

Further notes and descriptions of new species of Libellulidae from Tropical Africa

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In continuing my studies of the enormous collections of *Odonata* in the Musée Royal du Congo Belge, Tervuren, I have found several more new species and examples of rare ones which form the subject of this paper. The study of this material has been combined with other in my own collection collected by the late Professor G. HALE CARPENTER of the Oxford University and by Mr. Elliot PINHEY of the Coryndon Museum, Nairobi; this material, collected in Uganda on the borders of the Belgian Congo, has proved to be broadly identical to the fauna of the latter and so may be considered as a whole.

A few of the genera concerned are among the most difficult met with in the family *Libellulidae* and were evidently a source of trouble to the late Dr F. RIS. They include the genera *Oxythemis* RIS, *Aethiothemis* MARTIN, *Lokia* RIS, *Eleuthemis* RIS and *Porpax* KARSGA; *Lokia* has already formed the subject of my paper in the *Rev. Zool. Bot. Afr.* XLVIII : 246, and I hope to deal with *Porpax* later. Some of the remaining genera, including three new ones, are dealt with below.

In placing these genera in their correct genealogical order in the family *Libellulidae*, I am of opinion that the condition of the distal antenodal of the forewings, whether it be complete and perpendicular or incomplete and oblique, should be the primary character to rely on, the former indicating the more recent, the latter the more archaic. Thus *Oxythemis* is more archaic than *Lokia*, which latter should certainly be placed well after *Orthetrum* in which the distal antenodal is complete. *Aethiothemis*, by its complete distal antenodal, should also occupy an earlier place than the one RIS has assigned to it. RIS has included two entirely different species in this latter genus, one with

the discoidal and subtriangles traversed, the latter with 3 cells, and the abdomen short and depressed. The other (*Bequaerti* RIS) with the discoidal triangle and subtrigone entire and the abdomen moderately long and slim; it seems to me that a new genus is required for this species, for which I suggest *Nubiothemis* with *Aethiothemis Bequaerti* RIS as type species of the genus.

Below I have described two new genera and species which are known only from the female sex, although I am aware that it has become a kind of unwritten law that new species should be described from only the male sex and that species known only from specimens of the opposite sex should be put aside until such time as the respective males have been discovered. Resulting from this, it is not uncommon to find undetermined female specimens in collections, which have remained unnamed and undescribed over a great number of years. One such, which is described for the first time here, has been in the British Museum Collections for just on fifty years unnamed simply because the male was and is still unknown. It seems to me that the objections against describing these specimens are far outweighed by the advantages. Female *Odonata* are generally more archaic than the males and being less specialized are the more easy to place; a published description may assist the collector in the field to recognise the male, especially if it has unique characters; a specimen put aside is often a specimen forgotten and is liable to neglect and possible loss, dangers against which a type species would be protected. Lastly it must not be forgotten that some genera are classified on the female characters, such as those of the *Aeshnidae*.

GENUS *TETRATHEMIS* BRAUER.

The genus *Tetrathemis* BRAUER is a dominant one in the Belgian Congo, if one has to judge from the scores of specimens now before me. By far the greatest number belong to the species *bifida* FRASER and only occasional specimens of *camerunensis* SJOST., *polleni* SELYS and *carduliformis* LONGFIELD are found. To these species may be added a new one with very distinct and differing anal appendages which was taken in the Lake Albert District, Uganda, and is certain to be found on the Belgian side of that lake.

Tetrathemis bifida FRASER.

Tetrathemis bifida FRASER, 1911, *Proc. R. ent. Soc. Lond.* (B) 8 : 138, figs 1 to 3.

Over 200 specimens have been examined and a large number yet remain to be examined critically; localities are, Eala, XII.34 to I.35, J. GUESQUIÈRE; Uele : Bambesa, VI. to X.38 to V.39, P. HENRARD; Elisabethville, II.38, CH. SEYDEL; Luluabourg, I. to XII.38, viz. all the year round : J. VRIJDAGH; Uele : Bambesa, I.38 to V.39, J. VRIJDAGH. *T. bifida* differs from *camerunensis* only by the deeply bifid inferior anal appendix, which is truncate in the latter, so that I think it probable that the specimens of this latter species reported from Bambesa by Dr SCHOUTFEDEN belong to *bifida* which had not been described at the date of his paper.

Tetrathemis pollenii SELYS.

Five males from Kasenyi, Lake Albert, VII.31, J. LEROY and 1 male from Ishwa, Lake Albert, IX.34, H. J. BRÉDO.

My species *carpenteri* probably belongs to this as Mr E. PINHEY informs me that he invariably takes typical *pollenii* with the dark banded wings, along with *carpenteri* which has the wings completely uncoloured. If this is so, then the latter should be known as *pollenii* var. *carpenteri* FRASER. This hyaline form is not to be confused with general specimens of *pollenii* which owing to their age have not yet developed colouring in the wings. In my key to the genus, I stated that *pollenii* did not have yellow spots behind the eyes but I find that this is an error and a number of specimens recently examined, both from Madagascar and the African continent, all possess similar spots to *carpenteri*. Occasional specimens of *pollenii* are taken with the broad apical black area of wings replaced by a large spot between the nodus and pterostigma; these may be varieties or it is more probable that the band starts as a spot and spreads with age to the greater part of the wings.

Tetrathemis camerunensis SJÖSTEDT.

I have not so far discovered among the present material any specimens of this species but Dr SCHOUTFEDEN has reported it from Nouvelle-Anvers, Stanleyville, Abumombazi and Bambesa.

Tetrathemis corduliformis LONGFIELD. (Fig. 1. c.)

Tetrathemis corduliformis LONGFIELD, 1936, *Trans. R. ent. Soc. Lond.* 85 : 484, (Holotype male from Budongo forest, Bunyoro District, Uganda, 18.II.34.)

Mr E. PINHEY has sent me a male from W. Kampala, Uganda and there is another male from Eala, XIII. 34, J. GUESQUIÈRE. This species is undoubtedly rare but possibly locally common where it establishes colonies.

The holotype male was described from a specimen in which the colours and markings were partly obscured by postmortem decomposition and partly by an overlay of pruinescence; this latter is rare in the genus *Tetrathemis* and the only specimens in which I have seen it are some of *pollenii* from Madagascar and Zululand; I have never seen it among the many scores of specimens of *T. platyptera* SELYS of all ages which I have taken in the Orient. The new material shows the markings and colouring clearly and none is pruinose; a female from Eala, XII.34, J. GUESQUIÈRE, also permits me to describe that sex.

Male. Abdomen 18 to 19.5 mm. Hindwing 22.5 to 23.5 mm.

The head markings and colouring of the male from Eala are similar to the type, whilst that from Kampala has the whole of frons anteriorly as well as superiorly dark blue metallic; the prothorax has the anterior lobe pale yellow, the border of the posterior lobe green; the middorsal stripe of the thorax is divided by the fine black middorsal carina, whilst the stripe on the anterolateral suture has the anterior arm of the Y-shaped marking separated as an isolated upper spot. The abdominal markings are identical to those of the new species *denticauda* described below and appear to be similar in all the Ethiopian species. I find some variations in the nodal indices, antenodals to forewings 8-9, hindwing 7; postnodals in forewing 6-8, hindwing 7-9.

Female. Abdomen 16 mm. Hindwing 19 mm.

A smaller but more robust insect than the male, the abdomen short and stout. Colour and markings similar to those of the male but the frons dark metallic blue in front as well as above and the lateral stripes thicker. The abdominal markings are a bright green and much broader than in the male, the oblique stripes meeting over the dorsum, especially on segment 2 where they form a broad U-shaped marking with the loop applied to the base of the segment. Wings hyaline but with the bases tinted more or less deeply with amber yellow, to as far as discoidal triangle in the forewing but to one cell beyond the nodus in the hind. In this respect they differ from all other females of the genus found in Africa but are similar to the oriental species *platyptera* etc. Nodal index, 8 antenodals and 6 to 7 postnodals in forewings, 7 antenodals in hindwings and 7 to 8 postnodals.

Tetrathemis denticauda sp. nov. (Fig. 1. a, b.)

A single male from Fort Portal, Bunyoro District south of L. Albert, G. H. CARPENTER. This species by its shortened anal appendages appears to be nearly related to *T. godiardi* LACROIX and *T. ruwenzoriensis* FRASER and rather less so to *corduliformis* LONGFIELD.

Male. Abdomen 18 mm. Hindwing 22 mm.

Head : labium chrome yellow with a broad black band running down its centre; labrum black, epistome greenish yellow, frons anteriorly and above and the vesicle steely metallic blue black; occiput ferruginous above, ochreous posteriorly; behind eyes black, unspotted. Prothorax dark ochreous, the posterior lobe black but paler along its margin which is slightly emarginate. Thorax black, marked with grass green, this changing to citron yellow below, two fine lines bordering the middorsal carina, a broad humeral stripe with its superior end curved somewhat medially and its posterior border very sinuous (this stripe appears to be a generic character and is largely a subfamily one), laterally a broad medial band which is bifurcated in its superior half to form the letter Y, and lastly a broad stripe on the posterior half of the metepimeron. Pectus citron yellow crossed by two arched bands of black. Legs black, inner sides of anterior femora citron yellow. Wings hyaline, pterostigma black, elongated, covering two cells (but only 1 very long cell in the left hindwing), 8 antenodals and postnodals in all wings, 1 Cu₁ to forewings, 2 in the hind, arculus between the first and 2nd antenodals in forewing but opposite the 2nd in hindwing, anal-loop of 4 cells. Abdomen black with citron yellow markings, a series of oblique stripes on the sides running forwards and upwards on to the dorsum of segments, the first stripe beginning on the genitalia of segment 2 and ending on the dorsum at its base where it becomes confluent with the stripe from the opposite side; segments 3 and 4 with similar stripes which begin at about the level of the jugal sutures but just fail to meet on the dorsum; segment 5 with only the lateral beginning of this stripe; segment 6 unmarked; segment 7 with its basal three fourths yellow but the middorsal carina black, remaining segments unmarked. Segments 1 and 2 dilated, 3 to 7 very narrow and cylindrical, segments 8 to 10 greatly dilated, 8 broadening rapidly towards its apical end and this dilatation proceeding on 9 to its greatest breadth on 10 which is at least three to four times as broad as segment 6, segments 7 to 10 are strongly keeled and segment 10 is almost globular in form. Anal appendages black, of equal length, about as long as segment 10, very stout and robust; superiors almost as broad as long, with a large conical external process to the outer side at apical end, the latter broadly rounded and bordered by a row of robust teeth. Inferior broad, short and truncate, its superior surface furnished with several very large imbricated spines or teeth. Genitalia similar to *corduliformis*. The remarkable shape of the abdomen and anal appendages will distinguish this species from any other. The anal appendages of *godardi* (Fig. 1, c. d.) have only a small spine to the outer side of the apices of the superiors, and the inferior has no teeth on its

upper surface save the normal apical pair. *Ruwenzoriensis* is without the great dilatation of the end segments and the inferior appendix has no upper teeth and is longer than the superiors.

Neodythemis africana n. sp.

Material examined : 1 male from Bambesa, 1934, collected by J. VUKIĆ-BAGI; 1 female from the same locality, 18.V.39, collected by P. HENRARD.

Male. Abdomen 24 mm. Hindwing 27 mm. Pterostigma 2.25 mm.

Head : labium citron yellow, middle lobe and borders of lateral black; labrum black, epistome, genae and side of frons citron yellow; the frons in front and above and vesicle metallic blue. Prothorax black, as also thorax, the latter marked with citron yellow, the middorsal carina, narrow antehumeral stripes, the sides broadly, these latter with a black stripe extending from the spiracle downwards and a second black stripe on the postero-lateral suture. Wings hyaline, nodal index, - 14 to 15 antenodals and 9 postnodals to forewings, 12 antenodals and 9 to 10 postnodals to hindwings, hypertrigones traversed once, discoidal triangles of forewings entire, those of the hind traversed once; discoidal field with a single row of cells to as far as Br, then 2 rows to as far as nodus; pterostigma black. Abdomen black, broad citron yellow markings on the sides of segments 1 to 3, subdorsal stripes on segments 3 to 5, overlapping the jugal suture only on the first of these segments, segment 7 with its basal half yellow. Anal appendages black, they and the genitalia scarcely differing from *N. hildebrandti* of Madagascar.

Female. Abdomen 25 mm. Hindwing 29 mm.

Closely similar to the male but a larger and more robust insect; the discoidal field of forewing has first 5 single cells, then rows of 2 cells to distal of the nodus; the nodal index hardly varies; the wings are tinted with yellow to as far as the 2nd antenodal and palely and evenly infuscated throughout.

This is the first species of the genus to be reported from the African continent (but only if the genus *Micromacromia* is not synonymous with *Neodythemis*, which I very much doubt). The present species is very similar to *Micromacromia afa* Rts from the Cameroons, W. Africa, differing by the narrower discoidal field and lower antenodal index. Type and allotype in the Musée Royal du Congo Belge.

Hemistigma neurothemoides n. sp.

Material examined : 3 females from Lisala, N.34, collected Dr TAMBACCO; Kwango : Kungungli, XII.32, collected R. P. REXIER; Katanga : Kalenge, I.34, collected F. G. OVERLAET.

Female. Abdomen 21 mm. Hindwing 24 mm. Pterostigma 3 mm.

Head : labium, labrum, epistome and frons pale yellow, the latter with a steely black stripe across its anterior face which together with a broad black base to the frons above, encloses a broad yellow stripe on the crest of the frons; thorax black on dorsum, greenish yellow on the sides, the middorsal carina yellow as also narrow antehumeral stripes which are angulated inwards above at the alar sinus and interrupted in the lower third. Laterally black stripes on the 1st and posterolateral sutures, that on the anterior curved forwards inferiorly to join the dorsal black; there are also black stripes on the upper part of mesepimeron and middle of metepimeron, the latter broken into a short stripe and a lower spot; the pectus bordered with black and posteriorly, a black triangle-like mark. Abdomen with ground-colour citron yellow, this cut up into a cancellated pattern by fine black lines on the middorsal carina and jugal sutures and a subdorsal black stripe, the latter steadily broadening posteriorly so as to gradually blot out the yellow markings; only the basal half of the yellow seen on segment 8 and a mere spot on 9 but broader on the sides of 10. Wings broadly golden yellow from apex along the costal border to a little proximal of the pterostigma from which point its posterior border runs obliquely to the hinder border of wings to about the level of nodus, the areas distal to this uncoloured. Nodal index, - 9½ antenodals in forewings and 8 to 9 postnodals; 8 antenodals and 9 postnodals in hindwings; pterostigma with distal half black, inner half pale yellow as in *albipuncta*. (One female has 10½ antenodals in the forewings but for the rest is as for the others.)

I have not seen a male of this species or subspecies, so that it may be a polymorph of *albipuncta* (RAMBUR); the distribution of the dark colouring on the wings is very reminiscent of some of the oriental *Neurothemis*, from which the present name is derived. Type and paratypes in the Musée Royal du Congo Belge.

Oxythemis phoenicosceles Ris.

Oxythemis phoenicosceles Ris, 1909, *Cat. Coll. Selys*, Libellulines : 163. (Male type from W. Africa.), 1916, 1071, (Female allotype from the Cameroons); SCHOUTEDEN, 1934, *Ann. Mus. Congo Belge, Zool.* 111, 11, 3 : 13 (A second male without locality but evidently from the Belgian Congo).

This rare and very interesting species is represented in the present collections by 3 males from Uele-Bambesa, III-V.38, J. VRIJDAH and 1 female from the R. Busera, VI.36, J. GHESQUIÈRE.

Some points in the original description by Dr Ris need correction or further elucidation.

Male. Abdomen 21 to 23 mm. Hindwing 22 to 24 mm.

(Adult) Labium entirely black; labrum broadly black along its free border, but the base, epistome and anterior surface of frons pale bluish white, only the upper surface of frons and the vesicle blue black metallic. Prothorax black as is also the thorax save for a narrow medial dorsal bluish green stripe which is bisected by the black middorsal carina; the sides, tergum and pectus pruinosed bluish white. Abdomen black, without markings but segments 1 to the base of 3 are pruinosed bluish white. Legs black, only the medial portions of the mid and hind femora bright scarlet, the extreme base and a broad apical ring black. Nodal index from two males, 11 to 12 antenodals and 7 to 9 postnodals to forewings; 8 to 9 antenodals and 7 to 9 postnodals to the hind.

Female. Abdomen 22 mm. Hindwing 23 mm.

Head and prothorax as for the male. Thorax black marked with greenish yellow as follows, a moderately broad middorsal stripe bisected by the black middorsal carina, two broad stripes on each side, one bordering the humeral suture posteriorly, the other covering the anterior half of the metepimeron. Legs black, only the hind pair of femora rust-red in the basal half. Wings hyaline, blackish brown vittae in the subcostal and cubital spaces extending as far as the 1st antenodal and the cubital cross-vein; similar markings in the hindwings but extending for several cells adjacent to the membrane; discoidal field of forewings beginning with a row of 3 cells, then continued as rows of 2 for a space of four cells; subtrigone of 2 cells in left forewing but normal and of 3 cells in the right; nodal index, - 10 to 11 antenodals and 9 postnodals in the forewings; 8 ante- and postnodals in the hind. Anal-loop as for the male; pterostigma ochreous between thick black veins. Abdomen black, segment 3 with a short lateral stripe and its ventral border yellow. Slight dilatation of the borders of segments 8 and 9 bordered with yellow. Anal appendages shortly conical, as long as segment 9, yellow.

The venation of this specimen agrees more closely with that of the type male than does the female described by Dr Ris so that it is possible he has wrongly paired it?

Oxythemis acuatorialis n. sp. (Fig. 2, 1.) Pinhey = *Orthetrum hintzi*!

A male from Kapanga, XI.32, collected F. G. OVERLAET.

This species resembles in its general facies an *Orthetrum abbotti* CALVERT but it has only 2 rows of cells in the discoidal field of forewings, *Orthetrum* having a broader field of not less than 3 rows. I

had at first relegated it to the genus *Aethiothemis* but believe now that it is more correctly placed in *Oxythemis*.

Male. Abdomen 26 mm. Hindwing 29 mm.

Labium, labrum, epistome and frons uniform ochreous, the vesicle darker; prothorax and thorax dark reddish brown marked broadly with greenish yellow, the whole of dorsum of thorax save for a dark antehumeral streak not extending as far up as the alar sinus, which latter is also yellowish; the sides except for a narrow black stripe on the humeral suture and a second extending upwards from the spiracle; the upper and posterior part of metepimeron pruinosed blue. Legs black, coxae and trochanters pale yellow. Wings hyaline; pterostigma ochreous between dark veins, the costa being especially thickened, covering 2 cells. Membrane blackish brown. Nodal index, - 15 antenodals and 8 to 9 postnodals in forewings, 9 to 10 ante- and postnodals in the hind; discoidal field of forewing begins with a row of 3 cells and is then continued as rows of 2 for a distance of five cells; distal antenodal complete; hypertrigones in forewings traversed once, subtrigone 3-celled; discoidal triangle of forewing traversed, entire in the hind. Anal-loop rather more elongate than in *phoeniceaeles*. Abdomen black without visible markings save for a geminate dorsal spot of yellow on segment 2. Anal appendages black, of the usual conventional Libelluline shape and about as long as segment 10. Genitalia as shown in figure 2. f.

This species appears to be most closely related to *Oxythemis carpenteri* FRASER, resembling it in the pale yellow colour with restricted dark markings and sharply localised pruinosed area on the sides of thorax. The type in the Musée Royal du Congo Belge.

Orthetrum Vrydaghi n. sp. (Fig. 1. f.)

Material examined : 3 males, two of which have the abdomen imperfect, from Bambesa, S.V.37, collected J. VRYDAGH.

Male. Abdomen 28 mm. Hindwing 27 mm. Pterostigma 3.75 mm.

Head : labium black, the base yellow laterally; labrum greenish yellow, epistome and frons bluish white; occiput dark reddish brown. Prothorax and thorax black, the latter marked with bright citron yellow, rather broad, sharply defined antehumeral stripes parallel to the middorsal carina; the alar sinus, a posthumeral stripe expanded above, a narrow mediolateral stripe deficient above and below; finally a stripe on the anterior border of the metepimeron which is angulated posteriorly above beneath the wing roots. Legs black. Wings hyaline, costa bright yellow, especially after the nodus, as well as numerous cross-veins and the antenodals; nodal index, 11 to 12 antenodals and 9 postnodals to forewings, 9 ante- and postnodals to hindwings; pterostigma bright

ochreous between stout black veins. Abdomen dorsoventrally dilated, but slightly so laterally, slightly constricted at segment 3, then narrow or slightly fusiform to the end, black, segment 1 with a small apical dorsal greenish yellow spot; segment 2 with a similar but much larger one shaped like the head of an arrow; segment 3 pruinosed blue; remainder and the anal appendages black. The latter as long as segment 9, of the conventional libelluline shape. Genitalia shaped as shown in figure 1. f.

This brightly marked *Orthetrum strongly* resembles *O. stemmale wrightii* (SELYS) in size and colouring and might therefore be considered as another subspecies of *stemmale*. I am of opinion however that the Seychelles species is not closely related to *stemmale* and it is not at all clear why Dr RIS placed it as such. The type is the complete male in the Musée Royal du Congo Belge.

PORPACITHEMIS gen. nov.

Small graceful Libellulines with the abdomen and wings of the same length, coloured steely black marked with citron yellow; venation of wings moderately close, 10 to 11 antenodals to forewings, the last incomplete; discoidal field narrow, its sides parallel but tending to converge distally, composed of 2 rows of cells for almost its entire length; discoidal triangle of forewings traversed once, its costal side about twice the length of the proximal, subtrigone 3-celled; discoidal triangle of hindwing entire, all *Hts* entire; 1 cubital vein to all wings, 1 row of cells between *IRiii* and *Rspl*; *MspI* absent. Anal-loop well formed, its apex overlapping the discoidal cell of hindwing by 2 or 3 cells, split-cells at base and apex; *CuP* arising from the lower angle of the discoidal triangle in hindwing; arculus at the level of the 2nd antenodal, 3 rows of cells at base of hindwing. Abdomen slim, of even width throughout. Type species of genus *Porpacithemis dubia* sp. nov.

Porpacithemis dubia sp. nov. (Figs 2, a, b, c and d.)

Female. Abdomen 28 mm. Hindwing 28 mm. (Male unknown).

Head : labium bright ochreous, the middle lobe and borders of lateral black; labrum and centre of postclypeus black, rest of face bright chrome yellow including the frons which is rounded but with a deep narrow sulcus; above frons a broad basal band which along with the vesicle is a blue black submetallic. Thorax steely blue-black marked with citron-yellow, - broad antehumeral stripes, broadening below and

angulated inwards above, 2 spots in the alar sinus, a posthumeral stripe, a midlateral and nearly the whole of the metepimeron (or the whole of the sides citron-yellow traversed by two narrow parallel black stripes.). Legs black, rather long and slender, black but the inner sides of the anterior femora pale yellow. Wings hyaline, apices of all dark burnt brown to as far as proximal end of pterostigma, which latter is dark ochreous between black veins. Nodal index - $10\frac{1}{2}$ to $11\frac{1}{2}$ antenodals and 7 to 8 postnodals to forewings, 8 antenodals and 11 postnodals to the hind; bases of all wings tinted with amber yellow to as far out as the 2nd antenodal; dark burnt brown rays in the costal, subcostal and cubital spaces; discoidal field of forewings with 2 rows of cells from origin at triangle to as far as the level of the distal end of *Br.* Abdomen black marked with citron yellow, a narrow dorsal apical triangle on segment 1, two small round points on middorsum of segment 2 at its base, and a broad apical annule covering its apical half but with two black apical lunules projecting into it; segment 3 as for 2 but the two basal spots larger and the apical annule reduced to two triangular spots on middorsum adjacent the jugal suture and a basal triangular spot on each side; segment 4 with only the basal dorsal spots which are now broadly oval in shape; segments 5 to 7 without jugal sutures, the two dorsal spots increasingly larger from 5 to 7 and centered on each segment, remaining segments unmarked, black as also are the short conical appendages.

Habitat : A single female, Gaboon L. ASEBÉ. Fernan-Vaz. 14.1.08, British Museum (Natural History) collection. Venationally, this species is nearest the neotropical genus *Microthyria* KIRBY.

***Aethiothemis Basilewskyi* n. sp.** (Fig. 1. g.)

Material examined : 1 male, the holotype, from Gels, Belgian Congo, 9.XI.35, coll. A. BAT.

Male. Abdomen 23 mm. Hindwing 21 mm.

Head : labium black, lateral lobes broadly citron yellow at base; labrum glossy black, the palps pale yellow; antclypeus pale greenish white, postclypeus brown but the superior border pale; frons both in front and above, as well as the vesicle dark metallic blue; occiput very small, glossy black. Prothorax blackish brown; thorax dull marked with pale green or greenish yellow, broad complete antehumeral stripes and the whole of the sides save two broad black stripes which are anastomosed in the upper half; the lower border of the metepimeron narrowly dark brown. Legs black; middle femora with a row of closely-set short spines which gradually lengthen distally but the distal three distinctly larger and more robust than the preceding; hind femora with

a similar row but undifferentiated distally. Wings hyaline, slightly infuscated, this deepening at the apices; the bases of hindwings tinted with amber yellow; distal antenodal complete, all triangles entire, anal-loop simple, apex obtuse, extending one cell beyond level of discoidal triangle, 2 rows of cells in anal-field proximal to the loop, only 1 row of cells between *IRiii* and *Rspl*; discoidal field dilating to 6 to 8 cells at border of wing in the forewing; nodal index, - 10 antenodals and 9 postnodals in forewings, 8 to 9 of each in the hind. Pterostigma elongate, covering 2 cells, 3 mm in length, dark ochreous with costal border thickened and black. Abdomen swollen at base, especially dorso-ventrally, segment 4 narrow, expanding slightly from segment 5 to 7 then slim to the end, black without any visible pale markings except some yellow on the sides of segments 1 to 3. Anal appendages black, superiors nearly twice the length of segment 10 and of the conventional Libelluline shape. Genitalia as shown in figure 1. g.

This elegant species resembles a medium sized blackish *Trithemis* or a large adult male *Diplacodes lefebvrei* RAMBUR for which it might be mistaken when on the wing, but the complete distal antenodal of forewings and the character of the genitalia distinguish it from any of these. The venation of the wings places it in group *Bequaerti* of *Aethiothemis* and the metallic frons distinguishes it from all other species in that genus. It must be said that this last character is so foreign to *Aethiothemis* that it raises doubts as to its correct placing, but the differences between the venation of *Bequaerti* and *solitaria* are even greater, the former by these characters being more nearly related to *Basilewskyi* than to *solitaria*, the type species of the genus. The type is deposited in the Musée Royal du Congo Belge.

Recently M. E. PINHEY has sent me a male of *A. Bequaerti* from Abercorn, N. Rhodesia, and the venation of this specimen agrees closely with that of *Basilewskyi*.

***Aethiothemis paludinis* n. sp.** Pinhey = *Orthetum hintzi*

Material examined : 1 teneral female from Bambesa, X.33, coll. H. J. BRÉNO; 1 adult male, IX.33; 1 adult female, VIII.33 and 1 adult female, VIII.33, Bambesa, all collected by H. J. BRÉNO; 1 subadult female, Uele, Bambesa, III.38, coll. J. VRIJDAGH and one pair of adults Bambesa, IX.33, coll. J. LEROY.

Male. Abdomen 29 mm. Hindwing 26 mm. Female. Abdomen 26 mm. Hindwing 26 mm.

Male. Labium glossy black, labrum and epistome pale olivaceous yellow; frons violaceous brown deepening to dark olivaceous and finally

black at base above; occiput black. Prothorax black but the posterior lobe centred with yellow.

Thorax black marked only by narrow white antehumeral stripes. Legs black. Wings hyaline, the extreme base of hindwings with a small spot of amber yellow; nodal index - 13 to 14 antenodals and 8 to 9 postnodals to forewings; 10 antenodals and 9 postnodals to hindwings; discoidal field beginning with a row of 3 cells or, in some 2 or 3 rows of 3 cells, rarely 3 rows of cells throughout; more commonly spaces of 2 rows of cells irregularly spaced between rows of 3 but very variable. Pterostigma bright ochreous between thick black veins, centred over one elongated cell. Abdomen black, without visible markings, dorso-ventrally dilated at segment 2, constricted at segment 3 and only slightly broader from 4 to the end, strongly carinated. Superior anal appendages of the conventional Libelluline shape, twice the length of segment 10, black.

Subadult: Head uniformly pale olivaceous yellow; thorax of similar colour but the humeral region blackish brown, this forking below. Abdomen yellow from segment 1 to 2 with the sutures finely mapped out in black, remaining segments dark but the ventral borders of 3 to 8 and 10 bright ferruginous, segment 9 with only a spot of the same colour at its base. Appendages paler, the inferior yellow. In another subadult male, the thorax has the pale antehumerals and there are 4 narrow yellow stripes visible on each side, one bordering the dark humeral area, one over the spiracle and the other two bordering the metepimeron above and below. Considerable variations are due to the age of individuals and the development of black pigment to enclose the yellow ground colour.

This species, which resembles a dark coloured *Trithemis*, is placed for convenience in genus *Aethiothemis* with which it largely agrees in its venation with the discoidal field of forewing reduced to 2 rows of cells and the distal antenodal complete; it is separated from other species of the genus by its closer venation and higher nodal index, as well as by its genitalia. Type and paratypes in the Musée Royal du Congo Belge.

ANECTOthemis gen. nov.

Eyes rather broadly confluent; frons rounded, with narrow but deep sulcus; posterior lobe of prothorax small, depressed; abdomen slightly, laterally and dorsoventrally, dilated at base, segment 3 narrowed, the remainder narrow and parallel-sided or slightly fusiform to the end. Wing venation rather close, distal antenodal incomplete, arculus between the 1st and 2nd antenodals, discoidal triangle of forewing traversed, its costal side about half the length of distal, subtrigone 3-celled,

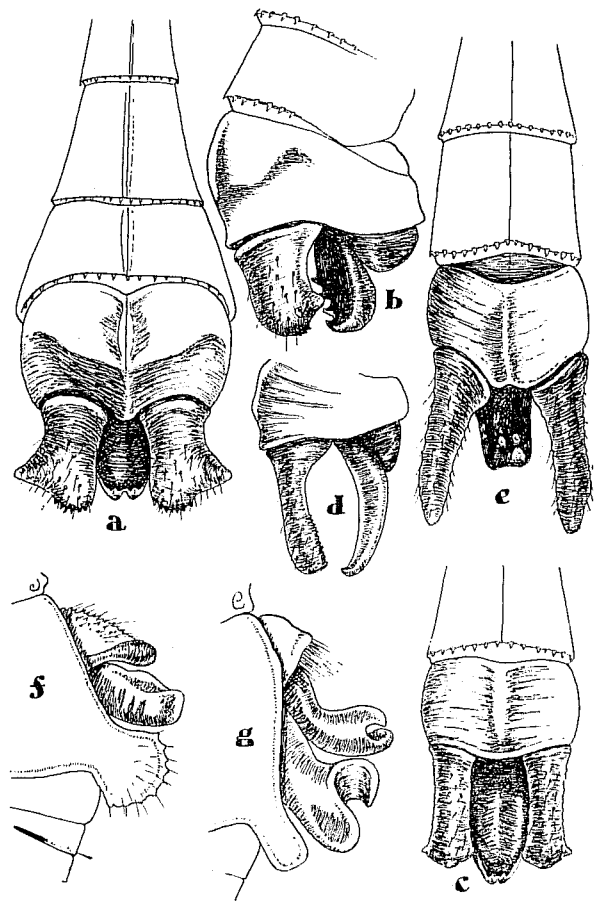


Fig. 1.

a. Anal appendages of *Tetrathemis denticauda* sp. nov., dorsal aspect. b. The same seen from the right side. c. The same of *Tetrathemis Godiardi* Lacroix, dorsal aspect (From the type). d. The same seen from the right side. e. Anal appendages of *Tetrathemis corduliformis* Longfield, dorsal aspect. f. Genitalia of *Orthetrum Frydaghi* sp. nov. g. The same of *Aethiothemis Basilevskyi* sp. nov., the penis is seen projecting above the hamules.

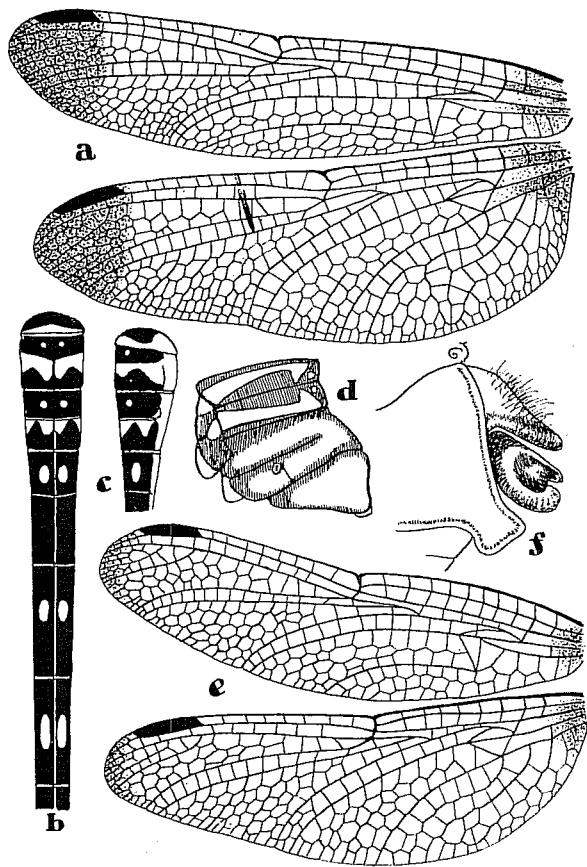


Fig. 2.

Parpacithemis dubia sp. nov. *a.* Wings. (From the type in the British Museum). *b.* Abdominal markings, dorsal aspect. *c.* The same seen from the left. *d.* Thoracic markings, left-dorsal aspect of same species. *e.* Wings of *Nabiothemis* (*Aethiothemis*) *Requartii* (Ris). *f.* Male genitalia of *Oxythemis aequatorialis* sp. nov.

discoidal field of forewing with 2 rows of cells to about as far as the penultimate antenodal; triangle in hindwing entire, with *CuP* at its lower angle; anal-loop elongate, its outer end well beyond level of discoidal triangle of forewing; 3 rows of cells in anal field of hindwing; only 1 row of cells between *IRiii* and *Rspl*; *Mspl* rudimentary; only 1 *Cuq* to all wings; no accessory cross-veins to *Br*; pterostigma large.

Type species of genus, *Anectothemis apicalis* FRASER.

Anectothemis apicalis n. sp.

Male unknown. Material examined, 2 females, 1 adult, BUSU Moto, 6.VIII.35, coll., A. BAL; 1 subadult, Eala, 35, coll., A. CORBIER.

Female. Abdomen 25 mm. Hindwing 23 mm. Pterostigma 3 mm.

Head: labium bright chrome yellow, the mid lobe and borders of lateral broadly black; labrum black, anteclypeus dull yellow, postclypeus glossy black at centre, bright chrome yellow laterally; frons chrome yellow anteriorly, steely black above crest as well as vesicle. Prothorax pale brownish yellow; thorax dark blackish brown with slight metallic reflex, marked broadly with chrome yellow, broad antehumeral stripes, the superior ends of which are slightly incurved; a broad stripe on the mesepimeron and a second on the posterior half or more of the metepimeron, the dark stripe, dividing these two, enclosing below a large triangular spot of yellow from which a fine sinuous line is prolonged upwards. Legs long, slim, black, the anterior pair of femora yellow on the inner side. Wings hyaline but with the apices of all four deeply infuscated, this area gradually fading out to just short of the nodus. Pterostigma dark ochreous between thick black veins; hindwings with a small golden brown spot at base and short rays in the cubital and subcostal spaces; nodal index, - 12½ antenodals and 7 to 8 postnodals in forewings, 9 ante- and postnodals in hindwings. Abdomen black marked with yellow, subdorsal and ventral black bands being enclosed by yellow ones. Segment 1 with a dorso-apical triangular spot and a large spot on each side; segment 2 with the middorsum yellow traversed by the fine black jugal suture and middorsal carina; the sides broadly and irregularly yellow; segments 3 to 4 or 5 yellow on dorsum but this divided up by the black middorsal carina, jugal suture and a subdorsal black stripe. Beneath abdomen black with a yellow basal spot on each segment. Anal appendages black, shortly conical. Vulvar scale short and triangular in shape.

A third female from Bambesa, which has the same identical body colour and markings together with the broad basal marking to hindwing, is without the dark apices to the wings and the discoidal field of forewings has 2 rows of cells to one cell distal to nodus (only to proxi-

mal end of *Br* in the other two females); the nodal index corresponds to the two others, so that, on balance, I am of the opinion that this is the same species but with aberrant venation. This third female comes from Bambesa, VI.38, collected by J. VRIJDAGH, and I have labelled it as « *Forma B*, type » to distinguish it from the other two.

This genus appears to link up *Aethiothemis* with the *Trithemis* complex, the presence of the antenodal brace vein (incomplete distal antenodal) indicating a closer relation to the latter. All three females have been incorporated in the collections of the Musée Royal du Congo Belge.

New and rare species of Zygoptera from the Belgian Congo

By Lt. Col. F. C. FRASER, I. M. S., Rétd.

This paper deals with some new species of the smaller Zygoptera which were found amongst unnamed undetermined material belonging to the Musée Royal du Congo Belge, Tervuren; two of the new species belong to the *Protoneuridae* and a third to the *Coenagriidae*; the hitherto unknown female of *Chlorocnemis cyanura* FORSTER is also described. This latter species was transferred to the new genus *Isomecoenemis* by COWLEY and is retained here with some doubt; as the female was unknown, COWLEY was unaware that this sex possessed specialized hooks on the prothorax, moreover he attributed the apparent absence of the anal vein in his figure of the wing of *cyanura*, due to buckling of the wings. This is not so but due to an actual rejoining of the vein with the posterior border of the wing, after which it separates again.

A new species of *Agriocnemis* described has curious anal appendages shaped unlike any other species of the genus; as these organs constitute the only reliable method of separating the species, I have refigured (Fig. B, a - g) those belonging to the whole of the African species, save *ebneri* Ris. (= *A. zerasica* LE ROY) in which they are so small as to be invisible, and *A. angolense* LONGF., the appendages of which approximate to those of *forcipata*.

Elatoneura vrijdaghi n. sp. (Fig. A, 2, 5 and 7.)

A single male from Ucle : Bambesa, Belgian Congo, III. 39, collected by J. VRIJDAGH. Holotype in the Musée Royal du Congo Belge.

Male. Abdomen 41 mm. Hindwing 22 mm.

Head. Labium pale yellowish; labrum, epistome and frons bright brick-red, a vestigial interrupted black stripe running between the eyes separating the frons from the vertex; occiput black sharply marked