

type material shows this to be correct and, since this appears to be a clear case of *lapsus calami* on the part of Ramme, it would appear justifiable to amend the name, thus:

*Chirindites odendaali* Ramme, 1929, *Mitt. zool. Mus. Berl.* 15: 282,

fig. 13; 283; pl. IV, fig. 10, 11

= *Chirindites odendaali* — **emend. nov.**

Mr Whellan also has sent specimens from a locality in Southern Rhodesia somewhat south of the original Chirinda area and the neighbouring Umtali District (where the species is also known, cf. Kevan, 1956: 125), namely, from Melsetter District, Chimanimani Mts., 6,000 ft., lush grass on stream bank, 25.IV.1957, two males.

One of the specimens is remarkable for its short, rather rounded, fastigium and consequently less oblique frontal profile. It also has the tegmina extending well beyond the posterior margin of the first abdominal tergum, a rather unusual, but not unknown condition in *C. odendaali*. Were it not that the second male is much more normal (although even in this case the fastigium is more parallel-sided and rounded apically), a geographical subspecies might be postulated. However *C. odendaali* is so very variable in size, fastigium and colour (cf. Kevan, 1956: 125), that it would be very precipitous to erect a new subspecies. Both specimens are greenish with reddish suffusion on the pro- and metazona of the pronotum; leg joints and hind tibiae are also red. Further records of the species from Southern Rhodesia and Mozambique are given elsewhere (Kevan, 1961).

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## Notes on African Odonata Nymphs - 2\*

by

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The previous paper described various nymphs or larvae, as they are, perhaps, more often called now, and summarized other work on the early stages of dragonflies. The present article includes references to descriptions of species omitted from the earlier paper and gives descriptions of a few more species bred during the period April to June 1960, in a partitioned rearing cage partly immersed in a dam at Douglasdale, about seven miles south of Bulawayo, Southern Rhodesia. My acknowledgements are due to Mr J. D. Milne for his kind assistance and enthusiasm.

As the result of these experiments it has been possible to determine a number of nymphs collected in previous years by University Expeditions from Sweden and England, although at present only generic identifications can be given for some of the material. A list of these is appended to this article.

#### 1. *Chlorolestes elegans* Pinhey, 1950.

*Ann. Transv. Mus* 21: 260, ff; id., 1958, *Occ. Pap. Nat. Mus. S. Rhod.* 22B: 99, f. (larva).

The nymphs described in the latter paper were taken on the Vumba Mountains, Umtali, Southern Rhodesia, and may be considered to represent a slightly different race to the adults described in 1950, from the Northern Transvaal.

#### 2. *Lestes pallidus* form *ictericus* Gerstaecker, 1869.

*Lestes ictericus* Gerst., 1869, *Arch. Naturgesch.* 35: 222.

The adult of this form, in the interpretation of the present author, is usually of a reddish brown colour. Two females emerged at Douglasdale, 21.IV.1960 and 4.V.1960.

**NYMPH** (fig. 1). Body length 17.5 mm. + caudal gills 8 mm. Mask reaching back slightly beyond bases of middle legs. Apices of gills rounded. Antennae and legs as in the figure of *ochraceus* (Pinhey, 1959: 471, fig. 2). Antennae two and a half times as long as the distance between their bases; five mental setae, or five and a trace of a sixth inner one; three lateral setae. Anterior margin of median lobe serially indented.

\* Part 1, vide Pinhey, 1959, *J. ent. Soc. S. Afr.* 22: 469-88.

**3. Pseudagrion massaicum** Sjoestedt.

*P. punctum massaicum* Sjoestedt, 1909, *Kilim-Meru Exp.* 2: 48; Pinhey, 1959: 472, f. (nymph)

One female emerged at Douglasdale, I.V.1960.

**NYMPH** (fig. 2). Body 17 mm. + caudal gills 6 mm. Antennae moderately robust, rather over twice the length of the distance between their bases. Mask just reaching bases of forelegs; one medial, three lateral setae. Lateral edge of labium with small setae; moveable spine large. Anterior margin of median lobe strongly convex.

**4. Microgomphus mozambicensis** Pinhey, 1959.

*Occ. Pap. nat. Mus. S. Rhod.* 23B: 340 (and ? larva).

**5. Orthetrum brachiale** (Beauvois).

*Libellula brachialis* Beauvois, 1805, *Ins. Afr. Amér.*: 171.

Douglasdale, male emerged I.V.1960, female 23.VI.1960.

**NYMPH** (fig. 3). Body reddish-brown (covered as usual in life with mud). Total length 15--17 mm. Coated with hair. Antennae slightly longer than the distance between their bases. Abdomen rounded above, its greatest width about 4.5 mm; without dorsal keel; no lateral spines, but with the lateral margins depressed. Anal pyramid distinctly longer than 9 + 10; cercoids nearly three quarters as long as cerci. Legs robust, with stout spines. Mask short; lobes crenulate at margins; median lobe projecting medially to an angle; with only two long setae (one longer than the other), 10--11 short setae in a row towards the side but irregularly arranged in the middle of the lobe. Lateral lobe with six setae; moveable spine moderately long, slender. This nymph differs from *O. caffrum* (Burmeister) chiefly in the irregular arrangement of the short setae on the median lobe of the mask, and in having only two long setae instead of three to four.

**6. Brachythemis leucosticta** (Burmeister).

*Libellula leucosticta* Burmeister, 1839, *Handb.* 2: 849; *B. leucosticta*, Fraser, 1949, *Mission de Witte* 61: 15 (larva); Corbet, 1957, *Entomologist* 90: 30 (larva).

At Douglasdale, an incomplete emergence of one adult, April 1960.

**7. Acisoma panorpoides ascalaphoides** Rambur, 1812.

*Acisoma ascalaphoides* Ramb., 1842, *Név.* 29.

One female emerged at Douglasdale, 23.V.1960.

**NYMPH** (fig. 4). Total length 12 mm. Eye large, prominent. Antennae shortish but longer than the distance between their bases; six segments. Legs

robust. Abdomen broad, sparsely setose; acarinate, but with well developed lateral spines on 8--9. Pyramid almost as long as 9 + 10; cerci slightly longer than pyramidal, cercoids almost as long. Mask reaching bases of middle legs; apex of median lobe pointed; 12--13 mental setae in an arc, the ones at either end shortest; 10 lateral setae, including a weak sub-basal one. Moveable spine slender.

**8. Sympetrum fonscolombei** (Selys).

*Libellula fonscolombei* Selys, 1840, *Mon. Lib. Eur.*: 29, 49, 208, in: *Bull. Acad. Belg.* 7(1): 34. Descriptions of larva: vide Pinhey, 1959, *loc. cit.* 486.

One male emerged at Douglasdale, 8.V.1960 and one female, 18.IV.1960.

**NYMPH OF MALE** (fig. 1). Total length 18 mm. Antennae twice as long as the distance between their bases. A group of setae on occiput behind the eyes and other short marginal setae. Legs rather long and slender; banded with blackish. Abdomen rather broad, rounded above; short lateral spines on 8--9. Dorsal appendage broadly triangular, approximately as long as 9 + 10; cerci slightly longer, cercoids about half as long as cerci. Mask deeply concave; median lobe at apex forming an angle of 120°, the centre rounded off; margins of all lobes even, bearing short submarginal spines; 15--16 mental setae, the longest in the centre, arranged in an arc; 12--14 lateral setae. Moveable spine very slender.

**9. Philonomon luminans** (Karsch).

*Sympetrum luminans* Karsch, 1893, *Berl. ent. Z.* 38: 22.

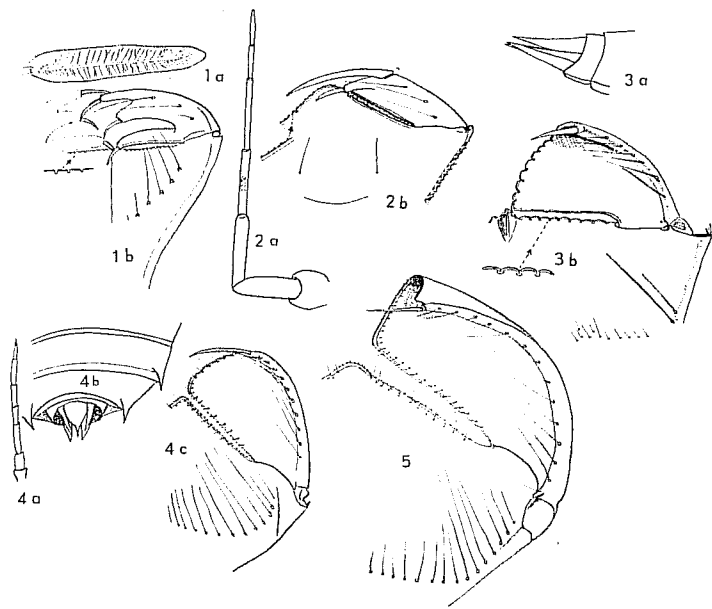
One female emerged at Douglasdale, 15.V.1960.

**NYMPH** (fig. 5). Total length 16 mm; greatest width of abdomen 5.5 mm. Antennae about one and a quarter times the distance between their bases. Body pale brown, tinged with greenish. Wing sheaths just reaching base of segment 6. Abdomen rounded above, without hooks; 8--9 with prominent lateral spines. Dorsal appendage as in *S. fonscolombei* barely as long as 9 + 10; but cercoids nearly as long as the appendix, cerci slightly longer, all with very acute apices. Legs slender, claws long. Mask as concave as in *fonscolombei*. Median lobe with apex sharper, the angle nearer 60°. Small marginal spines, 13 mental setae, only the median ones shortish; 11 long, one short sub-basal, lateral setae and two very small basal setae on lateral lobe; moveable spine slender, as in *fonscolombei*. The species differs from *fonscolombei* in the arrangement of setae on the mask and in the comparative lengths of the anal appendages.

**10. Trithemis kirbyi ardens** Gerstaecker, 1891.

*Libellula (Trithemis) ardens* Gerst., 1891, *Jber. hamburg. wiss. Anst.* 9: (5, 9, 187, sep.).

Two females emerged at Douglasdale, 26.IV. and 15.V.1960.



Figs. 1. *Lestes pallidus f. ictericus*. a. gill, b. mask.  
 2. *Pseudagrion massaicum*. a. antenna, b. mask.  
 3. *Orthetrum brachiale*. a. end of abdomen, from right, b. mask.  
 4. *Acisoma panorpoidea ascalaphoides*. a. antenna, b. end of abdomen, from above, c. mask.  
 5. *Sympetrum fonscolombi*. Mask.

**NYPH (fig. 7).** Total length 15-16 mm; greatest width of abdomen 5.5 mm. Distance between antennae very short, about 1.2 mm; antennae about two and a half times this distance; flagellum of four short and one long segments. Abdomen triquetral, with prominent dorsal hooks on all segments; lateral spines on 8-9. Dorsal appendage elongate, longer than 9 + 16; cercoids very short; cerci as long as dorsal appendage. Legs moderately slender. Femora and tibiae banded with black. Body marked with an irregular black

pattern. Mask moderately concave; median lobe conical; margins straight but armed with short, stout spines; seven to eight mental setae, all longish; six lateral setae. Moveable spine slender.

**11. *Trithemis dorsalis* (Rambur).**

*Libellula dorsalis* Rambur, 1842, *Néer*, 89; *Heliothemis dorsalis* (Rambur), Barnard, 1937, *Ann. S. Afr. Mus.* 32(3): 254 (larva).

One female emerged at Douglasdale, 4.V.1960.

**NYPH (fig. 6).** Total length 17 mm; greatest width of abdomen 6 mm. Antenna as long as about twice the distance between their bases. Abdomen broad, triquetral, with dorsal hooks. Marked strongly with blackish. Lateral spines on 8-9. Legs slender, banded with black. Appendages very similar to the last species. Mask reaching coxae of middle legs. Mask as in *T.f. ardens*, with similar armature and margins, but with the spines on the slightly sinuous central margins of lateral lobes grouped in twos or threes, then concentrated at the angle; nine to ten mental setae; six to seven long laterals and one to two small subbasals. Moveable hook slender.

**12. *Pantala flavescens* (F.).**

*Libellula flavescens* F., 1798, *Suppl. Ent. Syst.*: 285; *P. flavescens* (F.), Barnard, 1940, *loc. cit.* 32: 660-1 (larva); Pinhey, 1959, *loc. cit.* 487 (nymph).

Females reared Bulawayo, December 1959; Douglasdale, April 1960 (adult more intensely amber at wing-bases than normal): Douglasdale, 1.V.1960.

**NYPHS COLLECTED IN SOUTH AFRICA BY THE LUND UNIVERSITY EXPEDITION, 1950-51.**

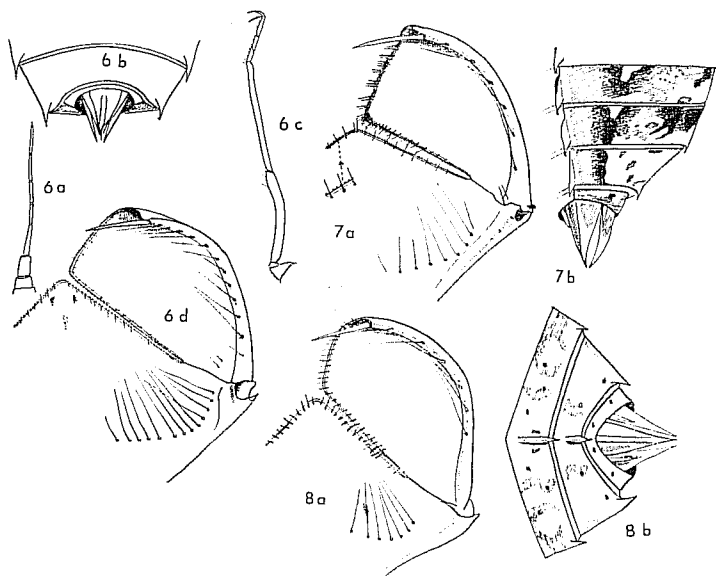
For list of adults, vide Brinck, 1955: 191-233.

***Chlorolestes conspicua* Sélys (1862).**

Loc. no. 1757, Blinkwater stream, Camps Bay, Table Mountain, 1.II.1951; ? loc. nos. 1748 and 1767, Shaded stream, Kogel Bay (C.P.), 9.XII.1950; ? loc. no. 1774, Maaschijnop, Hermannus (C.P.), on fast stream, 21.XII.1950; ? loc. no. 1780, Echo Valley, 2800', Table Mountain, 15.XII.1950.

***Synlestid* species, indeterminate.**

Loc. no. 1740, Tzitzikama Forest, Storms River (C.P.), 14.I.1951 (*Chlorolestes* ? *longicauda*); loc. no. 1763, Viljoenspas, Grabouw (C.P.), 11.II.1951; loc. no. 1804, Skurftberg, Ceres (C.P.), 12.II.1951.



Figs. 6. *Philonomon luminans*. a, antenna, b, end of abdomen, from above, c, hindleg, d, mask.  
7. *Trithemis dorsalis*. a, mask, b, abdomen, from right.  
8. *T. kirbyi ardens*. a, mask, b, abdomen, from above.

**Lestes** species.

Loc. no. 987, East Ottery, Cape Flats, 2.II.1951.

**Ischnura senegalensis** (Rambur, 1812).

Loc. no. 1717, Brandylei, Worcester (C.P.), 11.II.1951; loc. no. 1719, Kaoko-Otavi, Ohopoho, S. W. Africa, 5.VI.1951; loc. no. 1720, Grabouw, Hottentot-Holland (C.P.), 4.II.1951; loc. no. 986, Zuurberg Pass, Addo (C.P.), 16.I.1951; loc. no. 1771, *ibid.*, 18.I.1951; loc. no. 1726, brackish lake E. Ottery, Cape Flats, 2. II.1951; loc. nos. 1745, 1777, 1800, Zeekoewlei, Cape Flats, 8.XII.1950; loc. nos. 1746, 1751, Tzitzikama Forest, Storms River (C.P.), 12-13.I.1951;

loc. no. 1736, Sanctates, Kaokoveld, S. W. Africa, 15.VI.1951; loc. no. 1739, brackish water, Kars River, Bredasdorp (C.P.), 1.I.1951; loc. nos. 1753, 1779, Bredasdorp (C.P.), 30.XII.1950; loc. no. 1768, brackish water, Hopefield (C.P.), 31.X.1950; loc. no. 1795, Wilde Vogel Vlei, Kommetje, Cape Penins., 2.II.1951; loc. no. 1801, Grootkop, Knysna (C.P.), 18.I.1951.

**Enallagma ? glaucum** (Burmeister, 1839).

Loc. no. 1812, Anabih (Orupemba), Kaokoveld, S. W. Africa, 13.VI.1951.

**Pseudagrion ? furcigerum** (Rambur, 1812).

Loc. no. 1727, mountain stream, Swartberg Pass, Platherg, 5000' (C.P.), 5.I.1951.

**Pseudagrion** species.

Loc. no. 1802, Kowares, Kaokoveld, S.W. Africa, 3.VI.1951.

**Aeshna rileyi** Calvert (1892).

Loc. no. 1787, De Hoop Vlei, in salty stream, Bredasdorp (C.P.), 3.I.1951.

**Aeshna** species.

Loc. no. 1730, stony stream, Qachas Nek, Matatiele, Basutoland, 6500', 7.III.1951.

**Anax imperator** Leach (1815).

Loc. nos. 1728, 1781, Kowares, Kaokoveld, S.W. Africa, 3.VI.1951; loc. no. 1736, Groot Kop, Knysna Forest (C.P.), 18.I.1951; loc. no. 1807, Swellendam (C.P.), 3.I.1951.

**Anax** species.

Loc. nos. 1749, 1790, Zeekoewlei, Cape Flats, 8.XII.1950; loc. nos. 1785, 1783, Zuurberg Pass, Addo (C.P.), 16.I.1951.

**Orthetrum ? caffrum** (Burmeister, 1839).

Loc. no. 1811, shallow water, Leribe, Basutoland, 10.III.1951.

**Orthetrum** species.

Loc. no. 1806, Bot River Vlei, Kleinmond (C.P.), on shaded stream, 20.XII.1950.

**Sympetrum fonscolombei** (Selys, 1840).

Loc. nos. 930, 1732, 1803, salt lake, Swartmodder, Upington (C.P.), 13 and

20.XI.1950; loc. no. 1718, in a pool, Kowares, Kaokoveld, S.W. Africa, 3.VI.1951.

*Zygonyx natalensis* (Martin, 1900).

Loc. no. 1721, fast stream, Mitchell's Pass, Ceres (C.P.), 12.II.1951.

*Pantala flavescens* (F., 1798).

Loc. no. 1788, Punchbowl, Soutpansberg, Louis Trichardt (Tvl.), May 1951.

A few other nymphs in this Lund collection are suspected to be *Diplacodes lefeberrei* (Rambur), but this needs confirmation.

#### DURHAM-NEWCASTLE UNIVERSITY EXPEDITION, 1951

This collection, as far as dragonfly nymphs are concerned, only involved a few species, all collected in pans at Ijara, Northern Frontier Province, Kenya, 23.VIII.1951:

*Ischnura senegalensis* (Rambur), *Ceragrion* species, *Pseudagrion* species, *Aeschna panorpoides ascalaphoides* Rambur, *Philonomon luminans* (Karsch), *Trithemis* species, and *Pantala flavescens* (F.).

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## The bat fleas of Southern Africa (Siphonapt.: Ischnopsyllidae)

by

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#### INTRODUCTION

Southern Africa, as defined here, is the area south of the Zambesi River and the northern international borders of the Caprivi Strip and South West Africa. This includes the whole of the Union, South West Africa, the High Commission Territories, Southern Rhodesia and southern Mozambique.

This account of the bat fleas of Southern Africa is intended as a supplement to "The Siphonaptera (excluding Ischnopsyllidae) of Southern Africa" by B. de Meillon, D. H. S. Davis and F. Hardy (1961), which deals with the small mammal fleas.

The specimens on which this paper is based, were all identified in the Department of Entomology of the South African Institute for Medical Research, where the National Flea Collection is housed. Specimens of two species, which are lacking in our collection, were kindly lent to me by the Zoological Museum, Tring; also seen were the bat fleas in the collection of the Veterinary Research Laboratory, Onderstepoort, with the kind permission of Dr R. du Toit.

As will be seen from this paper, bat fleas are poorly represented in the National Flea Collection. This is due to two reasons, firstly we have found that fleas are not common on bats, especially, it seems, in Africa. Many hundreds of bats have often to be collected before a single specimen is found. Why fleas should be so scarce on bats is not clearly understood but when one considers that bats do not make nests and that the bare walls of caves and buildings afford little shelter, this is perhaps not so surprising. In this laboratory we have had little success in rearing fleas from debris collected off the floors of caves and lofts. Other workers have been more successful. Smit (1958) states that the collecting of bat guano from places with favourable conditions is an excellent source of bat fleas. It is possible, therefore, that the places from where our bat guano was obtained, were unsuitable for the development of larvae.

The second reason for the paucity of bat fleas in the National Flea Collection is the fact that little concentrated or organized effort has been made to collect bats. This is in strong contrast to the vast collection of small