

## NEW SPECIES OF ODONATA FROM SOUTHERN AFRICA

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(With 30 Text-figures)

THE few species described here are a preliminary to a detailed survey of the Odonata fauna of Southern Africa, which it is hoped to publish separately at a later date. More information on the relationships of the new species will be seen in this other paper.

In the preparation of both, I must acknowledge the ready assistance I have received from the staff of the Transvaal Museum and from Lt.-Col. F. C. Fraser.

### *Chlorolestes elegans* n.sp. (Figs. 1-4)

**INTRODUCTION.** A very large species, in general appearance like *longicauda* but with inferior appendages markedly different, the outer branch of each broad and straight, the inner one reduced to a small upwardly-projecting spine-like process. Pterostigma of mature ♂ rather uniform dark brown. Pale humeral stripe continuous along both sides of this suture.

**DESCRIPTION.** Holotype. Unbanded mature ♂. Very like a large *longicauda*. Labrum metallic green; dorsum of head marked with metallic green and blue-green. Humeral yellowish stripe on thorax entirely, or almost entirely, on both sides of the suture. Other features as in that species. Pterostigma in all the male Transvaal specimens blackish brown with merely a faint indication of reddish in outer part, not distinctly bicolorous; evidently they are very mature specimens, and have developed whitish pruinosity on dorsum of abdomen 9-10. No blue spot in interalary spaces.

Mature banded ♂ (paratype) very similar in body markings; bands on wings as in *longicauda*.

Accessory genitalia of male: hamules heavily sclerotized; posterior hamules shaped more like *fasciata* than *tessellata*.

Allotype. ♀. Very similar. The only specimen in the collection is slightly less mature than the males and has the outer  $\frac{2}{3}$  of pterostigma pale yellow brown, up to the brown distal crossvein.

Abd. ♂ 46-47.5, ♀ 44; hw. ♂ 31.5-34, ♀ 35; Pt. 2 mm. Abd./hw. ratio 1.4-1.5.

A hyaline male specimen from Penhalonga in the National Museum, Bulawayo, is evidently a smallish specimen of this species; pterostigma small, blackish brown. Abd. 46.5, hw. 29, pt. 1.5 mm.

**DISTRIBUTION.** So far only found in the Transvaal and Southern Rhodesia. Transvaal Museum Collection: 4 ♂♂ (1 banded), 1 ♀, from Woodbush Village, Transvaal, December 1907, and Entabeni, November 1931. Other records: National Museum, Bulawayo, from Southern Rhodesia—Penhalonga, 21 October 1943.

**REMARKS.** This large species is the most northerly one known of the genus.

**MATERIAL.** Holotype ♂, allotype ♀; 1 paratype ♂ banded, 1 paratype ♂ unbanded in Transvaal Museum.

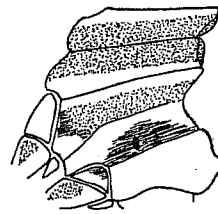


Fig. 1. *Chlorolestes elegans* n.sp. Pattern of thorax.

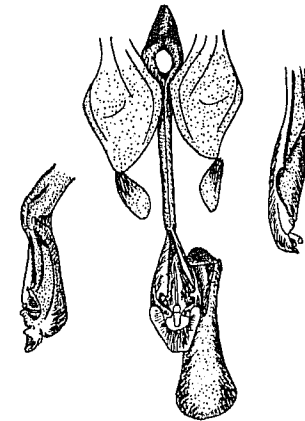


Fig. 2. *Chlorolestes elegans* n.sp. Accessory genitalia and penis of ♂.

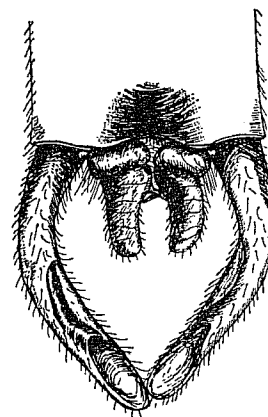


Fig. 3. *Chlorolestes elegans* n.sp. Anal appendages of ♂ from above.

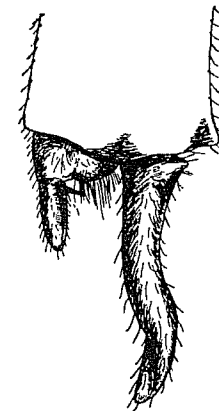


Fig. 4. *Chlorolestes elegans* n.sp. Anal appendages of ♂ from left side.

### *Pseudagrion assegaai* n.sp. (Figs. 5-10)

**INTRODUCTION.** Very similar in size and habits to *nubicum*. The ♂♂ are also very much alike in colour (coeruleous blue) and markings, but the dorsum of the 2nd abdominal segment has a rather spear-shaped spot instead of one U-shaped; and the superior anal appendage is much shorter. The ♀ of this species differs in its colour, which is light brown, and the shorter prothoracic stylets. Black humeral line narrower than in *nubicum*. The ♂ is closely related to *sudanicum* Sélys, but the latter has a U-shaped black dorsal mark on abdomen 2 as in *nubicum*.

**DESCRIPTION.** Holotype and paratypes. Mature ♂. Eyes in life pale blue above and at sides, pink on ventrum. Labium whitish. Occiput whitish green. Genae, labrum and epistome sky blue (turning green in some pinned examples); frons greenish blue (turning olive green); with black markings: a small median and two

lateral spots at base of labrum; most of postclypeus black, almost to margins; frons above with short black basal band connected vertically at the anterior ocellus to the vertex, which is black. Postocular spots pale blue-green, pyriform, isolated. A narrow pale green line along posterior edge of occipital plate. Prothorax black, edged narrowly at the back and more widely anteriorly, and entire sides pale blue-green; also a large pale blue-green dorsolateral spot; posterior lobe slightly raised, broadly rounded along its free margin.

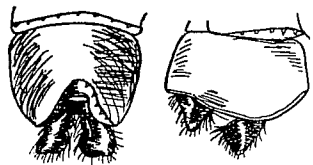


Fig. 5. *Pseudagrion assegaii* n.sp. Anal appendages of ♂ from above and the left side.



Fig. 6. *Pseudagrion assegaii* n.sp. Penis from below.

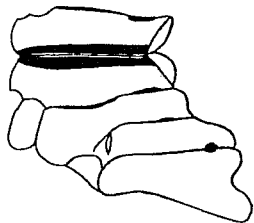


Fig. 7. *Pseudagrion assegaii* n.sp. Thoracic pattern of ♂.

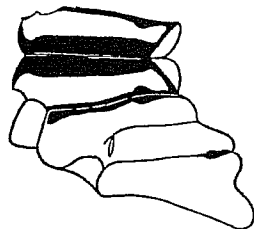


Fig. 8. *Pseudagrion assegaii* n.sp. Thoracic pattern of ♀.

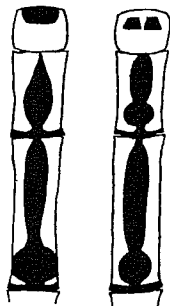


Fig. 9. *Pseudagrion assegaii* n.sp. Abdomen 1 to 3 of ♂ and ♀ respectively.



Fig. 10. *Pseudagrion assegaii* n.sp. Hindlobe of prothorax, ♀.

Synthorax black on dorsum to humeral line, with broad pale blue-green antehumeral bands (skyblue in life), nearer humeral than medial suture; this band slightly excavate externally at dorsal end, and in width equal to about half the entire mesepisternal breadth. Sides skyblue to light blue-green; the black from dorsum usually slightly overlapping the humeral suture on to mesepimeron; a black spot at dorsal end of second lateral suture and sometimes another at dorsal end of first suture; usually a small round black spot on metepisternum just below middle of first suture and, in one of our specimens, another such spot

on metepimeron approximately in centre of this plate. Legs ochreous; femora and tibiae with black external line. Pterostigma ochreous or light brownish ochreous.

Abdomen 1-2, 8-10 light skyblue in life, 3-7 pale greenish blue; in pinned examples all segments may be the latter colour. 1, above with broad black basal spot; 2, with metallic green-black median band, narrow at proximal end, gradually widening to  $\frac{2}{3}$  length of segment then suddenly contracting and ending in a black distal annulus. 3-6, with broad black, green or bronze-reflecting band, narrowed at distal end, inflated after a brief constriction before distal end of each segment; 7, with more uniform broad green-black band, continuous or ending abruptly before end of segment where there is a blue transverse band. 8-10, entirely skyblue except for a basal black triangle (or complete band) on dorsum of 10. Anal appendages blackish, very short; superiors only little more than a  $\frac{1}{4}$  as long as segment 10. Accessory genitalia: penis, fig. 6.

Allotype. Mature ♀. General colour light ochreous brown. Labium and occiput whitish ochreous. Face and head light ochreous with black markings as follows: very narrow basal line on labrum; a median and two lateral spots at base of postclypeus; a short crescent at base of frons above; a small spot on either side of anterior ocellus; a continuous transverse band just behind the posterior ocelli. Postocular spots olivaceous, not very distinctly marked off from the back of the head, which is orange ochreous. Prothorax ochreous; lateral medial lobes very rounded; posterior lobe with an even margin slightly angled mid-dorsally, but not divided into the 3 lobes often found in *Pseudagrion* ♀♀; stylets ochreous, slightly raised, short, about twice as long as broad; a short black bar between them; a small black central spot in the hollow between the latero-medial lobes. In some examples the two black markings on prothorax are more extensive and almost link up.

Synthorax light orange or ochreous brown, at sides more greenish, ventrally more yellowish; with reduced black markings (having a green sheen): a mid-dorsal band, slightly contracting at its lower end; this band in its total (double) width not broader than  $\frac{1}{2}$ - $\frac{2}{3}$  of each mesepisternum; a black spot at upper end of humeral suture and again at second lateral suture; or with a fine interrupted line along humeral suture; usually a faint brown spot on metepisternum just below middle of second lateral suture. Legs pale ochreous; foreleg with short black exterior line on exterior of femur and a more complete line on inner surface of tibia. Pterostigma whitish ochreous.

Abdomen orange ochreous or light ochreous brown; a narrow black annulus at end of each segment. Dorsum marked with black, having a green sheen: with narrow broken basal bar and a very fine transverse mid-dorsal line; 2-7, with the band very much as in the ♂; 8, with broad band almost to distal end; 9, with broad band in proximal  $\frac{2}{3}$ . 10, without any dorsal marking. Cerci and valves of the ground colour.

Abd. ♂ 25-26, ♀ 25-26; hw. ♂ 18-19, ♀ 18-20. Abd./hw. ratio (♂) 1.4.

DISTRIBUTION. Transvaal and Southern Rhodesia. Transvaal Museum Collection: Moorddrift, Transvaal, October 1909 (Swierstra); Nile. R., Potgietersrust, October 1948 (D. Brown); Salisbury, Southern Rhodesia, December 1947-January 1948 (Pinhey).

REMARKS. Found in same habitats as *nubicum*.

MATERIAL. Holotype, allotype, 2 ♂♂ and 1 ♀ paratypes in Transvaal Museum.

### *Pseudagrion makabusiensis* sp.n. (Figs. 11, 12)

INTRODUCTION. A rather dark species about the size of *salisburyense* and related to *melanicterum* Selys. Head and thorax blackish; narrow green ante-

humeral stripes. Pterostigma blackish. Abdomen mainly metallic green; 8-10, dark blue or violet blue. Superior appendages almost as long as 10, widely forked; toothed.

**DESCRIPTION.** Holotype and paratypes. Mature ♂ (Makakuzi R.). Labium and occiput whitish ochreous, the latter dusted with white pruinosity. Labrum, genae and epistome glossy bronze black; frons and vertex in front lilac brown; rest of head above dull black, with only very slight green sheen; postocular spots elongate oval, pale ochreous (bluish in life), connected to or separate from a narrow line across back of occipital plate. Prothorax black, with metallic green sheen; narrow greenish ochreous transverse line just behind the anterior margin, and two small lateral spots of this colour. Postnotal border slightly erect, scarcely trilobed.

Synthorax above bronze and greenish black; very narrow, straight, pale green (very pale pinkish ochreous in some pinned examples), antehumeral lines in lateral half of mesepisternum, these lines not quite reaching anterior border. Sides and ventrum mainly greenish yellow to ochreous, the mesepimeron, in dorsoanterior half, invaded by the greenish black of the dorsum and, at dorsal end of mesepimeron, this dark colour descends and travels halfway down first lateral suture; a broad black band on second lateral suture. Sides and ventrum coated with white pruinose.

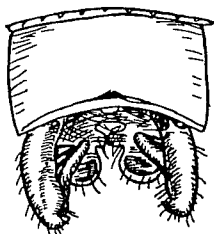
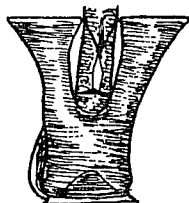


Fig. 11. *Pseudagrion makabusiensis* n.sp.  
Anal appendages of ♂, from above and from the left side.



Fig. 12. *Pseudagrion makabusiensis* n.sp.  
Penis, from below.



Legs black, lightly dusted with white. Wings hyaline pterostigma blackish brown to black.

Abdomen dorsally with a very broad black band with bright green or (more distally) bronze sheen on 1-7 (narrower on 2), this band severed on distal end of 1 and basal end of 2 by narrow pale ring, and almost severed at proximal end of 3-6 by narrow, pale, basal rings except for a very narrow dorsal continuation of the green band. 8-10 and distal end of 7, dark blue or violet-blue. Sides and ventrum green to ochreous, this pale colour broader on proximal than on distal segments, as the dorsal band extends farther down on posterior segments. 1, All round, 2 at sides and also, to a lesser extent 3, dusted lightly with white pruinosity.

Appendages blackish brown; superiors deeply and broadly forked at apex, the upper branch curled down; inferiors narrow (in side view) and directed obliquely upwards.

In side view rather like *angolense*; in dorsal view the superior appendage is seen to bear two teeth on inner margin, one of them very large.

**Variety A (Hunyani R).** Differs mainly on side of synthorax: black band on second lateral suture still broader; that on first lateral suture extends (as above) half-way along this suture and then curves down obliquely to meet the second suture slightly beyond its mid-point. Postocular spots slightly broader; not joined to line on occipital plate.

**Variety B. (♂ Goromonzi).** Differs from typical form as follows: labrum and epistome ferruginous; labrum with 3 small black basal dots; postclypeus with very narrow black basal line; genae, frons and front of vertex light ferruginous. Postocular spots not joined to occipital line. Pterostigma dark brown. The blue-violet areas on abdomen 7-10 are replaced by light ferruginous on 7-9; 10, all black.

This is possibly a rather younger stage, although fairly densely whitish on thorax and legs.

A teneral ♂ from Goromonzi is similar to this variety B, but with the face paler ferruginous; postocular spots bright blue. Antehumerals green; thorax whitish green at sides. Pterostigma olivaceous. The only ♀ I have seen is a very teneral example and not serviceable as an allotype.

**Teneral ♀ (Goromonzi).** Labium, occiput, face and frons pale ochreous; 3 dark brown spots at base of labrum (1 medial and 2 lateral); postclypeus with very broad dark brown basal band. Vertex black, very slightly greenish; postocular spots as in ♂; pale green; connected by occipital line. Prothorax greenish black above, with lateral ochreous spot and ochreous anterior transverse line; sides ochreous. Posterior lobe yellowish laterally; gently rounded, slightly raised. Stylets yellowish, about three times as long as broad. Synthorax marked as in typical ♂; the pale areas ochreous, the antehumeral line slightly broader than in ♂. Legs pale ochreous, with narrow dark exterior line on femora. Pterostigma pale greyish ochreous. Abdomen similar to ♂ but the dorsal green band continuous (except for pale basal rings) almost to end of 7; extreme distal end of 7, and 8-10, red on dorsum except for a narrow black terminal ring. Valves yellowish.

Abd. ♂ and ♀ 28-29.5; hw. 20. Abd./hw. ratio (♂) 1.5.

**DISTRIBUTION.** Southern Rhodesia. Transvaal Museum Collection: Salisbury (Makabusi R., near Hunyani R.) and Goromonzi, December 1947-January 1948 (Pinhey).

**REMARKS.** Found very locally on rushes or grasses in very sluggish parts of streams. The ♀ requires description from a mature specimen.

**MATERIAL.** Holotype ♂ and 6 paratype ♂♂ in Transvaal Museum.

### *Pseudagrion nigerrimum* n.sp. (Figs. 13-17)

**INTRODUCTION.** The ♂ is readily distinguished from other *Pseudagrion* by the very black colouring all over its body and, in life, having the lower half of the eye bright red. The ♀ is rather like a large specimen of ♀ *nubicum* or *assegaii*; orange-brown, with rather brassy sheen in the less mature examples; stylets reduced to mere lumps on the postnotal margin.

**DESCRIPTION.** Holotype mature ♂ (Shawanoya). Head, thorax and most of abdomen above black, the latter with metallic sheens. Occiput and genae very glossy black in front, the occiput ventrally pale ochreous dusted with white. Eyes in life black above, scarlet in ventral half. Labium brownish ochreous to ferruginous, dusted with white. Thorax with rather long hair. Posterior margin of prothorax almost straight, somewhat erect, curved laterally. The black of the dorsum spreads down the sides to about first lateral suture, except at dorsal end of mesepimeron which is olive or olivaceous; a broad black band in upper half of first lateral suture below this olive area. Rest of sides pale olivaceous with continuous black line on second lateral suture. Metepimeron, ventrum of thorax, sides of prothorax, interalar spaces and wing origins coated with dense whitish pruinosity. Legs black, femora dusted with white pruinosity. Anal vein rises well proximal to Ac, by more than the length of Ac. Pterostigma dark grey, between black veins.

Abdomen 1-2, black; 1 and dorsum of 2 at base, dusted with white pruinosity;

rest of 2, metallic green above except for a narrow yellow annulus at distal end, which is divided mid-dorsally by the metallic green. 3-6, with very broad, black, dorsal band, reflecting metallic green; this band almost severed at proximal ends by a pale green ring (incomplete mid-dorsally), at distal end spreading down sides except for a small lateral distal yellowish spot on 3-5; a black terminal ring; rest of sides of 3-6, yellow green to pale olivaceous. 7, wholly black, except for a rather paler lateral spot at proximal end. 8, light blue in basal  $\frac{2}{3}$ ; 9, in basal half; the rest of 8-10, black. Anal appendages olive brown, black at tips; superiors very short.

Accessory genitalia: penis (Fig. 16).

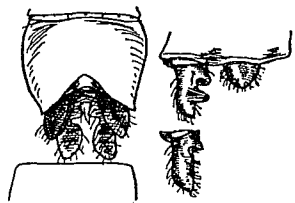


Fig. 13. *Pseudagrion nigerrimum* n.sp. Anal appendages of ♂, from above and left side, and superior appendage in side view.

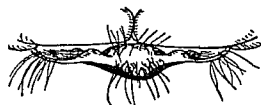


Fig. 14. *Pseudagrion nigerrimum* n.sp. Hindlobe of prothorax, ♀.

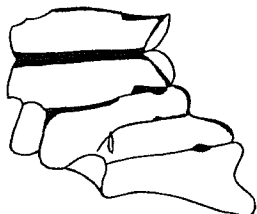


Fig. 15. *Pseudagrion nigerrimum* n.sp. Thoracic pattern of ♀.

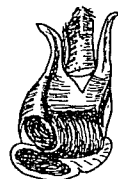


Fig. 16. *Pseudagrion nigerrimum* n.sp. Penis from below.



Fig. 17. *Pseudagrion nigerrimum* n.sp. Abdomen 1 to 3 of ♀.

*Paratypes.* In another specimen (Umtali) the sides of the thorax and abdomen are darker, almost ferruginous. The wings are rather smoky, the pterostigma blackish grey. In another still older specimen, all the pale markings are still darker, the white pruinosity more extensive on sides of thorax; the wings are still more smoky, and the pterostigma black.

Non-pruinose ♂ (Salisbury). Almost as black as the mature specimens; thorax at humeral angles slightly glossy, at sides pale greenish, becoming pinkish more ventrally; pale parts of abdomen pinkish ochreous or pinkish brown. Pruinosity starts at leg bases, ventrum of thorax and between the wings.

*Allotype* ♀ (Shawanoya). Pale brownish (greener in life). Labium and occiput pale ochreous or pale orange, the latter lightly dusted with whitish. Labrum, anteclypeus and genae pale orange, pale orange ochreous or pinkish ochreous; labrum with minute black dot in centre at base; postclypeus, frons and vertex to a level of lateral ocelli ochreous brown; a black spot on either side of anterior ocellus: just behind this a narrow black transverse line runs across the head,

starting at base of each eye it runs in towards lateral ocellus, turns back a little and continues behind these ocelli. This black line forms an anterior edge to a rather large postocular green (olive) spot, behind its posterior border a black elongate spot or fine line; the spot may be slightly invaded with pale orange of the occiput. A very short black line marks the lateral boundary of the occipital plate. Prothorax orange brown, with very narrow black posterior transverse line; a black spot on mesonotum in front of the lateral lobes; posterior margin trilobed, erect; stylets vestigial, mere swellings on this margin.

Synthorax above and on mesepimeron yellow brown with slight brassy sheen. A narrow black median dorsal band, and a narrow black band on humeral suture, which contracts and then expands again at dorsal end in an irregular manner. Sides yellowish green to pale green; a narrow short dark brown line in upper  $\frac{1}{3}$  of first lateral suture; a dark brown spot at upper end of second lateral suture. Ventrums ochreous, slightly touched here and there with white pruinosity. Legs ochreous; femora with short black exterior line in distal half. Pterostigma greyish ochreous between black veins. Wings hyaline.

Abdomen orange to ochreous brown (more greenish in life); dorsally with a discontinuous blackish band reflecting green: on 1 a large divided basal spot and a short narrow transverse distal line; on 2 a fairly broad band widening to a triangle at  $\frac{3}{4}$ , then more narrowly connected to a black terminal ring. 3-7, similar but the band almost severed at proximal end, and at distal end the triangle becomes progressively a circular spot; 8, with broad band scarcely tapering at either end; 9, with broad band tapering to distal end; 10, with very narrow mid-dorsal line. Cerci short, ochreous. Valves long, ochreous.

*Paratype.* In an old ♀ (Umtali) there is a strong contrast on the head between the pale orange labrum, etc. and the rest, which is ferruginous with the markings almost obliterated. Synthorax darker above. Thorax and abdomen ventrally, and 1 above, lightly dusted with white pruinosity. Dorsal band on abdomen blacker without the green sheen. Wings very faintly greenish.

Abd. ♂ 29-33, ♀ 29-31; hw. ♂ 21-23, ♀ 23-24. Abd./hw. ratio (♂) about 1.4.

**DISTRIBUTION.** Southern Rhodesia—Portuguese East Africa. Transvaal Museum Collection (Coll. Pinhey): Inyagui R., Salisbury, June 1947; near Shawanoya-Mtoko Rd., Salisbury, December 1947; Dora R., Umtali, February 1948 (long series).

Other localities where it has been found: Sebungwe Dist. and Chirundu Bridge (Whellan); Odzi R. (Pinhey); Mavita, October 1947 (Portuguese East Africa) (Pinhey).

**REMARKS.** Widespread but only common in certain localities. It likes to settle on rushes and grasses at the edges of rivers, streams or small pools, and flies actively, low down over the surface of the water as in the case of *massaicum*.

**MATERIAL.** In Transvaal Museum: holotype ♂ and allotype ♀ in copula, Mtoko Rd., 30 miles from Salisbury, 28 December 1947; 1 paratype ♂ and 1 paratype ♀ in cop. and 7 ♂♂ paratypes all from Dora R. (? Park R.), Umtali, 11 February 1948; 1 ♂ from Inyagui R., Mtoko Rd., 1 June 1947 (all collected by Pinhey).

### *Enallagma sapphirina* n.sp. (Figs. 18-22)

**INTRODUCTION.** In life this small species is noticeable by its brilliant deep cobalt or sapphire blue colour: The abdomen is much bluer than other local species; the superior anal appendages are short and blunt, with ventral spine; inferiors extend back in a point directed horizontally backwards considerably beyond the superiors.

**DESCRIPTION.** Holotype. Mature ♂. In life all the blue and whitish colours of

the dorsum of head, thorax and abdomen are very deep cobalt or sapphire blue; ventrum paler. The eye is deep cobalt with a small black cap.

After death: labium whitish. Occiput whitish below, dusted with white pruinosity; laterally olive green. Labrum and genae violet blue. Epistome and frons olive green; postclypeus with a broad or very broad black basal band tending to be trilobed (holotype) but variable (paratypes). Vertex broadly black; this black extending narrowly round the lateral edge of the very large oval green postocular spots; these spots only partly edged behind by a short black arc on the yellowish occiput; postocular spots joined by a yellow green line on back of occipital plate. In another specimen (paratype) these spots are more yellow and elongate, bordered more completely posteriorly by a black arc.

Prothorax black above with whitish blue markings; at sides pale olive. The bluish dorsal markings are a pale anterior transverse ring broken mid-dorsally, the posterior edge extremely narrowly whitish, a dorsolateral and three very small mid-dorsal marks—a twin pair of central spots and a short posterior median line-ending on posterior margin. Hindlobe broad, very gently curved.

Synthorax very pale or whitish coeruleous, stained laterally somewhat with violet; mid-dorsally a broad black band with green sheen covering half of each mesepisternum, but with a narrow white line on lower half of median carina and two small white spots at its ventral end. Antealar sinuses green-black framed in front with whitish; a rather narrow green-black line on humeral suture and continuing along the top of the mesinfraepisternum; a black spot at dorsal end of second lateral suture. White pruinosity on lower sides and ventrum of thorax, coxae, femora, abdomen 1 at base, and more thinly on ventrum of 9-10. Legs ochreous; femora with broad, tibiae with narrower blackish ferruginous incomplete streaks on outer surface. Ac. midway (holotype) between 1st and 2nd ax. or slightly nearer 1st ax. Pterostigma whitish ochreous, darker centrally; between brown veins.

Abdomen skyblue on 1-4 or 5; the rest more violet or reddish tinged; with black discontinuous dorsal band, with green sheen, as follows: on 1 a broad almost continuous band but deeply excised before the end, with a narrow blue distal ring; 2, with continuous irregular band, broad at base and just beyond half-way, then very deeply and broadly excised before a terminal black ring; 3-4, with broad distal patch tapering forwards very narrowly (or widely broken) towards a very small spot at proximal end; 5-6, with a very broad dorsal band but tapering well before proximal end; 7, with complete broad band except for a narrow incomplete proximal ring; 8-9 and extreme distal end of 7, blue; 10, broadly greenish black on dorsum. Anal appendages brownish; superiors short and blunt, with dense terminal tuft of long white hair, and with a ventral spine; inferior extending considerably farther as a horizontal pointed projection.

In a paratype ♂ the dark dorsal markings on 3-4 are much more reduced, forming terminal spots.

In a further specimen the blue colouring, especially on the thorax, has been replaced largely by ferruginous. It is a slightly immature specimen and shows less pruinosity.

Accessory genitalia: penis (Fig. 21).

*Allotype* ♀. Here again the pale colouring in life was deep cobalt, but more whitish yellow on abdomen 1-6. After death: paler and duller than ♂, but the markings very similar, the differences being as follows: face more ochreous, postclypeus ferruginous (with black as in ♂); small black basal dot on labrum; short black basal bar on frons.

Prothorax with pale colours, orange brown or light ferruginous, at sides more extensively than in ♂; posterior lobe very similar, with a small whitish central spot bearing long white hair. Synthorax more light ferruginous above, violet or violet blue at sides; the pale median line complete; the black humeral line incomplete

and reduced to a short narrow line at dorsal end, and another in ventral half, and only faintly indicated over the mesinfraepisternum. White frosting as in ♂. Wings narrow. Pterostigma whitish ochreous, elongate. Ac. slightly nearer 1st than 2nd ax.

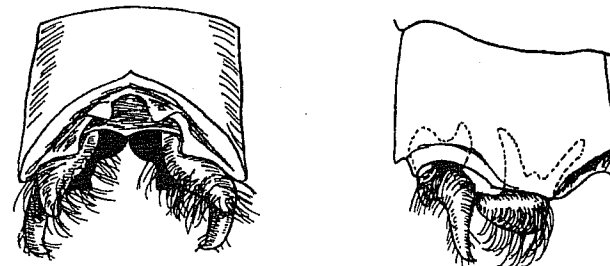


Fig. 18. *Enallagma sapphirina* n.sp. Anal appendages of ♂, from above and left side.

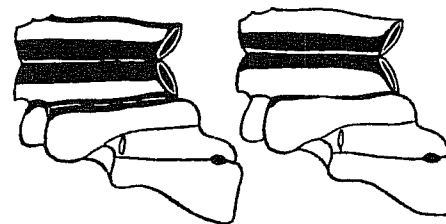


Fig. 19. *Enallagma sapphirina* n.sp. Thoracic pattern of ♂ and ♀ respectively.

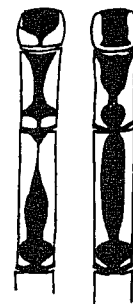


Fig. 20. *Enallagma sapphirina* n.sp. Abdomen 1 to 3 of ♂ and ♀ respectively.



Fig. 21. *Enallagma sapphirina* n.sp. Penis from below.

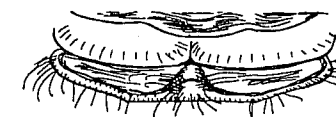


Fig. 22. *Enallagma sapphirina* n.sp. Hindlobe of prothorax ♀.

Abdomen blue and violet, with broad black band having a green sheen, almost continuous: 1, with uniform band except narrow blue terminal ring; on 2, starting at proximal end, in 3 points (shallowly trident-shaped), with usual broad spot shortly before distal end; 3-7, with continuous broad band, slightly tapering at anterior end and expanded before distal ends; 8, with broad dark band, except for a very narrow pink terminal ring, broken dorso-laterally; 9, with complete band. Segment 10 extremely short, with a dark dorsal band; cerci short, brown; a long terminal spine on 10th sternite; valves reaching end of abdomen.

Abd. ♂ 19.5–20, ♀ 20–21; hw. ♂ 14–15, ♀ 15–16. Abd./hw. ratio (♂) about 1.4.  
 DISTRIBUTION. Transvaal; Natal. Transvaal Museum Collection: Sterkfontein, October 1948–January 1949 (Pinhey). Others taken on streams nearer Pretoria West, February 1949.

Dr Newton has found it recently in Zululand, at Halodu, 26 November 1948.

REMARKS. Flying in some numbers over small streams. Their deep cobalt or sapphire colouring was very striking. The ♀ oviposits amongst floating leaves of water plants.

MATERIAL. (All from Sterkfontein): holotype, allotype ♀, 14 ♂♂ paratypes, 4 ♀♀ paratypes in Transvaal Museum. Paratypes sent away: 2 ♂♂, 1 ♀ to the British Museum; 2 ♂♂ to the National Museum, Bulawayo; 2 ♂♂ to the Division of Entomology, Salisbury, Southern Rhodesia.

### *Chlorocypha fitzsimonsi* n.sp. (Figs. 23–25)

INTRODUCTION. Male slightly larger than *caligata*, but with the same expanded, red and white tibiae; abdomen, at least the first six segments red above, with reduced black markings. I take pleasure in naming this species after Dr V. Fitz-Simons, Director of the Transvaal Museum.



Fig. 23. *Chlorocypha fitzsimonsi* n.sp. Anal appendages of ♂ from left side.

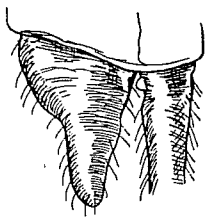


Fig. 24. *Chlorocypha fitzsimonsi* n.sp. Penis from below.



Fig. 25. *Chlorocypha fitzsimonsi* n.sp. Abdomen 1 to 3 of ♂.

DESCRIPTION. Holotype male. A rather more robust insect than *caligata*. Head and face above black, with three orange marks on vertex, the middle one U-shaped. Prothorax and synthorax reddish orange, marked with black as in *caligata*. Legs similar to the latter species, tibiae flattened, red and yellowish white. Wings hyaline, yellow at base, with black pterostigma. Abdomen 1–6 red above (remaining segments discoloured, but perhaps blue?); black markings reduced to a discontinuous narrow black median line with a small spot on each side of this line in distal half; on 2 this black T-shaped; short black lateral line on 1–2. Anal appendages black. Inferiors conical. Penis very like *caligata*.

♂ Abd. 22, hw. 24, pt. 2 mm. Abd./hw. ratio (♂) 0.9.

DISTRIBUTION. 1 ♂ in Transvaal Museum taken in south Natal, Umzimkulu Valley, near Paddock, 28 December 1948 (V. Fitz-Simons).

REMARKS. Holotype ♂ in Transvaal Museum. Captured among a few *C. caligata*.

### *Paragomphus sabicus* n.sp. (Figs. 26–30)

Thoracic pattern (Fig. 26); anal append. and acc. genit. ♂ (Figs. 27 and 29); append. (Fig. 28).

INTRODUCTION. Much larger than *cognatus*; face yellower; green markings on mesepisternum more cuneiform. Abdomen 8–9, ferruginous, with large leaflets.

Superior appendages long, narrow, with acute apices; inferiors upturned, somewhat dilated apically. This species agrees closely in genitalial features and foliations with *acuminatus* (Fraser, MS.), but the thoracic pattern is markedly different, more like *cognatus*.

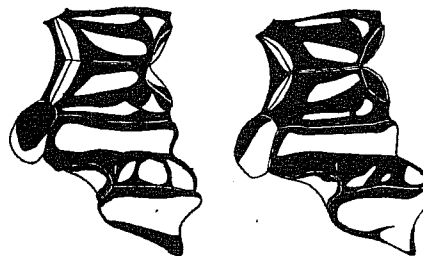


Fig. 26. *Paragomphus sabicus* n.sp. Thoracic patterns.

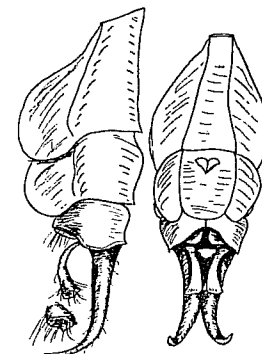


Fig. 27. *Paragomphus sabicus* n.sp. Anal appendages of ♂, from left side and below.

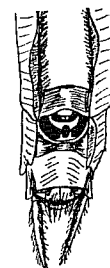


Fig. 28. *Paragomphus sabicus* n.sp. Terminal segments of abdomen of ♀, from below.

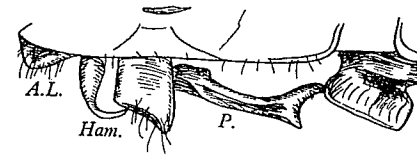


Fig. 29. *Paragomphus sabicus* n.sp. Accessory genitalia of ♂, from left side (A.L. = ant. lamina, Ham. = hamules, P. = penis).



Fig. 30. *Paragomphus sabicus* n.sp. Penis.

DESCRIPTION. Holotype adult ♂. Differs from *cognatus* as follows: face bright yellow to chrome yellow, with or without faint greenish tinge. Vertex black; postocellar bar ferruginous; occipital plate yellowish. Prothorax black. Synthorax as in *cognatus* but central stripe of mesepisternum cuneiform.

Forefemora entirely yellow; foretibiae yellowish with black line. Remainder of legs ferruginous to black, tibiofemoral joint with yellow spot. Wings and pterostigma as in *cognatus*; membrane with tendency to becoming faintly greenish with age.

Abdomen marked very much as in *cognatus*, but distal end of 7 and whole of 8–9 ferruginous; foliations large; ferruginous with broad black border; 10, orange with ferruginous basal line, and a dorso-lateral dark spot. Appendages orange-

brown at apex; superiors long and fine to apex, slightly divergent; inferior appendages with single upward curve, slightly dilated distally.

Accessory genitalia: see Fig 29.

Allotype ♀. Very similar to ♂; abdomen slightly wider, at base considerably so; foliations on 8-9 shorter and all black; 8-9, ferruginous at sides, black dorsally; 10 and appendages, yellower than in ♂. Cerci long.

Abd. ♂ 36, ♀ 36-38; hw. ♂ and ♀ 29-32. Pt. 3.5 mm. Abd./hw. ratio (♂) about 1.2.

DISTRIBUTION. Southern Rhodesia (Fraser's *acuminatus* is from Belgian Congo). Transvaal Museum Collection: Southern Rhodesia: 1 ♂, 3 ♀♀, Birch-enough Bridge, January 1938 (G. van Son).

REMARKS. These few specimens were taken in the Sabi Valley, hence the name.

MATERIAL. In Transvaal Museum: holotype ♂, allotype ♀, 1 paratype ♀.

## THE TENEBRIONIDAE OF SOUTHERN AFRICA

### I. FIRST ACCOUNT OF THE TENEBRIONIDAE COLLECTED ON THE UNIVERSITY OF CALIFORNIA-TRANSSVAAL MUSEUM EXPEDITION, 1948

BY C. KOCH, F.R.E.S.

*Department of Entomology, Transvaal Museum*

(With 18 Plates)

THE entomological phase of the University of California-Transvaal Museum Expedition was initiated by Dr V. F. FitzSimons, Director of the Transvaal Museum, Prof. Dr Chas. L. Camp, Director of the Museum of Paleontology of the University of California and Mr Wendell Phillips, leader of the Expedition. I am much indebted to the South African Council for Scientific and Industrial Research for financial aid, in the form of a bursary which, together with the full co-operation extended by the Transvaal Museum, has enabled me to study the material and to publish the scientific results.

Two trips have been undertaken:

(1) To Southern Angola—May to August 1948. Team: Mrs Ella-Marie Loeb, Dr E. Loeb, Mr Boris Ifund, all from Berkeley; Mr E. Williams from the Medical School of the University of Witwatersrand, Johannesburg, and the author. Itinerary: across the Southern Kalahari (Kuruman River, Rietfontein, Keetmanshoop) to South-West Africa; from Windhoek through the Kaokoveld of Franzfontein and across the Etosha Pan to Ovamboland and Southern Angola, as far as the Kunene Falls. On the return journey, the Kuruman River route was reached by travelling along the Auob River.

(2) To the 'Sperrgebiet' of the Southern Namib—October to December 1948. Team: Dr van Son, entomologist to the Transvaal Museum, and the author. Itinerary: through the Orange Free State and across the Great Karroo (Kendrew, Klipplaat, Willowmore, Prince Albert) to the South-Western Cape Province (Calitzdorp, Barrydale, Montagu, Cape Town, Piquetberg, Elands Bay, Graafwater, Clanwilliam); across Little Namaqualand (Klaver, Garies, Hondeklip Bay, Soebatsfontein, Springbok, Grootmist, Port Nolloth, Holgat) to the mouth of the Orange River (Alexander Bay, Grootderm). With the assistance of the staff of the Consolidated Diamond Mines of South-West Africa, the fauna of the Southern Namib between Oranjemund and Luederitzbucht was thoroughly examined at Chameis, Bogenfels and Pomona. On our return we passed through the northern Bushmanland (Aggeneys, Pofadder, Kakamas) and the Gordonia district (Upington and Oliphants Hoek).

A truck was loaned to the expedition by General Motors South African Ltd., petrol was supplied by the Shell Company of South Africa Ltd., food by Dr Herbert Lang, Pretoria, and two drinking water tanks by Dr Alexander Jokl, Johannesburg.