

*Protaphis* but bearing fewer hairs. The long empodial hairs and the presence of 3 hairs on all first tarsal segments will distinguish *Swirskiphis* from many other Aphidina.

#### *Szelegiewiczziella* Holman 1974

The 4-segmented antennae with processus terminalis 3.5–5.4 times as long as the base of the last antennal segment and tergites 1–6 of the abdomen comprising a sclerotic shield are characteristic. In many ways resembling *Shaposhnikoviella* of the Anuraphidina but distribution of the lateral abdominal tubercles and the long fine antennal hairs are characteristically aphidine.

#### *Toxoptera* Koch, 1856 (Figs. 40–49)

The presence of a stridulating mechanism distinguishes *Toxoptera* from all other Aphidinae. Tao (1961) keyed the known fauna and Eastop (1966) gave a key to the three widely distributed species. *Toxoptera* was once used for all *Aphis*-like species with a once branched media in the forewing, including the greenbug, *Schizaphis graminum* (Rondani) of the subtribe Rhopalosiphina.

#### *Toxopterina* Börner, 1940 (Fig. 36)

The large lateral abdominal tubercles, pointed cauda and long processus terminalis 4.5–5.0 times as long as the base of the sixth antennal segment distinguish the apterae from other genera and the once branched media of the forewing distinguish the alatae from most other Aphidina.

#### *Xerobion* Nevsky, 1928

Included from the original description and subsequent redescription.

#### *Xerophilaphis* Nevsky, 1928

Many of the species originally described in *Xerophilaphis* are similar to the type-species of *Clypeoaphis* Soliman, 1937, which has been regarded as a synonym of *Xerophilaphis* Nevsky, 1928. However, the type-species *X.saxaulica*, while otherwise agreeing with

*Clypeoaphis*, is described as having the arrangement of lateral abdominal tubercles characteristic of the Aphidina.

#### *Zyxaphis* Knowlton, 1947

*Z.utahensis* Knowlton, 1947, the type-species, has the median hairs of abdominal tergites 6–8 placed on spinal tubercles. It seems reasonable, however, to include the otherwise similar North American species of *Aphis*, even though they lack the spinal tubercles.

#### Acknowledgments

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## West African species of *Macromia* (Odonata: Corduliidae) belonging to the *picta* and *sophia* groups

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ABSTRACT. *Macromia amicorum* sp.n., a member of the *picta* species-group, is described from Nigeria and the Ivory Coast, and is compared with both sexes of the closely related species *flavimitella*. A key is provided to members of the *sophia* species-group.

#### Introduction

The genus *Macromia* Rambur 1842 is made up of large to medium-sized insects, predominantly black and yellow in body colour, often with a metallic sheen, and with the eyes emerald-green during life. They are powerful fliers, and the genus is world-wide in distribution, being known from N. America, S. Europe, Africa (especially the tropical regions), India, the Far East, S.E. Asia, and Australia. About thirty African species are known, and a number of others have been described, but many of these have been, or probably will be, found to be synonyms as the various species-groups come to be revised.

The genus does not readily fall into clearly defined species-groups. Selys (1878) tried to split off a separate genus *Phyllomacromia*, but this has not stood the test of time. As more species were discovered the characters used to distinguish *Phyllomacromia* were found to turn up indiscriminately in both groups. Authors have now reverted to the name *Macromia* for all of them, and each has his own ideas of what constitutes a species-group, the term being used loosely to signify little more than such-and-such a species and those most closely related.

In a previous communication (Gambles, 1971) an account was given of five species of *Macromia* inhabiting the Savannah zone of Nigeria (four of them belonging to the *picta*

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group), and reference was made to other species from the more forested regions further south, which differed by a more sombre coloration.

The present paper describes a further member of the *picta* group recently discovered by several workers in Nigeria and the Ivory Coast, and compares it with the closely related *flavimitella* from Zaire, previously known from a single male. Further material of the latter species of both sexes has recently been found in the Central African Empire, so that a more careful comparison has been made possible.

The opportunity has also been taken to review the members of the *sophia* species-group, and other superficially similar species with which they have been confused in the past, or with which confusion could easily arise if due attention is not called to features which are of importance in identification. Type material has been re-examined, various discrepancies in the literature cleared up, and new synonymy established.

#### Abbreviations for depositories

BMNH, British Museum (Natural History), London; CUMZ, Cambridge University Museum of Zoology; DALDC, Professor D. A. L. Davies' collection; IARS, Institute for Agricultural Research, Samaru, Nigeria; IPNC, Institut des Parcs Nationaux du Congo, Bruxelles; IRSNB, Institut Royal des Sciences

Naturelles de Belgique, Bruxelles; MAC Musée de l'Afrique Centrale, Tervuren (Bruxelles); MJPC, Professor M. J. Parr's collection, Department of Biology, Salford University; MNHNP, Museum National d'Histoire Naturelle, Paris; MNHUB, Museum für Naturkunde, Humboldt-Universität zu Berlin; NMB, National Museum, Bulawayo; RMGC, R. M. Gambles' collection; RPLC, Dr R. P. Lindley's collection; SACC, Dr S. A. Corbet's collection, Department of Applied Biology, Cambridge University.

### The *picta* group

*Macromia picta* Hagen in Selys 1871 is one of the commonest and most widespread African species of the genus. There are a number of other species superficially similar and usually indistinguishable on the wing, generally considered to be its fairly close relatives. These are all medium sized Odonata with three lateral yellow stripes on the thorax, superior anal appendages a bright yellow, the abdomen conspicuously patterned with black and yellow for most of its length and measuring between 32 and 38 mm, with a hindwing of 30–35 mm. These are loosely referred to as the *picta* group. They can be divided into two sub-groups, the *picta* sub-group (*picta*, *amicorum* and *flavimitella*), characterized by the presence of a 'horn' on the dorsum of the tenth segment, a conical projection surmounted by a tuft of stout setae, directed in an oblique posterior direction; and the *africana* subgroup, in which this subterminal horn is absent. Related to *africana* Selys 1871 are *pseudofrancana* Pinhey 1961 and *nigeriensis* Gambles 1971. But as further species with a general resemblance come to be added, the group becomes more and more difficult to define. Distinguishing features are not all of equal value, species or colour-forms tending towards melanism in damp forested areas, and the number of cells and cross-veins increasing with the size of the insect, so that species intermediate in size between the smaller and paler *picta* group of the savannah and the large dark *sophia* group of the forest regions become difficult to classify into distinct species-groups, even though it is mostly simple to separate them into individual species.

The new species described below resembles

*picta* and *pseudofrancana* in general appearance, somewhat similar to the latter in the shape of the hamules, and with a dorsal abdominal spine almost identical with that of the former.

Fraser (1954), in the most comprehensive review of African *Macromia* published to date, found himself unable to define any clear-cut species-groups, owing to the uneven distribution of useful diagnostic characters among the various species. So he propounded a formula for each species by which the presence of twenty-three stated characters was indicated by a letter of the alphabet. This formula can be very useful, but it has definite limitations, both because some of the characters can be variable, and also because some of the species have been found to share the same formula with others described later. Thus *picta*, *flavimitella* and *amicorum* share the formula ACGJMSTUW. Fraser's (1954) figure of the abdominal markings of *picta* shows, incidentally, hamules which can only belong to *amicorum* or *flavimitella*, probably the former. In an earlier paper (1971) I suggested the possibility that this figure might have been based on a damaged specimen of *pseudofrancana*, repaired by the addition of the terminal segments of a *picta*. But the discovery of a further species, combining hamules like those of one species with the subterminal spine of the other species, shows that this criticism was wholly unjustified. In the same way Schmidt (1951) figures as *picta* a similar specimen in the Berlin Museum which by its hamules must have been either *amicorum* or *flavimitella*, probably the latter (from Neu-Kamerun, leg. Tessimann), so it seems possible that there may be a number of specimens labelled *picta* in various collections which are actually either *flavimitella* or *amicorum*. Dr K. K. Günther of the Berlin Museum (personal communication) tells me that Tessimann's specimen of '*picta*' cannot now be traced, so that it is not possible to decide for certain the specific identity of Schmidt's 1951 figure.

### *Macromia amicornum* sp.n.

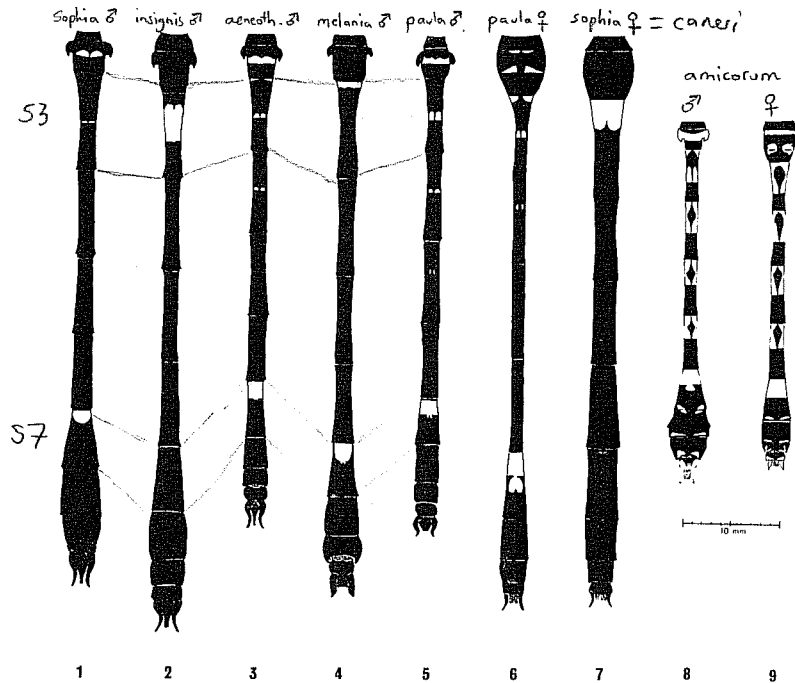
Holotype ♂. Head: labium yellow, with brown line along borders of lateral lobes where they meet each other; labrum and anteclypeus ferruginous brown, yellow where they

join; postclypeus mostly yellow; frons deep ferruginous turning to dark brown dorsally with bluish metallic sheen on dorsum of horns, yellow at sides and with transverse yellow band on dorsum posterior to horns; vertex black with slight metallic sheen, grooved in centre to form two small tubercles; occiput black, hind margin bilobed.

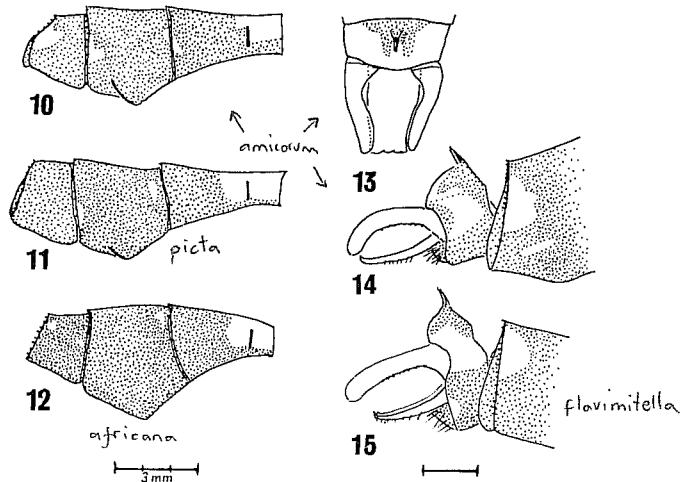
Pterothorax: dorsum dark brown, almost black, central carina and ante-alar sinuses yellow; yellow antehumeral, mediolateral, and metepimeral stripes, separated by blackish-brown stripes of uniform colour; legs black, fore femora marked extensively with yellow on ventral (posterior) surface; hind tibiae with

bright yellow keels ventrally; all coxae yellowish brown, trochanters of forelegs yellow, and of both other pairs black.

Abdomen: slender, slightly clubbed, black and yellow (details in Fig. 8), resembling *picta* and *pseudofrancana* in having post-jugal black on segments 3–6 with straight transverse anterior margin, instead of coming to a point mid-dorsally with slight lateral yellow posterior to jugal suture as in *africana* and *nigeriensis*; segment 2 with orellets yellow; segment 8 with foliations less pronounced than in *africana* and *nigeriensis*, shaped more like *picta* and *pseudofrancana*, and with slight notch like that of *picta* but rather more



FIGS. 1–9. Abdominal markings of *Macromia* species, dorsal view, semidiagrammatic. 1, *sophia*, ♂ holotype; 2, *insignis*, ♂ holotype (reconstructed); 3, *aeneothorax*, ♂ holotype (reconstructed); 4, *contumax*, ♂ holotype (i.e. *melania*); 5, *paula*, ♂ labelled '*bicornis*' by Fraser, Bombona, Zaïre; 6, *paula* ♀ holotype; 7, *sophia*, ♀, Cameroun (S. A. Corbet); 8, *amicorum*, ♂ holotype; 9, *amicorum*, ♀ paratype. The scale on each figure represents 1 mm, unless otherwise indicated.



FIGS. 10–15. *Macromia* species (10–12, abdominal segments 7–9 of males, lateral view from right to show foliations on segment 8); 10, *amicorum*, holotype; 11, *picta*, Vom, Nigeria; 12, *africana*, Vom, Nigeria. 13–15, segment 10 and appendages of males; 13, *amicorum*, holotype, dorsal; 14, ditto, lateral from right; 15, *flavimitella*, Central African Empire, lateral from right.

marked (Figs. 10–12); segment 10 with raised dorsal cone bearing spine (clump of stout setae) of shape similar to that of *picta* (Fig. 14), dark-coloured with conspicuous yellow stripe posteriorly from base of spine to hind margin of segment; extensive yellow patches at postero-lateral angles of this segment; posterior margin without spines; superior appendages yellow, commencing straight but bending downwards a little after half their length (much straighter in *flavimitella*); inferior appendage roughly rectangular in shape, and coloured brown both dorsally and ventrally (Figs. 13–15).

Accessory genitalia: genital lobes yellow and elongated, as in *pseudofricana* but to a much greater extent, projecting considerably beyond hook of hamule (by approximately same length as hook does beyond ventral projection); in ventral view extremities of lobes flattened and slightly expanded, forming structures similar to the apposed cupped palms of human hands, into which the hooks of the hamules fit (Fig. 17); hamules black, with

angular projection on ventral border (Fig. 19), not so sharp as in *pseudofricana*, and terminal hook wider and more curved.

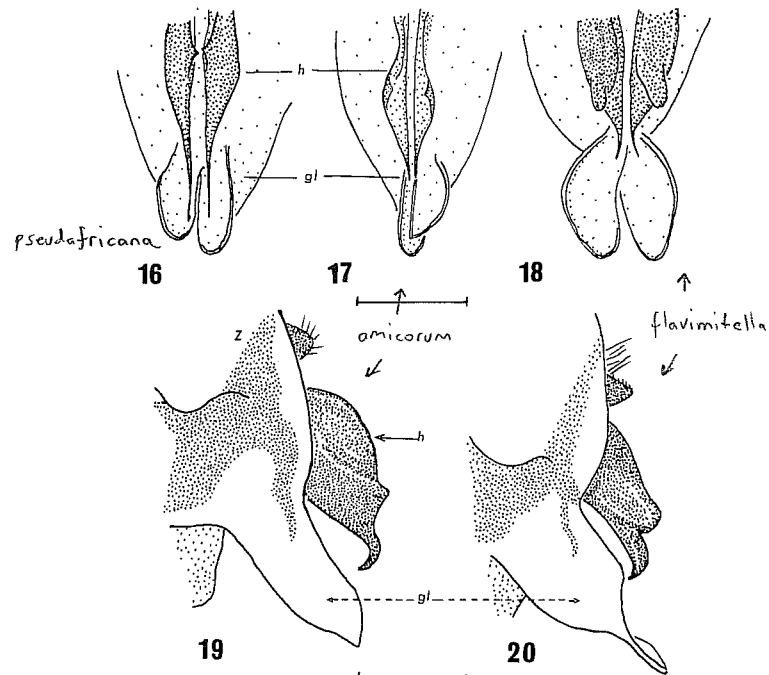
Wings: hyaline, venation medium brown, with narrow yellow streak along groove of costa (wider and more obvious in some of the paratypes); nodal formula

$$\begin{array}{ccc} 6 & 14 & 14 & 5 \\ 8 & 9 & 9 & 7 \end{array}$$

discoidal field starting with single row in all wings; four Cuq in all wings; anal loop with six cells, anal triangle with two; excavation between membranule and tornus intermediate in depth between *picta* and *pseudofricana* (Figs. 21–23); membranule pale brown, whitish at base; pterostigma brown, 2.4 x 0.65 mm in forewings, 2.35 x 0.65 mm in hindwings.

Length of abdomen (excluding appendages), 35.5 mm; hindwing 31 mm.

Paratype ♀ (from type locality). Colour and pattern similar to those of holotype,



FIGS. 16–20. *Macromia* species. Hamules (h), and genital lobes (gl) of males (16–18 viewed ventrally and slightly anteriorly, 19–20 viewed laterally from right); 16, *pseudofricana*, Vom, Nigeria; 17, 19, *amicorum*, holotype; 18, 20, *flavimitella*, Central African Empire.

except that the ferruginous has not yet darkened to brown on dorsum of frontal horns, and vertex more blue-black than black; yellow annulus on anterior half of segment 2 divided into two yellow spots, as in most females of genus (Fig. 9); pattern of hind segments as in Fig. 25; hind margin of segment 10 with row of small spines; appendages yellow, 0.95 mm long, 0.35 mm wide at base, tapering to a point, lateral border straight, medial border convex.

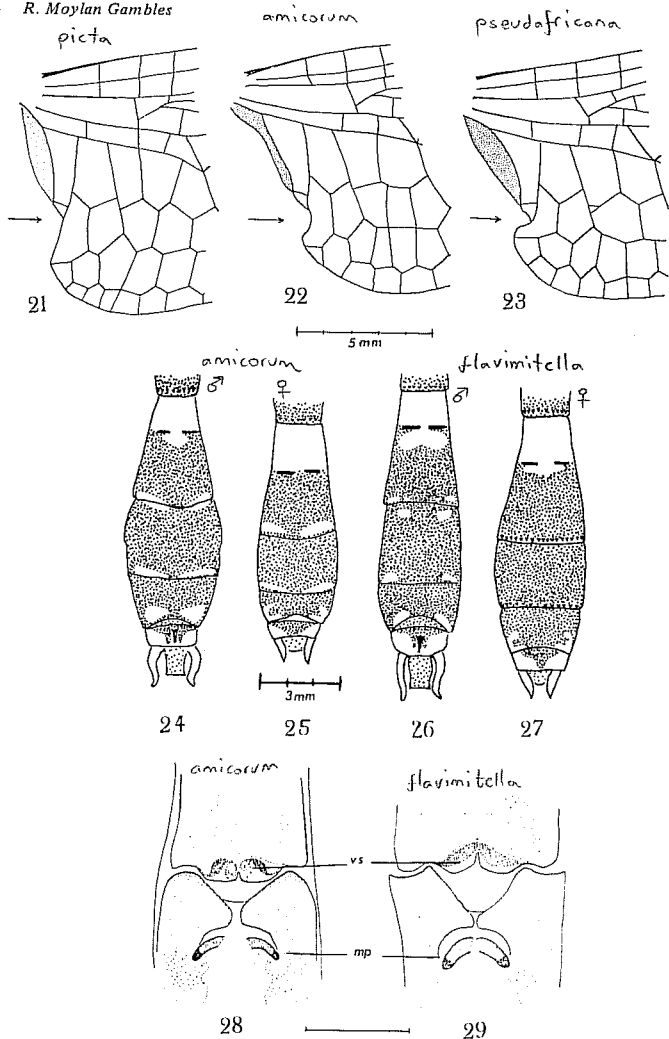
Genitalia: hind end of eighth sternite step-like, with vulvar scale turned dorsad, posterior margin curved with notch in centre, dividing scale into two halves; heavier chitinization on

either side of notch forming two roughly quadrilateral areas (Fig. 28); median processes separated at base by distance approximately half length of process, processes widely divergent, free ends cylindrical for short distance before being rounded off; length of processes 0.35 mm, breadth 0.09 mm; length of free extremity 0.09 mm, breadth 0.06 mm.

Wings: nodal formula

$$\begin{array}{ccc} 5 & 12 & 13 & 5 \\ 7 & 9 & 9 & 7 \end{array}$$

discoidal field starting with single row in all wings; four Cuq in forewings, three in hindwings; seven cells in anal loop; pterostigma



FIGS. 21–29. *Macromia* species. 21–23, anal margins of male hindwings, to show extent of excavation, marked by arrow: 21, *picta*, Vom; 22, *amicum*, holotype; 23, *pseudaficana*, Vom. 24–27, pattern of abdominal markings, segments 7–10, dorsal view; 24, *amicum*, holotype; 25, ditto, ♀; 26, *flavimitella* ♂; 27, ditto, ♀. 28–29, vulvar aperture of female, showing vulvar scales (vs) and median processes (mp); 28, *amicum*; 29, *flavimitella*.

yellow brown than in holotype, 2.6 × 0.7 mm in forewings, 2.55 × 0.77 in hindwings.

Length of abdomen (excluding appendages) 35 mm; hindwing 31 mm.

*Holotype* ♂. IVORY COAST: River Bandama, near Korhogo, iv. 1971 (R. P. Lindley) (RMGC).

*Paratypes*, 10 ♂ 8 ♀. IVORY COAST: Bandama, and associated rivers and lakes between Bouafilé and Korhogo, 8 ♂, 6 ♀ (R. P. Lindley) (RPLC). 1 ♀ from type-locality (R. P. Lindley) (RMGC). River Nzi, E. of Katiola, 1 ♀ (A. J. Edwards) (CUMZ). NIGERIA: Assob Falls, 1 ♂ (M. J. Parr) (MJPC). Kagoro, 1 ♂ (J. C. Deeming) (IARS).

#### *Macromia flavimitella* Pinhey

*Macromia flavimitella* Pinhey, 1966a; 30–32. [*Macromia* species near *aequatorialis* (Martin) of Pinhey, 1961: 109 and Plate 8, misidentification.]

♂. As described by Pinhey (1966a), except in a few small particulars. In general closely resembles *amicum*, but has some of the yellow markings slightly more prominent, and there are considerable differences in the accessory genitalia.

Genital lobes large, yellow, and flattened as in *amicum* to form structures like the cupped palms of human hands (Pinhey likened them to hoods, covering the hooks of the hamules, from which the name is derived), but whereas in *amicum* the palms are apposed, in *flavimitella* they are pronate (appearing supinate in ventral view). As a result of this, they appear very narrow in lateral view, and are also very much more flexible at the 'wrists', and so are easily distorted downwards and forwards; hook of hamule similar to that of *amicum*, stouter and more curved than in *pseudaficana*, but where these two species have a short and somewhat pointed projection on the ventral border, *flavimitella* has a large prominent rounded lobe, slightly lateral to origin of hook (Fig. 20).

Pinhey comments on the black and elongated anterior lamina, but the structure that he figures must be one of the anterior hamules

(the main hamules are the posterior ones), which are rather large in this species. In *flavimitella*, as in most other *Macromia* species, the anterior lamina is a reduced and inconspicuous structure.

There is more yellow on segment 7, posterior to the jugal marks, than there is in the male of *amicum*. The superior anal appendages are yellow, and straighter than those of the latter species (Figs. 14 and 15).

♀. Head: labium, sides of mandibles, labrum, clypeus, and frons yellow, anterior surface of frons suffused with deep reddish orange, lateral lobes of labium brownish where they meet, and centre of labrum brownish; vertex dark metallic blue, grooved in centre to form two small tubercles; occipital triangle dark brown.

Prothorax dark brown; pterothorax brown with yellow ante-alar sinuses, antehumeral, mediolateral, and metepimeral stripes; forelegs with coxae and trochanters yellow, femora black with ventral surface marked extensively with yellow, tibiae and tarsi black; mid- and hindlegs all black except for reddish brown coxae.

Abdomen black marked with yellow, segments 4–6 with sharp transverse division between yellow and post-jugal black (the other two females agree, unlike most males examined, which had 3–6) as in *picta*, *pseudaficana*, and *amicum*, with usual black diamond-shaped mark on yellow half (Fig. 41); 7–10 as in Fig. 27, with some yellow visible posterior to jugal marks in 7, unlike the female *amicum*, which has no post-jugal yellow; anal appendages yellow, short, pointed, lateral border almost straight, medial border convex, length 1.1 mm, width at base 0.4 mm; hind margin of 10 with row of small black spines.

Genitalia: hind end of eighth sternite and vulvar scale very similar to those of *amicum*, differing chiefly in the amount and shape of the heavier chitinization; median processes stouter, stumper, closer at their bases, and less divergent, 0.4 × 0.18 mm; free portion rounded off from commencement, 0.13–0.15 mm wide at base, 0.13 mm long. The appearance of the median processes provides a simpler and surer way of separating the females of the two species than do the vulvar scales themselves (Figs. 28 and 29).

Wings: nodal formula

7	$\frac{14}{15}$	13	7
9	$\frac{9}{8}$	9	9

discoial field starting with two rows of cells in all wings; four Cu<sub>1</sub> in forewings, three in hindwings; nine and ten cells in anal loop; pterostigma ochreous brown; costa dark brown grooved with yellow; membranule greyish brown, whitish for basal third.

Length of abdomen (excluding appendages) 37 mm, hindwing 34 mm.

*Material examined* (15 ♂, 3 ♀). CENTRAL AFRICAN EMPIRE. Ouham and Nana Rivers, near Bouar, 13 ♂, 3 ♀ (*R. P. Lindley*) (RPLC). Same locality, 1 ♂ (*R. P. Lindley*) (RMGC). UGANDA, Aswa River, 1 ♂ (*V. G. L. van Someren*) (BMNH). (The ♂ holotype, ZAIRE, Garamba National Park, is in IPNC, not examined).

#### Comparison of the two species

These species differ chiefly in the accessory genitalia of both sexes, described in detail above (Figs. 17–20, 28–29). Colour and pattern are very similar, but *amicorum* has the yellow band on segment 7 with less yellow projecting posterior to the jugal marks, a little in the male and none in the female. In *flavimitella* the female has a small amount of yellow posterior to the jugal marks, the same as in the male *amicorum*, and the male has considerably more (Figs. 24–27). The apical half of the superior appendage of the male is more curved in a ventral direction than the straighter *flavimitella*. Also, *amicorum* is generally slightly smaller, ♂ hindwing 29.5–32 mm (mean 31,  $n=10$ ), and *flavimitella* 29.5–33 mm (mean 32,  $n=16$ ). The male *flavimitella* tends to have rather fewer antenodal cross-veins, in spite of its slightly larger size, 12 being the commonest number (over half of thirty-two wings noted, the rest having 11, 13 or 14), as against 13 in *amicorum* (half of twenty wings, the rest with 12, 14 or 15). In the hindwing *flavimitella* had 8 in over half of twenty-nine wings noted (range 8–10), as against 9 in *amicorum* (well over half of twenty wings, range 8–10). The females are

not compared, as only three of *flavimitella* are known. Similarly *flavimitella* males tend to have fewer cells in the anal loop, five cells in well over half of eighteen hindwings noted (range 5–8), while *amicorum* had six in over half of twelve hindwings (range 6–8). In the females of either species there are more than in the males, usually nine or ten.

#### The *sophia* group

*Macromia sophia* Selys, unlike *picta*, is neither common nor widespread, but it is a species that has been widely recorded in the literature. These records have more often than not referred to one or other of several species with which it has been confused. The species-group as I prefer to define it is restricted to *sophia*, *insignis*, *aureozona* and *aeneothorax*, species apparently closely related, and characterized especially by long, tapering, slightly bisinuous superior appendages in the male, at least 3 mm in length, and an inferior appendage tapering to a very narrow apex; in the female, the lobes of the vulvar scale are very long, sometimes pressed close to the abdomen, but more often projecting conspicuously in a ventral direction. However, authors have used the species-group to cover a much wider assemblage of large, dark, forest-loving species, mostly with a long vertical 'horn' on the tenth segment of the male, but some without it, and some with a pair of horns. The abdomen, excluding the appendages, is from 44.5 to 61 mm long in the male, and the hindwing 40–51 mm; the length of the female hindwing can be as much as 56 mm.

These other species appear less closely related to *sophia*, and in some cases the affinities seem very tenuous indeed, e.g. *maesi*. I have included *nyanzana* (formerly *reginae*) which is not usually put in this group, because it appears to have distinct affinities with *melania*, and darker individuals bear a definite superficial resemblance and could be easily confused with it.

#### *Macromia sophia* Selys

*Macromia sophia* Selys, 1871: 550 (♂); 1878: 198 (♀).

[*Macromia aeneothorax* (Nunney, 1895); Pinhey, 1966b (♀), misidentification.]

Selys (1871) described *sophia* from Cape Coast Castle, now in Ghana. This species differed from all other African *Macromia* by its large size, the predominantly black colour of the body with very limited yellow on the abdomen, and a very long vertical dorsal horn on the tenth segment. The female was described (Selys, 1878) from a specimen from Isubu in Cameroun. Since then, many authors have tended to call any large dark African species '*sophia*'.

Schouteden (1934), referring to *sophia*, commented that Martin (1906) omitted to mention the bright yellow band encircling the thorax, and Fraser (1954) made this conspicuous band one of the chief characters for recognizing the species. Unfortunately, the true *sophia* lacks this band, and both these authors were referring to a quite different species, *aureozona* Pinhey (1966b).

*Material examined* (3 ♂, 4 ♀). Holotype ♂, GHANA: Cape Coast Castle (BMNH). Original ♀, CAMEROUN: Isubu (BMNH). Other material; GUINEA: Yalanzou, Nimba (*M. Lamotte*), 1 ♂ (BMNH). IVORY COAST: Dadane, Mt Nimba (*T. H. E. Jackson*), ix.67, 1 ♂ (RMGC). NIGERIA: Ikrom, (labelled '*aeneothorax*' by Fraser), 1 ♀ (BMNH). CAMEROUN: Barombi Mbo, 17.iii.70 (*S. A. Corbet*), 1 ♀ in SACC, 1 ♀ in RMGC.

#### *Macromia insignis* (Kirby) Sp.rev.

*Pseudogomphus insignis* Kirby, 1889, 299.

Kirby described *insignis* from Cameroun, as the type-species of a new monobasic genus *Pseudogomphus*, which he considered related to *Cordulegaster*. Karsch (1891) placed *insignis* as a synonym of *sophia*, and this seems to have been generally accepted. However, the type specimens of both species have now been re-examined, and are clearly distinct. Meanwhile, any reference to *sophia* in the literature, unless it is to some extant specimen whose identity can be checked, can equally well refer to either species.

Pinhey (1966b) regarded *insignis* as a colour form or possibly a sub-species of

*sophia*, differing only in slightly larger size, and the greater amount of yellow on segment 3. Actually *insignis* is much closer to *aureozona*, and differs only in lacking the thoracic band and in having extensive yellow on segment 3.

*Material examined* (4 ♂, 3 ♀). Holotype ♂, CAMEROUN (BMNH). Other specimens. CENTRAL AFRICAN EMPIRE: Bouar, 1 ♂ (*R. P. Lindley*) (RPLC). Etoumbé, 1 ♀ (BMNH, Gardner Collection, ex Pinhey). Kelle, 1 ♂, 1 ♀, x.63 (RMGC, ex Pinhey). GABON: Makokou, 1 ♂, 19.xi.73, 1 ♀, 5.xi.73 (*J. Legrand*) (RMGC).

#### *Macromia aureozona* Pinhey

*Macromia aureozona* Pinhey, 1966b, 296. [*Macromia sophia* Selys; Schouteden, 1934: 46; Fraser, 1954: 53; Pinhey, 1961: 116, all misidentifications.]

Until Pinhey's work (1966b), this species was hopelessly mixed up with *sophia*, and the misidentifications listed above are all referred to under that species. Fraser, who knew both species, considered that those which lacked the yellow band encircling the thorax had lost it through post-mortem decomposition, and not by any difference of species. He certainly knew the true *sophia*, *teste* the specimen correctly determined by him in the BMNH. Whether he had ever seen a specimen of *insignis* is uncertain from the published literature. As there is no structural difference between *aureozona* and *insignis* and they are distinguished solely by geographical range and the distribution of the yellow markings (so that *aureozona* could arguably be considered a subspecies of *insignis*), his excellent figure of the female genitalia (1954) could equally well be either of these species, but certainly not *sophia*. Mainly, if not entirely, *aureozona* is a Zaire species, whereas *insignis* is from Cameroun, Central African Empire, and Gabon.

*Material examined* (2 ♂, 3 ♀). ZAIRE: Bambesa, Kisautu (BMNH, Fraser Bequest). (The holotype ♂, with 21 ♂, 8 ♀ paratypes, none of them examined, are in MAC; likewise 2 ♂, 1 ♀ in NMB.)

*Macromia aeneothorax* (Nunney)

*Ceratogomphus*? *aeneothorax* Nunney, 1895: 349.

*Ceratopyga aeneothorax* (Nunney); Nunney, 1895: 350.

*Macromia aeneothorax* (Nunney); Fraser, 1954: 47.

*Macromia selysi* Kirby, 1900: 77, syn.n.

\*[*Macromia sophia* Selys; Longfield, 1936: 496. Misidentification.]

\**Macromia lieftincki* Fraser, 1954: 65, syn.n.

\**Macromia camerunica* Pinhey, 1974: 191, syn.n.

\*These three are of the colour-form *M.aeneothorax* f. *lieftincki*, stat.n.

Nunney (1895) described a new species from West Africa which he believed to be a *Ceratogomphus*, as *C.aeneothorax*. However, in case it should prove to require a separate genus, he provisionally made a new one for it, *Ceratopyga*. The species was then lost sight of until the BMNH acquired the type in 1938 with the McLachlan Collection. Thus Kirby (1900) described a specimen of *aeneothorax* in a collection from Sierra Leone as a new species, *M.selysi*. This synonymy has been generally overlooked. Unfortunately the holotype of *selysi* has the discoidal field of the forewing starting with one row of cells instead of two, a distinction on which earlier authors seem to have placed undue emphasis. In some species it can be variable, and both conditions are present among the specimens listed below, including one with the two conditions in opposite wings.

Longfield (1936) mentioned two males of *sophia* from Fernando Po, a record repeated by Pinhey (1962, 1971). Fraser (1954), revising the African species of *Macromia*, re-examined these specimens and described them as a new species, *lieftincki*, but does not appear to have compared them seriously with any species other than *sophia*. The distinguishing feature in the description of *lieftincki* was the presence of a small ventral 'tubercle' at the base of each superior appendage. Closer examination of the two original males shows that this 'tubercle' is actually a drop of exudate which has dried and gummed the hairs into a solid lump. It is certainly a strange coincidence that the 'tubercle' is present in both specimens, and under both superiors of each, but the positions

are not exactly symmetrical. Presumably, if owing to putrefaction of intestinal contents there had been some oozing from the anus between the inferior appendage and the underlying valves, a droplet might exude at either side of the base of the inferior, and would then come in contact with the ventral surface of the superiors at exactly the spot where the 'tubercles' now appear. Apart from the 'tubercles' there is nothing to distinguish '*lieftincki*' morphologically from *aeneothorax*, and the main differences in colour and pattern are slight and variable, so that at the most *lieftincki* can only be regarded as a colour-form of *aeneothorax*.

Pinhey (1974) described *camerunica* as closely allied to *lieftincki*, differing in little except the absence of the characteristic 'tubercles'. In view of the above observations, *camerunica* must now be regarded as *M.aeneothorax* f. *lieftincki*. Pinhey's description of the female '*camerunica*' appears to be the first accurate description of the female *aeneothorax* to be published. Pinhey (1966b) and Fraser (specimen in BMNH) misidentified a totally different female, probably *sophia*, as *aeneothorax*.

*Material examined* (total of both forms, 16 ♂, 1 ♀).

f. *aeneothorax*. Holotype ♂ WEST AFRICA (Sierra Leone, or Cameroun?) (BMNH, McLachlan Collection). Holotype ♂ of *selysi* SIERRA LEONE (BMNH). Other specimens. SIERRA LEONE: 5 ♂ (BMNH). IVORY COAST: southern part, 1 ♂ (*R. P. Lindley*) (RPLC).

f. *lieftincki*. FERNANDO PO: Holotype ♂ and paratype ♂ of '*M.lieftincki*' (*W. H. T. Tams*) (BMNH). CAMEROUN: Nkongsamba, 5 ♂ (*R. Borelly* 1937) (BMNH, Cowley Collection). NIGERIA: Obudu Plateau, 1 ♂ (*J. T. Medler*) 14.iii.71 (RMGC). Obudu Plateau, 1 ♀, 4.vii.73 (*M. J. Parr*) (MJPC).

*Macromia paula* Karsch

*Macromia paula* Karsch, 1892: 15 (♀).

*Macromia bicornis* Förster, 1906: 320 (♀); Schmidt, 1951: 169.

Karsch described as *paula* a large dark

female from Buea at the foot of Mt Cameroun. Schmidt (1951) made this a synonym of *bicornis* Förster (a possibility considered by Förster himself, who only knew the male) but this was dogmatically denied by Fraser when he received a pair of the latter in cop, from what is now Zaire. Since then the synonymy has been overlooked, at least by English-speaking workers. However, comparison of Karsch's type with one of the female '*bicornis*' examined by Fraser shows them to be definitely the same species. Fraser was doubtless expecting *paula* to be a larger insect than it is, for Karsch's paper — by a typographical error — gives the hindwing as 52.5 mm, whereas in the specimen it actually measures 49 mm. In the Zaire females it is 47 and 45.5 mm. The chief characteristic of this species is the presence of a pair of horns on the tenth segment of the male.

*Material examined* (3 ♂, 3 ♀). Holotype ♀ CAMEROUN: Buea (MNHUB). Other specimens. ZAIRE: 2 ♂, 1 ♀, Bomboma (labelled '*M.bicornis*') (BMNH, Fraser Bequest). GABON: Makokou, 1 ♂, 1 ♀ (*J. Legrand*) (MNHNP).

*Macromia melania* Selys

*Macromia melania* Selys, 1871: 55 (♀).

*Phylloaeromacromia contumax* Selys, 1879: 103, (♂) syn.n.

*Phylloaeromacromia biflava* Martin, 1906: Fraser, 1954: 73 (as synonym of *contumax*).

*Hyalaeschna paludis* Sjöstedt, 1899: 40, (♀) (label '*Macromia melania*' added later to the type by Sjöstedt himself); Pinhey, 1962: 211.

*Macromia contumax* (Selys); Fraser, 1954: 73.

Selys described *melania* from a single female (from Nigeria, Old Calabar) lacking half the abdomen, so it remained imperfectly known for many years. The first male discovered was a particularly large specimen from Akele, Cameroun, and the connection was unrecognized. It was given the name *contumax*, but no further records have been published under this name. Two slightly smaller males (hindwing 42.5 and 43 mm, instead of 47) in the BMNH have been assigned

to *contumax* from their almost exact correspondence with the type, and there is a female with them. Martin (1906) described as *biflava* a male which he considered either new, or possibly the unknown male of *melania*, and specimens of both sexes are recorded from various parts of tropical Africa from Guinea to the Central African Empire. (Records from Abyssinia are mistaken; Pinhey (1962) misquotes Martin's 'Assinie' in the Ivory Coast, and Nielsen's (1935) description of specimens from Ola Ouagër, Abyssinia, refers to *nyanzana*.) Other females from Ghana to Uganda have been labelled *melania*.

This species differs from those of the *sophia* group proper in a number of important points. The male is best recognized by the absence of a horn, the shape of the dorsum of the tenth segment, the superior appendages which are straight laterally with a slightly bisinuose inner margin, and the broad, almost rectangular, inferior appendage. The females have the lobes of the vulvar scale short, broad, almost semicircular, and inclined obliquely and posteroventrally away from the abdomen (Figs. 56 and 57). They also have rather more yellow on segments 2–3 than the males. Although this pattern is somewhat variable in the females examined (Figs. 52–54) it all seems to be a variation of the same basic design, and may be due to such factors as nature of habitat, or degree of development. Vulvar scales are also basically similar, apparent differences being mainly due to the degree of compression of the specimen, and whether lateral or dorsoventral. Where the lobes of the vulvar scale are facing mainly laterally, the cleft between them is more arched, and where the whole assemblage is flattened (as in Fig. 56) the lobes lie closely side by side and the cleft is almost non-existent.

*Material examined* (4 ♂, 7 ♀). Holotype ♀, *melania*, NIGERIA: Old Calabar (IRSNB). Holotype ♂, *contumax*, CAMEROUN: Akele (BMNH). Holotype ♂, *biflava*, IVORY COAST: Assinie (MNHNP). Other specimens, GHANA: Accra, 1 ♀ (BMNH, McLachlan Collection); CAMEROUN: Dehane, 1 ♂, 1 ♀, iii.37 (*R. Borelly*), Lolodorf, 1 ♂, 1937 (*R. Borelly*) (BMNH, Cowley Collection); CENTRAL AFRICAN EMPIRE: 1 ♀ (MNHNP). UGANDA: near Kampala, 2 ♀ (*E. C. G. Pinhey*), 1 ♀ (*P. S. Corbet*) (BMNH).

*Macromia nyanzana* Grünberg

*Macromia nyanzana* Grünberg, 1911: 104.  
*Macromia reginae* Le Roi, 1915: 348.  
*Macromia halei* Fraser, 1928: 137.

This species was long known as *reginae*, but Pinhey (1962) found this to be a synonym of *nyanzana*, Longfield (1936) having already made *halei* a synonym of *reginae*. It is mainly an East African species, and is closely related to and replaced in West Africa by *bifasciata* (Martin, 1912), which is slightly smaller, has more yellow on the body, and is a savannah species. Both *nyanzana* and *bifasciata* are characterized by their usually having the whole of the anterior half of segment 3 yellow in both sexes, with no black except sometimes a narrow longitudinal line mid-dorsally. In *nyanzana* this black line may sometimes widen, and in very dark specimens may almost obliterate the yellow, which can lead to confusion with *melania*. The species resembles *melania* in a number of ways besides the colour-pattern. In the male, the whole shape of the dorsum of the tenth segment as well as the absence of the horn, the shape of the anal appendages, the hamules and genital lobes, are similar; and in the female the shape of the lobes of the vulvar scale is the same as in *melania*. Although dark females of *nyanzana* and paler ones of *melania* can sometimes be very similar in the pattern of segment 3, they can always be distinguished in segment 2, where *melania* shows yellow laterally, and *nyanzana* is dark from all aspects. Segment 7 has more yellow in *nyanzana* than in *melania*. The lobes of the vulvar scale of *nyanzana* are rather more pointed, and carry long hairs at the tip, where *melania* is hairless (Figs. 56 and 58).

*Material examined.* UGANDA: various localities, 16 ♂, 9 ♀ (BMNH, DALDC, RMGC). RHODESIA: 1 ♀ (BMNH).

*Macromia seydeli* Fraser

*Macromia seydeli* Fraser, 1954: 55.

This species is recorded only from Zaire. It is a dark species with the yellow mediolateral girdle conspicuous, as in *aureozona*, but could

not be mistaken for the latter, owing to its slightly smaller size, and much slimmer build.

*Material examined* (1 ♂, 1 ♀). Paratypes 1 ♂, 1 ♀, ZAIRE: Lomami (BMNH, Fraser Bequest). (Holotype ♂, paratype ♀ in MAC, not examined).

*Macromia unifasciata* Fraser

*Macromia unifasciata* Fraser, 1954: 67.

This species also has the yellow thoracic band, and is extremely similar both in size and structure to *seydeli*. Morphological differences are very slight, but it is a much paler insect, with considerable yellow on the abdomen. It is known both from Zaire and Rhodesia.

*Material examined* (1 ♂). ZAIRE: Gorge, Pelenge, 28. iv. 42, 1 ♂ (BMNH, Fraser Bequest). (Holotype ♂, and 2 ♀ in MAC, not examined).

*Macromia maesi* Schouteden

*Macromia maesi* Schouteden, 1917: 105.

This species is recorded from Zaire only. The male is recognized by the short, blunt, dilated superior appendages, unlike those of any of the *sophia* or related groups; and the female by the characteristic pale central mark on segment 2 (Figs. 45 and 50).

*Material examined* (2 ♂, 2 ♀). ZAIRE: Bunia, 1 ♂; Eala, 1 ♂, 2 ♀ (BMNH, Fraser Bequest). (Holotype ♂, paratype ♀, ZAIRE: Inongo, 9. x. 13 (*Dr Maesi*) (MAC) not examined).

## General discussion of the above species

A useful means of distinguishing males of *aeoethorax*, *sophia* and *insignis* (together with the morphologically identical *aureozona*), is by the shape of the genital lobe, and the line of the genital fossa. The hamules are very similar in all three, so are of little help, although those of *aeoethorax* are slightly more slender than those of the others. In *aeoethorax* the genital lobe is more or less in a straight line with the edge of the fossa when

viewed laterally, and projects only very slightly if at all in a ventral direction. In *sophia* and *insignis* the lobe is distinctly prominent ventrally, and there is an excavation in the margin of the fossa just anterior to the lobe, in *sophia* a narrow groove, and in *insignis* and *aureozona* a broad hollow. The anteroventral border of the genital lobe is flattened to form a shallow cup-like surface. In *insignis* and *aureozona* the cup is tilted laterally, so that the rim of the medial half projects much further anteriorly than that of the lateral half, and fills the gap between the lateral half and the hamule. In *sophia* the tilt is very much slighter, and comparatively little of the internal surface of the cup is visible laterally (Figs. 30–32).

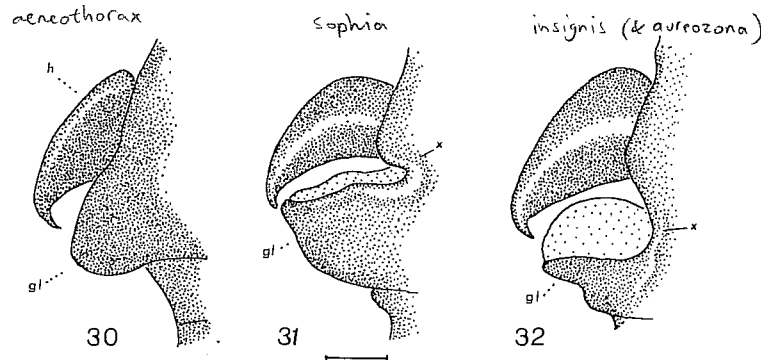
In addition, there is a difference in the abdominal colour-pattern of these species (Figs. 1–3).

The male *sophia* has small yellow jugal spots on segments 2 and 3, and a yellow patch on the basal part of 7 extending two-thirds of the distance to the jugal suture mid-dorsally and one-third laterally. There are no yellow stripes or other marks on the thorax.

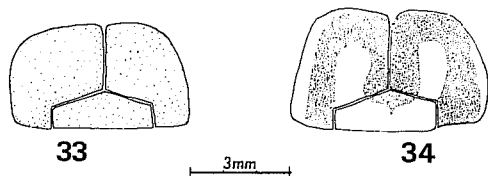
The male *insignis* has considerable yellow on segment 3, and this represents an enlargement of the jugal yellow spots. There is no basal yellow anterior to the black mark on the prejugal portion of the segment. This species

has no other yellow on either abdomen or thorax. The morphologically similar *aureozona* has no yellow at all on the abdomen, the only yellow being the very obvious mediolateral stripe on the thorax, continued dorsally to encircle the body, from which the species takes its name.

The male *aeoethorax* has small yellow jugal spots on 2, and small basal and jugal spots on 3. There is also a basal yellow band on the anterior part of 7, reaching almost but not quite as far as the jugal suture. Unlike *sophia*, *insignis* and *aureozona*, it has the antealar sinus yellow. Lateral thoracic stripes are variable. It is usually possible to make out the mediolateral. This is just visible in the type. Fraser (1954) refers to this as metepimeral, and says it is mentioned by Nunney. Nunney, however, only says 'a faint yellow line medially on each side' without stating which of the three possible stripes it is. The stripes are usually much clearer in *f. lieftincki* than in the nominotypical form, but this is not an absolute distinction. A much better way of distinguishing the two colour-forms is by the labium. In *f. aeoethorax* this is more or less unicolorous pale brown. In *f. lieftincki* the ground-colour is orange-yellow with a dark brown E-shaped mark, with the back lying along the apical border of the lateral lobes, and the three branches running across the lobes and along



FIGS. 30–32. *Macromia* species. Hamules (h) and genital lobes (gl) of males, showing excavation (x) in border of genital fossa, lateral view from left. 30, *aeoethorax*, no excavation; 31, *sophia*, Nimba, Guinea, excavation a narrow groove-like slit; 32, *insignis*, holotype (*aureozona* almost identical), excavation widely open.



FIGS. 33-34. *Macromia* species. Labial lobes of *aeneothorax*. 33, *f.aeneothorax*, Sierra Leone; 34, *l.lieftincki*, paratype, Fernando Po.

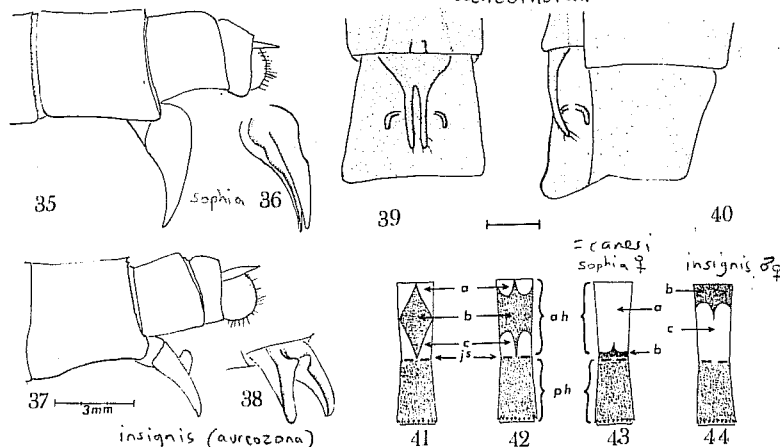
the line separating them (Figs. 33 and 34), conspicuous in Fraser's type and paratype of *lieftincki*, and clearly described by Pinhey under *camerunica*. Specimens from Sierra Leone, and the type (of whose origin there seems to have been some doubt, either Sierra Leone or Cameroun), have the pale lateral stripes on the thorax scarcely visible and the labium concolorous, whereas all those I have seen from E. Nigeria, Cameroun or Fernando Po have been of the colour-form *lieftincki* as defined above. However, Dr Pinhey has kindly provided me with particulars of the Nigerian specimens in the NMB, and these were all without stripes. The colour and pattern of the labium were not mentioned. As it is not possible to say whether the absence of stripes was lifelong, or due to old age, or to post-mortem degeneration, it is not possible to say whether the two colour-forms are a question of age and development, or of geographical distribution.

There are three distinct species of the *sophia* group proper known from West Africa, *sophia*, *insignis* and *aeneothorax*, based on the holotype males. Similarly three morphological types of female are known, two corresponding in pattern and distribution with two of the males. Therefore it seems a reasonable probability that the remaining female is that of the only unmatched male, i.e. *sophia*, in spite of certain differences in the colour-pattern of segment 3, and the fact that no one has found both sexes from the same locality.

Selys, at least, considered the female which he described from Cameroun to be that of *sophia*, although it was found about 1200 km from the male. Dr S. A. Corbet has taken two females similar in pattern and structure from Barombi Mbo, W. Cameroun, and there is another in the BMNH, misidentified by Fraser

as *aeneothorax*, from Ikom, Nigeria. All these have an ovipositor (lobes of the vulvar scale) exactly similar to that figured by Schmidt (1951) for *sophia* (a specimen from Barombi, in the Berlin Museum). It is this form of ovipositor that Pinhey (1966b) - misled by Fraser - figured for *aeneothorax*. The vulvar scale is produced in a ventral direction with the two lobes closely apposed to each other (Figs. 35 and 36), whereas in *insignis* and *aureozona* (Figs. 37 and 38), the two lobes, although pointing in a similar direction, diverge strongly at the tips and are separated at their bases by a fold on their inner margins, the 'inner sub-basal triangular lobe' of Pinhey. Selys's female is badly crushed and the lobes are distorted, the left pointing normally, the right posteriorly. The terminal segments have become detached, and are gummed to a card on the same pin, so the lobes are difficult to see clearly. They were therefore washed off and temporarily resuspended in 70% alcohol and glycerine to soften them, and make them visible from all angles. No trace can be found of the inner sub-basal triangular lobes, so before it was crushed it must have been similar to the females which I have assigned to *sophia*.

These all have considerably more yellow on the anterior half of the third segment than have the males. This has led Pinhey to the opinion that Selys's female is that of *insignis*, which he considered merely a colour-form of *sophia*. However, apart from the difference of the vulvar scale, which shows that Selys's female cannot be *insignis*, the arrangement of the yellow pattern is different. In *insignis* of both sexes, the yellow on 3 is formed from the jugal spots, posterior to the black marking on the anterior half of the segment, and there is no yellow basally. In the male *sophia* there



FIGS. 35-44. *Macromia* species. 35-40, vulvar scales, 'ovipositor', or 'terebra'; 35, *sophia*, ♀ Cameroun, lateral view from left; 36, ditto, oblique posterior view, slightly left; 37, *insignis*, ♀ Gabon, left lateral view (*aureozona* almost identical); 38, ditto, oblique posterior view, slightly left; 39, *aeneothorax*, ♀, Obudu Plateau, E. Nigeria, ventral view; 40, left lateral view (slightly ventral); 41-44, *Macromia* abdominal segment, diagrammatic: a = basal spot, b = black mark on anterior half of segment, c = jugal spot, js = jugal 'suture', with two black 'jugal marks', ah = interior or prejugal half of segment, ph = posterior or postjugal half of segment; 41, showing typical 'diamond' black mark; 42, 'diamond' modified to 'batswing'; 43, pattern on third segment *sophia* ♀; 44, pattern on third segment *insignis* (both sexes).

may be a very slight basal yellow mark on 3 (not visible in the type, however), and slightly larger but still very small jugal spots, the black mark filling almost the whole of the anterior part of the segment. In the supposed females of this species, almost the whole of the anterior part of this segment is yellow, and the yellow is in the basal position, wholly anterior to the central black which extends back to the jugal suture (Figs. 41-44). While not proving that the supposed female is necessarily that of *sophia*, this at least confirms that it cannot possibly be *insignis*.

The female of *aeneothorax* has a vulvar scale which is totally different, the lobes being long and narrow, crossing the median processes, pointing backwards closely applied to the abdomen, and not projecting ventrally at all (Figs. 39-40).

The female of *paula* has the lobes of the vulvar scale directed backwards (Fig. 55), wider than those of *aeneothorax*, and similarly

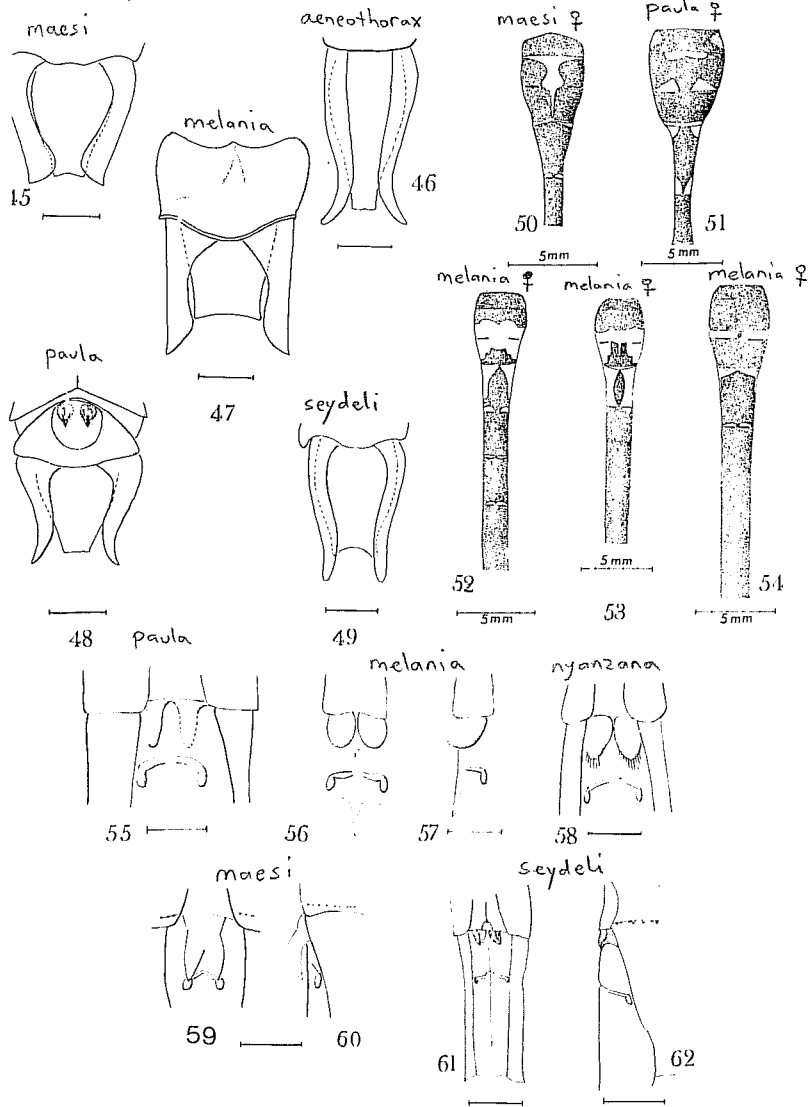
apposed to the ventral surface but not reaching beyond the median processes.

The female genitalia of *melania* and *nyanzana* have already been described above and compared. Those of *seydeli* and *unifasciata*, almost identical with each other, have extremely short lobes to the vulvar scale (Figs. 61 and 62), and *maesi* has the vulvar scale bifid, prominent basally, but recurved (Figs. 59 and 60).

#### Key to species

The following key will help to separate the species of the *sophia* group proper, also the various other large dark species which have at times been, or which could be, confused with them. These are for the most part West African species, but also include a few others from Zaire, etc., which have not yet been and are probably unlikely to be found in the West





(Senegal to Cameroun inclusive). The *pieta* group is less suited to being dealt with by means of a key, owing to the difficulty of defining the group, which merges almost imperceptibly into other groups, so this has not been attempted.

- Superior appendages of the male strongly dilated medially at the apices, giving them an overall blunted appearance (Fig. 45); female with a characteristic pale longitudinal turnip-shaped mark on mid-dorsum of abdominal segment 2, whereas other females with pale marks on this segment either have two pale spots separated by a dark longitudinal stripe, or else have the yellow extending right across the segment and not bounded by dark laterally (Figs. 50-54); vulvar scale bifid, prominent, and recurved (Figs. 59 and 60); apparently without any obvious affinities with any other species in this key, but included because some authors have - owing to its being large and dark - referred to it as being one of the *sophia* group. . . . . *maesi* Schouteden Superior appendages without medial dilatation at apex, but more or less tapered to a point (Figs. 46-49); females lacking the pale central mark on segment 2. . . . . 2
- Large dark species, hindwings 40.5-50 mm in males, females 46-56 mm; males with a single long vertical horn on dorsum of tenth segment (a truncated cone surmounted by a tuft of stiff bristles); superior appendages long (at least 3 mm), tapering, and slightly bisinuous; inferior appendage long, and narrowed at the tip; female with long lobes to vulvar scale (ovipositor), either projecting ventrally almost at right angles, or if applied closely to the ventral surface then long and narrow and extending well beyond the median processes (*sophia* group proper) . . . . . 3
- Large or moderately large species, coloration mainly dark; male with dorsal horn present or absent, single or double; superior appendages of male shorter (less than 3 mm), inferior appendage not narrowed at apex, or if so, shorter, and sides usually convex; female with lobes of vulvar scale shorter, and not projecting (unless very short) . . . . . 7
- Genital lobe of male projecting ventrally, and set at an angle to the main line of the genital fossa (Figs. 31 and 32); ante-alar sinus dark; female

with lobes of vulvar scale very conspicuous and projecting ventrally (Figs. 35 and 37) . . . . . 4  
 Genital lobe of male not projecting ventrally, but more or less in line with the genital fossa; ante-alar sinus yellow; female with lobes of vulvar scale long and narrow, closely applied to ventral surface of abdomen, and extending beyond median processes (Figs. 39 and 40)

- (*aeneothorax*) . . . . . 6
- Male genital lobe separated from anterior part of genital fossa by a narrow groove-like slit (Fig. 31); male with at least some yellow on segment 7; lobes of vulvar scale closely apposed to each other for their full length, and no inner sub-basal lobe (Fig. 36); no black marks at base of wings . . . . . *sophia*
  - Male genital lobe separated from anterior part of fossa by a wide excavation (Fig. 32); no yellow on segment 7; lobes of vulvar scale separated at base by an inner sub-basal lobe which projects backwards and is plainly visible in lateral view; lobes widely divergent at their apices (Figs. 37 and 38); black marks at base of wings in female. 5
  - No lateral yellow stripes on thorax; considerable yellow on abdominal segment 3. . . . . *instigins*
  - Conspicuous yellow mediolateral stripe encircling thorax; no other thoracic stripes; no yellow on abdomen. . . . . *aureosana*
  - Labium with lobes more or less unicolorous brown (Fig. 33); thoracic stripes sometimes not visible, seldom more than mediolateral distinguishable

*aeneothorax* form *aeneothorax* (Nunney)

Labium with lobes of an orange-yellow, with an E-shaped mark of dark brown, the back lying along the apical margin of the lobes, the three arms running across the lobes, the middle one down their junction (Fig. 34). Thoracic stripes usually all visible, even if sometimes a little dull, and often very clearly marked

*aeneothorax* form *lieftincki* Fraser

- Male with no horn on segment 10; superior appendages of male with lateral margin straight, although medial border is slightly bisinuous; inferior appendage broad and rectangular (Fig. 47); female with lobes of vulvar scale short and broad, projecting obliquely in a postero-ventral direction (Figs. 56 and 57) . . . . . 8  
 Horn or horns on segment 10 of male; superior appendages more slender and slightly bisinuous;

FIGS. 45-62. *Macromia* species. 45-49, anal appendages of male, dorsal view, semi-diagrammatic; 45, *maesi*, ♂ Zaire; 46, *aeneothorax*; 47, *melania* (holotype of '*contumax*'); 48, *paula*, ♂ labelled '*bicornis*' by Fraser; 49, *seydeli*, ♂ paratype (*unifasciata* almost identical). 50-54, pattern of basal segments, ♀ abdomen, dorsal view; 50, *maesi*, ♀ Zaire, segments 1-3; 51, *paula*, ♀ holotype, segments 1-3; 52, *melania*, ♀ holotype segments 1-4 (rest of abdomen missing), E.Nigeria; 53, *melania*, ♀ Cameroun (labelled *contumax*), segments 1-4; 54, *melania*, Uganda, ♀ segments 1-4; 55-62, vulvar scales; 55, *paula*, ♀ holotype (slightly restored); 56, *melania* (labelled *contumax*), ♀ ventral view; 57, ditto, lateral view from left; 58, *nyanzana*, ♀ Uganda, ventral view; 59, *maesi*, ♀ Zaire, ventral view; 60, ditto lateral view from left; 61, *seydeli*, ♀ paratype, Zaire, ventral view; 62, ditto lateral view from left.

inferior appendage moderately tapered; vulvar scale not projecting, lobes narrow, either of medium length or extremely short . . . . . 9

- 8 Yellow markings on abdomen restricted; yellow on segment 7 not extending beyond the jugal marks in either sex; that on segment 3 confined to basal spots in the male, but the female usually also has lateral yellow on this segment (Figs. 52-54); predominantly a dark species; female without dark rays or patches at base of wings, or with such rays quite rudimentary; lobes of vulvar scale more or less semicircular, and without hairs at the tips (Figs. 56 and 57). . . . . *melania* Selys  
Yellow markings on abdomen (segment 3 onwards) more obvious; anterior half of segment 3 usually wholly yellow except for a narrow black line which is sometimes present mid-dorsally (giving the third segment—but no others—a general appearance similar to that of the *melania* shown in Fig. 53); yellow on segment 7 extending considerably beyond the jugal marks; female with conspicuous dark rays or patches at base of wings; lobes of vulvar scale somewhat more pointed, and carrying fairly long hairs at the tip (Fig. 58) . . . . . *nyanzana* Grünberg

- 9 A pair of horns on tenth segment of male; ante-humeral, mediolateral, and metepimeral stripes present in both sexes, and usually plainly visible, but sometimes a little dull; end of inferior appendage of male a broad truncated triangle (Fig. 48); female with lobes of vulvar scale narrow and elongated (length over 0.75 mm), but not reaching beyond median processes (Fig. 53)  
*paula* Karsch

A single horn on segment 10 of male; both sexes with single conspicuous yellow stripe (mediolateral) encircling thorax as in *aurazona*, but these are smaller and more slender insects than the latter; apex of inferior appendage of male considerably excavated (Fig. 49); female with lobes of vulvar scale much shorter (not more than 0.4 mm) (Figs. 61 and 62). . . . . 10

- 10 Ante-alar sinus black; no yellow on abdomen; segments 8-10 black; membranule black; black basal rays on wings (very small in male, conspicuous in female) . . . . . *seydeli* Fraser

Ante-alar sinus yellow; typical *Macromia* pattern of black and yellow on segments 3-6, and yellow band on 7; 8-10 ferruginous; membranule whitish; no basal rays on wings. *infasciata* Fraser

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