying and fertility is considered to be normal for caged individuals. At no time was difficulty experienced in rapidly increasing the size of the colony if so desired. An encouraging feature is the fact that the larvae reared on this artificial diet did not become diseased although the laboratory was contaminated with larval disease. This is most likely due to the fact that the larvae are exposed to the laboratory atmosphere for only a few hours between hatching and the transfer to the stoppered rearing tubes and the short period between prepupal stage and pupation.

Probably the greatest advantage obtained by rearing these insects as described lies in the fact that one is no longer dependent upon the availability of natural food plants and is thus assured of larvae as and when required. Furthermore, although the preparation of the rearing medium might take some time, no further attention need be given to the larvae until they reach the prepupal stage.

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African Chlorocyphidae (Odonata)

by

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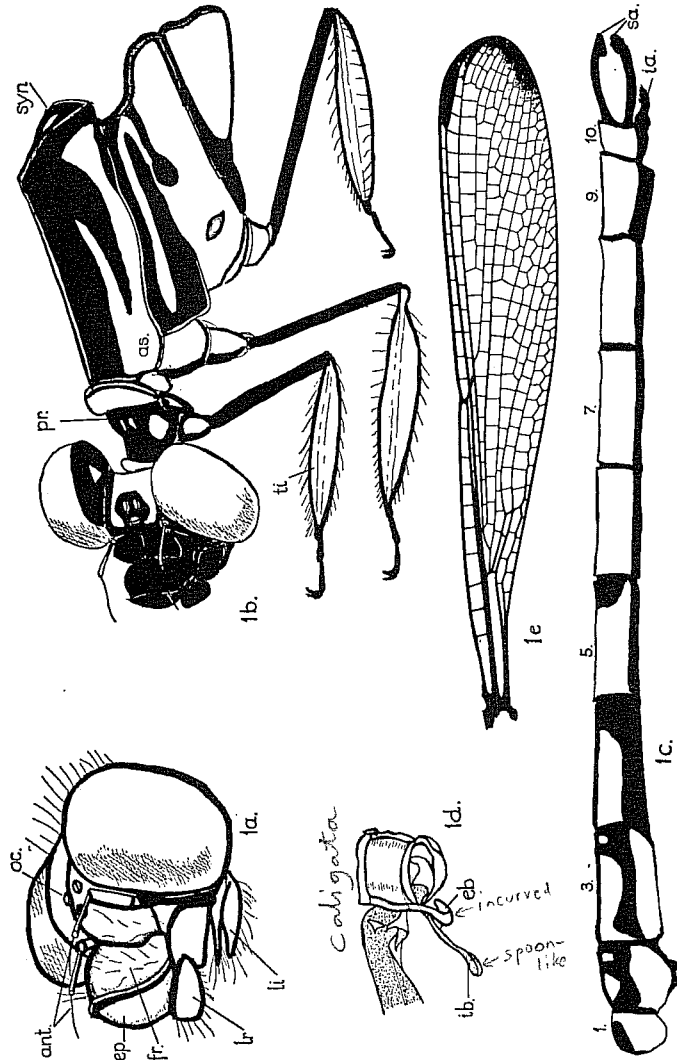
INTRODUCTION

The Chlorocyphidae are easily recognized as a family. Unlike other Zygoptera so far recorded in Africa, they have a short thick body and a characteristic snout-like epistome. The wings are narrow, petiolate and have an elongate pterostigma. References and diagnoses are detailed in the author's Catalogue (1962a). The family is well represented in tropical Asia.

The African species of this family were revised by Fraser (1949 and 1950) who placed them in two genera, *Chlorocypha* Fraser, s.s. and *Platycypha* Fraser. Previous to 1934 the species formed part of the genus *Libellago* Sclys.

There has been much uncertainty in the past in the recognition of some of the species, particularly the *dispar*- and *rubida*-groups and of a few species described solely from females (Pinhey, 1963: 149). The present paper is given in an attempt to clear up some of these difficulties and to provide the means of distinguishing the species. During the author's visit to Europe in 1964 it was possible to examine collections and especially types of many of the species and the present revision would not have been possible without the ready assistance of the entomologists in charge of the material. Special acknowledgement must be made in connection with this family to Messrs D. E. Kimmins and R. M. Gambles for information and Mlle S. Kerner Pillault for the loan of specimens.

Apart from the necessity of examining types it has been realized for many years that some of the confusion is due to maturation changes in colour and markings in species in which the male has a red abdomen, rather than to extensive variation. This particularly applies to the development of black markings on head and thorax and on the base of the abdomen during maturation of the male (and to a lesser extent of the female). This blackening is not usually a melanotic phase but a normal process of maturing. Thus, the blue, green, red or yellow markings on the head, thorax and abdomen gradually diminish in some of the red species and the ultimate norm may, in species such as *C. dispar* (Beauvois) or *C. grandis* (Sjöstedt) be a very dark species. In the *rubida*-group there is often a marked change in the black pattern on abdominal segment 2. The dorsal head markings in this group may also alter from a condition with extensive large blue areas to a reduced colour pattern, and it is still not clear how extensive this change may be in one or two species, such as *C. rubida* (Hagen) itself. It is also possible that certain chlorocyphids here recorded as species may in fact represent subspecies: for instance *C. wittei* Fraser may be a subspecies of *C. victorinae* (Förster) and *C. frigida* Pinhey is, perhaps, a southern race of *C. selysi* (Karsch). *C. hasta* Pinhey is regarded



in this paper as a subspecies of *C. molindica* Fraser and other close relationships have been found. Another peculiar feature is the apparent colour variability in certain of the species of which the male has a bicoloured red and blue abdomen as well as in the more sombre species *C. neptunus* (Sjöstedt).

One feature which has been rather conspicuously ignored in the African species is the penial structure. Cowley (1937) made a preliminary survey of this aspect for African and Oriental species and showed that in *Chlorocypha* and related genera the penis has two apical branches, an inner slender branch directed towards the head and an external branch tending to point in the opposite direction. As indicated below the Ethiopian species can be conveniently placed in three genera, *Chlorocypha* Fraser, *Platycypha* Fraser and *Africoocypha* Pinhey. The present survey refers to species of the African mainland, south of the Tropic of Cancer, since no species of the family have been found in palaeartic Africa and the dubious records of *Libellago* from Madagascar are here regarded as incorrect (Pinhey, 1962a: 151).

PENEAL LOBE: The penes of nearly all the African species have been examined and some of them are figured in this revision. All of them show close similarities and have the two apical branches as shown by Cowley. In *Platycypha* the appearance is remarkably uniform as shown in fig. 1d. Here the inner branch is slender, ending in a shallow spoon or cup, the thick outer branch is rather short, incurved. A very similar condition is found in many *Chlorocypha*, such as *consueta* (Karsch), *cyanifrons* (Selys), *aphrodite* (Le Roi), *frigida*, *glauca* (Selys), *ghesquieri* Fraser, *jacksoni* Pinhey, *molindica*, *rubida* (Hagen), *selysi*, *seydeli* Fraser, *tenius* Longfield, *trifaria* (Karsch) and *victoriae*. This might add weight to the suggestion that *Platycypha* is no more than a subgenus. On the other hand a few of the other *Chlorocypha* are distinctive enough and it is inadvisable to split up the genus on the penial structure alone. In *C. hintzii* (Grünberg) and the closely allied *C. cancellata* (Selys) the inner branch is entirely filamentous, not lobed at the apex. Combined with the peculiar thoracic marking these might be separable as a subgroup. Other species approach the "Platycypha" condition, *C. dahli* Fraser having the external branch short, whilst in *C. curta* (Hagen) and *C. willei* this branch is longer than normal.

In *C. dispar* the inner branch has only a small apical lobe, as is the case in *C. schmidti* spec. nov. which has a more truncate external branch. In *C. neptunus* the inner branch ends in a "spoon" but the external branch has a rather pointed apex. The most abnormal species is *C. grandis* which is in body shape and markings

EXPLANATION OF FIGURES

Fig. 1a-e. *Platycypha caligata* (Selys), male.

1a. head from left; ant. antenna; ep. front of epistome; fr. frons; lr. labrum; oc. ocelli. 1b. Head and thorax from left; as. antehumeral stripe (fishhook pattern); pr. prothorax; syn. synthorax; ti. expanded tibia. 1c. Abdomen from left; 1-10 segments, i.a. inferior appendage, s.a. superior appendage. 1d. Penial lobe from left. (Cape Maclear, Malawi); eb. external apical branch; ib. interior apical branch. 1e. Right forewing.

rather close to *C. molindica*, but the inner branch of the peneal lobe ends in a shoe-like scoop and the external branch is short, incurved. Lastly, *Africocypha greyi* Pinhey has the inner branch ending in a small lobe, but the external branch is very short and much less developed than in most African chlorocyphids.

♀-GENITALIA: The form of the ovipositor and sheath are illustrated for *C. consuela* (fig. 55b). The bursae show some morphological differences but without apparent generic or subgeneric grouping. Thus, *Platycypha picta* (Pinhey) and *P. rufitibia lucalaensis* Pinhey are closely similar but show little affinity to the bursae of other *Platycypha* species. *P. auripes* (Förster) is more like *Chlorocypha wittei* than other examples chosen to illustrate the bursae of the family.

PATTERN: It appears from examination of series that some of the important features include facial markings, the extent of dorsal markings on the head (if any), the antehumeral stripes (if any) and the black markings on the basal segments of the abdomen. The most usual form of antehumeral marking is the "fishhook" pattern (fig. 1b), a green or yellowish band which has unequal branches directed dorsad. In the *cancellata*-group this is replaced by a very broad unbranched band nearly covering the mesepisternum; in some of the *grandis*-group there is a broken ring; in adult male *C. dispar* and a few other species there is no pale band; and in *Africocypha* there is a narrowish, uniform and unbranched stripe (fig. 50a). The basal segments of the abdomen (all black in a few species) may have more hyphen-shaped marks near the distal end of the segments; or "bollards" attached to the distal ends (fig. 27); or segment 2 may have a variably shaped coloured area (surrounded by black) which is often described as a "mushroom" (fig. 38), an inaccurate but convenient term. Abdominal segments frequently show a black "U" pattern (fig. 24). On segment 2 the simplest black pattern is a pair of distal hypens which may remain so (e.g. in *C. tenuis*) or developed into bollards in many species. From bollards they may develop into basal or lateral marking which eventually links up together with the bollards to give pyriform, hastate or mushroom-shaped colour pattern; in a few species the black then more or less covers the whole segment; segment 3 may follow this pattern to a lesser degree.

LEG DISPLAY: It is evident in African Chlorocyphidae that the development of colour on the tibiae is significant. Fraser separated his genus *Platycypha* essentially on the basis of the expanded tibiae of the male. From a study of females and males it now appears that it is the presence or absence of a bright colour on the tibiae which is more important. In *P. amboniensis* (Martin) the tibial expansions are much less developed than in other species hitherto placed in *Platycypha* and on such grounds it might be held to be intermediate to *Chlorocypha*. In the case of *P. rufitibia* (Pinhey), placed originally in *Chlorocypha* through the absence of tibial expansions, the tibiae are red and white. Females of *Platycypha* have one character which differentiates this sex from females of *Chlorocypha*. In all female *Platycypha* the black "U" is present on the subbasal segments and it is always divided by a black median dorsal line. It was noticed, however, that in *P. rufitibia* in which the male has red and white legs and *P. picta*, the male of which has the legs almost

entirely bright yellow, the females also have the divided "U" pattern. Moreover the peneal lobe of these species is similar to *Platycypha* and they are now transferred from *Chlorocypha* to this genus, despite the lack of tibial expansions. That the males utilize these coloured tibiae in a courtship display has been known for some time in the case of *Platycypha caligata* (Selys).

In many *Chlorocypha* species, s.s. a noticeable feature is a cream-coloured or white streak on the anterior surface of the hind tibiae (and sometimes the middle tibiae) of the males of some species, the tibiae otherwise black, for instance, in *C. dispar*, *C. consuela* and many others. This is evidently also a stage in the attainment of leg display. It is not, however, a group criterion since, for instance, *C. hasta*, which is obviously closely allied to and here considered a subspecies of *C. molindica*, lacks such an adornment, whereas true *C. molindica* has a white streak on the hind tibia. In the latter, however, it is only a short streak, not a complete stripe (as in *C. dispar*, etc.) and this is evidently only the rudiment of leg display, an instance of divergence.

Africocypha originally accorded only subgeneric value under *Chlorocypha* is generically separable on firmer grounds than *Platycypha*. Apart from the tibiae being reddish externally and the presence of a uniform, undivided antehumeral stripe on the thorax, the inferior anal appendages are abnormally long, almost the length of the superior appendages and they have a distinct subapical flange on the superior appendage.

On taking all features into account it is evident that colour and pattern play a more important part in sexual behaviour in this family than in most dragonflies as is evidenced by the general uniformity of male secondary sexual characters.

Key to the Genera

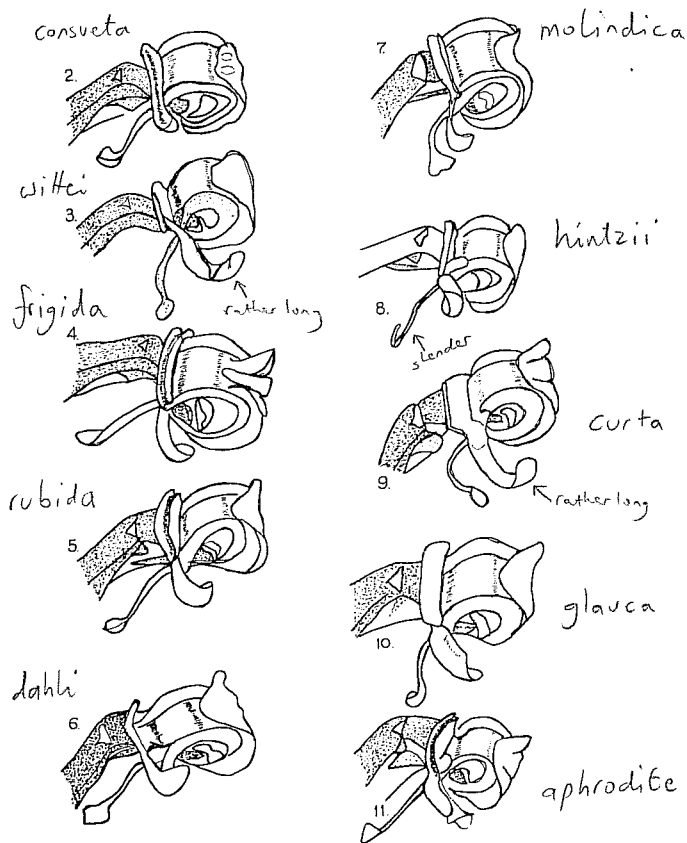
- 1 Inferior anal appendage of male very nearly as long as superior appendage; synthorax of male and female with complete and uniform, coloured antehumeral stripe; tibiae of male red posteriorly **Africocypha**
- Inferior anal appendage of male extending less than or scarcely more than half the length of the superior appendage; antehumeral stripe, if present, either a short stripe incomplete dorsally, or it is in the form of a branched stripe ("fishhook") pattern or an irregular ring 2
- 2 Tibiae of male either uniformly yellow or orange or bicoloured red (or yellow) and white and often with flattened expansions; segments 4-5 of the abdomen in the female with a black "U" pattern divided medially by a black mid-dorsal stripe . . . **Platycypha**
- Tibiae of male either black, or black and white, or black and creamy yellow; segments 4-5 in the female either without the "U" or without the median black line if the "U" is developed **Chlorocypha**

Genus *AFRICOCTYPHA* Pinhey

1960, *Entomologist's mon. Mag.* 96: 261.

This genus is distinguished by thoracic markings, anal appendages and peneal branches as mentioned above. In addition the prothoracic hindlobe is thicker and heavier than in the other two genera.

Type species: *Chlorocypha (Africocypha) greyi* Pinhey.



Figs. 2-11. Penial lobes. 2. *C. consueta* (Karsch) (Mwinilunga). 3. *C. wittei* Fraser (Chingola). 4. *C. frigida* Pinhey (Mwinilunga). 5. *C. rubida* (Hagen) (Ibadan). 6. *C. dahli* Fraser (large ♂, North of Bertoua). 7. *C. m. molindica* Fraser (Ituri Forest). 8. *C. hintzii* (Grünberg) (Uganda). 9. *C. c. curta* (Hagen) (Bouar). 10. *C. g. glauca* (Sclys) (Bondo). 11. *C. aphrodite* (Le Roi) (Paulis).

Key to the species

- 1 Epistome and labrum yellow; abdominal segments 4-5, 7-8 red **greyi**
— Epistome, labrum and abdominal segments 4-8 blue **lacusephantum**

Africocypha greyi Pinhey, figs. 17 and 31

1960, *Entomologist's mon. Mag.* 96: 261.

Only recorded so far from the ♂-holotype (Widekum, near Mamfe, Cameroons) in the National Museum, Bulawayo and one ♂-paratype (Ntaali Mountain, Cameroons) in the British Museum (Nat. Hist.).

Diagnostic features: labrum and epistome in front yellow. Synthorax with unbranched, uniform green or yellow antehumeral stripe. Abdominal segments 1-3 black with yellow lateral marking; segments 4-8 mainly red but in life segment 6 with a remarkable coating of white pruinosity; segments 9-10 black.

Africocypha lacusephantum (Karsch), figs. 18, 50 and 67

1899, *Ent. Nachr.* 25: 165. ♀-Holotype (Joh.-Albrechtshöhe, N. Kamerun) in Berlin Mus.

Chlorocypha (Africocypha) ntaali Pinhey, 1960, *Entomologist's mon. Mag.* 96: 263, **syn. nov.** ♀-Holotype (Widekum, Cameroons), ♀-paratypes (Ntaali Mt.), ♂-allotype (Kumba-Mamfe Road, Cameroons) in National Mus., Bulawayo.

Diagnostic features: male: labrum and epistome blue or greenish, thorax as in *A. greyi*, abdominal segments 1-3 black with yellow lateral marking, segments 4-7 blue, 9-10 black. The female of *A. ntaali* is identical with the female of *A. lacusephantum*: labrum blue to yellowish, face and head above mainly black. Synthorax black with uniform blue or green antehumeral stripe and two yellow lateral stripes (fig. 50a). Abdomen mainly black, segments 2-7 with paired blue mid-dorsal spots and green lateral spots.

Genus *PLATICYPHA* Fraser

1949, *Bull. Inst. r. Sci. nat. Belg.* 25(6): 10.

As in the generic key above the characters of this genus (which probably has no more than subgeneric value) must be expanded to include species with coloured legs rather than being confined to species with expanded tibiae. The divided "U" mark on the abdomen of the female must also be incorporated in the diagnosis.

Type species: *Libellago caligata* (Sclys).

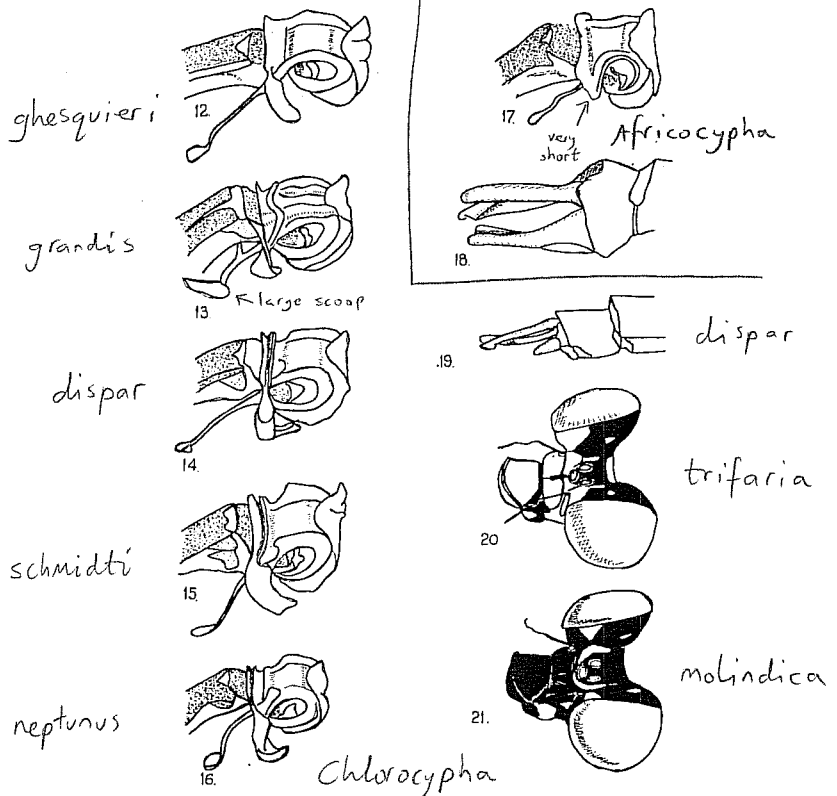
Key to the species

MALES:

- 1 Tibiae without flat expansions; abdominal segments 1-7 red, 9-10 blue 2
- Tibiae with flat expansions 4
- 2 Very small species, abdomen less than 15 mm, hindwing less than 16 mm; legs yellow with black knees; abdominal segment 3 black with red centre, segments 4-5 with very broad black "U" **picta**
- Species of average size, abdomen over 19 mm, hindwing over 21 mm; legs reddish, tibiae white anteriorly; segments 3-5 mainly red 3
- 3 Segments 1-7 red, 8 black with minute blue distal spot, 9-10 blue; segment 2 black with red central and lateral markings **rufitibia rufitibia**
- Segments 1-6 red, 7 black, 8-10 blue; segment 2 mainly red **rufitibia lucalaensis**
- 4 Tibiae entirely orange, the expansions very narrow, scarcely wider than the tibial shafts; abdomen greenish on basal segments, pale blue on terminal segments **amboniensis**
- Tibial expansions far wider than the shaft 5
- 5 Tibiae entirely yellow; abdomen dorsally orange-red on segments 3-8 **auripes**
- Tibiae white on anterior surfaces, red (or yellow in juveniles) on posterior surfaces; segments 7-10, at least, blue 6
- 6 Segments 3-6 dull greenish, 7-10 sky blue; black markings on segment 3 only faintly developed 7
- Segments 3-10 pale blue; black markings on segment 3 prominent 9
- 7 Segment 6 with only traces of black at distal end; small species, abdomen 17 mm, hindwing 18-19 mm. Segments 2-6 red **pinheyi**
- Segment 6 almost all black; larger species, abdomen 22 mm, hindwing 23-24 mm 8
- 8 Segments 2-5 red or orange-red **fitzsimonsi fitzsimonsi**
- Segments 2-5 ochreous or greenish **fitzsimonsi inyangae**
- 9 Segment 2 of abdomen with large square or triangular blue subbasal spots; segments 2-7 (or 8) very broadly black at distal ends; thorax laterally greenish 10
- Segment 2 with triangular blue subbasal spots; segments 6-8 not broadly black at distal ends; thorax laterally reddish 11
- 10 Segment 8 broadly black at distal end; segment 2 with square subbasal spots **lacustris lacustris**
- Segment 8 only very narrowly black at distal end; segment 2 with triangular subbasal spot **lacustris chingolae**
- 11 Epistome of adult black in front; expansion on fore tibia gradual **caligata caligata**
- Epistome largely red in front; expansion on fore tibia wide and more abrupt **caligata angolense**

FEMALES: (female of *A. pinheyi* Fraser still unknown).

- 1 Very small species, abdomen less than 15 mm, hindwing less than 16 mm; labrum and front of epistome all black; abdominal segment 3 black with central pale spot and lateral pale bands **picta**
- Abdomen 17 mm or more, hindwing 23 mm or more; either the labrum or the epistome or both usually with yellowish markings; segment 3 with black "U" divided by black median line 2
- 2 Epistome in front with only traces of yellow triangles or all black 3
- Epistome in front with more extensive yellowish markings 5



Figs. 12-17. Penes. 12. *C. ghesquieri* Fraser (Eala). 13. *C. grandis* (Sjöstedt) (Widékum, Cameroons). 14. *C. dispar* F. Fraser (Schmidt) (Sierra Leone). 15. *C. schmidti* sp. n. (Mt. Hoyo, Congo). 16. *C. neptunus* (Sjöstedt) (Donala). 17. *A. greyi* Pinhey (Widékum, Cameroons).
 Figs. 18 and 19. Anal appendages and segment 10 from right. 18. *A. lucasephantum* (Karsch).
 Figs. 20 and 21. Head from right. 20. *C. trifaria* (Karsch). 21. *C. m. molindica* Fraser.

- 3 Labrum all black; segment 2 black with central double yellowish spot and yellowish lateral bands **rufitibia rufitibia** .
 — Labrum black with yellow spots 4
 4 Yellow spots on labrum rounded; segment 2 of abdomen black with two separate pale central triangles and with yellowish lateral spots **auripes**
 — Yellow spots on labrum triangular; segment 2 yellowish brown with black bollards on distal margin **rufitibia lucalensis**
 5 Segment 2 of abdomen with a central pattern of four pale spots thickly edged with black 6
 — Segment 2 of abdomen with black line or band at distal end, otherwise almost uniformly pale 7
 6 Mesepimeron with black band not enclosing a yellowish streak; labrum with yellow triangles **caligata**
 — Mesepimeron with black band enclosing a yellowish streak; labrum all yellow **fitszimonsi**
 7 Segment 2 of abdomen with broad black band at distal end **lucustris**
 — Segment 2 with transverse linear black lines at base and distal ends **amboniensis**

Platygypha amboniensis (Martin) ^{notion exp.} legs orange, abd. blue

1915, Voyage Alluaud, Pseudonévroptères II, Odonata: 42. "Kenycypha"

♂-Holotype (Amboni Valley, Vallée Boisée, 1800 m, W. of Mt. Kenya, Jan.-Feb. 1912) a solitary male in Paris Museum, not actually labelled as the type but evidently this is the example on which the description was based.

Found on the slopes of Mt. Kenya and the Aberdare Mts. in Kenya.

Diagnostic features: MALE: labrum yellowish, epistome in front mainly black. Synthorax with fishhook stripe as in all known *Platygypha*. Tibiae entirely orange, with only very narrow flat expansions. Abdominal segments 1-3 greenish-ochreous, 4-10 greyish blue; segment 2 with black basal and distal bars, 3 and 4 with distal bars only. Penaeal lobe as in *P. caligata* (Selys).

FEMALE: labrum yellowish, epistome in front yellowish with black centre. Synthorax with fishhook stripe as in other *Platygypha*. Abdominal segment 2 with only sparse black marking, a fine median line linking basal and distal transverse lines; segments 3-5 with U markings divided by black median line.

Platygypha auripes (Förster), figs. 25 and 57 ^{exp.} legs yellow, abd. red

1906, *Jber. Ver. Naturk. Mannheim* 71-72: 54. ♂-Lectotype (Usambara Mts.) in Ann Arbor (not examined).

Platygypha greenwayi Pinhey, in Fraser, 1950, *Bull. Inst. r. Sci. nat. Belg.* 26(18):18. ♂-Holotype, ♀-allotype (Amani, Usambara Mts.) in British Mus. (Nat. Hist.).

Local in Tanganyika coastal forests.

Diagnostic features: MALE: face in front blackish. Synthorax with yellow fishhook or with two separated stripes (broken fishhook). Tibiae yellow; broadly expanded. Most abdominal segments orange-red; segment 2 black with greenish central triangles, segments 9 and 10 all black. Penaeal lobe as in *P. caligata*.

FEMALE: labrum black with two yellow spots, epistome in front black.

Otherwise as in previous species but abdominal segment 2 black with coloured central and lateral spots.

Platygypha caligata (Selys), figs. 1, 44 and 56

1853, *Bull. Acad. r. Belg. Cl. Sci.* 20(suppl.): 58. ♂-Type (Durban) probably in Selys Collection, Bruxelles Mus., but not designated.

Libellago ambigua Gerstaecker, 1869, *Arch. Naturgesch.* 35: 222. Type not found (Mbaramu, Tanganyika and Zanzibar).

Libellago hartmanni Förster, 1897, *Ent. Nachr.* 23: 216.

♂-Lectotype, ♀-allolectotype (Transvaal) in Ann Arbor (not examined).

Libellago sulphuripes Martin (ined.).

♂-Type (Potchefstroom Distr., Transvaal) in British Mus. (Nat. Hist.).

The species is widespread, generally common, in South, East and Central Africa.

Diagnostic features: MALE: face black. Synthorax with green fishhook. Thorax and base of abdomen reddish laterally. Tibiae red and white, expanded. Abdomen pale blue; segment 2 black with bluish triangles and distal spots; segments 3-4 with black U, 5 with black distal band more or less developed. Penaeal lobe fig. 1d.

FEMALE: labrum with yellow triangles, epistome in front black and yellowish. Abdominal segment 2 with four bluish central spots thickly outlined with black; segments 3-5 with divided U.

Platygypha caligata angolense Longfield

1959, *Publicat. cult. Co. Diam. Angola* 45: 27.

♂-Holotype (Ongueria, South Angola) in British Mus. (Nat. Hist.). A short series of general examples (Lucala River region, West Angola) in National Mus., Bulawayo.

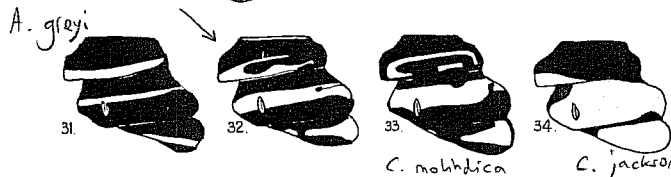
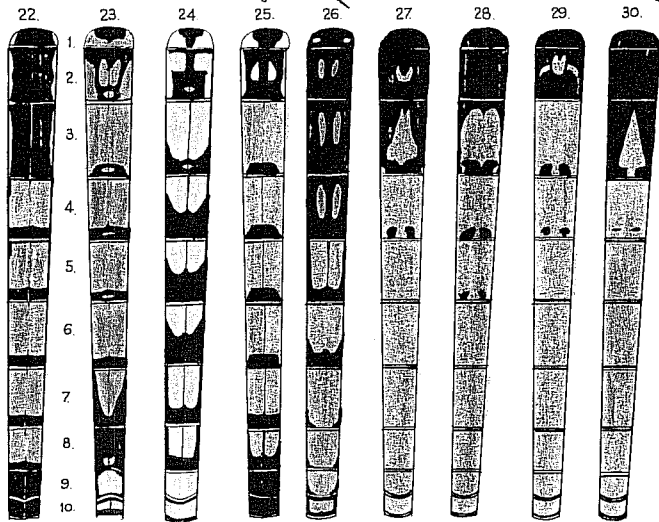
Diagnostic features: male differs from nominotypical *caligata* in having the epistome partly reddish in front and the expansions on fore tibia wider and more abrupt.

Two females of the Lucala District series differ from the nominotypical race in a paler anterior surface to the epistome and abdominal segment 2 has two central triangles more or less joined to a single distal pale spot.

Platygypha fitszimonsi (Pinhey) ^{exp.} legs red & white, abd. red & blue

1950, *Ann. Transv. Mus.* 21: 270. ♂-Holotype (Natal) in Transvaal Museum.

Diagnostic features: MALE: face in front black; synthorax with fishhook (sometimes broken). Tibiae red and white, less expanded than in *P. caligata*. Abdominal segments 1-5 red; segment two with a black basal triangle, its apex crossing a distal transverse line; segment 5 with a black U, 6 mainly black; segments 7-10 blue. Penaeal lobe as in *P. caligata*.



Figs. 22-34. Male characters. The figures are purely diagrammatic, not indicating shape.

Figs. 22-30. Abdomen dorsally. 22. *A. greyi* Pinhey. 23. *P. r. rufithibia* (Pinhey). 24. *P. l. lacustris* (Förster). 25. *P. avripes* (Förster). 26. *P. picta* (Pinhey). 27. *C. d. dispar* (Beauvois). 28. *C. schmidti* spec. nov. 29. *C. dispar ovalosa* Fraser. 30. *C. grandis* (Sjöstedt).

Figs. 31-34. Synthorax from left. 31. *A. greyi* Pinhey. 32. *P. r. rufithibia* (Pinhey). 33. *C. m. malindica* Fraser. 34. *C. jacksoni* Pinhey.

Explanation:

Figs. 27 and 28 illustrate "bollards" on segment 4. Figs. 27 and 29 illustrate "hyphens" on segment 5. Fig. 30 shows a "spear-head" on segment 3. Fig. 24 shows "U-pattern" on segments 3-8. Fig. 32 shows "fishhook" antehumeral. Fig. 33 shows "ring-shaped" antehumeral.

FEMALE: labrum yellow, epistome variable; segment 2 marked as in *P. c. caligata*, segments 3-5 with divided U.

Platycypha fitzsimonsi inyangae Pinhey, fig. 54

1958, *Occ. Pap. natn. Mus. Sth. Rhod.* 22(B): 106.

♂-Holotype, ♀-allotype (Inyanga, Rhodesia) in British Mus. (Nat. Hist.).

Eastern mountains of Rhodesia.

Diagnostic features: male like *P. fitzsimonsi* but the basal segments ochreous to greenish, not red.

Female typical.

Platycypha lacustris (Förster), fig. 24

as *caligata*

1914, *Arch. Naturgesch.* 80: 61. Depository of ♂-holotype (Entebbe, Uganda) uncertain.

Chlorocypha armageddoni Fraser, 1940, *Ann. ent. Soc. Am.* 33: 551.
♂-Holotype (Buganda, Uganda) in British Mus. (Nat. Hist.).

Western Kenya, Uganda, Ituri Forest (Congo).

Diagnostic features: MALE: differs from *P. caligata* in having the side of the thorax and base of abdomen greenish, not red. Abdomen blue, with segments 2-8 broadly black at distal ends. Penaeal lobe as in *P. caligata*.

FEMALE: labrum with yellow triangles, epistome in front mainly black. Abdominal segment 2 with the black restricted to a distal band and median dorsal line.

Platycypha lacustris chingolae Pinhey

1962, *Occ. Pap. natn. Mus. Sth. Rhod.* 26(11): 904.

♂-Holotype (Chingola, Zambia) in National Mus., Bulawayo. So far only found in a riparian forest to the west of Chingola, Zambia.

Diagnostic features: male differs from the nominotypical race in abdominal features: segment 2 with triangular rather than square spots; segment 8 only narrowly black at distal end. Penaeal lobe as in *P. caligata*.

Platycypha pinheyi Fraser

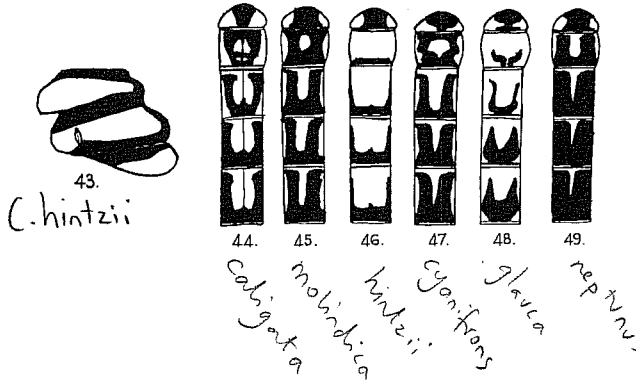
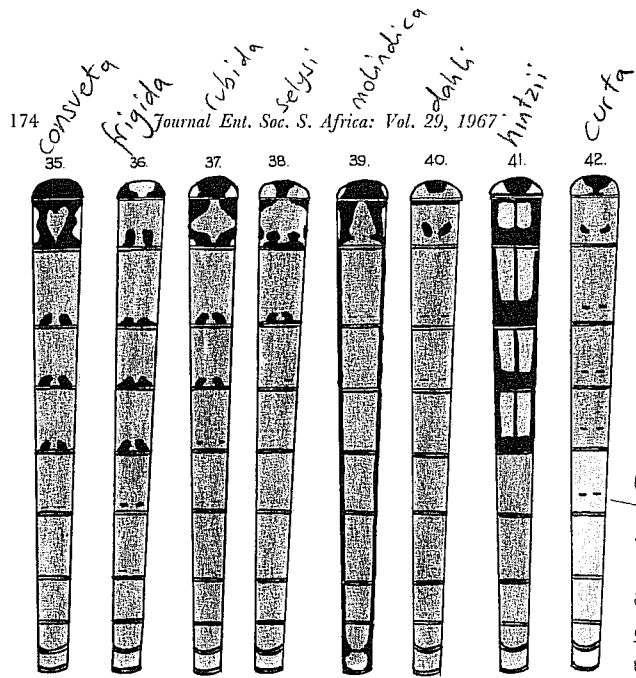
like *fitzsimonsi*?

1950, *Bull. Inst. r. Sci. nat. Belg.* 26(18): 6.

♂-Holotype (Mwangongo River, north east of Lake Tanganyika) in British Mus. (Nat. Hist.).

One male from Makobola, Lake Tanganyika, in Tervuren Mus., Tervuren. Possibly also the unknown female from Uvira, Lake Tanganyika.

Diagnostic features: Fraser's original description was erroneous in colour pattern (Pinhey, 1961a: 60). Male very like *P. caligata* but much smaller. Tibiae



less widely expanded. Abdominal segments 1-5 reddish with sparse black marking; segments 6 or 7 to 10 greyish (probably blue in life). Penaeal lobe not examined.

Platycypha picta Pinhey, figs. 26 and 59 legs yellow (unexp.), abd. red
1962, J. ent. Soc. sth. Afr. 25: 30.

♂-Holotype, ♀-allotype (Etuombi Forest, Moyen Congo) in the National Mus., Bulawayo.

So far only recorded from the topotypical locality.
Diagnostic features: Smallest of the African chlorocyphids. Male face black. Synthorax with fishhook. Legs yellow, without expansions. Abdomen black and dull reddish; segments 2 and 3 black with red centre, 4 and 5 with broad black U. Penaeal lobe as in *P. caligata*.

Female face black. Thorax with fishhook. Abdominal segments 2 and 3 black with central and lateral coloured areas; segments 4 and 5 with thick and divided black U.

Platycypha rufitibia (Pinhey), figs. 23 and 32

1960, Entomologist's mon. Mag. 96: 263. ♂-Holotype, ♀-allotype (Mamfe Distr., Cameroons) in the National Mus., Bulawayo.

Libellago lanceolata Martin (ined.) (pars). Two males labelled (type (Gabon) in Paris Mus., one of them labelled "*Rhincocypha lanceolata* M. type Gabon").
L. lanceolata is not an example of *C. tenuis* (as suggested by Pinhey, 1962a: 150). The mature male is *P. rufitibia*, the teneral male (vide infra) is *C. cyanifrons*.

Recorded only from Cameroons.

Diagnostic features: MALE: face purplish black. Thorax with fishhook. Tibiae red and white but not expanded. Abdomen red on segments 1-7, segment 8 black with trace of blue, 9 and 10 blue; segment 2 black with red central and lateral marking; 3 red with black distally. Penaeal lobe as in *P. caligata*.

FEMALE: face black with trace of yellow. Abdominal segment 2 black with pale central and lateral markings; segments 3-5 with divided U.

EXPLANATION OF FIGURES

Figs. 35-49. Male and female characters.
Figs. 35-42. Abdomen of male dorsally (diagrammatic, not indicating shape).
35. *C. consuetu* (Karsch) (showing bollards on segments 3-5). 36. *C. frigida* Pinhey.
37. *C. rubida* (Hagen). 38. *C. selysi* (Karsch), with "mushroom" pattern on segment 2. 39. *C. m. molindica* Fraser. 40. *C. dahli* Fraser (pattern on large male). 41. *C. hintzii* (Grünberg). 42. *C. e. curta* (Hagen). 43. *C. hintzii* (Grünberg), thorax of male from left.

Figs. 44-49. Basal five segments of abdomen of female.
44. *P. caligata* (Selys). 45. *C. molindica* Fraser. 46. *C. hintzii* (Grünberg). 47. *C. cyanifrons* (Selys). 48. *C. glauca* (Selys). 49. *C. neptunus* (Sjöstedt).

Chlorocypha rufitibia lucalaensis subsp. nov., fig. 58

In *C. rufitibia* the male is very red on the thorax and the abdomen, but there are traces of sky-blue colour on the last segments of the abdomen; the tibiae are red posteriorly, whitish anteriorly. The new subspecies from Angola differs essentially in two respects. The thoracic antehumeral "fishhook"-stripes are thicker. Abdominal segments 1-6 mainly red, segment 7 black, segment 8 is mainly sky-blue dorsally (only edged with black), like segments 9 and 10, whereas in the nominotypical race segment 8 is mainly black with merely a transverse blue bar near the basal end. Moreover, the postocular spots are more pronounced, larger and pyriform, instead of being elliptical or more or less obsolete. Penal lobes as in *P. caligata*.

In life the pale colours on the head and front of the thorax are orange-brown; side of thorax red; abdomen orange-brown, strongly reddened dorsally and posteriorly on each segment; the terminal three segments sky-blue; abdomen ventrally crimson on segments 2-6.

The female of this subspecies is characterized on the head by having yellow triangles on the labrum and a very large yellow square at the occipital plate from which slender branches diverge anteriorly. Abdominal segment 2 mainly yellowish-brown with black bollards.

In the general male of this race the pale areas of thorax and abdomen are creamy-yellow.

The subspecies occurs gregariously on the Lucala River, 228 km from Luanda and was captured on 6 and 8 - 9.X.1964.

Holotype, allotype and paratypes in National Museum, Bulawayo; one paratype of each sex will be presented to the Museu do Dundo, to the British Museum (Natural History), and to the Transvaal Museum, Pretoria.

Genus *CHLOROCYPHA* Fraser1928, *J. Bombay nat. Hist. Soc.* 32: 684.Type species: *Agrion dispar* Beauvois

Key to the species

MALES:

- 1 Abdomen slender, cylindrical, segment 3 more than twice as long as wide; mesepisterna black, with or without yellow or green slender antehumeral stripe, often ring-shaped or occasionally very restricted to ventral end only; ground colour of abdomen red 2
- Abdomen thicker, triangular in cross-section, segment 3 less than twice as long as broad; antehumeral stripe absent or in the form of a fishhook, or occasionally divided as two broad streaks or forming a very broad unbranched band 7
- 2 Hind tibiae with at least a partial white or yellow streak on anterior surface, not black nor coated with thin white pruinosity 3
- Hind tibiae all black or coated with thin white pruinosity 5

- 3 Segment 2 black with middorsal yellow longitudinal stripe. Mesepisternum with a short straight yellow antehumeral stripe at ventral end, crossing the humeral suture **jacksoni basilewskyi**
- Segment 2 at least half red; yellow antehumeral stripe in the form of an elongate, broken ring and the stripe does not cross the humeral suture; sometimes the stripe may be absent 4
- 4 Segment 2 black with red wingglass mark; side of thorax black with two yellow bands **molindica**
- Segment 2 all red except a pair of distal black hyphens; side of thorax mainly yellow **tenuis**
- 5 Segment 2 all black, segment 3 black enclosing a red spear-head or all black; thorax all black or with only traces of yellow stripes **grandis**
- Segment 2 with red central patch or broadly red, segment 3 red with black distal hyphens; thorax at side mainly yellow 6
- 6 Segment 2 black with red spear-head; antehumeral stripe a broken yellow ring **molindica hasta**
- Segment 2 red with black distal hyphens; yellow antehumeral stripe reduced to a short streak at ventral end which crosses the humeral suture **jacksoni jacksoni**
- 7 At least the hind tibiae with white or yellow streak on anterior surface, but tibiae are not coated with white pruinosity 8
- Tibiae all black (or brownish in *ghesquieri*) with or without a fine white powdery pruinosity 22
- 8 Segments 8-10 blue 9
- Segments 8-10 red or yellowish 13
- 9 Nearly all segments blue 10
- Segments 1-5 red 11
- 10 Small species, abdomen c. 16 mm; segment 2 black with yellow lateral stripe; head above with small, isolated coloured spots; thorax laterally with two irregular, coloured bands **croceus**
- Larger species, abdomen c. 20-21 mm; segment 2 blue with pair of distal black bollards; head above with large blue adjacent spots; thorax laterally with three coloured bands **aphrodite**
- 11 Segments 1-5 red, 6-10 blue, with only small, isolated black distal spots **curta** var.
- Segments 1-6 red, 7-10 blue 12
- 12 Segments 2-5 with small isolated, distal, paired spots or hyphens, not attached to distal margins **curta** f. **curta**
- Segments 2-5 with distal black bollards, attached to distal ends of segments **curta** f. **bicolor**
- 13 Segments 1-5 blue, 6-10 red; segments 2 and 3 with black distal spots or bollards; side of thorax mainly pale yellowish or greenish **seydelli**
- Segments 1-5 not blue; side of thorax not mainly yellowish, but either all black or with definite black and yellow (or green) bands 14
- 14 Small or smallish species, abdomen usually less than 17 mm; segment 2 black with yellow centre, segments 3-5 with thick black U **neptunus**
- Larger species, abdomen over 18 mm; segment 2 black or red, segments 4 and 5 mainly red (only in **luminosa** with very thin black U) 15
- 15 Segment 2 mainly red, with pair of distal black markings 16
- Segment 2 broadly or entirely black 17
- 16 Segment 2 with distal bollards; frons with four large blue spots **victoriae**
- Segment 2 with distal semilunar markings, free or attached to distal end of segment; frons without large blue spots (when mature) **wittei**

} slender
reds

} blues

} red & blues

} blue & red

} reds

17	Segment 3 mainly red with only sparse or thin black markings	18
—	Segment 3 at least half black	21
18	Segments 3 and 4 with thin black U; wings yellow	luminosa
—	Segments 3 and 4 with distal hyphens or bollards; wings not mainly yellow	19
19	Segment 2 black with large red mushroom	victoriae
—	Segment 2 black with yellow central spot and lateral arms or red central and lateral markings	20
20	Segment 2 black with yellow central spot or spot with lateral arms, but without pale lateral band	dispar ovulosa
—	Segment 2 black with red central and lateral markings	consueta
21	Segment 3 either black with a large red triangle, its apex at base of segment and its base at distal end, or with a mid-dorsal red band of variable shape, sometimes with lateral extensions	dispar schmidtii
—	Segment 3 black with very large red, more or less semicircular area	22
22	At least four of the abdominal segments blue or violet	23
—	Nearly all segments red	27
23	Basal segments of abdomen blue, distal segments red; mesepisternum with yellow or green fishhook or with two separated stripes	24
—	Basal segments broadly black and reddish; mesepisternum almost entirely greenish-yellow	26
24	Segments 1-4 blue, 5-10 red, segment 2 black with blue markings	25
—	Segments 1-5 blue, 6-10 red, segment 2 black with blue central patch	glauca var.
25	Segment 2 with blue central pyriform or mushroom mark	glauca glauca
—	Segment 2 with blue band	glauca radix
26	Segments 4-6 with very broad black U or distal band, 7-10 all violet	cancellata
—	Segments 4 and 5 with very broad black U or distal band, 6-10 all violet	hintzii
27	Epistome in front all black	28
—	Epistome in front all yellow or blue	31
28	Labrum entirely black, segment 2 all red with black distal spots	dahlii
—	Labrum with yellow or blue triangles; segment 2 black with red central area	29
29	Segment 3 red with black distal hyphens, segment 4 all red; legs brown	ghesquieri
—	Segment 3 red with small black distal bollards, attached to end of segment; segment 4 with distal hyphens or bollards; legs black	30
30	Epistome above and frons all blue	cyanifrons
—	Epistome above black; frons above blue or black	rubida
31	Labrum with two blue triangles; frons broadly blue	trifaria
—	Labrum all yellow or blue; frons not broadly blue	32
32	Face in front entirely yellow; segment 2 black with irregular red transverse band	selysi
—	Face in front all blue; segment 2 red with small black distal bollards	frigida

In the following key to females characters are sometimes difficult to find and they even may be illusory at times. It is advisable to consider the known distribution of the species as well as characters in the key, when females are being examined. The width of the abdomen, wing colouration and thoracic markings are normally more definite than some of the other features. Markings on the sub-basal abdominal segments are useful guides, but sometimes there is a certain amount of variation, as is the case in these segments of the male. Such variation

may or may not be degrees of maturation. Facial markings are reliable in their absence, in the mature condition. Thus, the mature female of *C. selysi* or *C. frigida* will always have the face unmarked with black.

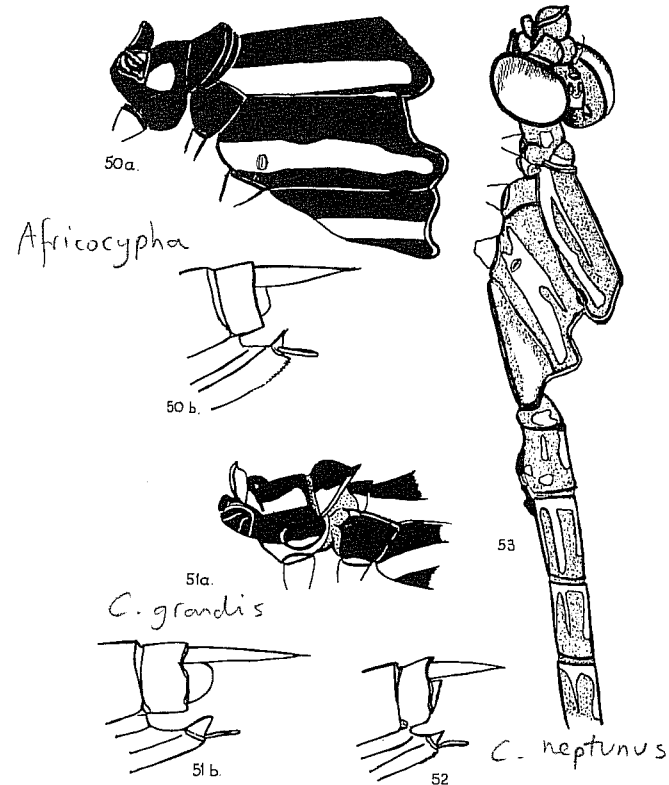
FEMALES:

1	Abdominal segment 3 twice as long as broad; synthoracic antehumeral stripe more or less ring-shaped; abdomen black laterally, this black enclosing a broken yellow stripe	2
—	Segment 3 one and a half times as long as broad (or less); antehumeral stripe a fishhook, or a very broad unbranched band; abdomen either without yellow lateral band or this band not entirely framed in black at basal ends of segments	8
2	Segment 2 black with yellow central marking	3
—	Segment 2 mainly yellowish, with black basal or distal marking	5
3	Side of synthorax black with yellow stripes; labrum black with yellow central spot; vertex black with isolated yellow central spot	grandis
—	Side of synthorax mainly yellow, with or without an incomplete broken black line on lateral sutures; labrum yellowish	4
4	Side of thorax with black lines on sutures; vertex with transverse band of four irregular yellow spots	molindica molindica
—	Side of thorax with black lines obsolete; vertex with isolated spots	molindica hasta
5	Labrum blackish, at most with yellow central spot	6
—	Labrum all yellow	7
6	Segment 2 pale yellowish with black distal hyphens	collarti
—	Segment 2 yellowish with black distal band	jacksoni jacksoni
7	Segments 2 and 3 yellowish with black distal hyphens	tenuis
—	Segment 2 yellowish with black distal spots, segment 3 yellowish with thin black U	jacksoni basilwskyi
8	Antehumeral stripe very broad or pyriform, unbranched	9
—	Antehumeral stripe of fishhook form	11
9	Segments 2-5 with distal hyphens; hindwing yellow	? dahlii
—	Segment 2 with black distal band, 3-5 with thin U	10
10	Hindwing all yellow	cancellata
—	Both wings hyaline	hintzii
11	Segment 2 mainly black or with continuous black longitudinal markings	12
—	Segment 2 pale with disconnected basal or distal black markings	21
12	Segments 2-5 with thick black U (sometimes the segments almost all black); labrum black with two separate yellow spots	neptunus
—	Segment 2 without black U	13
13	Segments 2-5 black with two pale elongated spots and a distal spot	croceus
—	Segments 2-5 not so marked	14
14	Hindwing all strongly yellow	15
—	Hindwing all or nearly all hyaline or fumose; frons pale; segments 3-5 with U	17
15	Labrum and epistome in front all yellow or bluish; segment 2 with pale central mushroom, segments 3-5 with U; second lateral suture of thorax with thin black stripe	selysi
—	Labrum and epistome at least partly black; second lateral suture with thick black stripe	16
16	Forewing mainly hyaline; segment 2 with pale central mushroom, segments 3-5 with L-shaped black marking (or U severed at base)	cyanifrons

- Forewing mainly yellow; segment 2 with pale central rounded bulb and usually with "stalk", segments 3-5 with U **rubida**
- 17 Segment 2 with pale central diamond or semicircle; thorax laterally with very broad stripe on second suture **dispar**
- Segment 2 with irregularly rounded central area; thorax laterally yellowish with moderate black stripe on second lateral suture 18
- 18 Posterior lobe of prothorax black; second lateral suture of thorax with thick black stripe 19
- Posterior lobe of prothorax yellow medially, laterally; only partly black; second lateral suture with thin black stripe 20
- 19 Segment 2 with pale central patch broadly surrounded with black; large species, hindwing 25-26 mm **consueta**
- Segment 2 with pale central patch only narrowly framed with black; smaller species, hindwing 23-24 mm **wittei**
- 20 Epistome in front all black; segments 3-5 with thick black U **victoriae**
- Epistome in front partly yellowish; segments 3-5 with thin U **curta**
- 21 Segments 3-5 with irregular black longitudinal stripes; face all yellow; segment 2 with distal black bollards. Hindwing yellow **seydelli**
- Segments 3-5 not marked in this way; hindwing sometimes yellow 22
- 22 Segment 3 pale with divergent black streaks at distal end; second lateral suture of thorax with thick black stripes; small species **ghesquieri**
- Segment 3 with black U; second lateral suture with thin black stripes; larger species 23
- 23 Posterior lobe of prothorax mainly black, sometimes yellow at lateral angle 24
- Posterior lobe of prothorax all yellow or mainly yellow 25
- 24 Labrum and epistome in front all yellow or bluish; all wings hyaline; segment 2 pale with black bollards or streaks on distal end **frigida**
- Labrum black with yellowish triangles; all wings definitely yellow; segment 2 with black basal and distal bands **trifaria**
- 25 Segment 2 with free distal spots, 3-5 with thin U; wings hyaline **curta**
- Segment 2 with black irregular distal streaks, 3-5 with thick U 26
- 26 Segment 2 with divergent streaks attached to distal end; forewing and hindwing strongly yellow **glauca**
- Segment 2 with divergent bars (more or less wedge-shaped); wings hyaline to faintly yellowish **aphrodite**

Members of this genus which have plain black tibiae probably include some of the more primitive species, but in these the tibiae may often be thinly coated with white pruinosity. The most primitive species recorded would appear to be *C. neptunus* with its dull abdominal colouration, heavily marked with black (fig. 53). Yet this species has apparently advanced to the stage where the tibiae of the male are partly yellowish. The development of yellow or white on the hind tibiae was evidently the first stage in utilizing the legs for a simple courtship display. Further stages in this led to the bicoloured tibiae of *Platycypha rufitibiae* and eventually the widened, coloured tibiae of *P. caligata* and its relatives. This development possibly evolved during later competition between the increased number of species and *P. caligata* which became one of the most, if not the most successful species of the family in Africa.

The species may be somewhat roughly divided into groups, some of the groups distinctive but others so arranged for convenience.



Figs. 50-53. Parts of the body.

50 a-b. *A. lucaselephantum* (Karsch), female, entire thorax from left and terminal (10th) segment of abdomen.

51 a-b. *C. grandis* (Sjöstedt), female, prothorax and ventral end of synthorax from left, terminal segment of abdomen.

52. *C. neptunus* (Sjöstedt), female, terminal segment of abdomen.

53. *C. neptunus* (Sjöstedt), male, head, thorax and base of abdomen from left (speckled areas black).

DISPAR-GROUP

Chlorocypha

Males with red abdomen and generally a strong tendency to blackening during maturation.

Chlorocypha dispar (Beauvois), figs. 14, 19 and 27

1805, Insects Afr. et Amér. 7(2): 85.

Depository of the ♂-holotype (Ivory Coast) uncertain.

Several forms or races have been coupled with this species, but in the present revision it is considered that *ovulosa* Fraser is a distinct subspecies, *C. cordulosa* (auctt.) is considered partly as a synonym of *C. cyanifrons* and partly as a new species, described below.

The following species remain in synonymy and are evidently only developmental stages:

Chlorocypha dispar pyriformosa Fraser, 1947, *Trans. R. ent. Soc. Lond.* 98: 23.

♂-Holotype (Ivory Coast) in British Mus. (Nat. Hist.) The figure given by Fraser (1947) for *C. pyriformosa* (fig. d) is identical with Fraser's fig. 2 of *C. dispar* var. in his later revision of the family (1949: 34).

Libellago dispar fraseri Schmidt, 1951, *Archos Mus. Bocage* 20: 161. ♂-Holotype in Schmidt collection (not examined during this survey).

Libellago mutans Martin (ined.). ♂-Type, ♀-allotype (Cote d'Ivoire) in Paris Mus. In "*mutans*" abdominal segments 2 and 3 have an irregular red band, whereas the type *C. dispar* apparently had a large red triangle on segment 3 extending the full length on this segment.

Of recorded distribution (Pinhey, 1962a: 149), it is probably advisable to restrict the area to the West African region from Nigeria to Sierra Leone.

Diagnostic features: MALE: face and head black; thorax in mature condition black. Tibiae white anteriorly. Abdomen black and red; segments 2 and 3 black with variable red pattern (probably developmental changes); segments 4-6 with sparse distal black markings.

FEEMALE: labrum with yellow spots, separate or joined. Epistome mainly black. Thorax with thin fishhook. Abdominal segment 2 black with pale central spot and lateral bands; segments 3-5 with black U. Wings mainly hyaline.

Chlorocypha dispar ovulosa Fraser, fig. 29

1947, *Trans. R. ent. Soc. Lond.* 98: 22, fig. f (erroneously named "*cordosa*" in subtitle).

♂-Holotype (Old Calabar) in British Mus. (Nat. Hist.). In the National Mus., Bulawayo, there is a male from Etoumbi Forest, Moyen Congo, so that the distribution is possibly Congo to southern Nigeria.

Diagnostic features: larger and more robust than the nominal typical race. Segment 3 of the abdomen entirely red except for a pair of bollards. Tibiae as in *C. dispar dispar*. Peneal lobe as in *dispar*.

Chlorocypha schmidti spec. nov., figs. 15 and 28

Libellago dispar cordosa Schmidt (nec Fraser), 1951, *Archos Mus. Bocage* 20: 164;
Chlorocypha dispar cordosa Pinhey, 1962a: 32.

♂-Holotype, mature (Mt. Hoyo, Bunia, Ituri, Congo, March 1959, R. H. Carcasson). Labium, face in front, head above and entire thorax black. Legs black, middle and hind tibiae creamy-white on anterior surface.

Abdomen triquetral, red with black markings: segments 1-3 black, 3 with large red dorsal semicircular patch, interrupted on mid-circumference (base of segment) and on diameter (distal end of segment) by black intrusions, those on the diameter being of the bollard form. Segment 4 red with black bollards, 5 and 6 red with distal hyphens, 7-10 unmarked with black. Abdomen ventrally and the anal appendages black.

Wings hyaline with some amber at bases; pterostigma black. Discoidal cell in forewings with one cross-vein, in hindwings with two cross-veins.

Abdomen 20 mm, hindwing 25 mm.

This is larger and more robust than *C. dispar* and the peneal lobe (fig. 15) is distinct.

♂-Holotype in National Mus., Bulawayo; ♂-paratype, same locality, 5.X.1957, Ross and Leech, in California Academy of Sciences.

Schmidt recorded this species (under the name "*cordosa*") from N.W. Tanganyika and its distribution thus extends from there into the Congo.

Chlorocypha consueti (Karsch), figs. 2, 35 and 55

1899, *Ent. Nachr.* 25: 376.

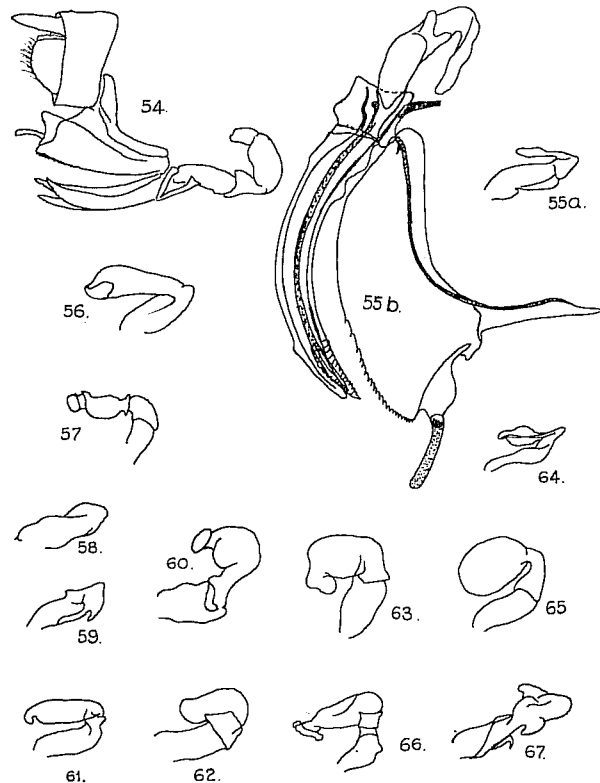
♂-Holotype (Panimbira, Lake Nyasa) in Berlin Mus.

In the past this species has been confused in synonymy with *C. luminosa* (Karsch) but a comparison of types has shown *C. consueti* to be a distinct species. Thus, some of the equatorial records of *C. luminosa* and all the records from south central Africa should be *C. consueti* (nec *luminosa* auctt.).

Distribution: Rhodesia, Malawi, Zambia, Congo, Southern Nigeria, Togoland (overlapping with *luminosa*).

Diagnostic features: MALE: face black. Thorax with fishhook or entirely black. Tibiae white anteriorly. Abdomen crimson red. Segment 2 black with red central and lateral marking; segments 3 and 4 with bollards. Peneal lobe with the external branch short, directed inwards, the inner branch ending in a spoon-like lobe. Wings hyaline.

FEEMALE: labrum with yellowish triangles, epistome in front partly black. Thorax with fishhook. Abdominal segment 2 black with central and lateral pale markings; segments 3-5 with black U; or segment 3 black with pale basal spots.



Figs. 54-67. Bursa of females
 54. *P. fitsimonsi inyangae* Pinhey: in situ, with ovipositor and abdominal terminalia. 55a. *C. consueta* (Karsch), b. the same, more enlarged, together with ovipositor. 56. *P. caligata* (Selys). 57. *P. auripes* (Förster). 58. *P. rufitibia lucanaensis* Pinhey. 59. *P. hida* (Pinhey). 60. *C. wittie* Fraser. 61. *C. hintzii* (Grünberg). 62. *C. aphrodite* (Le Roi). 63. *C. selysi* (Karsch). 64. *C. grandis* (Sjöstedt). 65. *C. cyanifrons* (Selys). 66. *C. m. malindica* Fraser. 67. *C. lacuslephantum* (Karsch).

Chlorocypha luminosa (Karsch)

1893, *Berl. ent. Z.* **38**: 33. Two ♂-types (Bismarckburg, Togo) in Berlin Mus.

Libellago jejuna Baumann, 1898, *Ent. Nachr.* **24**: 345. ♂-Holotype (Togo) in Berlin Mus.

So far only recorded from Togo. Records from central and southern Africa are referable to *C. consueta*.

Diagnostic features: male differs from *C. consueta* in having a thin black U on each of the abdominal segments 3 and 4; the wings are entirely amber yellow, which is an unusual feature in the male.

Chlorocypha ghesquieri Fraser, fig. 12

1959, *Revue Zool. Bot. afr.* **60**: 308.

♂-Holotype, ♀-allotype (Eala, Congo Republic) in Tervuren Mus. The male suggests affinity with *C. consueta* but it is a smaller species, less heavily marked with black.

Only known from the Congo.

Diagnostic features: MALE: labrum with yellow spots, epistome in front black. Thorax with fishhook. Legs without white or yellow streaks. Abdomen red; segment 2 black with wide red mushroom; segment 3 with only distal hyphens; 4 and 5 unmarked.

FEMALE: labrum with yellow triangles, epistome black in front. Thorax with fishhook. Abdominal segments 2-4 reddish with black divergent streaks attached to distal end.

RUBIDA-GROUP

Species of this group differ from the *dispar*-group in a tendency to develop large blue spots on the postclypeus or frons. Abdomen red, segment 2 may vary or change from sparse black marking to more extensive blackening and in some species this is certainly a question of maturation of the male.

Chlorocypha rubida (Hagen), figs. 5 and 37

1853, in Selys, *Bull. Acad. r. Belg. Cl. Sci.* **20**(suppl.): 58.

♂-Holotype (Guinea) in Copenhagen Mus. (not examined).

Distribution: Congo Republic, Moyen Congo, Cameroons, Southern and Eastern Nigeria, Guinea. Uganda records may be confused with *C. victorae*.

Diagnostic features: Face black (or sometimes with bluish spot on labrum); head with large blue frontal spots which may be obliterated. Thorax with incomplete fishhook or all black. Legs black, often with some thin white pruinosity.

Abdomen blood red; segment 2 black with a red diamond or mushroom pattern; segments 3 and 4 with bollards, segments 5 and 6 (and sometimes 4) with hyphens.

FEMALE: labrum with yellowish triangles, epistome in front partly black. Thorax with fishhook. Abdominal segment 2 black with a somewhat flask-shaped bluish central patch and with lateral pale band; segments 3-5 with U. Both wings yellowish.

Chlorocypha cyanifrons (Selys), figs. 47 and 65

1873, *Bull. Acad. r. Belg. Cl. Sci. (2)* 35: 493. ♂-Holotype (Gabon) in British Mus. (Nat. Hist.).

Libellago glaucifrons Sjöstedt, 1899, *Bih. svensk. Vetensk. Akad. Handl.* 25: 51. ♂-Cotype in British Mus. (Nat. Hist.) is a melanic example of *C. cyanifrons*.

Chlorocypha dispar cordosa Fraser, 1947, *Trans. R. ent. Soc. Lond.* 90: 23. ♂-Holotype in the British Mus. (Nat. Hist.).

Paras: **Libellago lanceolata** Martin (ined.).

General male in Paris Mus. (Mature male is *P. rufitibia*, vide supra).

Distribution: Congo Republic, Moyen Congo, Cameroons, Eastern Nigeria; also recorded from other equatorial African territories but these records have not been checked during this survey.

Diagnostic features: MALE: labrum with yellowish triangles, epistome in front black. Head above broadly blue on frons. Thorax with fishhook or with two separated stripes. Tibiae black with traces of white pruinosity. Abdomen red; segment 2 varying from red with bollards to black with red mushroom; segments 3 and 4 with bollards. Penaeal lobe as in *C. rubida*.

FEMALE: face as in male. Thorax with fishhook. Segments 2 black with pale mushroom; segments 3-5 with black L-shaped marking. Forewing yellow on costa, hindwing all yellow.

Chlorocypha trifaria (Karsch), fig. 20

1899, *Ent. Nachr.* 25: 378. ♀-Holotype teneral (Semliki River, 26.XII.1891) in Berlin Mus.

Chlorocypha straeleni Fraser, 1949, *Bull. Inst. Sci. Nat. Belg.* 25(6): 28. ♂-Holotype (Uganda) in Bruxelles Mus.

Distribution: Congo Republic, Uganda, Southern Sudan.

Diagnostic features: MALE: labrum with blue spots, epistome blue in front. Frons above broadly blue. Thorax with fishhook. Tibiae black with only white pruinosity. Abdomen red; segment 2 red with bollards or black with irregular red transverse band, segment 3 with bollards, 4 and 5 with distal hyphens. Penaeal lobe as in *C. rubida*.

FEMALE: labrum with pale triangles, epistome in front partly black. Thorax with very broad fishhook. Abdominal segment 2 pale with black basal and distal bands; segments 3-5 with U. Both wings all yellow.

Chlorocypha selysi (Karsch), figs. 38 and 63

1899, *Ent. Nachr.* 25: 165. A male (Togo Hinterland, Kling S.) in Berlin Mus. is probably the holotype, but not so labelled.

Libellago camerunensis Sjöstedt, 1899, *Bih. K. svenska Vetensk. Akad. Handl.* 25: 56, **syn. nov.** ♀-Holotype, teneral (Cameroons) in Stockholm Mus. (Pinhey, 1963: 152). From the description, particularly the pale face, this is evidently a female of *C. selysi*.

Distribution: Cameroons, Eastern Nigeria. Other records (Pinhey, 1962a: 150) not checked, but in the Martin collection, Paris Mus. there are males labelled "camerunensis" from Angola which are *C. selysi* [see also under *C. curta* (Hagen)].

These Angola examples were probably taken in the north of that territory and would corroborate the additional distribution through the Congo.

Diagnostic features: MALE: face in front uniformly yellow; frons above not blue in mature males. Thorax with fishhook. Tibiae black, sometimes with white pruinosity. Abdomen red; segment 2 with bollards or black with irregular red transverse band (as in *C. trifaria*); segment 3 with bollards or hyphens, 4 and 5 with hyphens. Penaeal lobe as in *C. rubida*.

FEMALE: face all yellow. Thorax with fishhook. Segment 2 with central pale mushroom or flask-shaped patch; segments 3-5 with U. Forewing yellow on costa, hindwings all yellow.

Chlorocypha victoriae (Förster)

1914, *Arch. Naturgesch.* 80: 61.

♂-type (Entebbe, Uganda) not found.

Distribution: Uganda, Congo Republic, Cameroons.

Diagnostic features: This and the following species differ from others in the *rubida*-group in developing whitish marking on the tibiae, instead of being black with white pruinosity. MALE: face black; frons usually with large blue spots. Thorax with fishhook. Tibiae white anteriorly, not pruinosity. Abdomen red; segment 2 with bollards or black with red mushroom; segment 3 with bollards, 4 with hyphens. Penaeal lobe as in *C. rubida*.

FEMALE: labrum with pale triangles, epistome in front mainly black. Thorax with fishhook. Segment 2 black with central pale disc, often with a distal stalk, and lateral pale band; segments 3-5 with U. Wings not all yellow.

Chlorocypha wittei Fraser, figs. 3 and 60

1955, *Explor. Parc natn. Upemba Miss. de Witte* 38: 10. ♂-Holotype incomplete, ♀-allotype (R. Mubale, 1480 m, Katanga) in Tervuren Mus.

Chlorocypha fabamacula Pinhey, 1961, *Oec. Pop. Rhodes-Livingstone Mus.* 14: 41. ♂-Holotype (Solwezi, Zambia), ♀-allotype (Mwini Lunga, Zambia) in National Mus., Bulawayo.

In all probability Fraser's record of *C. rubida* from Katanga, Southern Congo was *C. wittei*, since a male of this species in Edinburgh Mus. (Katanga,

Cookson 1930 donation) was labelled "rubida" by Fraser. It is probable that *C. rubida* is confined in the Congo to the northern equatorial region. Distribution: Zambia, Angola, Congo Republic, Nigeria.

Diagnostic features: MALE: face in front black; frons not broadly blue. Thorax with fishhook. Tibiae white anteriorly. Abdomen red; segment 2 with distal reniform markings, free or joined to distal end of segment; segments 3-6 with hypheans. FEMALE: very like that of *C. consuetata*.

Chlorocypha frigida Pinhey, figs. 4 and 36

1961, *Oec. Pap. Rhodes-Livingstone Mus.* 14: 43.

♂-Holotype, ♀-allotype (Ikkelenge, N.W. Zambia) in National Mus., Bulawayo. Not yet recorded elsewhere and even in that locality it is confined to certain of the streams.

Diagnostic features: MALE: face in front all blue; frons above unmarked. Thorax with fishhook. Tibiae black, with or without thin white pruinosity. Abdomen red; segments 2-5 with bollards. FEMALE: face in front all pale bluish. Thorax with fishhook.

Segment 2 with bollards; segments 3 and 4 with distal black bar. Wings hyaline.

Chlorocypha dahlia Fraser, figs. 6 and 40

1956, *Bull. Inst. fr. Afr. noire* 13: 940.

♂-Holotype (Cameroons) in Copenhagen Mus. (not examined).

In his description Fraser gives dimensions of the two original males: abdomen 22 mm, hindwing 23 mm. In the National Mus., Bulawayo, there is a series from Cameroons and Moyen Congo agreeing in most respects but of much larger size: abdomen (without appendages) 25 mm, hindwing 26.5-27 mm. Normally in this genus there is no great discrepancy in size (although the National Mus., Bulawayo, has a dwarf male of *Platycypha caligata*), but it seems probable that the Bulawayo series belongs to this species. The peculiar yellowish markings on the metepimeron of Fraser's fig. c (a flask with curved neck and a separate spot) are variable, sometimes forming a unified band.

Diagnostic features: MALE: face black; frons not blue. Thorax with broad fishhook. Tibiae black. Abdomen red; segments 2-4 with hypheans.

In the National Mus., Bulawayo, there is a large chlorocyphid female of doubtful relationship (described below) which, like the *cancellata*-group, is almost completely yellowish on the mesepisterna. The abdomen has only sparse black marking, so that it is unlikely to belong to the *cancellata*-group. This female was received from Moyen Congo with males of *C. dahlia* and it may possibly be the unknown female of this species, by comparison of the size and the abdominal marking. The yellow thorax may possibly correlate with the broad fishhook of the male. The author has seen a teneral female, probably the same species, from Joh-

Albrechtshöhe, Nord Kamerun, in Berlin Mus., where it has been placed near *A. lacuselephantum*.

FEMALE (Kelle Forest, Moyen Congo, March 1963): somewhat immature. Labium black, pale yellow posteriorly. Labrum and genae yellow; front of epistome black with traces of yellow laterally. Head dorsally with large pale spots on epistome and frons, a forcipate marking around the ocelli, joined to the occiput and thereby linked to the postocular spots.

Prothorax yellow on anterior and posterior lobes, the latter with yellow posterior flange; middle lobe black with yellow lateral and sublateral spots. Synthorax almost entirely yellow, with black patches above bases of legs, a black dorsal spot on humeral suture, a short black dorsal streak on first lateral suture and a continuous black stripe on second suture. Legs mainly blackish-brown, yellowish at bases.

Abdomen pale reddish-brown, with narrow black basal annuli and traces of other black markings: segment 1 with dorso-basal patch; segments 2-7 with distal hypheans; segment 9 dark brown with large triangular yellow lateral spot with base on distal margin; segment 10 and cerci black, the cercus about one and a half times as long as segment 10.

Hindwing entirely amber-yellow, more deeply so near base; forewing amber from base almost to nodus, but distally hyaline. Pterostigma brown with yellow centre. All discoidal cells with two cross-veins.

Abdomen 19 mm, hindwing 28.5 mm.

The uniform mesepisterna are peculiar but in the males of *C. dahlia* the fishhook is sometimes a broad band scarcely branched at all. If a teneral male could be examined it might show a condition approaching that of the above female.

GLAUCA-GROUP "*Cyanocypha*"

There is no great affinity between the species of this group but they have all diverged from the red male abdomen of the previous groups by the development of a pale blue colour (as in some of the *Platycypha*).

Chlorocypha glauca (Selys), figs. 10 and 48

1879, *Bull. Acad. r. Belg. Cl. Sci.* (2) 47: 380.

♂-Holotype (Mt. Cameroon) in Selys collection, Bruxelles Mus.

There are two varieties of the male of this striking species, one with blue extending to abdominal segment 4, followed by six scarlet segments, the other with segment 5 also in the blue region. The two forms may occur together and may be either incidental varieties or, perhaps less likely, developmental stages. The same variation may be seen in *C. curta*. They are evidently polyandrous.

Distribution: Northern Congo Republic, Cameroons, Ghana. Also stated to occur in Liberia and Guinea.

Diagnostic features: MALE: face black, frons not broadly blue. Thorax with two separate antehumeral stripes. Tibiae black, with or without pruinosity. Abdominal segments 1-4 (or 1-5) blue, 5-10 (or 6-10) red; segment 2 black with pyriform or mushroom-shaped blue patch; segment 3 (or 3 and 4) with bollards, the following segments with hyphens. Peneal lobe similar in the two forms (fig. 10). FEMALE: labrum and front of epistome partly yellow. Thorax with thick fishhook. Abdominal segment 2 pale, with black distal divergent streaks or reniform markings attached to distal margin; segments 3-5 with U. Forewing yellow except at apex, hindwing all yellow.

Chlorocypha glauca radix Longfield

1959, *Publicações cult. Co. Diam. Angola*. 45: 28.

♂-Holotype in British Mus. (Nat. Hist.). Recorded from Southern Nigeria and Ghana (inland and coast).

Diagnostic features: Differing from typical *C. glauca* in having a complete fishhook antehumeral stripe and abdominal segment 2 is black with a blue band. It thus resembles the less mature male of *C. glauca*. Segments 1-4 are blue, 7-10 red.

Chlorocypha curta (Hagen), figs. 9 and 42

1853, in Selys, *Bull. Acad. r. Belg. Cl. Sci.* 20(suppl.): 58. ♂-Holotype (Guinea) in Vienna Mus. (not examined).

Libellago decorata Karsch, 1893, *Berl. ent. Z.* 38: 34.

It is surprising to find that like *C. glauca* which has the base of the abdomen blue, the terminal segments red, *C. curta* has these colours reversed but also shows variation in number of segments of each colour: segments 7-10 are sky-blue in typical *C. curta*, but in a common variety only 6-10 are blue. In certain localities, such as the Uganda-Kenya border, only true *C. curta* occurs, whilst in certain northern Congo localities such as Bouar both colour forms are found. It would appear that subspecies have not become established and it is better to regard the forms as polychroic than subspecific.

Chlorocypha curta bicolor Fraser

1941, *Proc. R. ent. Soc. Lond.* (B) 10: 39.

Another variety or race has been recorded; in the description this is said to differ in having the distal spots on the basal segments of the abdomen linked up (like bollards) to the distal ends of these segments. Kimmins pointed out to the present author that the ♂-type of *C. bicolor* (Bagang) in British Mus. (Nat. Hist.) does not agree with the description. In this type segments 1-6 are red, 7-10 blue, segment 2 has free distal reniform spots, not joined to the distal margin, and the next segments have only distal hyphens as in typical *C. curta*. A male (Kumba, Cameroons) in the National Mus., Bulawayo, is more like the descrip-

tion of *C. bicolor* in having distal bollards on segments 2-5, that on 2 being more reniform than the others, but linked to the distal margin. The type "*bicolor*" is intermediate to this condition.

In the past, *C. curta* was at one time confused with *C. selysi* (Pinhey, 1962a: 150) and in Paris Mus. (auct. vid. 1964).

Martin's three males under "*curta*" are two Angola males (labelled "*camerunensis*") of *C. selysi* and one of *C. luminosa*.

The interest in this fact lies in the possibility that Martin may have known Sjöstedt was describing his *C. camerunensis* (Sjöstedt, 1899) from Cameroons. Sjöstedt described this latter species from a female, whereas Martin's two males might have been available and would have been more readily identifiable. There is no doubt that these males are typical *C. selysi*, with the yellow face and the irregular red band on abdominal segment 2.

Distribution of *C. curta*: western Kenya, Uganda, Northern Congo Republic, Gabon, Cameroons, Nigeria, Guinea.

Diagnostic features: MALE: labrum with pale spots, epistome black; frons above without large blue spots. Thorax with fishhook. Tibiae white anteriorly. Abdomen red on segments 1-6 (or 1-5), blue on 7-10 (or 6-10); segments 2-6 normally with only free distal hyphens or small spots, but in f. *bicolor* segments 2-5 has larger irregular spots, free or joined like bollards. Peneal lobe similar in the two colour forms but not examined in *C. bicolor*.

FEMALE: labrum with yellowish band, epistome partly black in front. Thorax with fishhook. Prothoracic posterior ledge yellow. Abdominal segment 2 pale coloured with free distal spots or with a partial black-framed central flask-shaped mark; segments 3-5 with thin U. Wings hyaline.

Chlorocypha seydeli Fraser

1958, *Revue Zool. Bot. afr.* 57: 109.

♂-Holotype, ♀-allotype (Congo) in Tervuren Mus. Recorded so far only from the Congo Republic.

Diagnostic features: Like *C. glauca* this species has a blue and red abdomen but there is an advance on that species in leg display, the middle and hind tibiae being yellow anteriorly.

MALE: labrum with small blue dots, epistome in front black, frons with blue spots. Synthorax with one very broad antehumeral band or a broad fishhook. Tibiae yellow anteriorly. Abdominal segments 1-5 blue, 6-10 red; segments 2 and 3 with distal spots or bollards; 4-6 with hyphens. Peneal lobe as in *C. aphrodite*.

FEMALE: face all yellowish. Thorax with fishhook. Segment 2 with black bollards; segments 3-5 with black longitudinal lines (instead of a U) enclosing a pale hour-glass pattern. Forewing hyaline, hindwing yellow with brownish apex.

Chlorocypha aphrodite (Le Roi), figs. 11 and 62

1915, *Ergebn. 2. dt. ZentAfr. Exped.* 1: 331.

Type males said to be in Senckenberg Mus. and Hamburg Mus., but not examined

during this survey. In the males of this and the following species nearly all the abdominal segments are blue (as in certain *Platycypha*).

Distribution: Northern Congo Republic and Moyen Congo.

Diagnostic features: MALE: face all black; head above with large blue spots. Thorax with fishhook. Tibiae white on anterior surface. Abdomen blue; segment 2 with bollards, 3 with bollards or free spots, 4 and 5 with small spots.

FEMALE: labrum yellow, epistome partly black. Thorax with thick fishhook or a complete greenish ring. Segment 2 with bollards; segments 3-5 with black U. Forewing yellowish except at apex, hindwing all yellowish.

Chlorocypha croceus Longfield

1947, *Archives Mus. Boenge* 16: 17.

♂-Holotype, ♀-allotype (Angola) in British Museum (Nat. Hist.).

Of this small species allied to *C. aphrodite* further specimens were collected by Father Eduardo to the north of Cuché, Angola, November 1951, which have the thorax entirely black, a criterion of age or perhaps a melanistic variation.

Diagnostic features: MALE: small, face and frons mainly black. Thorax with slender fishhook. Tibiae yellowish on anterior surface. Abdomen blue; segment 2 black with yellow lateral stripe; segments 3-9 with hyphens. Peneal lobe not examined (no examples in the National Mus., Bulawayo).

FEMALE: face mainly yellow. Thorax with fishhook. Segments 2-7 black, with two pale central streaks and a distal dot. Wings with yellow subcostal streaks.

CANCELLATA-GROUP

This small group is distinctive and characterized by the mesepisternum in both sexes being nearly covered by an extremely broad yellowish antehumeral stripe; subbasal segments of abdomen in male with broad black U markings; inner branch of peneal apex filamentous, not lobed apically. It is probable that the two species mentioned here are colour variants of the same species (vide *C. glauca* and *C. curta*), but in the author's experience they have occurred separately (in the same season). The distribution overlaps in countries but may possibly be isolated locally or ecologically.

Chlorocypha cancellata (Selys)

1879, *Bull. Acad. r. Belg. Cl. Sci.* (2)47: 383.

Two ♂-cotypes (Mongo-Malobata, Cameroons) in British Mus. (Nat. Hist.).

Distribution: Northern Congo Republic, Moyen Congo, Cameroons, Eastern Nigeria. Also recorded from Guinea but this has not been checked.

Diagnostic features: MALE: face black, frons not blue. Thorax with very broad yellow pyriform antehumeral stripe. Tibiae black. Abdomen reddish or

greenish on segments 3-6, 7-10 violet; segment 2 black with broad greenish saddle; 3-6 with very broad black U or distal band. Peneal lobe as in *C. hintzii*.

FEMALE: labrum with yellowish triangles, epistome in front black. Synthorax as in male. Segment 2 with black band at distal end; segments 3-5 with thin U. Forewing hyaline, but hindwing yellow, unlike *C. hintzii*.

Chlorocypha hintzii (Grünberg), figs. 8, 41, 43, 46 and 61

1914, *Ent. Rdsh.* 31: 53. ♂-Holotype and ♀-allotype (Ekom-Bavinga, Cameroons) in Berlin Mus. Probably the type locality is that now known as the Ikom-Bamenga region of the Nigerian-Cameroons border.

Chlorocypha regalis Pinhey (ined.).

♂-Type (Uganda) in the British Mus. (Nat. Hist.) has been placed in synonymy (Pinhey, 1962a: 149).

Distribution: Uganda, the Ituri forest region of the Congo, Cameroons.

Diagnostic features: male differs from *C. cancellata* in having segments 3-5 reddish or greenish, 6-10 violet. Female differs in having both wings hyaline.

NEPTUNUS-GROUP

A single small dull coloured species (abdomen c. 18 mm, hindwing c. 20 mm.) with extensive black markings on the abdomen of both sexes. Peneal lobe with external branch directed posteriad to a point. The abdomen of the male ranges in colour from yellow to dull reddish, heavily marked with black (fig. 53). This is probably the most primitive existing species of recorded African chlorocyphids, retaining, perhaps, ancestral characters prior to the development of striking male colour features which arose through heavy selective competition in equatorial Africa. The tibiae, however, indicate that leg display has been developed.

Chlorocypha neptunus (Sjöstedt), figs. 16, 49, 52 and 53

1899, *Bih. K. svenska VetenskAkad. Handl.* 25(2): 54. ♂-Holotype, ♀-allotype (Cameroons) in Stockholm Mus. (not examined).

Libellago sperata Martin (ined.)

Series of both sexes, not labelled types (Cameroons), in Martin collection, Paris Mus.

Distribution: Cameroons.

Diagnostic features: Small or smallish species, hindwing 18-21 mm. MALE: face and frons black. Thorax with fishhook. Tibiae yellowish on anterior surfaces. Abdomen black and yellow, dull reddish terminally; segment 2 black with yellow centre; 3-5 or 6 with very broad black U; 6-10 or 7-10 with only black distal traces.

It is evident that this is another species with dimorphic males, the larger males having less black, i.e. no black U on segment 6, as in Martin's undescribed "*sperata*". One male in Paris Mus. has only the partial limbs of a U on segment 5.

FEMALE: labrum with separate yellow spots, epistome in front black. Thorax with fishhook. Abdominal segments with thick black U, or almost all black with central yellow spots on most segments. Wings not yellow.

GRANDIS-GROUP

This group has diverged from all other known African *Chlorocypha* species in developing a more slender build, the abdomen cylindrical instead of triangular in cross-section, segment 3 of the male, taken as a measure, being more than twice as long as broad. The cerci of the female are more elongate than in the other groups, being about two and a half times as long as segment 10 (c.f. figs. 50-52). In *C. grandis* the penaeal branches are so distinct that it might be considered in a quite separate group by itself. In general features, however, it has similarities, other than morphological, which make it convenient to consider the remaining species together in a single group: for instance the sparse markings on most of the abdomen (segments 4-10) of the male and the broken yellow lateral stripe on the abdomen of the female. None of the known species has developed a blue colour the markings of the male being yellow and red.

Chlorocypha grandis (Sjöstedt), figs. 13, 30, 51 and 64

1899, *Bih. K. svenska Vetensk. Akad. Handl.* 25(2): 58. ♀-Holotype in Stockholm Mus.

Chlorocypha gracilis (Karsch), 1899, *Ent. Nachr.* 25: 163.
♂-Holotype (female not seen in Berlin Mus.) (Joh.-Albertshöhe, Cameroons) in Berlin Mus.

Distribution: Moyen Congo, Cameroons. Also said to be found in the Northern Congo Republic and Guinea.

Diagnostic features: A very black species. MALE: face, head and thorax all black. Abdominal segments 1 and 2 all black; 3 black with a red spear-head; 4-6 red with distal hyphens. Inner branch of penaeal lobe short and inflated apically into a shoe-shaped lobe.

FEMALE: labrum black with yellow centre, epistome in front black. Antehumeral stripe a reduced fishhook (a hooked stripe). Abdomen with yellow lateral stripe; segment 2 black with yellow centre; segments 3-5 with very thick U. Wings hyaline.

Chlorocypha tenuis Longfield

1936, *Trans. R. ent. Soc. Lond.* 85: 468. ♂-Holotype, ♀-allotype (Kibale Forest, Toro, Uganda) in British Mus. (Nat. Hist.).

Libellago alata Martin (ined.). ♀-Type (Ruwenzori) in British Mus. (Nat. Hist.).

Distribution: Western Kenya, Uganda.

Diagnostic features: MALE: face and frons black. Antehumeral marking in form of a ring. Hind tibiae with short white streak on anterior surface. Abdomen red; segments 2-5 with hyphens. Penaeal lobe similar to *molindica* Fraser.

FEMALE: face pale. Thorax with ring-shaped antehumeral marking. Segments 2 and 3 with distal hyphens; segment 4 with thin U. Wings hyaline.

Chlorocypha molindica Fraser, figs. 7, 21, 33, 39, 45 and 66

1948, *Proc. R. ent. Soc. Lond. (B)* 17: 9. ♂-Holotype, ♀-allotype (Molindi River, Congo) in Tervuren Mus.

Libellago graueri Schmidt (ined.). ♂-Type (Urw. Mawambi, 1910, Grauer) in Vienna Mus.

Chlorocypha longfieldi Fraser (ined.).
Type ♂ ♀ (Molindi River, Parc Nat. Albert, 1934) in Parcs Dept., Bruxelles Mus. In build and markings this pair is similar to *C. molindica* but the head of the male (which in *molindica* has the characteristic yellow band of four spots) is lost. The female, however, has the yellow band on the head and the locality is topotypical. The red marking on segment 2 of the male is of the spear-head pattern.

Distribution: Uganda, Northern Congo Republic, Ruanda Urundi.

Diagnostic features: MALE: face and frons black, vertex with characteristic transverse band of four irregular yellow spots. Antehumeral marking an incomplete ring or all black. Hind tibia with short white streak. Abdomen red; a yellow lateral stripe; segment 2 black with red central wingglass or spear-head mark; segments 3-6 with hyphens. Penaeal inner branch ending in a broad lobe.

FEMALE: labrum yellow, epistome in front black. Antehumeral as in male. Segments 2-5 with U. Wings hyaline.

Chlorocypha molindica hasta Pinhey, **comb. nov.**

1960, *Oec. Pop. natn. Mus. Sth. Rhod.* 24(B): 510.

♂-Holotype, ♀-allotype (Lubungwe River, Kasangazi, Lake Tanganyika, 1960) in the National Mus., Bulawayo.

It seems probable that this is a south easterly race of *C. molindica*, so far only recorded from the eastern shores of Lake Tanganyika.

Diagnostic features: MALE: differs from *C. molindica* in having one isolated yellow triangle on either side of the vertex instead of a band of spots; the side of the thorax is mainly yellow (like *C. tenuis*) instead of black with yellow bands; tibiae black only; segment 2 has a spear-head and a distal yellow dot below it. Penaeal lobe as in *C. molindica*. FEMALE: (teneral) on the vertex differs as in the male, thus lacking the band of spots; side of thorax mainly pale, whereas in *S. molindica* these are black streaks.

Chlorocypha collarti (Navás)

1929, *Revue Zool. Bot. afr.* 18: 111.

♀-Holotype (Kuni, Mayumbe, Congo Republic, leg. A. Collaert) in Tervuren Mus.

The ♀-type is teneral, the markings consequently not very distinct, but it is very close to *C. molindica hasta*. Discovery of a male from the type locality would be the surest way of deciding whether any synonymy exists here.

Diagnostic features: FEMALE: labrum with single yellow basal spot; markings on head sparse (as in *C. hasta*). Antehumeral a broken ring. Abdomen with yellow lateral band. Segments 2-5 with only distal hyphens.

The ♀-type *C. collarti* as well as the ♀-allotype and ♀-paratype of *C. molindica hasta* are all teneral so that close comparisons with a mature female are not possible. *C. collarti* may be conspecific with *C. molindica* (s.l.) or a very immature *C. grandis* or *C. jacksoni*.

Chlorocypha jacksoni Pinhey, fig. 34

1952, *Occ. Pap. Coryndon meml. Mus.* 3: 13.

♂-Holotype, ♀-allotype (Mafuga Forest, Western Uganda) in British Mus. (Nat. Hist.).

So far only recorded from the one forest area in Western Uganda.

Diagnostic features: MALE: face and frons blackish. Synthorax with a characteristic short yellow antehumeral only at ventral end of mesepisternum, crossing the humeral suture and continuous with the yellow lateral marking. Tibiae black. Abdomen red; segments 2-5 with distal hyphens. Peneal lobe as in *C. molindica*. The inferior anal appendages are slightly over half the length of the superior unlike most species.

FEMALE: labrum blackish, epistome in front mainly black. Antehumeral in the form of a ring. Segments 2-5 pale with black distal transverse bands. Wings hyaline.

Chlorocypha jacksoni basilewskyi Fraser, **comb. nov.**

1955, *Annls Mus. r. Congo Belge Sér. Div.* 36: 23.

♂-Holotype, ♀-allotype (Bururi, Urundi) in Tervuren Mus. So far only recorded from Burundi.

Diagnostic features: MALE: like *C. jacksoni*, the antehumeral stripe is short, ventral and crosses the humeral suture. Unlike *C. jacksoni* the tibiae have developed a whitish line. Face and frons black. Abdomen red; segment 2 black with yellow median band; 3-5 with distal hyphens. Peneal lobe not examined (no male in National Mus., Bulawayo).

FEMALE: face yellow. Antehumeral a broken ring. Segment 2 pale with distal triangular spot; segments 3-5 with thin U. Wings hyaline.

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